



Vincotech

10-PY124PA040SH-L588F48Y

datasheet

fastPACK 1

1200 V / 40 A

Features

- High speed IGBT
- Fast, soft reverse Diode
- Open emitter topology
- Integrated thermistor

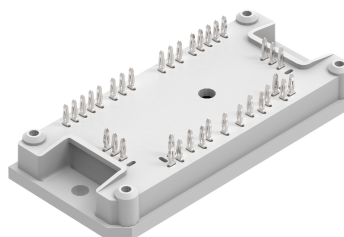
Target applications

- Charging Stations
- Power Supply
- Solar Inverters
- Welding & Cutting

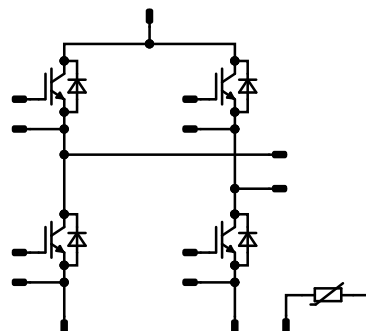
Types

- 10-PY124PA040SH-L588F48Y

flow 1 12 mm housing



Schematic





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10-PY124PA040SH-L588F48Y
datasheet

Maximum Ratings

$T_j = 25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Conditions | Value | Unit |
|-----------------------------------|------------|--|-------|------|
| H-Bridge Switch | | | | |
| Collector-emitter voltage | V_{CES} | | 1200 | V |
| Collector current (DC current) | I_C | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 44 | A |
| Repetitive peak collector current | I_{CRM} | t_p limited by T_{jmax} | 120 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 115 | W |
| Gate-emitter voltage | V_{GES} | | ±20 | V |
| Short circuit ratings | t_{SC} | $V_{GE} = 15\text{ V}$, $V_{CC} = 800\text{ V}$ $T_j = 150\text{ °C}$ | 10 | µs |
| Maximum junction temperature | T_{jmax} | | 175 | °C |

H-Bridge Diode

| | | | | |
|--|------------|--|------|-----|
| Peak repetitive reverse voltage | V_{RRM} | | 1200 | V |
| Forward current (DC current) | I_F | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 25 | A |
| Surge (non-repetitive) forward current | I_{FSM} | Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$ | 100 | A |
| Surge current capability | I^2t | | 50 | A²s |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 61 | W |
| Maximum junction temperature | T_{jmax} | | 175 | °C |

Module Properties

Thermal Properties

| | | | | |
|---|-----------|--|----------------------------|----|
| Storage temperature | T_{stg} | | -40...+125 | °C |
| Operation temperature under switching condition | T_{jop} | | -40...+($T_{jmax} - 25$) | °C |

Isolation Properties

| | | | | |
|----------------------------|------------|-------------------------------------|-------|----|
| Isolation voltage | V_{isol} | DC Test Voltage* $t_p = 2\text{ s}$ | 6000 | V |
| Isolation voltage | V_{isol} | AC Voltage $t_p = 1\text{ min}$ | 2500 | V |
| Creepage distance | | | >12,7 | mm |
| Clearance | | | 7,92 | mm |
| Comparative Tracking Index | CTI | | ≥ 200 | |

*100 % tested in production



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Characteristic Values

| Parameter | Symbol | Conditions | | | | | Values | | | Unit |
|-----------|--------|------------|------------------------------|---|-------------------------------------|------------|--------|-----|-----|------|
| | | | V_{GE} [V] V_{GS} [V] | V_{CE} [V] V_{DS} [V] V_F [V] | I_C [A] I_D [A] I_F [A] | T_j [°C] | Min | Typ | Max | |

H-Bridge Switch

Static

| | | | | | | | | | | |
|--------------------------------------|---------------|--------------------------|----|------|--------|------------------|------|----------------------|---------------------|----|
| Gate-emitter threshold voltage | $V_{GE(th)}$ | $V_{CE} = V_{GE}$ | | | 0,0015 | 25 | 5,3 | 5,8 | 6,3 | V |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | | 15 | | 40 | 25 125 150 | 1,78 | 1,99 2,33 2,41 | 2,42 ⁽¹⁾ | V |
| Collector-emitter cut-off current | I_{CES} | | 0 | 1200 | | 25 | | | 5 | μA |
| Gate-emitter leakage current | I_{GES} | | 20 | 0 | | 25 | | | 120 | nA |
| Internal gate resistance | r_g | | | | | | | None | | Ω |
| Input capacitance | C_{ies} | $f = 1 \text{ Mhz}$ | 0 | 25 | | 25 | | 2330 | | pF |
| Output capacitance | C_{oes} | | | | | | | 150 | | pF |
| Reverse transfer capacitance | C_{res} | | | | | | | 130 | | pF |
| Gate charge | Q_g | $V_{CC} = 960 \text{ V}$ | 15 | | 40 | 25 | | 185 | | nC |

Thermal

| | | | | | | | | | | |
|--|---------------|---|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink ⁽²⁾ | $R_{th(j-s)}$ | $\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX) | | | | | | 0,83 | | K/W |
|--|---------------|---|--|--|--|--|--|------|--|-----|

Dynamic

| | | | | | | | | | | |
|-----------------------------|--------------|--|----------|-----|----|------------------|--|-------------------------|--|-----|
| Turn-on delay time | $t_{d(on)}$ | $R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$ | ± 15 | 600 | 40 | 25 125 150 | | 63,6 65 66 | | ns |
| Rise time | t_r | | | | | 25 125 150 | | 15,4 18,6 18 | | ns |
| Turn-off delay time | $t_{d(off)}$ | | | | | 25 125 150 | | 162,4 215,8 229,6 | | ns |
| Fall time | t_f | | | | | 25 125 150 | | 26,3 62,8 70,15 | | ns |
| Turn-on energy (per pulse) | E_{on} | $Q_{tFWD}=2,7 \mu C$ $Q_{tFWD}=4,78 \mu C$ $Q_{tFWD}=5,82 \mu C$ | | | | 25 125 150 | | 1,54 2,19 2,41 | | mWs |
| Turn-off energy (per pulse) | E_{off} | | | | | 25 125 150 | | 1,32 2,29 2,53 | | mWs |



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Characteristic Values

| Parameter | Symbol | Conditions | | | | | | Values | | | Unit |
|-----------|--------|------------|------------------------------|---|-------------------------------------|------------|--|--------|-----|-----|------|
| | | | V_{GE} [V] V_{GS} [V] | V_{CE} [V] V_{DS} [V] V_F [V] | I_C [A] I_D [A] I_F [A] | T_j [°C] | | Min | Typ | Max | |

