



Vincotech

10-PY07HVA050S501-L984F28Y

datasheet

flowPACK 1 H6.5

650 V / 50 A

Features

- Innovative H6.5 topology
- Optimized for bidirectional operation
- Integrated temperature sensor
- Low inductance housing

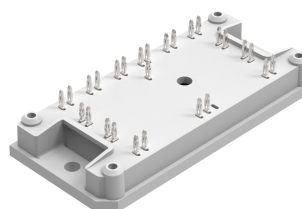
Target applications

- Energy Storage Systems

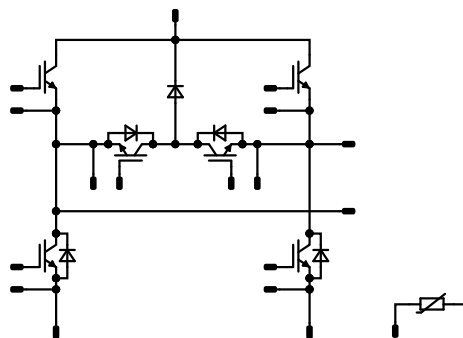
Types

- 10-PY07HVA050S501-L984F28Y

flow 1 12 mm housing



Schematic





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Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
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Buck Switch

Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	48	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	73	W
Gate-emitter voltage	V_{GES}		± 20	V
Maximum junction temperature	T_{jmax}		175	°C

Buck Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	46	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	100	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	63	W
Maximum junction temperature	T_{jmax}		175	°C

Boost Switch

Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	48	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	150	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	73	W
Gate-emitter voltage	V_{GES}		± 20	V
Maximum junction temperature	T_{jmax}		175	°C



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Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	46	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	100	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	63	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			8,17	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	

Buck Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0005	25	3,2	4	4,8	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		50	25 125 150		1,39 1,48 1,51	1,75 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	650		25			50	µA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25		25		3100		pF
Output capacitance	C_{oes}							88		pF
Reverse transfer capacitance	C_{res}							12		pF
Gate charge	Q_g	$V_{CC} = 520 \text{ V}$	15		50	25		120		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,29		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$	± 15	400	50	25 125 150		61,12 62,4 63,04		ns
Rise time	t_r					25 125 150		8,96 9,92 10,24		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		75,2 91,52 96,32		ns
Fall time	t_f					25 125 150		12,98 24,11 33,69		ns
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD} = 1,46 \mu\text{C}$ $Q_{tFWD} = 2,68 \mu\text{C}$ $Q_{tFWD} = 3,11 \mu\text{C}$				25 125 150		0,391 0,554 0,596		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,662 0,969 1,07		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	

Buck Diode

Static

Forward voltage	V_F				50	25 125 150		1,5 1,44 1,42	1,92 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 650$ V				25			2,65	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,5		K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt=5527$ A/µs $di/dt=5083$ A/µs $di/dt=5044$ A/µs	± 15	400	50	25 125 150		51,61 72,81 78,32		A
Reverse recovery time	t_{rr}					25 125 150		48,53 68,22 76,75		ns
Recovered charge	Q_r					25 125 150		1,46 2,68 3,11		µC
Reverse recovered energy	E_{rec}					25 125 150		0,481 0,899 1,03		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		1093 1460 1634		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	

Boost Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0005	25	3,2	4	4,8	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		50	25 125 150		1,39 1,48 1,51	1,75 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	650		25			50	µA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25		25		3100		pF
Output capacitance	C_{oes}							88		pF
Reverse transfer capacitance	C_{res}							12		pF
Gate charge	Q_g	$V_{CC} = 520 \text{ V}$	15		50	25		120		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,29		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$	± 15	400	50	25 125 150		62,4 63,36 64,32		ns
Rise time	t_r					25 125 150		11,2 12,8 12,48		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		76,8 93,44 98,56		ns
Fall time	t_f					25 125 150		11,22 27,76 37,43		ns
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD} = 1,42 \mu\text{C}$ $Q_{tFWD} = 2,58 \mu\text{C}$ $Q_{tFWD} = 3 \mu\text{C}$				25 125 150		0,361 0,494 0,541		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,677 0,954 1,06		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	

Boost Diode

Static

Forward voltage	V_F				50	25 125 150		1,5 1,44 1,42	1,92 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 650$ V				25			2,65	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,5		K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt=4009$ A/µs $di/dt=3837$ A/µs $di/dt=3654$ A/µs	± 15	400	50	25 125 150		54,88 70,7 75,83		A
Reverse recovery time	t_{rr}					25 125 150		44,58 66,29 74,34		ns
Recovered charge	Q_r					25 125 150		1,42 2,58 3		µC
Reverse recovered energy	E_{rec}					25 125 150		0,478 0,84 0,971		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		1792 1282 1408		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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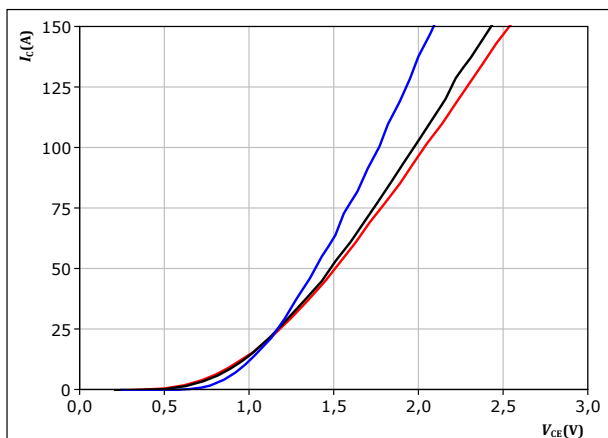
Buck Switch Characteristics

figure 1.

IGBT

Typical output characteristics

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



$t_p = 250 \mu s$
 $V_{GE} = 15 V$

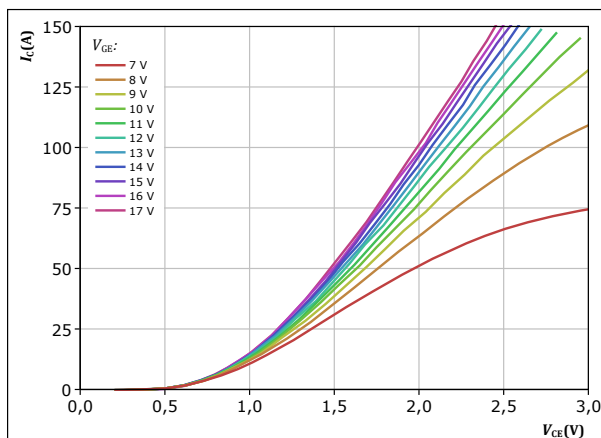
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 2.

IGBT

Typical output characteristics

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



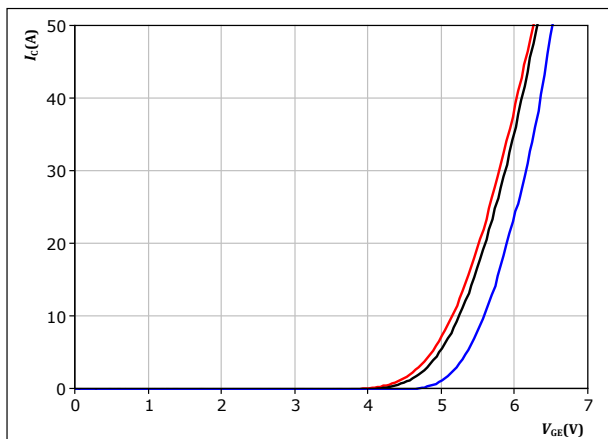
$t_p = 250 \mu s$
 $T_j = 150 \text{ °C}$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3.

