



Vincotech

10-P1076PA100I7-L825F09Y

datasheet

flowPACK 1

650 V / 100 A

Topology features

- Inverter
- Kelvin Emitter for improved switching performance
- Temperature sensor

Component features

- Easy paralleling
- Low collector emitter saturation voltage
- Low turn-off losses
- Positive temperature coefficient

Housing features

- Base isolation: Al_2O_3
- Convex shaped substrate for superior thermal contact
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

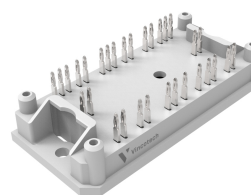
Target applications

- Embedded Drives
- Heat Pumps
- Industrial Drives
- Servo Drives

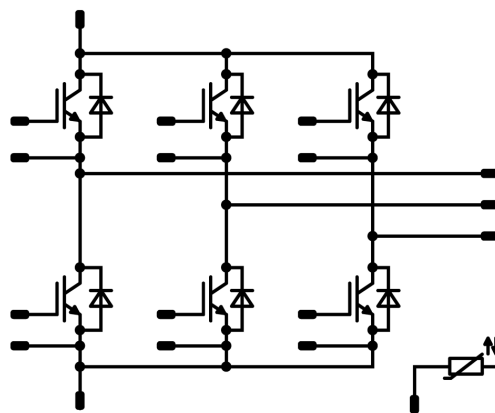
Types

- 10-P1076PA100I7-L825F09Y

flow 1 17 mm housing



Schematic





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Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
Inverter Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	91	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	300	A
Turn off safe operating area		$T_j = 150\text{ °C}$, $V_{CE} = 1200\text{ V}$	300	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	122	W
Gate-emitter voltage	V_{GES}		± 20	V
Short circuit ratings	t_{SC}	$V_{GE} = 15\text{ V}$, $V_{CC} = 400\text{ V}$ $T_j = 150\text{ °C}$	3	μs
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$

Inverter Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	83	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	300	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	119	W
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$

Module Properties

Thermal Properties

Storage temperature	T_{stg}		-40...+125	$^{\circ}\text{C}$
Operation temperature under switching condition	T_{jop}		-40...+($T_{jmax} - 25$)	$^{\circ}\text{C}$

Isolation Properties

Isolation voltage	V_{isol}	DC Test Voltage* $t_p = 2\text{ s}$	6000	V
Creepage distance			>12,7	mm
Clearance			>12,7	mm
Comparative Tracking Index	CTI		≥ 600	

*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		

Inverter Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,001	25	4,35	5	5,65	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		100	25 125 150		1,3 1,36 1,38	1,65 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	650		25			40	µA
Gate-emitter leakage current	I_{GES}		20	0		25			200	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25		25		6100		pF
Output capacitance	C_{oes}							184		pF
Reverse transfer capacitance	C_{res}							62		pF
Gate charge	Q_g	$V_{CC} = 520 \text{ V}$	15		100	25		580		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2 \text{ W/mK}$ (PTM)						0,78		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 2 \Omega$ $R_{goff} = 2 \Omega$	± 15	350	100	25 125 150		60,46 62,93 63,55		ns
Rise time	t_r					25 125 150		15,8 19,61 20,18		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		128,79 158,48 165,66		ns
Fall time	t_f					25 125 150		23,28 47,3 49,39		ns
Turn-on energy (per pulse)	E_{on}					25 125 150		1,13 1,62 1,83		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		1,55 2,36 2,55		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	

Inverter Diode

Static

Forward voltage	V_F				100	25 125 150		1,68 1,58 1,56	2 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 650$ V				25			40	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 5,2$ W/mK (PTM)						0,8		K/W
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Dynamic

Peak recovery current	I_{RM}	$di/dt=7116$ A/µs $di/dt=4832$ A/µs $di/dt=5281$ A/µs	± 15	350	100	25 125 150		72,83 91,15 97,39		A
Reverse recovery time	t_{rr}					25 125 150		65,51 107,9 121,24		ns
Recovered charge	Q_r					25 125 150		2,31 4,75 5,53		µC
Reverse recovered energy	E_{rec}					25 125 150		0,462 1,01 1,19		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		1731,9 1156,39 1225,68		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		4,7		kΩ
Deviation of R100	$\Delta_{R/R}$	$R_{100} = 401 \Omega$				100	-12		13,1	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 3 \%$						3612		K
B-value	$B_{(25/100)}$	Tol. $\pm 3 \%$						3650		K
Vincotech Thermistor Reference									U	