H-Bridge Diode

Static

| | | | | | | | | | | |
|-------------------------|-------|----------------|--|--|----|------------------|--|----------------------|--|----|
| Forward voltage | V_F | | | | 25 | 25 125 150 | | 2,27 2,44 2,36 | 2,74 ⁽¹⁾ 2,79 ⁽¹⁾ | V |
| Reverse leakage current | I_R | $V_i = 1200$ V | | | | 25 150 | | 1600 | 60 3300 | µA |

Thermal

| | | | | | | | | | | |
|--|---------------|---------------------------------------|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink ⁽²⁾ | $R_{th(j-s)}$ | $\lambda_{paste} = 3,4$ W/mK (PSX) | | | | | | 1,56 | | K/W |
|--|---------------|---------------------------------------|--|--|--|--|--|------|--|-----|

Dynamic

| | | | | | | | | | | |
|---------------------------------------|----------------------|---|----------|-----|----|------------------|--|----------------------------|--|------|
| Peak recovery current | I_{RRM} | $di/dt=3019$ A/µs $di/dt=3104$ A/µs $di/dt=2972$ A/µs | ± 15 | 600 | 40 | 25 125 150 | | 48,06 54,99 60,27 | | A |
| Reverse recovery time | t_{rr} | | | | | 25 125 150 | | 101,42 221,81 250,67 | | ns |
| Recovered charge | Q_r | | | | | 25 125 150 | | 2,7 4,78 5,82 | | µC |
| Reverse recovered energy | E_{rec} | | | | | 25 125 150 | | 1,13 2,11 2,6 | | mWs |
| Peak rate of fall of recovery current | $(di_{rr}/dt)_{max}$ | | | | | 25 125 150 | | 3780 2583 2658 | | A/µs |



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Characteristic Values

| Parameter | Symbol | Conditions | | | | | Values | | | Unit |
|-----------|--------|------------|------------------------------|---|-------------------------------------|------------|--------|-----|-----|------|
| | | | V_{GE} [V] V_{GS} [V] | V_{CE} [V] V_{DS} [V] V_F [V] | I_C [A] I_D [A] I_F [A] | T_j [°C] | Min | Typ | Max | |

Thermistor

Static

| | | | | | | | | | | |
|--------------------------------|----------------|-------------------------|--|--|--|-----|----|------|---|------|
| Rated resistance | R | | | | | 25 | | 22 | | kΩ |
| Deviation of R_{100} | $\Delta_{R/R}$ | $R_{100} = 1484 \Omega$ | | | | 100 | -5 | | 5 | % |
| Power dissipation | P | | | | | | | 5 | | mW |
| Power dissipation constant | d | | | | | 25 | | 1,5 | | mW/K |
| B-value | $B_{(25/50)}$ | Tol. $\pm 1 \%$ | | | | | | 3962 | | K |
| B-value | $B_{(25/100)}$ | Tol. $\pm 1 \%$ | | | | | | 4000 | | K |
| Vincotech Thermistor Reference | | | | | | | | | I | |

⁽¹⁾ Value at chip level

⁽²⁾ Only valid with pre-applied Vincotech thermal interface material.



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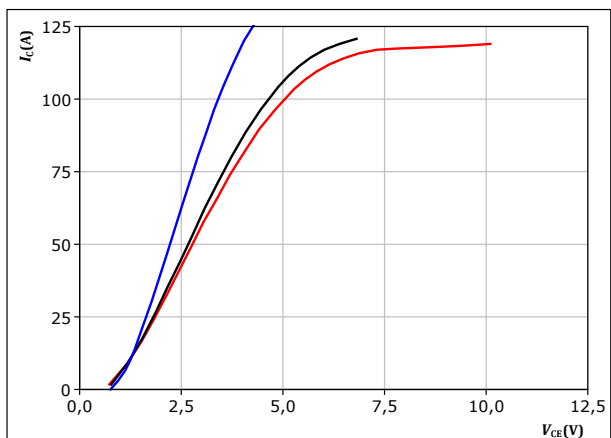
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datasheet

H-Bridge Switch Characteristics

figure 1. IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$

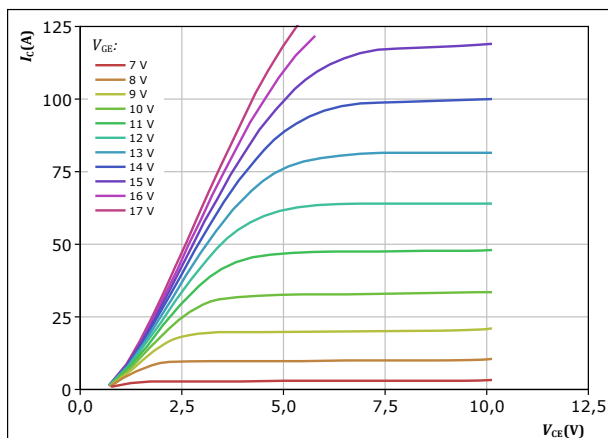


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j:$ 25 °C, 125 °C, 150 °C

figure 2. IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$

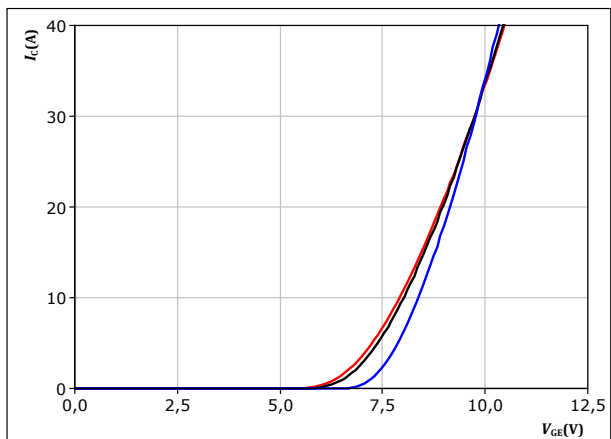


$t_p = 250 \mu s$
 $T_j = 150 \text{ °C}$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

$$I_C = f(V_{GE})$$

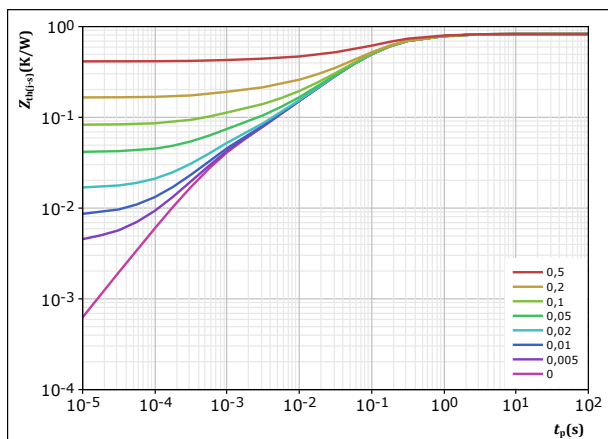


$t_p = 250 \mu s$
 $V_{CE} = 10 V$
 $T_j:$ 25 °C, 125 °C, 150 °C

figure 4. IGBT

Transient thermal impedance as a function of pulse width

$$Z_{th(j-s)} = f(t_p)$$



$D = t_p / T = 0.828 \text{ K/W}$
IGBT thermal model values

| R (K/W) | τ (s) |
|-----------|------------|
| 1,17E-01 | 9,80E-01 |
| 3,36E-01 | 1,61E-01 |
| 2,55E-01 | 5,83E-02 |
| 8,38E-02 | 9,69E-03 |
| 3,62E-02 | 7,58E-04 |