IGBT

Typical transfer characteristics

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



$t_p = 250 \mu s$
 $V_{CE} = 10 V$

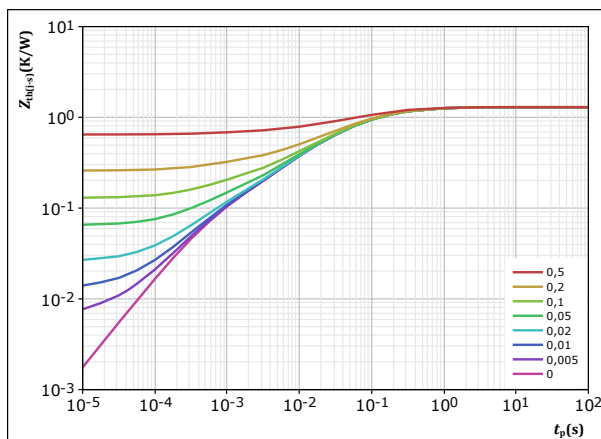
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 4.

IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 1,294 \text{ K/W}$
IGBT thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
2,09E-01	5,36E-01
6,00E-01	8,05E-02
3,10E-01	1,69E-02
1,08E-01	4,25E-03
6,63E-02	5,30E-04



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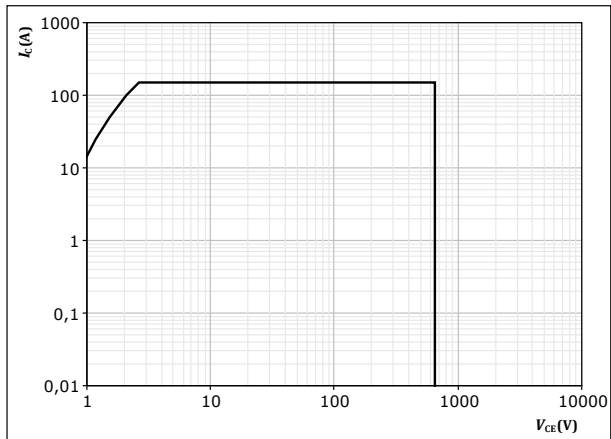
Buck Switch Characteristics

figure 5.

IGBT

Safe operating area

$I_C = f(V_{CE})$



$D =$ single pulse

$T_s = 80 \text{ } ^\circ\text{C}$
 $V_{GE} = 15 \text{ V}$
 $T_j = T_{jmax}$



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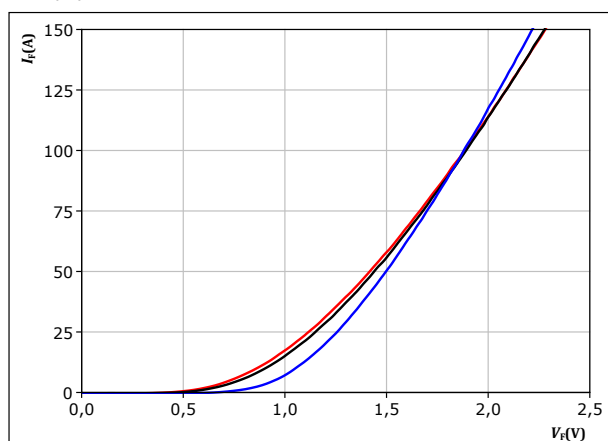
Buck Diode Characteristics

figure 6.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

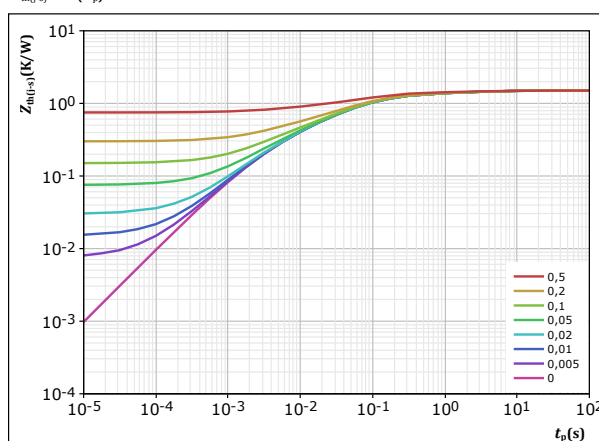
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 7.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	
$R_{th(j-s)} =$	1,501	K/W
FWD thermal model values		
R (K/W)	τ (s)	
1,03E-01	4,73E+00	
2,05E-01	5,53E-01	
6,39E-01	8,31E-02	
3,39E-01	2,02E-02	
1,71E-01	4,42E-03	
4,45E-02	1,30E-03	



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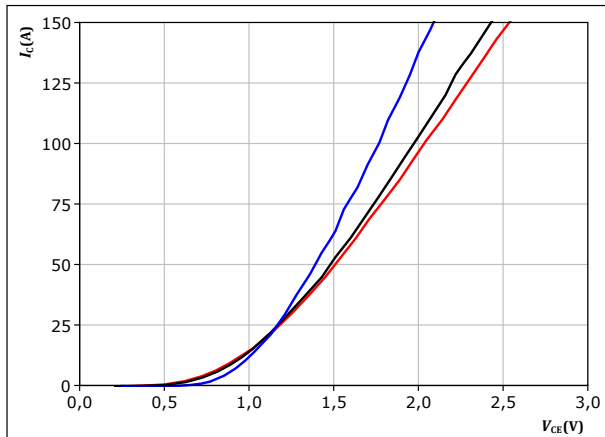
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Boost Switch Characteristics

figure 8. IGBT

Typical output characteristics

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

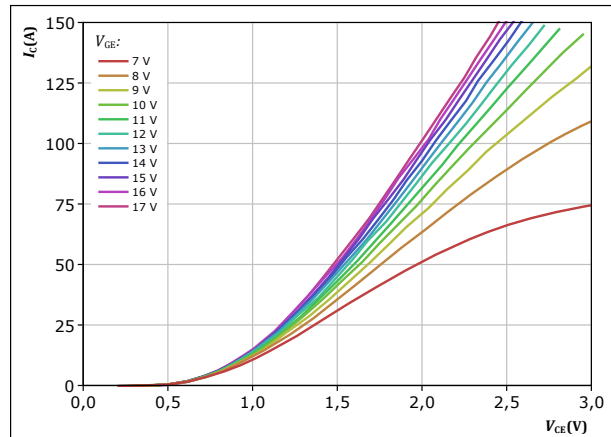


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j:$ 25 °C, 125 °C, 150 °C

figure 9. IGBT

Typical output characteristics

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

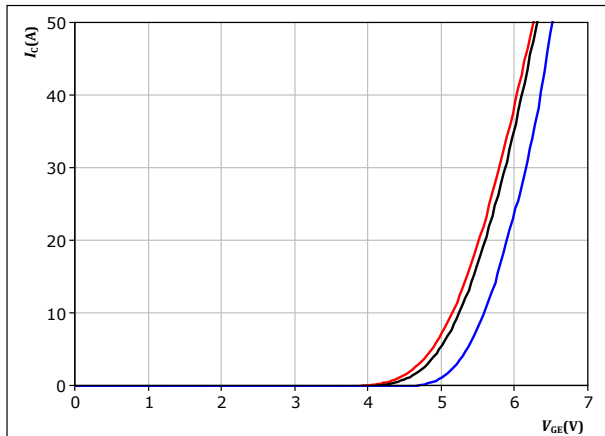


$t_p = 250 \mu s$
 $T_j = 150 \text{ } ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 10. IGBT