⁽¹⁾ Value at chip level

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



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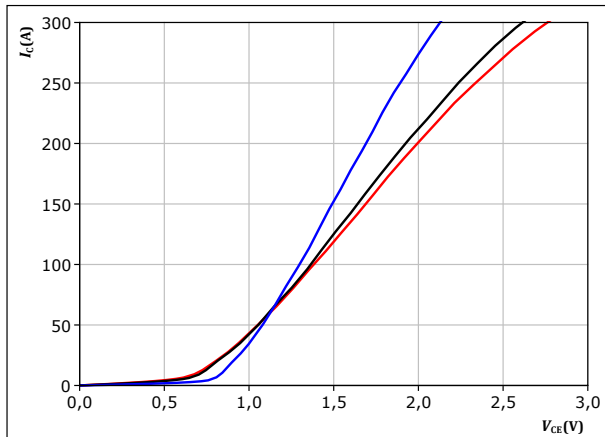
10-P1076PA100I7-L825F09Y datasheet

Inverter Switch Characteristics

figure 1. IGBT

Typical output characteristics

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



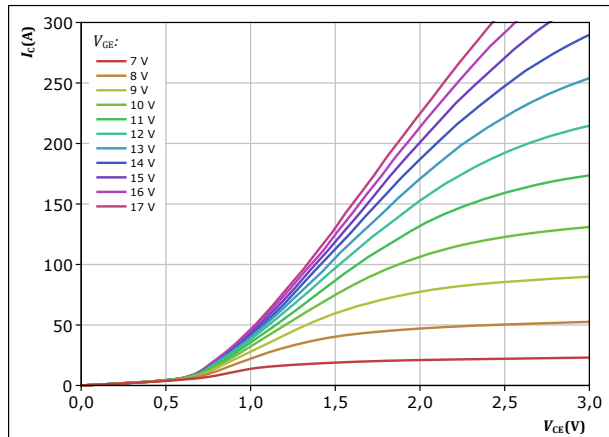
$t_p = 250 \mu s$
 $V_{GE} = 15 V$

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 2. IGBT

Typical output characteristics

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

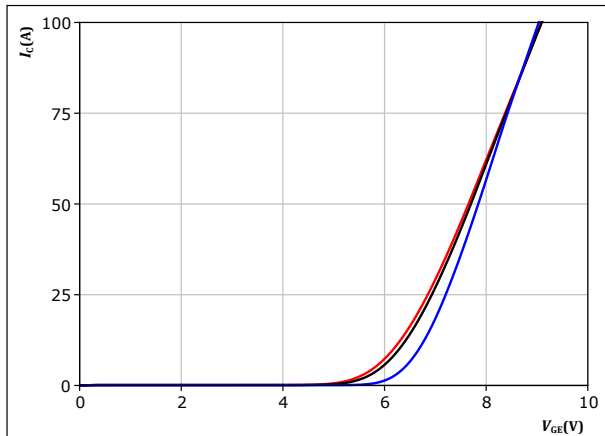


$t_p = 250 \mu s$
 $T_j = 150 ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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



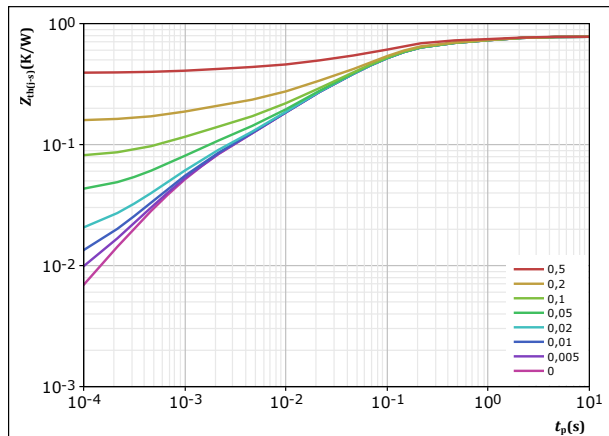
$t_p = 250 \mu s$
 $V_{CE} = 9 V$

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 0,779 K/W$
IGBT thermal model values

$R (K/W)$	$\tau (s)$
9,61E-03	1,22E+01
1,31E-01	9,23E-01
4,57E-01	8,37E-02
1,29E-01	1,14E-02
5,61E-02	1,02E-03