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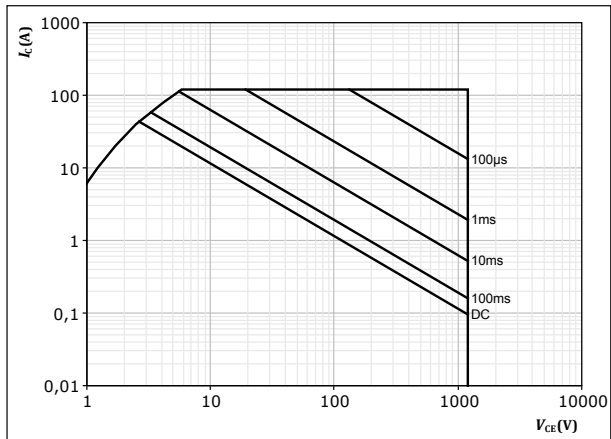
H-Bridge Switch Characteristics

figure 5.

IGBT

Safe operating area

$I_C = f(V_{CE})$



$D = \text{single pulse}$

$T_s = 80 \text{ } ^\circ\text{C}$

$V_{GE} = 15 \text{ V}$

$T_j = T_{jmax}$



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H-Bridge Diode Characteristics

figure 6.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

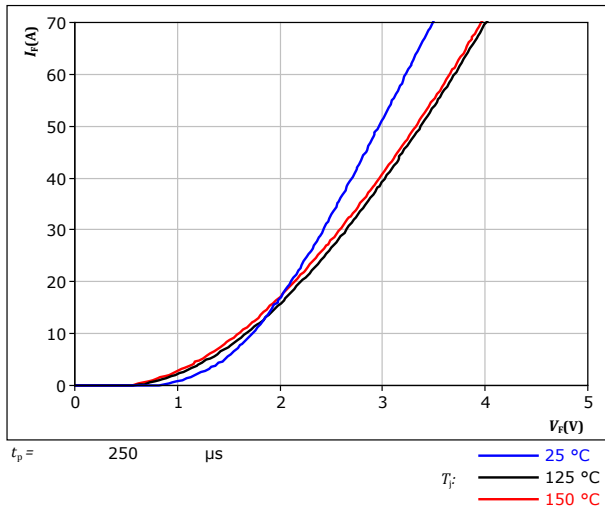
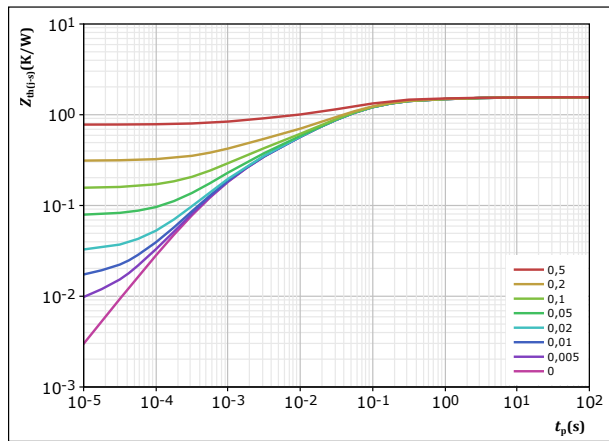


figure 7.

FWD

Transient thermal impedance as a function of pulse width

$$Z_{th(j-s)} = f(t_p)$$



| | |
|--------------------------|------------|
| $D =$ | t_p / T |
| $R_{th(j-s)} =$ | 1,556 K/W |
| FWD thermal model values | |
| R (K/W) | τ (s) |
| 4,65E-02 | 4,86E+00 |
| 1,06E-01 | 8,11E-01 |
| 4,71E-01 | 1,09E-01 |
| 4,83E-01 | 3,07E-02 |
| 2,34E-01 | 7,03E-03 |
| 1,81E-01 | 1,25E-03 |
| 3,38E-02 | 3,28E-04 |



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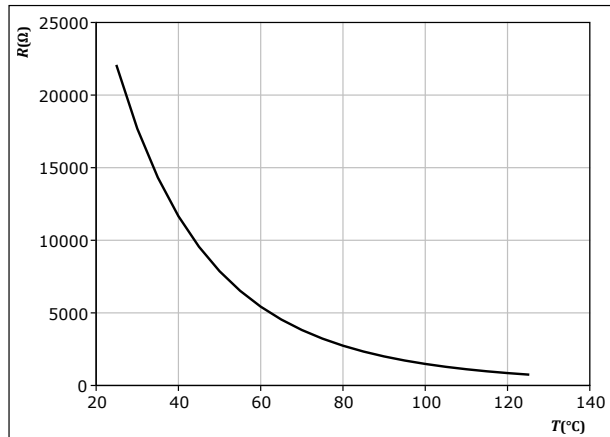
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Thermistor Characteristics

figure 8. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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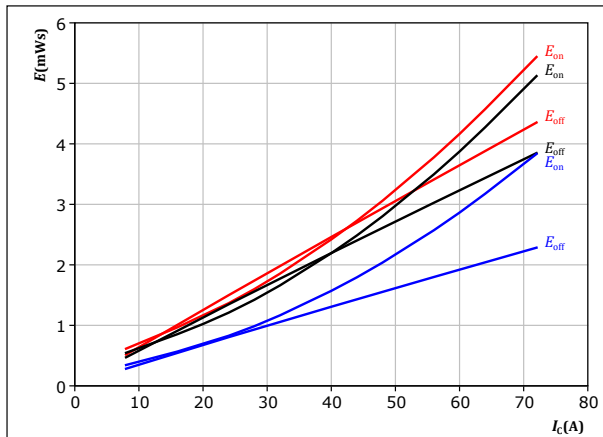
H-Bridge Switching Characteristics

figure 9.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_c)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω
 $R_{goff} = 8$ Ω

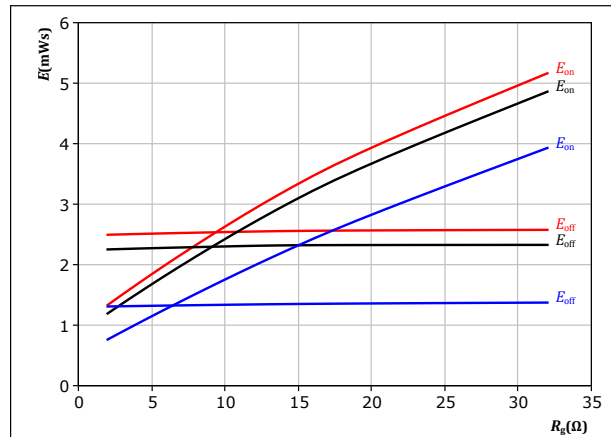
T_j : 25 °C
125 °C
150 °C

figure 10.

IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 40$ A

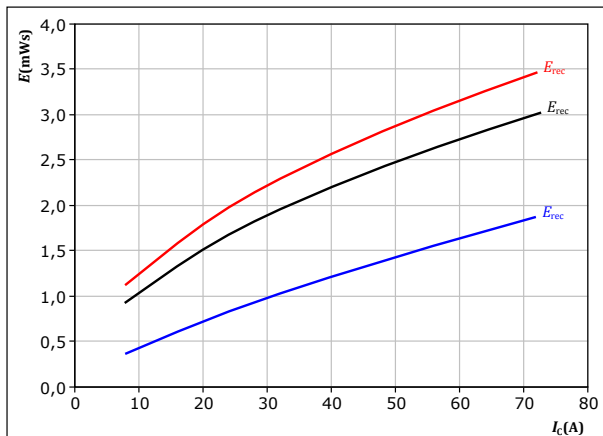
T_j : 25 °C
125 °C
150 °C

figure 11.

FWD

Typical reverse recovered energy loss as a function of collector current

$$E_{rec} = f(I_c)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

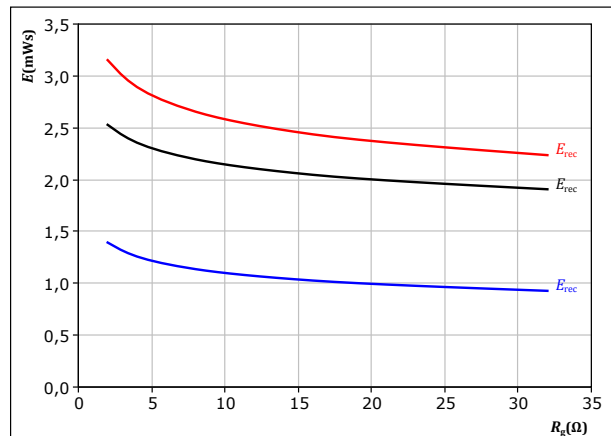
T_j : 25 °C
125 °C
150 °C

figure 12.

FWD

Typical reverse recovered energy loss as a function of gate resistor

$$E_{rec} = f(R_g)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 40$ A

T_j : 25 °C
125 °C
150 °C



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H-Bridge Switching Characteristics

figure 13.

IGBT

Typical switching times as a function of collector current
 $t = f(I_C)$

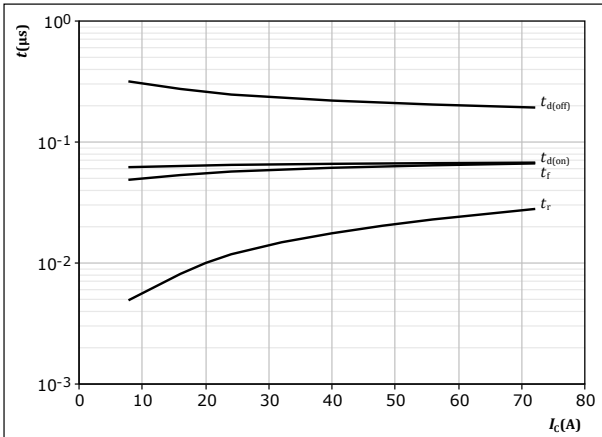


figure 14.

IGBT

Typical switching times as a function of gate resistor
 $t = f(R_g)$

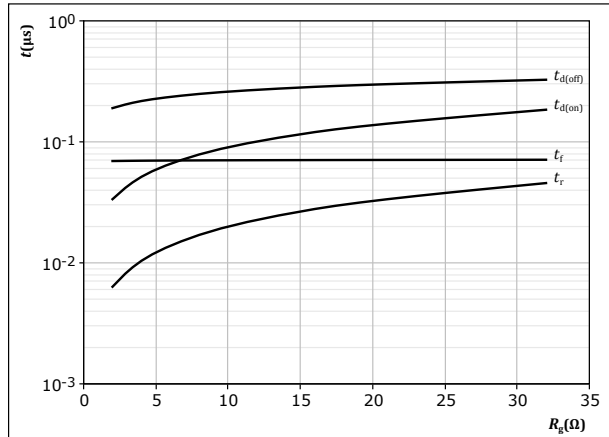


figure 15.

FWD

Typical reverse recovery time as a function of collector current
 $t_{rr} = f(I_C)$

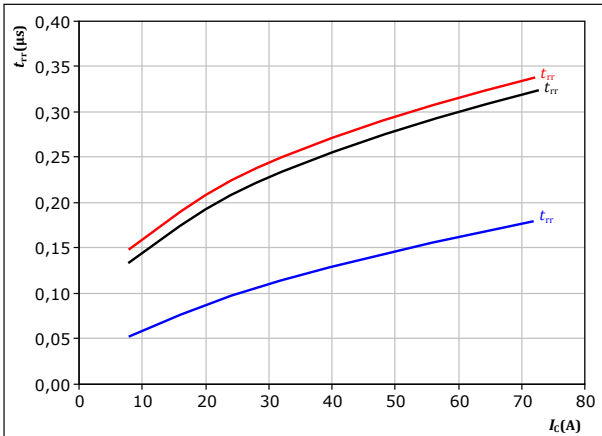
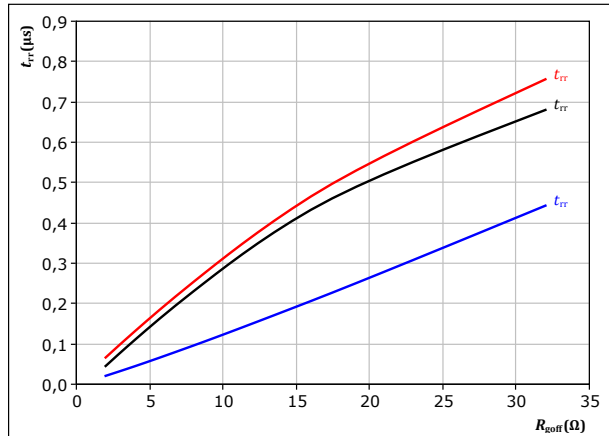


figure 16.