Typical transfer characteristics

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

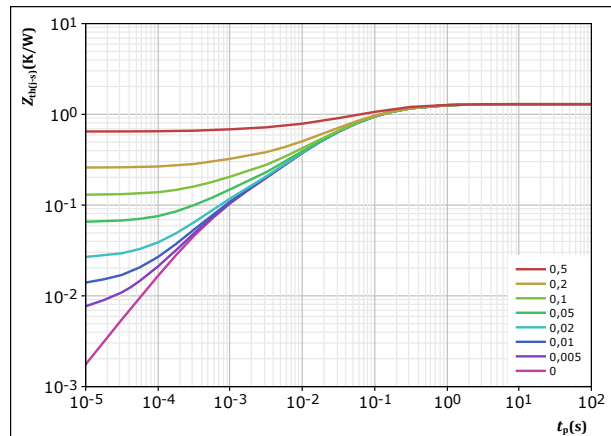


$t_p = 250 \mu s$
 $V_{CE} = 10 V$
 $T_j:$ 25 °C, 125 °C, 150 °C

figure 11. IGBT

Transient thermal impedance as a function of pulse width

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



$D = 1,294 \text{ K/W}$
IGBT thermal model values

R (K/W)	τ (s)
2,09E-01	5,36E-01
6,00E-01	8,05E-02
3,10E-01	1,69E-02
1,08E-01	4,25E-03
6,63E-02	5,30E-04



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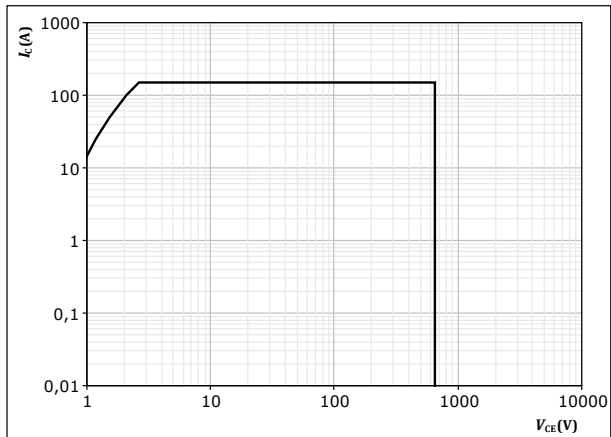
Boost Switch Characteristics

figure 12.

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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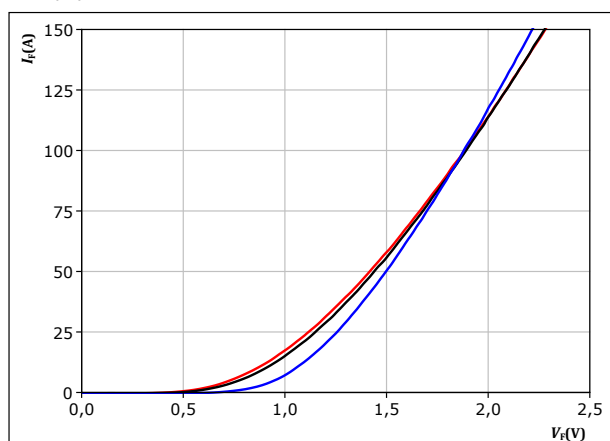
Boost Diode Characteristics

figure 13.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

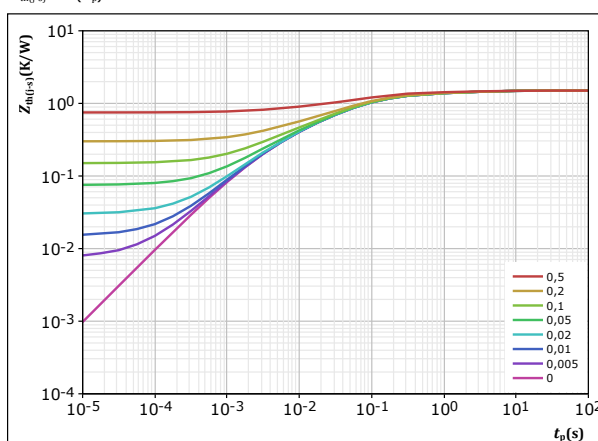
T_j : 25 °C, 125 °C, 150 °C

figure 14.

FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 1,501 \text{ K/W}$

FWD thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
1,03E-01	4,73E+00
2,05E-01	5,53E-01
6,39E-01	8,31E-02
3,39E-01	2,02E-02
1,71E-01	4,42E-03
4,45E-02	1,30E-03



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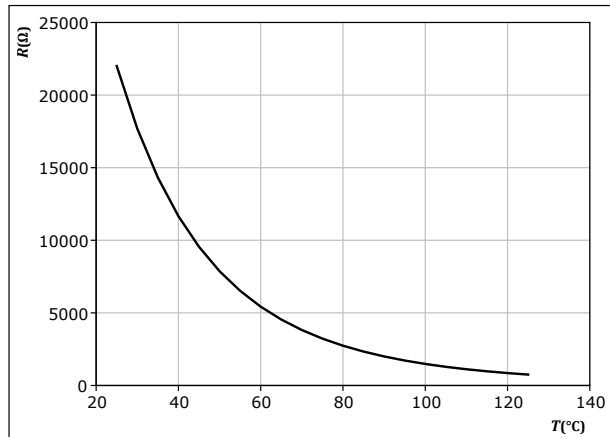
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Thermistor Characteristics

figure 15. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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datasheet

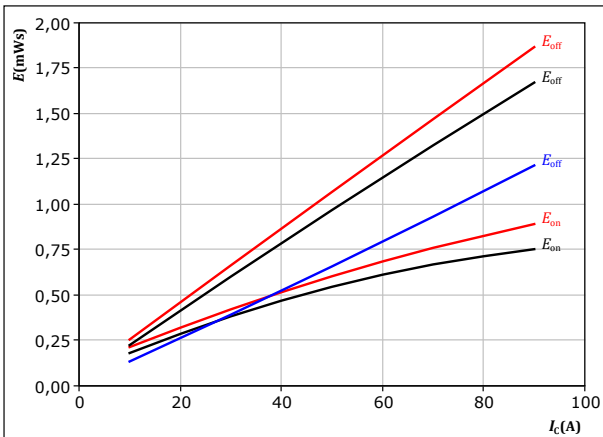
Buck Switching Characteristics

figure 16.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

$V_{CE} = 400 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 8 \text{ } \Omega$
 $R_{goff} = 8 \text{ } \Omega$

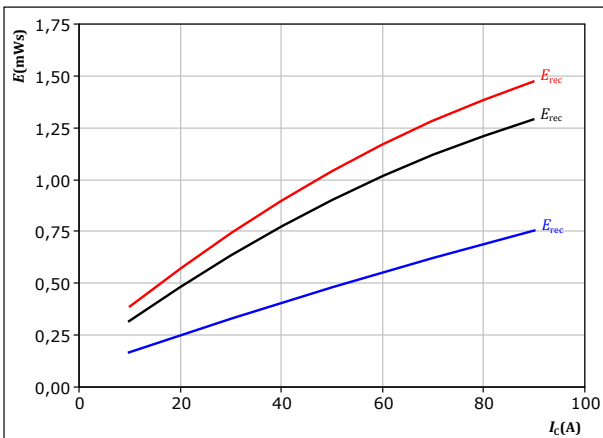
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 18.

FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

$V_{CE} = 400 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 8 \text{ } \Omega$

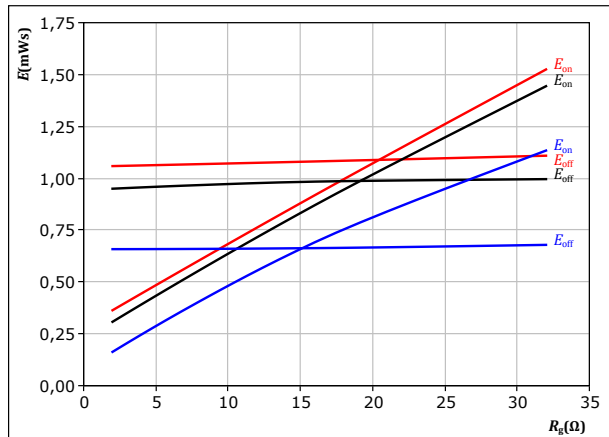
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 17.

IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 400 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 50 \text{ A}$

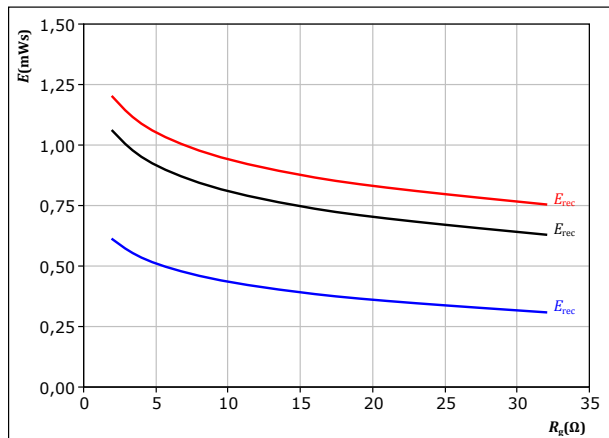
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 19.

FWD

Typical reverse recovered energy loss as a function of gate resistor

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



With an inductive load at

$V_{CE} = 400 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 50 \text{ A}$

T_j :
— 25 °C
— 125 °C
— 150 °C



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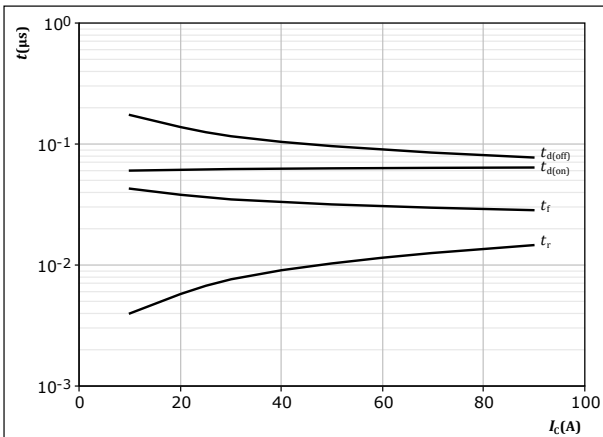
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datasheet

Buck Switching Characteristics

figure 20.

IGBT

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



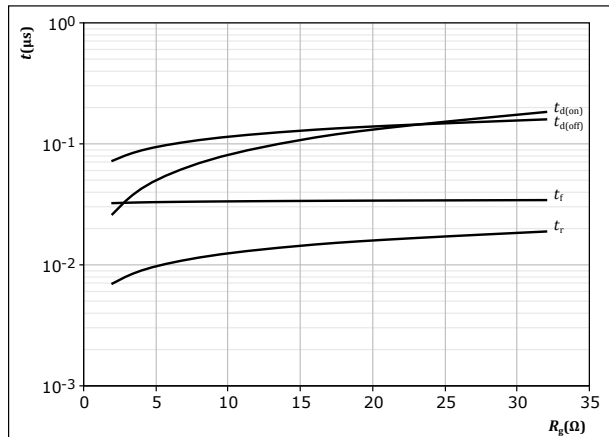
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω
 $R_{goff} = 8$ Ω

figure 21.

IGBT

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



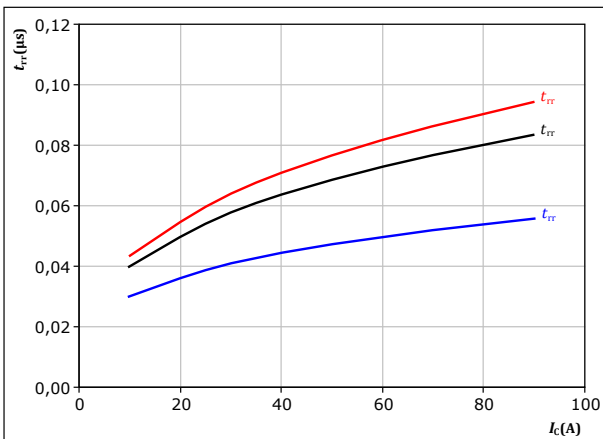
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $I_C = 50$ A

figure 22.

FWD

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



With an inductive load at

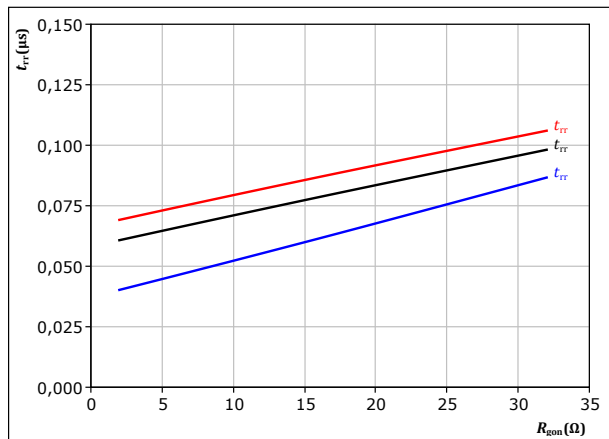
$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 23.

FWD

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



With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $I_C = 50$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



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datasheet

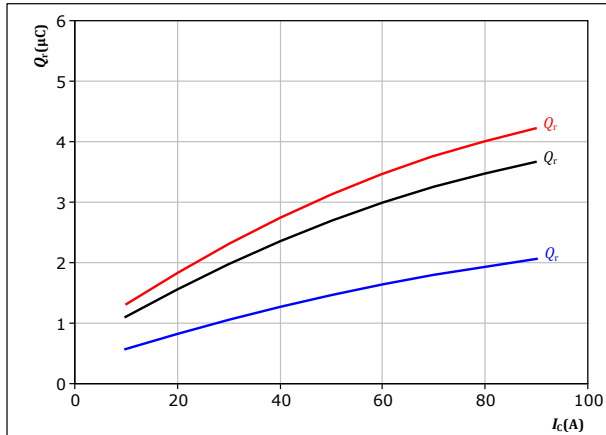
Buck Switching Characteristics

figure 24.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_C)$$



With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

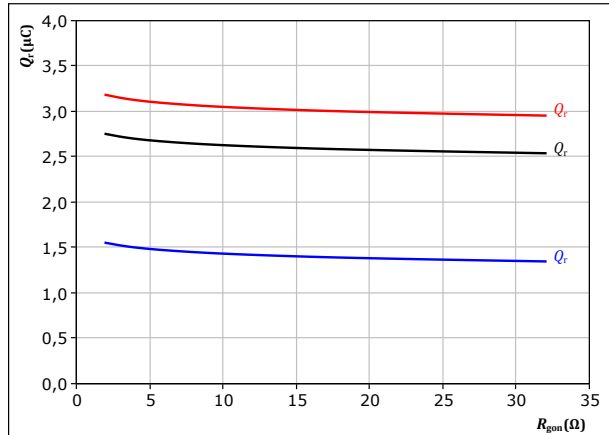
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 25.