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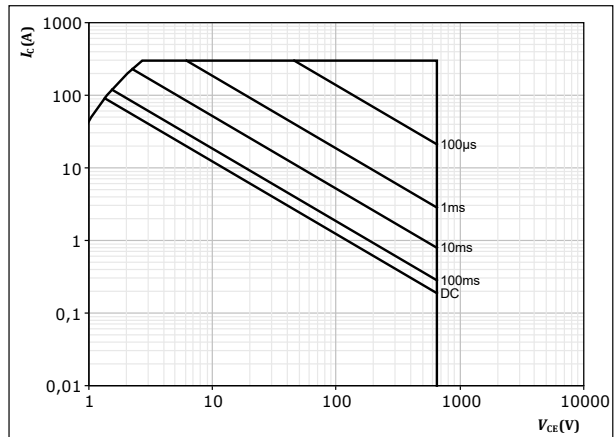
datasheet

Inverter Switch Characteristics

figure 5. IGBT

Safe operating area

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

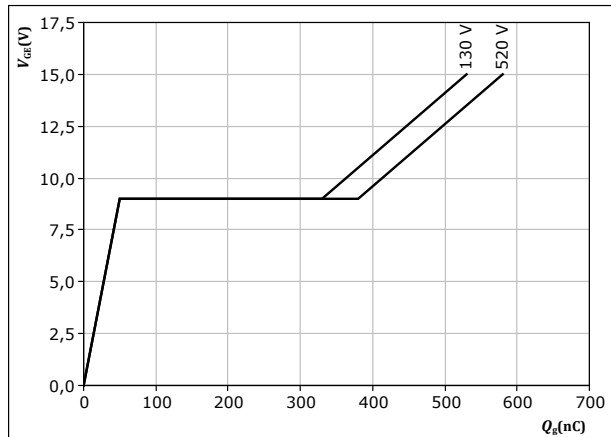


$D =$ single pulse
 $T_s = 80$ °C
 $V_{GE} = 15$ V
 $T_j = T_{jmax}$

figure 6. IGBT

Gate voltage vs gate charge

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



$I_C = 100$ A
 $T_j = 25$ °C



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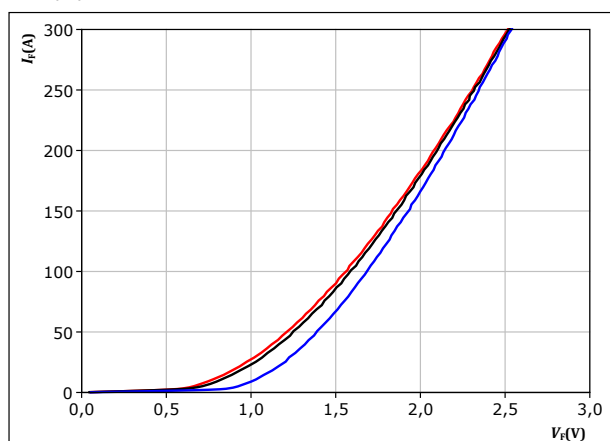
Inverter Diode Characteristics

figure 7.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

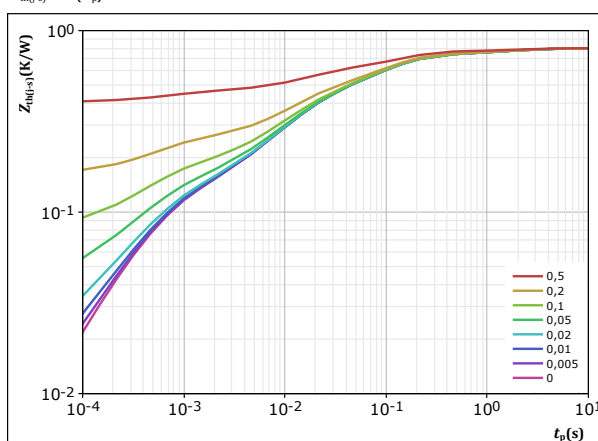
T_j : 25 °C, 125 °C, 150 °C

figure 8.

FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 0,8 \text{ K/W}$

FWD thermal model values

R (K/W)	τ (s)
$1,02E-02$	$1,68E+01$
$6,96E-02$	$1,42E+00$
$3,54E-01$	$9,36E-02$
$2,66E-01$	$1,17E-02$
$1,04E-01$	$4,94E-04$



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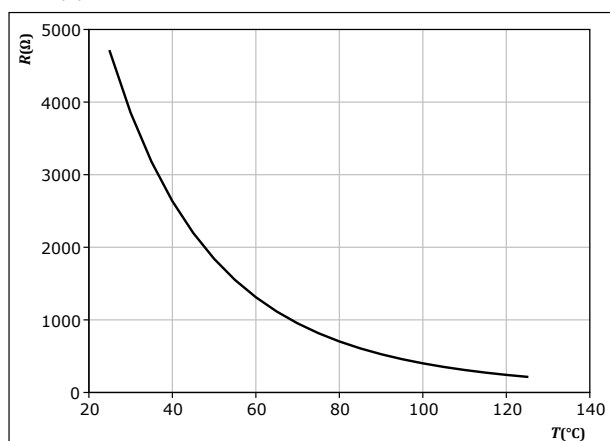
Thermistor Characteristics

figure 9.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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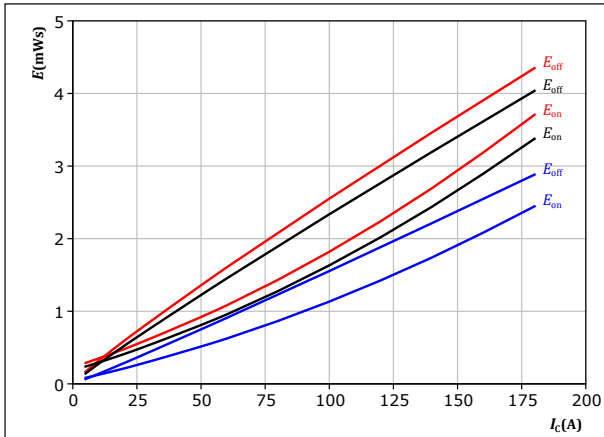
Inverter Switching Characteristics

figure 10.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 2$ Ω
 $R_{goff} = 2$ Ω

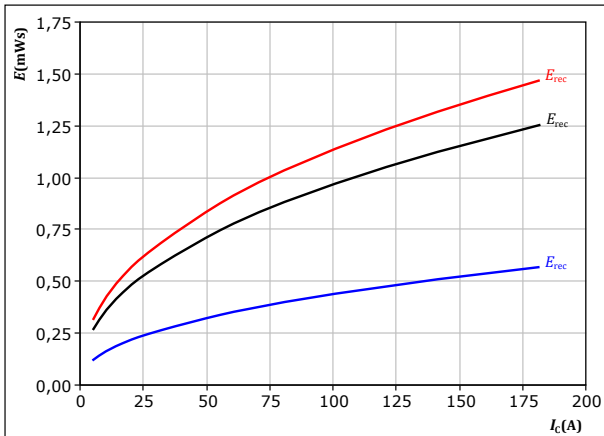
T_j : 25 °C
125 °C
150 °C

figure 12.

FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 2$ Ω

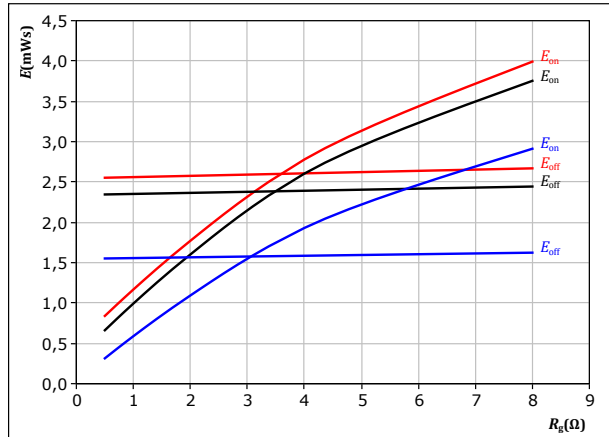
T_j : 25 °C
125 °C
150 °C

figure 11.

IGBT

Typical switching energy losses as a function of IGBT turn on gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 100$ A

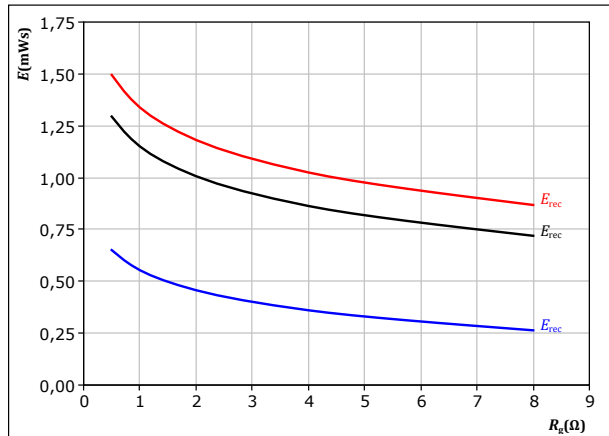
T_j : 25 °C
125 °C
150 °C

figure 13.