FWD

Typical reverse recovery time as a function of IGBT turn off gate resistor
 $t_{rr} = f(R_{goff})$





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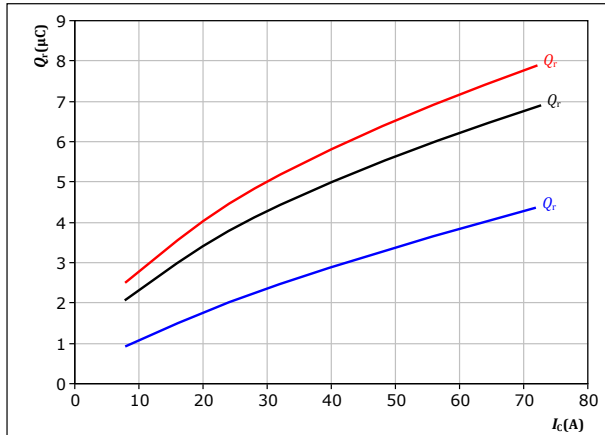
H-Bridge Switching Characteristics

figure 17.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

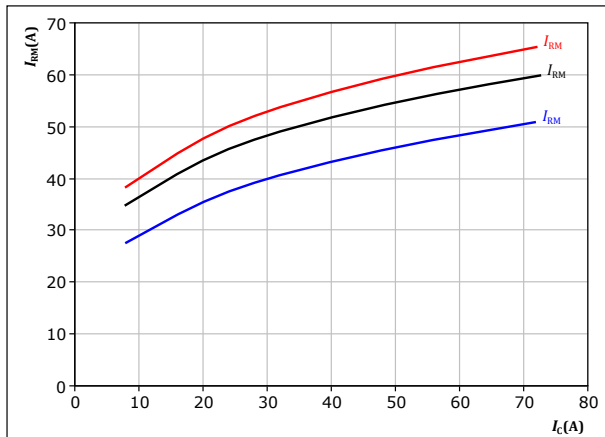
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 19.

FWD

Typical peak reverse recovery current as a function of collector current

$$I_{RM} = f(I_c)$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

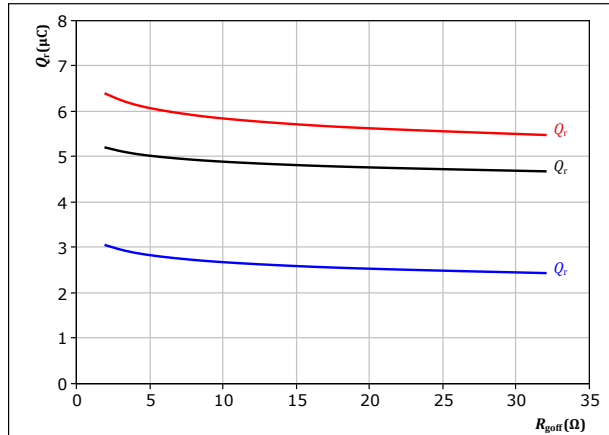
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 18.

FWD

Typical recovered charge as a function of turn off gate resistor

$$Q_r = f(R_{goff})$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 40$ A

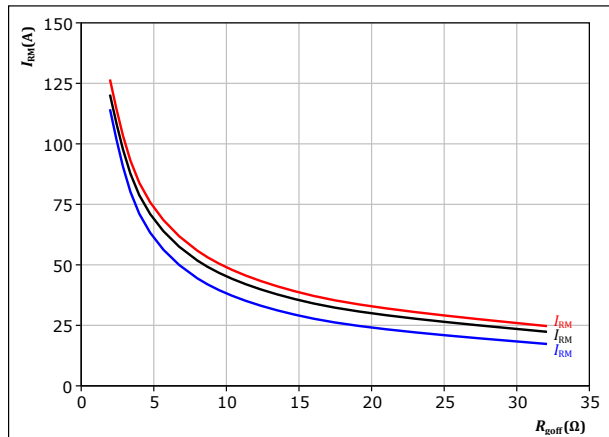
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 20.

FWD

Typical peak reverse recovery current as a function of turn off gate resistor

$$I_{RM} = f(R_{goff})$$



With an inductive load at

$V_{CE} = 600$ V
 $V_{GE} = \pm 15$ V
 $I_c = 40$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



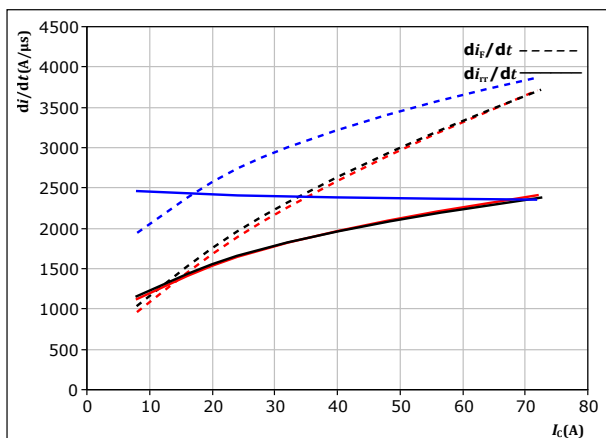
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datasheet

H-Bridge Switching Characteristics

figure 21. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_r/dt = f(I_C)$



With an inductive load at

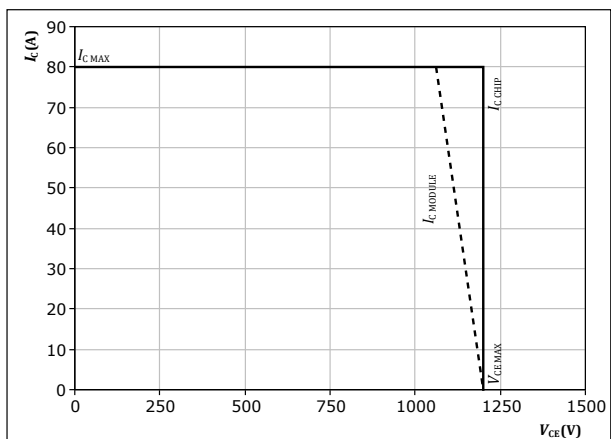
$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{goff} = 8 \text{ } \Omega$