FWD

Typical recovered charge as a function of turn on gate resistor

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



With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $I_C = 50$ A

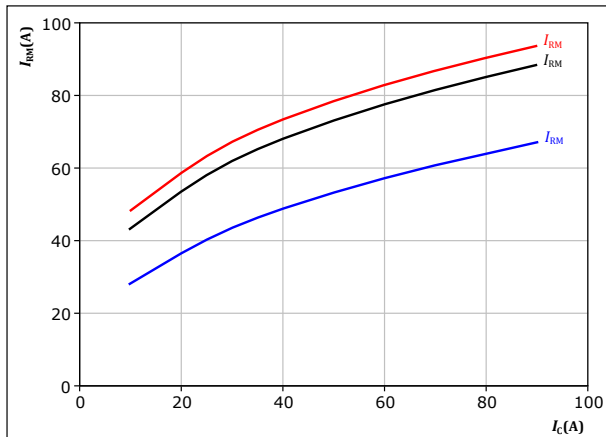
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 26.

FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

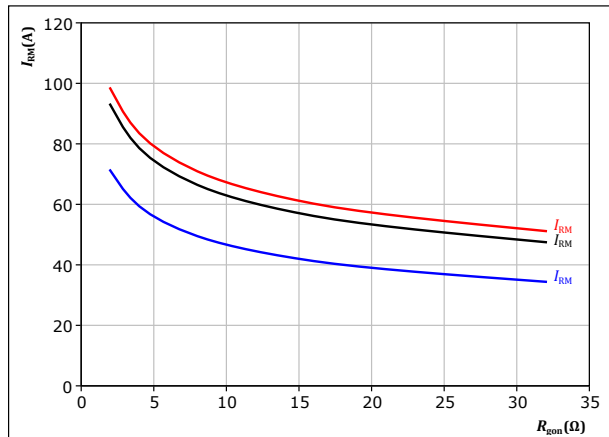
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 27.

FWD

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

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



With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $I_C = 50$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



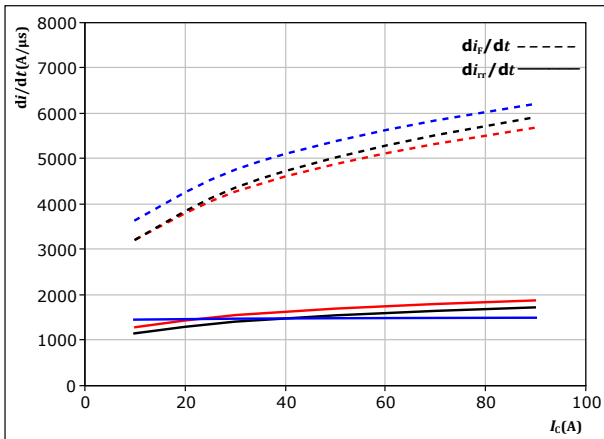
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datasheet

Buck Switching Characteristics

figure 28. FWD

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



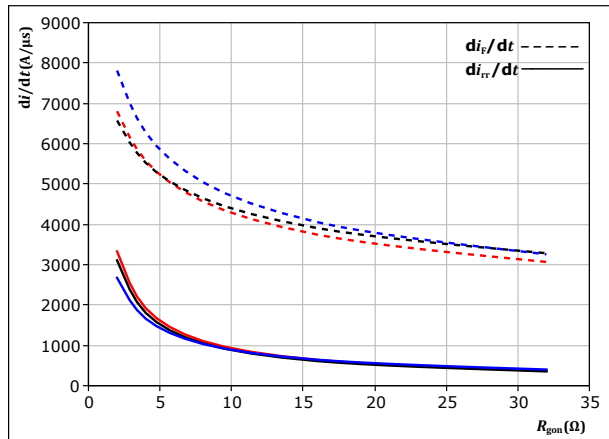
With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 29. FWD

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



With an inductive load at

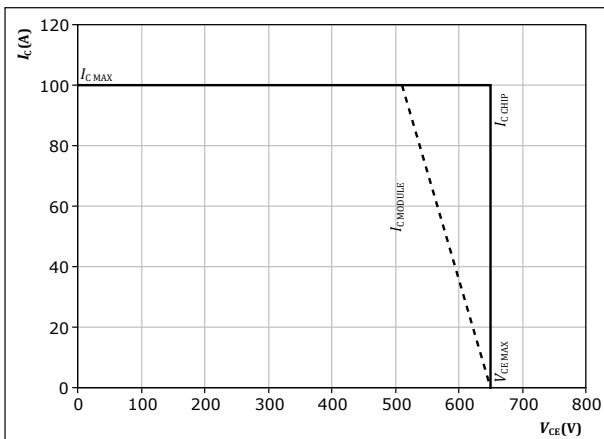
$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $I_C = 50$ A

T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 30. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 150$ °C
 $R_{gon} = 8$ Ω
 $R_{goff} = 8$ Ω



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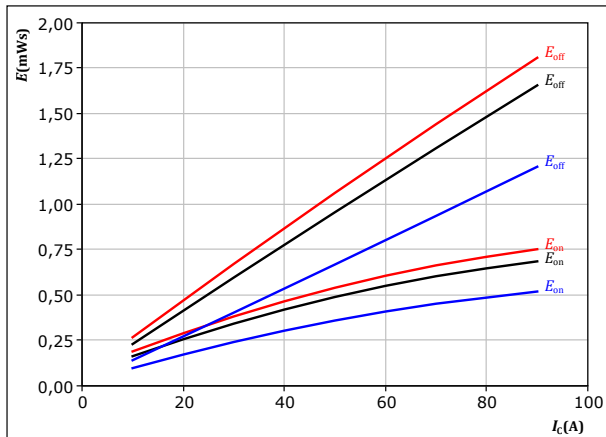
10-PY07HVA050S501-L984F28Y
datasheet

Boost Switching Characteristics

figure 31. IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_c)$$



With an inductive load at

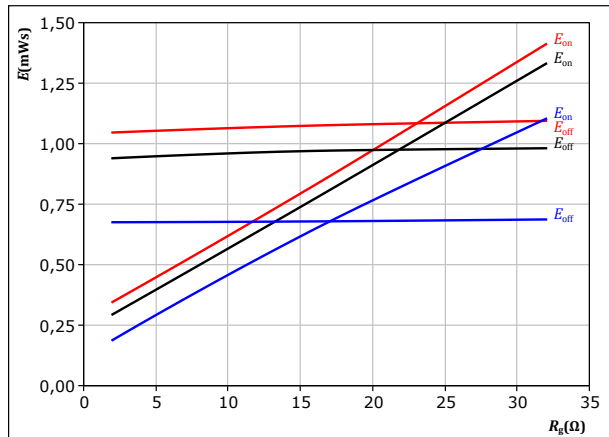
$V_{CE} = 400 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 8 \text{ } \Omega$
 $R_{goff} = 8 \text{ } \Omega$

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 32. IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

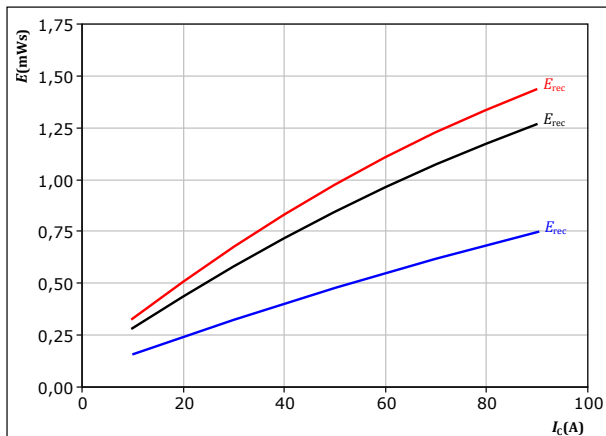
$V_{CE} = 400 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_c = 50 \text{ A}$