$T_j = 25 \text{ } ^\circ\text{C}$
 $T_j = 125 \text{ } ^\circ\text{C}$
 $T_j = 150 \text{ } ^\circ\text{C}$

figure 22. FWD

Reverse bias safe operating area

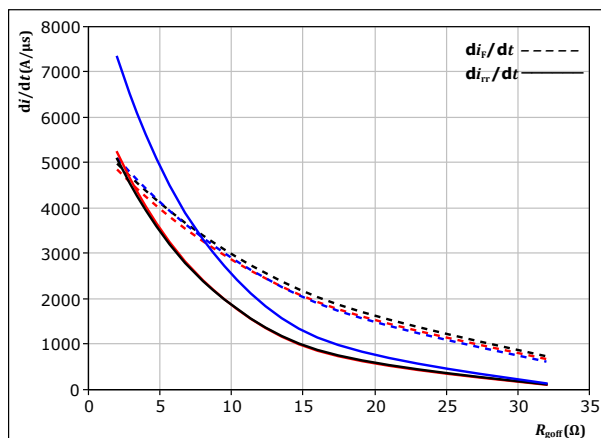
$I_C = f(V_{CE})$



At $T_j = 150 \text{ } ^\circ\text{C}$
 $R_{goff} = 8 \text{ } \Omega$
 $R_{goff} = 8 \text{ } \Omega$

figure 22. FWD

Typical rate of fall of forward and reverse recovery current as a function of turn off gate resistor
 $di_f/dt, di_r/dt = f(R_{goff})$



With an inductive load at

$V_{CE} = 600 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 40 \text{ A}$

$T_j = 25 \text{ } ^\circ\text{C}$
 $T_j = 125 \text{ } ^\circ\text{C}$
 $T_j = 150 \text{ } ^\circ\text{C}$



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H-Bridge Switching Definitions

figure 24. IGBT

Turn-off Switching Waveforms & definition of t_{doff} , t_{Eoff} (t_{Eoff} = integrating time for E_{off})

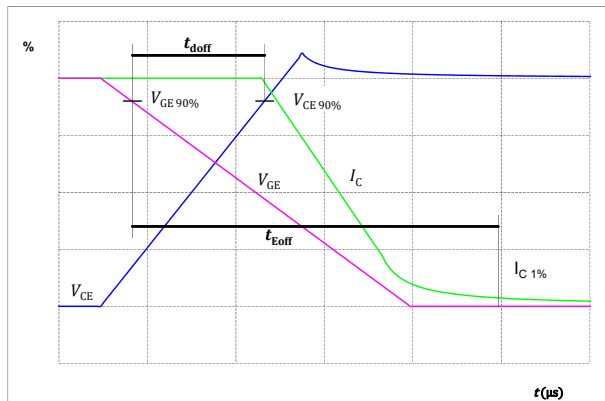


figure 25. IGBT

Turn-on Switching Waveforms & definition of t_{don} , t_{Eon} (t_{Eon} = integrating time for E_{on})

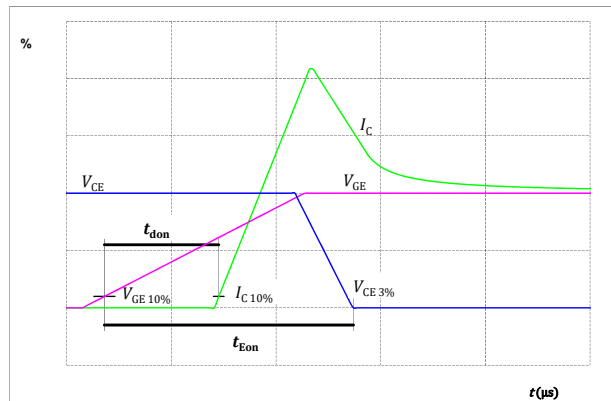


figure 26. IGBT

Turn-off Switching Waveforms & definition of t_f

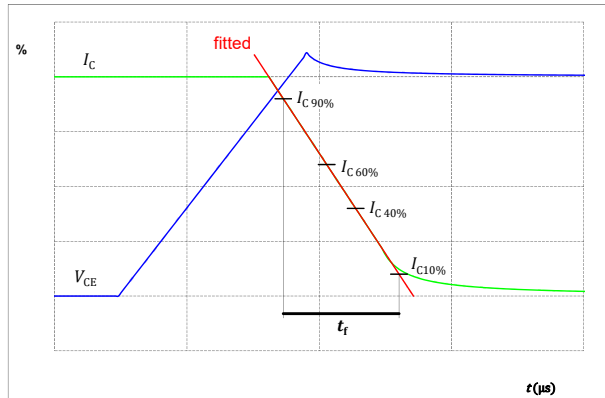
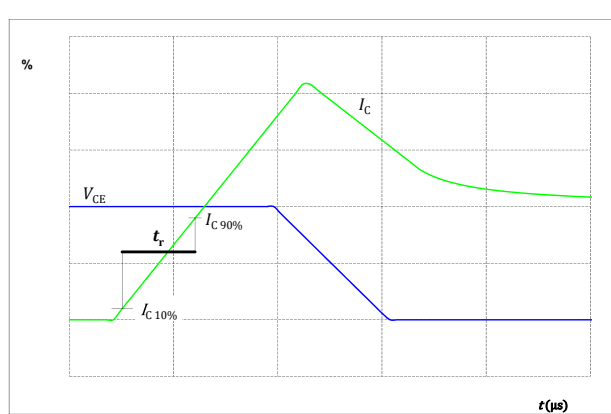


figure 27. IGBT

Turn-on Switching Waveforms & definition of t_r





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H-Bridge Switching Definitions

figure 28.

FWD

Turn-off Switching Waveforms & definition of t_{rr}

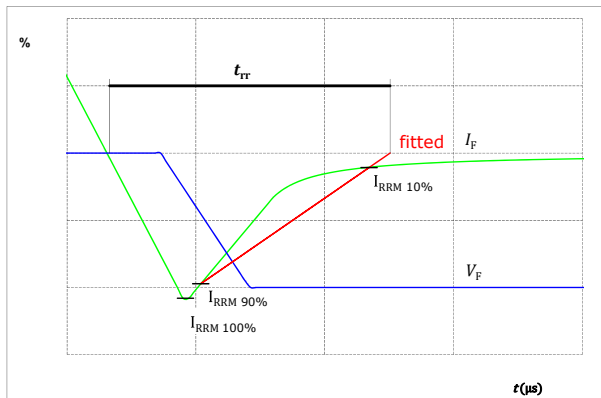
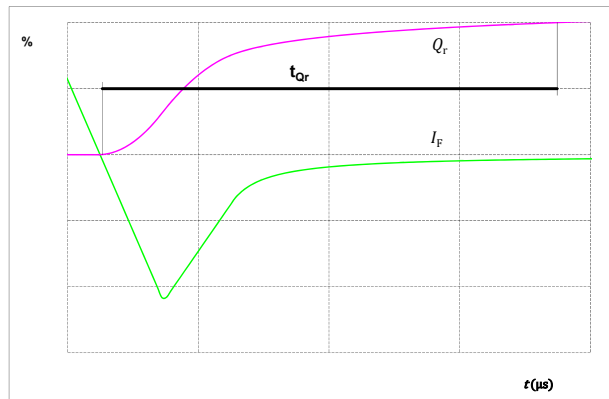


figure 29.