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 33. FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

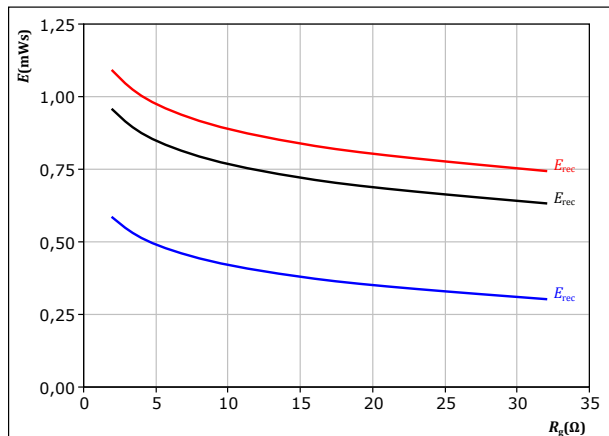
$V_{CE} = 400 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 8 \text{ } \Omega$

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 34. FWD

Typical reverse recovered energy loss as a function of gate resistor

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



With an inductive load at

$V_{CE} = 400 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_c = 50 \text{ A}$

T_j :
— 25 °C
— 125 °C
— 150 °C



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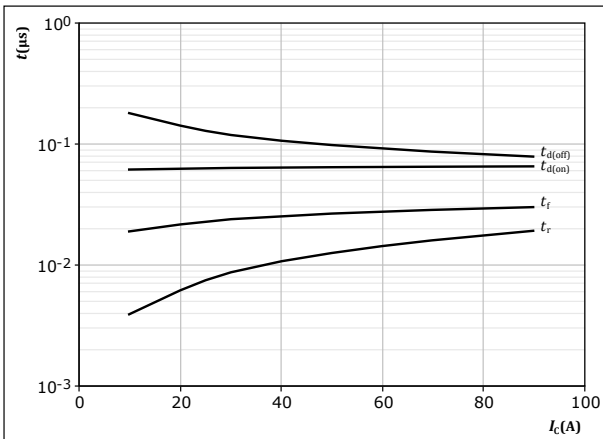
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datasheet

Boost Switching Characteristics

figure 35.

IGBT

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



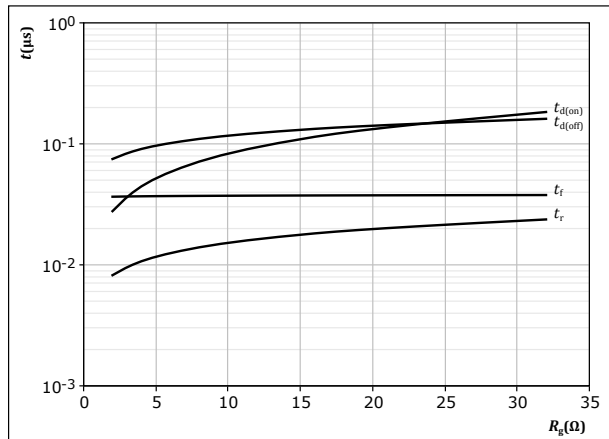
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω
 $R_{goff} = 8$ Ω

figure 36.

IGBT

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



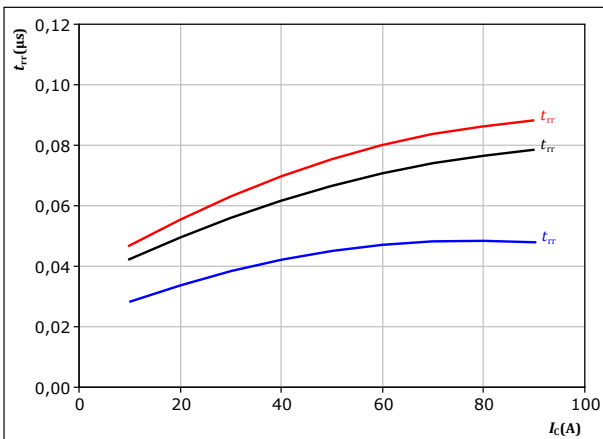
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $I_c = 50$ A

figure 37.

FWD

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



With an inductive load at

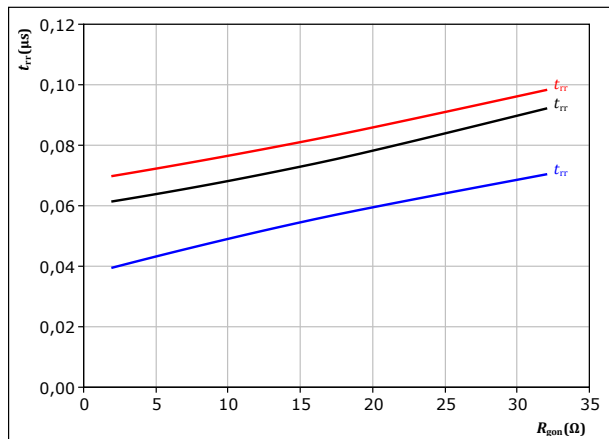
$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 38.

FWD

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



With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $I_c = 50$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



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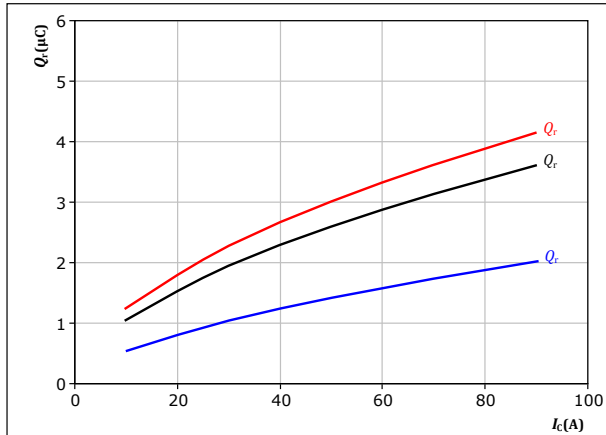
Boost Switching Characteristics

figure 39.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

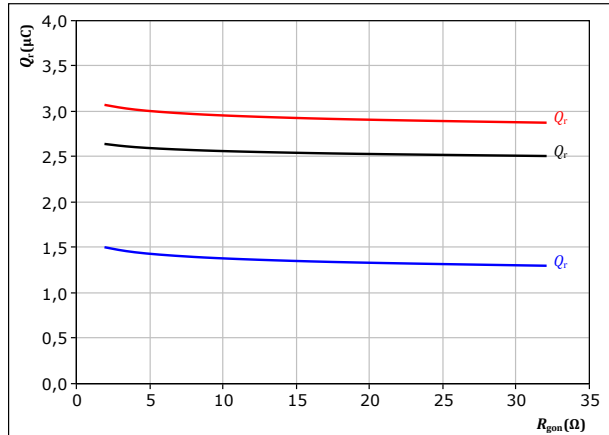
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 40.

FWD

Typical recovered charge as a function of turn on gate resistor

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



With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $I_c = 50$ A

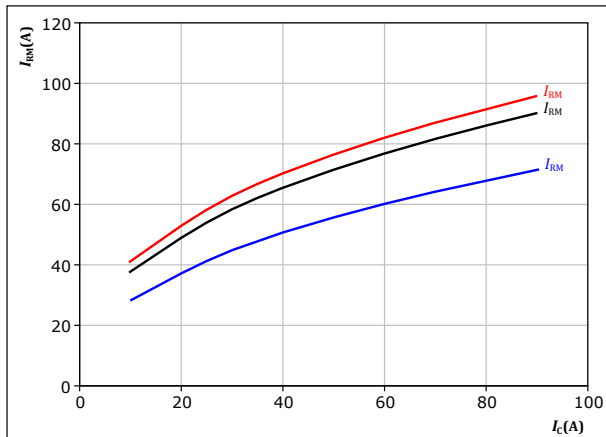
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 41.

FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

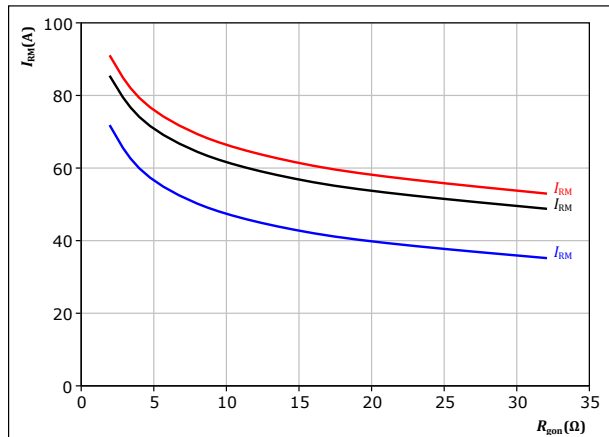
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 42.

FWD

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

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



With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $I_c = 50$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



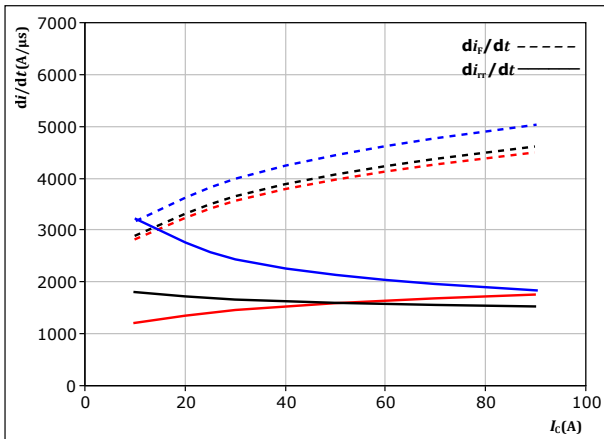
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datasheet

Boost Switching Characteristics

figure 43. FWD

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



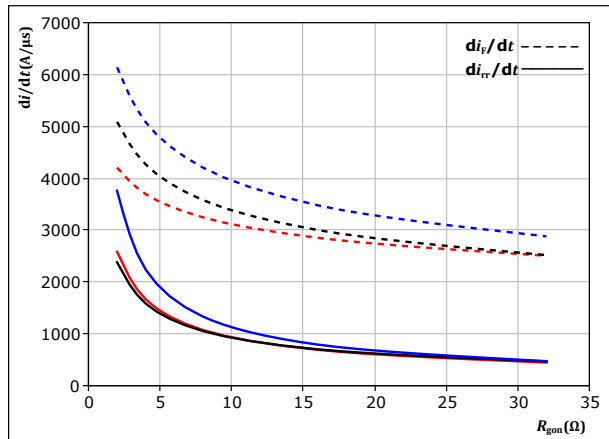
With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 8$ Ω

T_j : 25 °C
125 °C
150 °C

figure 44. FWD

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



With an inductive load at

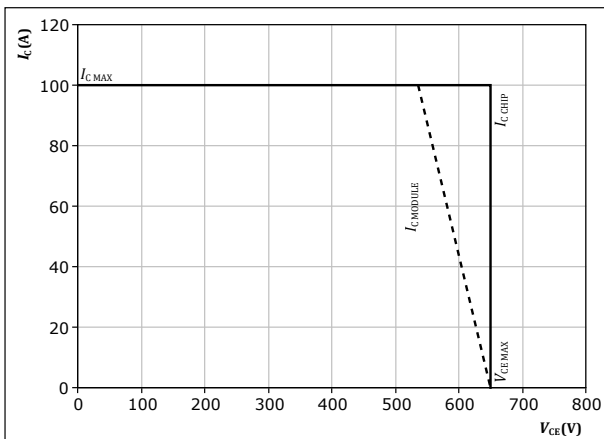
$V_{CE} = 400$ V
 $V_{GE} = \pm 15$ V
 $I_C = 50$ A

T_j : 25 °C
125 °C
150 °C

figure 45. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 150$ °C
 $R_{gon} = 8$ Ω
 $R_{goff} = 8$ Ω



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Switching Definitions

figure 46. IGBT

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

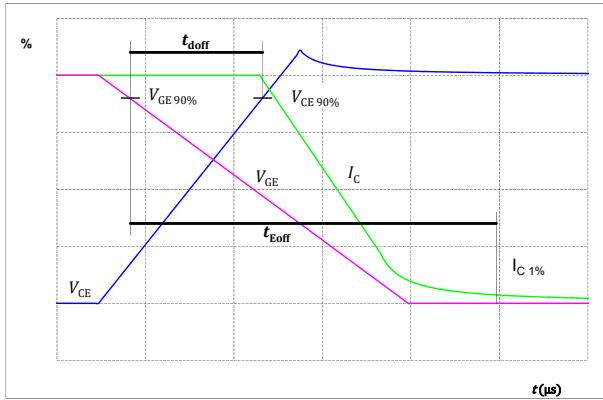


figure 47. IGBT

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

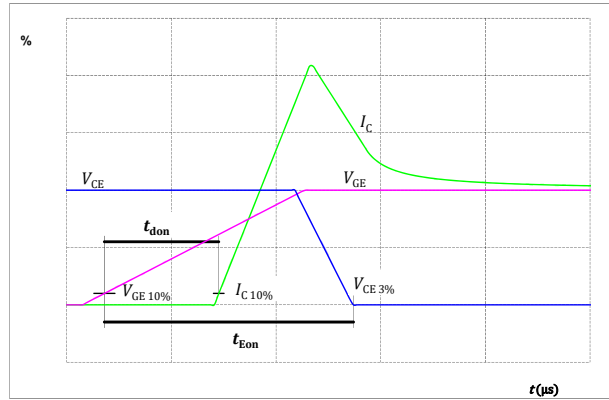


figure 48. IGBT

Turn-off Switching Waveforms & definition of t_f

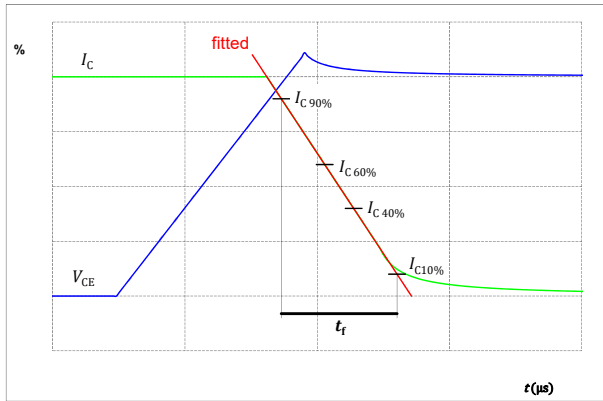
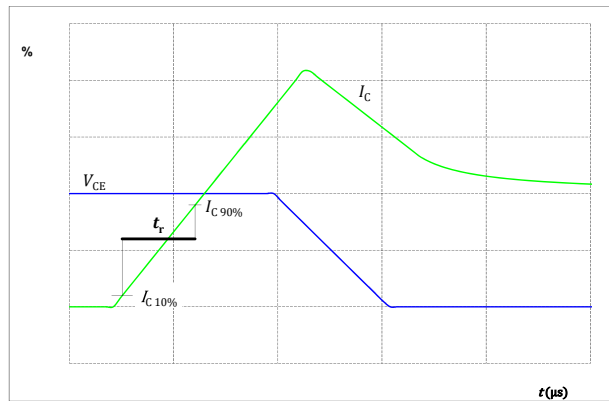


figure 49. IGBT

Turn-on Switching Waveforms & definition of t_r





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Switching Definitions

figure 50.