FWD

Turn-on Switching Waveforms & definition of t_{Qr} (t_{Qr} = integrating time for Q_r)





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10-PY124PA040SH-L588F48Y

datasheet

| Ordering Code | |
|--|------------------------------|
| Version | Ordering Code |
| Without thermal paste | 10-PY124PA040SH-L588F48Y |
| With thermal paste (5,2 W/mK, PTM6000HV) | 10-PY124PA040SH-L588F48Y-/7/ |
| With thermal paste (3,4 W/mK, PSX-P7) | 10-PY124PA040SH-L588F48Y-/3/ |

| Marking | | | | | | |
|------------|-------------------------------|------------|-----------|-----------|-------|--------|
| Text | Name | | Date code | UL & VIN | Lot | Serial |
| | NN-NNNNNNNNNNNNNN- TTTTTVV | | WWYY | UL VIN | LLLLL | SSSS |
| Datamatrix | Type&Ver | Lot number | Serial | Date code | | |
| | TTTTTVV | LLLLL | SSSS | WWYY | | |

| Outline | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------|------|---------------|-----|---|---|----------|---|--|--|---------------|---|------|---|------|---|------|-----|------|---|------|---|------|---|------|---|-----|---|------|---|-----|---|------|---|----|---|------|---|--------|---|------|---|--------|----|------|---|----|----|------|---|-----|----|------|---|-----|----|---|-----|------|----|---|---|------|----|--|--|---------------|----|-----|---|------|----|--|--|---------------|----|---|-----|-----|----|---|------|-----|----|---|------|-----|----|---|------|-----|----|-----|------|-----|----|-----|------|-----|----|-----|------|-----|----|------|------|-----|----|-------|------|-----|----|-------|------|-----|----|-------|------|----|----|-------|------|----|----|-------|------|-----|----|-------|------|-----|----|------|------|-----|----|------|------|-----|----|------|------|-----|----|------|------|-----|----|------|------|-----|----|------|------|-----|----|------|------|-----|----|------|-----|-----|----|--|--|---------------|
| <p>Pin table [mm]</p> <table><thead><tr><th>Pin</th><th>X</th><th>Y</th><th>Function</th></tr></thead><tbody><tr><td>1</td><td></td><td></td><td>not assembled</td></tr><tr><td>2</td><td>46,3</td><td>0</td><td>DC-2</td></tr><tr><td>3</td><td>43,6</td><td>2,7</td><td>DC-2</td></tr><tr><td>4</td><td>43,6</td><td>0</td><td>DC-2</td></tr><tr><td>5</td><td>39,2</td><td>1</td><td>G13</td></tr><tr><td>6</td><td>36,2</td><td>0</td><td>S13</td></tr><tr><td>7</td><td>33,2</td><td>1</td><td>NC</td></tr><tr><td>8</td><td>28,8</td><td>0</td><td>Therm2</td></tr><tr><td>9</td><td>23,8</td><td>0</td><td>Therm1</td></tr><tr><td>10</td><td>19,4</td><td>1</td><td>NC</td></tr><tr><td>11</td><td>16,4</td><td>0</td><td>S11</td></tr><tr><td>12</td><td>13,4</td><td>1</td><td>G11</td></tr><tr><td>13</td><td>9</td><td>2,7</td><td>DC-1</td></tr><tr><td>14</td><td>9</td><td>0</td><td>DC-1</td></tr><tr><td>15</td><td></td><td></td><td>not assembled</td></tr><tr><td>16</td><td>6,3</td><td>0</td><td>DC-1</td></tr><tr><td>17</td><td></td><td></td><td>not assembled</td></tr><tr><td>18</td><td>0</td><td>9,5</td><td>DC+</td></tr><tr><td>19</td><td>0</td><td>12,2</td><td>DC+</td></tr><tr><td>20</td><td>0</td><td>14,9</td><td>DC+</td></tr><tr><td>21</td><td>0</td><td>28,6</td><td>Ph1</td></tr><tr><td>22</td><td>2,7</td><td>28,6</td><td>Ph1</td></tr><tr><td>23</td><td>5,4</td><td>28,6</td><td>Ph1</td></tr><tr><td>24</td><td>8,1</td><td>28,6</td><td>Ph1</td></tr><tr><td>25</td><td>10,8</td><td>28,6</td><td>Ph1</td></tr><tr><td>26</td><td>15,25</td><td>28,6</td><td>G12</td></tr><tr><td>27</td><td>18,25</td><td>28,6</td><td>S12</td></tr><tr><td>28</td><td>21,25</td><td>28,6</td><td>NC</td></tr><tr><td>29</td><td>31,35</td><td>28,6</td><td>NC</td></tr><tr><td>30</td><td>34,35</td><td>28,6</td><td>S14</td></tr><tr><td>31</td><td>37,35</td><td>28,6</td><td>G14</td></tr><tr><td>32</td><td>41,8</td><td>28,6</td><td>Ph2</td></tr><tr><td>33</td><td>44,5</td><td>28,6</td><td>Ph2</td></tr><tr><td>34</td><td>47,2</td><td>28,6</td><td>Ph2</td></tr><tr><td>35</td><td>49,9</td><td>28,6</td><td>Ph2</td></tr><tr><td>36</td><td>52,6</td><td>28,6</td><td>Ph2</td></tr><tr><td>37</td><td>52,6</td><td>14,9</td><td>DC+</td></tr><tr><td>38</td><td>52,6</td><td>12,2</td><td>DC+</td></tr><tr><td>39</td><td>52,6</td><td>9,5</td><td>DC+</td></tr><tr><td>40</td><td></td><td></td><td>not assembled</td></tr></tbody></table> | | | | Pin | X | Y | Function | 1 | | | not assembled | 2 | 46,3 | 0 | DC-2 | 3 | 43,6 | 2,7 | DC-2 | 4 | 43,6 | 0 | DC-2 | 5 | 39,2 | 1 | G13 | 6 | 36,2 | 0 | S13 | 7 | 33,2 | 1 | NC | 8 | 28,8 | 0 | Therm2 | 9 | 23,8 | 0 | Therm1 | 10 | 19,4 | 1 | NC | 11 | 16,4 | 0 | S11 | 12 | 13,4 | 1 | G11 | 13 | 9 | 2,7 | DC-1 | 14 | 9 | 0 | DC-1 | 15 | | | not assembled | 16 | 6,3 | 0 | DC-1 | 17 | | | not assembled | 18 | 0 | 9,5 | DC+ | 19 | 0 | 12,2 | DC+ | 20 | 0 | 14,9 | DC+ | 21 | 0 | 28,6 | Ph1 | 22 | 2,7 | 28,6 | Ph1 | 23 | 5,4 | 28,6 | Ph1 | 24 | 8,1 | 28,6 | Ph1 | 25 | 10,8 | 28,6 | Ph1 | 26 | 15,25 | 28,6 | G12 | 27 | 18,25 | 28,6 | S12 | 28 | 21,25 | 28,6 | NC | 29 | 31,35 | 28,6 | NC | 30 | 34,35 | 28,6 | S14 | 31 | 37,35 | 28,6 | G14 | 32 | 41,8 | 28,6 | Ph2 | 33 | 44,5 | 28,6 | Ph2 | 34 | 47,2 | 28,6 | Ph2 | 35 | 49,9 | 28,6 | Ph2 | 36 | 52,6 | 28,6 | Ph2 | 37 | 52,6 | 14,9 | DC+ | 38 | 52,6 | 12,2 | DC+ | 39 | 52,6 | 9,5 | DC+ | 40 | | | not assembled |
| Pin | X | Y | Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | | not assembled | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 46,3 | 0 | DC-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 43,6 | 2,7 | DC-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 43,6 | 0 | DC-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 39,2 | 1 | G13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 36,2 | 0 | S13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 33,2 | 1 | NC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 28,8 | 0 | Therm2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | 23,8 | 0 | Therm1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 19,4 | 1 | NC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | 16,4 | 0 | S11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | 13,4 | 1 | G11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | 9 | 2,7 | DC-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 9 | 0 | DC-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | not assembled | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 6,3 | 0 | DC-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | not assembled | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | 0 | 9,5 | DC+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | 0 | 12,2 | DC+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 0 | 14,9 | DC+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | 0 | 28,6 | Ph1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | 2,7 | 28,6 | Ph1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | 5,4 | 28,6 | Ph1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | 8,1 | 28,6 | Ph1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | 10,8 | 28,6 | Ph1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | 15,25 | 28,6 | G12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | 18,25 | 28,6 | S12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | 21,25 | 28,6 | NC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | 31,35 | 28,6 | NC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | 34,35 | 28,6 | S14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | 37,35 | 28,6 | G14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | 41,8 | 28,6 | Ph2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | 44,5 | 28,6 | Ph2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | 47,2 | 28,6 | Ph2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | 49,9 | 28,6 | Ph2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | 52,6 | 28,6 | Ph2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | 52,6 | 14,9 | DC+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 | 52,6 | 12,2 | DC+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39 | 52,6 | 9,5 | DC+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | | | not assembled | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p>Tolerance of pinpositions: ±0,5mm at the end of pins Dimension of coordinate axis is only offset without tolerance</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

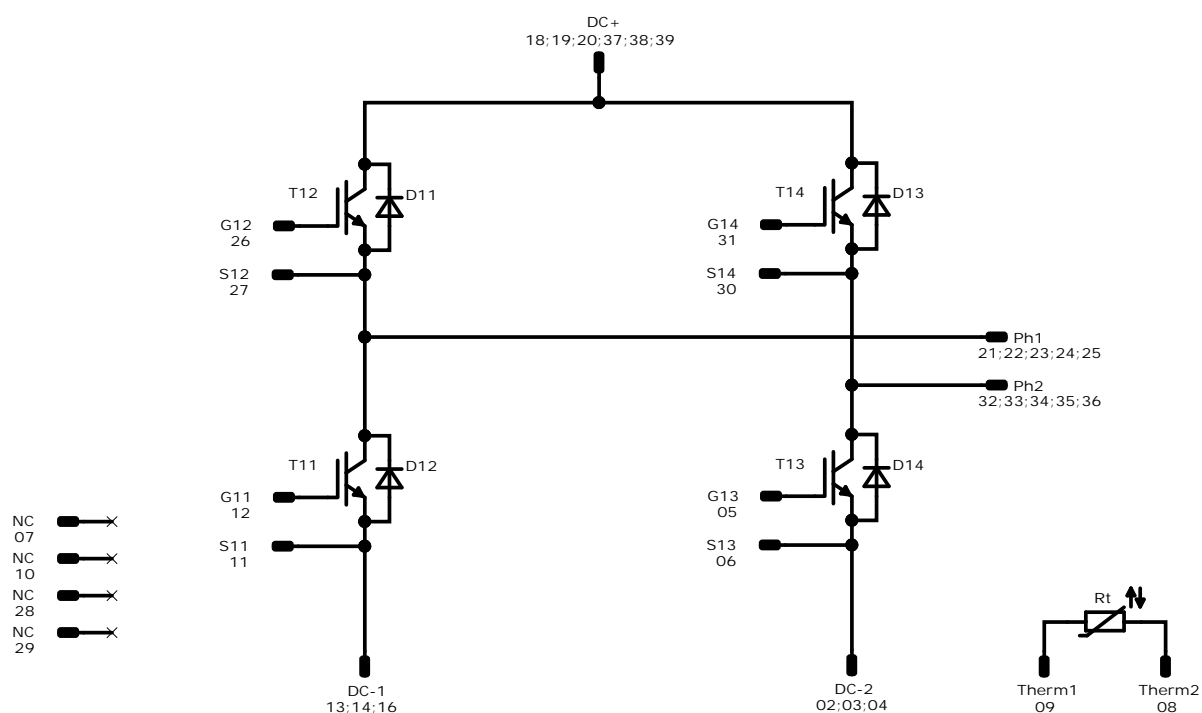


Vincotech

10-PY124PA040SH-L588F48Y

datasheet

Pinout



Identification

| ID | Component | Voltage | Current | Function | Comment |
|--------------------|-----------|---------|---------|-----------------|---------|
| T11, T12, T13, T14 | IGBT | 1200 V | 40 A | H-Bridge Switch | |
| D11, D12, D13, D14 | FWD | 1200 V | 25 A | H-Bridge Diode | |
| Rt | NTC | | | Thermistor | |



| Packaging instruction | | | | |
|---------------------------------------|------|----------|------|--------|
| Standard packaging quantity (SPQ) 100 | >SPQ | Standard | <SPQ | Sample |

| Handling instruction |
|---|
| Handling instructions for <i>flow</i> 1 packages see vincotech.com website. |

| Package data |
|--|
| Package data for <i>flow</i> 1 packages see vincotech.com website. |

| Vincotech thermistor reference |
|--|
| See Vincotech thermistor reference table at vincotech.com website. |

| UL recognition and file number |
|---|
| This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website. |



| Document No.: | Date: | Modification: | Pages |
|--------------------------------|-------------|---|-------|
| 10-PY124PA040SH-L588F48Y-D3-14 | 9 Sep. 2021 | Updated thermal characteristic of H-bridge switch Separated datasheet for press-fit version New datasheet format, module is unchanged | |

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