FWD

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

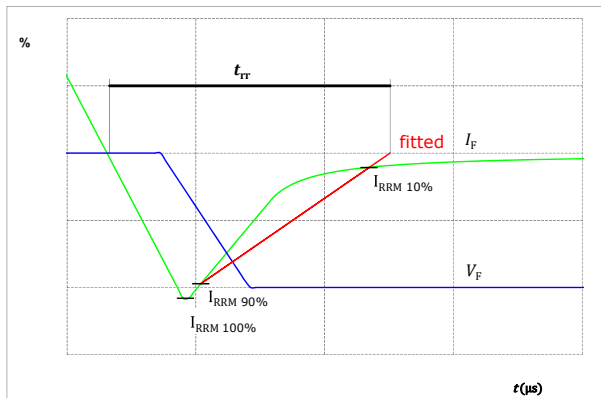
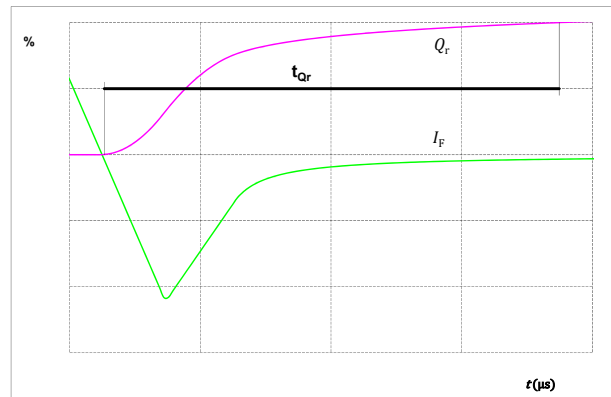


figure 51.

FWD


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





datasheet

Ordering Code	
Version	Ordering Code
Without thermal paste	10-PY07HVA050S501-L984F28Y
With thermal paste (PSX)	10-PY07HVA050S501-L984F28Y-/3/
With thermal paste (PTM)	10-PY07HVA050S501-L984F28Y-/7/

Marking							
	Text	Name		Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNNN- TTTTTIVV		WWYY	UL VIN	LLLL	SSSS
	Datamatrix	Type&Ver	Lot number	Serial	Date code		
	TTTTTIVV	LLLL	SSSS	WWYY			

Pin table [mm]			
Pin	X	Y	Function
1	52,2	0	G14
2	49,2	0	S14
3	not assembled		
4	26,1	0	Therm2
5	23,1	0	Therm1
6	3	0	S12
7	0	0	G12
8	0	8	DC+
9	0	10,5	DC+
10	0	17,7	DC-1
11	0	20,2	DC-1
12	0	28,2	G11
13	3	28,2	S11
14	10	28,2	G21
15	13	28,2	S21
16	20,35	28,2	Ph2
17	22,85	28,2	Ph2
18	29,35	28,2	Ph1
19	31,85	28,2	Ph1
20	39,2	28,2	S22
21	42,2	28,2	G22
22	49,2	28,2	S13
23	52,2	28,2	G13
24	52,2	20,2	DC-2
25	52,2	17,7	DC-2
26	52,2	10,5	DC+
27	52,2	8	DC+
28	26,1	22,1	A20

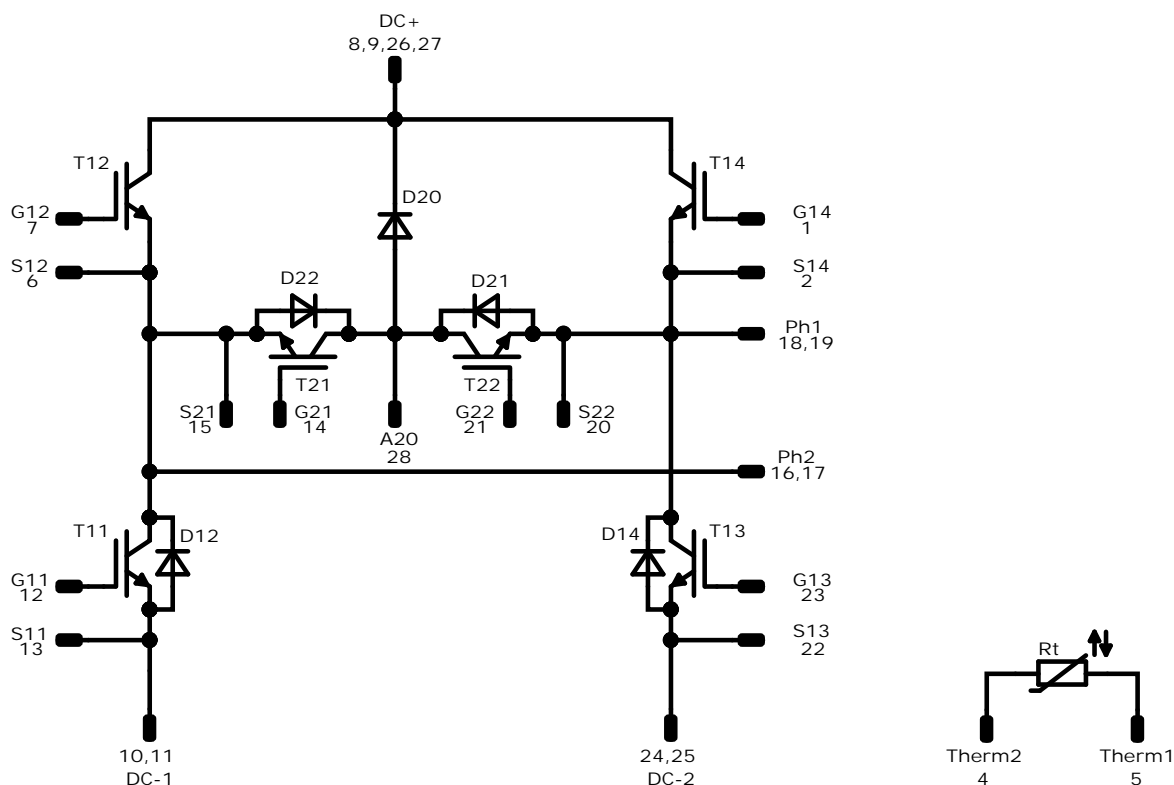
Outline

The technical drawing shows the A20 connector from two perspectives. The top view is a rectangular layout with rounded corners, featuring 28 pins numbered 1 through 28. The pins are arranged in two rows: pins 1-14 on the left and pins 15-28 on the right. The left side has four mounting holes. The bottom view shows the side profile of the connector, highlighting the 28-pin header. Dimensions are provided in millimeters: the overall width is 26±1 mm, the height is 12.5 mm, and the pin pitch is 2.5 mm. A note indicates that the center of the press-fit pinhead is the reference point for connection parameters, and a tolerance of ±0.5 mm is specified at the end of the pins.



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Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T13, T12, T14	IGBT	650 V	50 A	Buck Switch	
D21, D22	FWD	650 V	50 A	Buck Diode	
T21, T22	IGBT	650 V	50 A	Boost Switch	
D12, D14, D20	FWD	650 V	50 A	Boost Diode	
Rt	NTC			Thermistor	



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datasheet

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

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

Package data
Package data for <i>flow 1</i> 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-PY07HVA050S501-L984F28Y-D2-14	12 Mar. 2021	Ordering option added	

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.