FWD

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 100$ A

T_j : 25 °C
125 °C
150 °C



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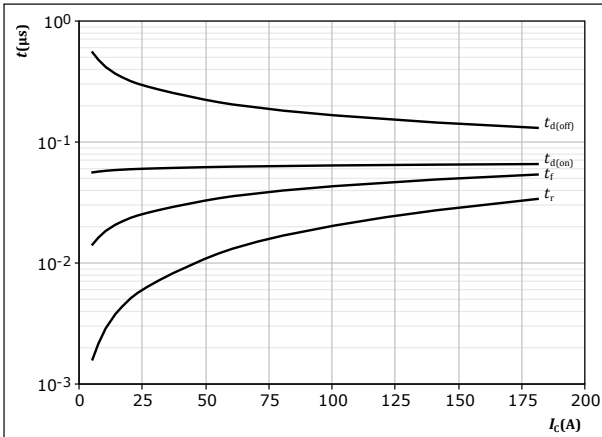
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datasheet

Inverter Switching Characteristics

figure 14.

IGBT

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



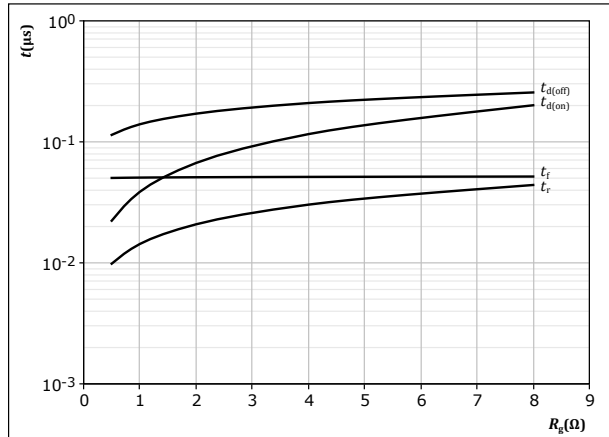
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 2$ Ω
 $R_{goff} = 2$ Ω

figure 15.

IGBT

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



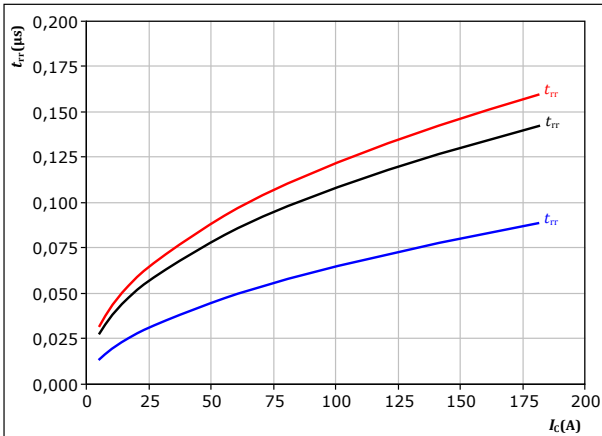
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 100$ A

figure 16.

FWD

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



With an inductive load at

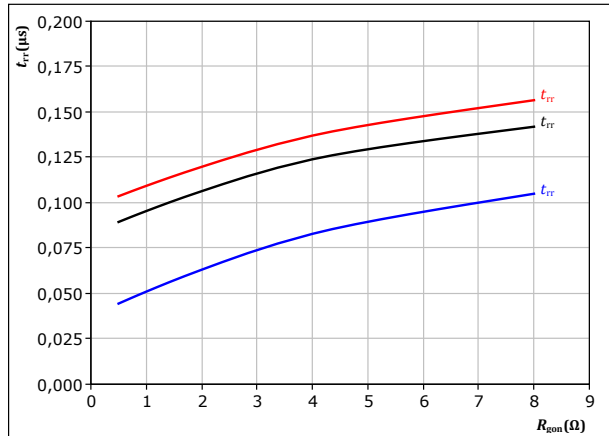
$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 2$ Ω

T_j : — 25 °C
— 125 °C
— 150 °C

figure 17.

FWD

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 100$ A

T_j : — 25 °C
— 125 °C
— 150 °C



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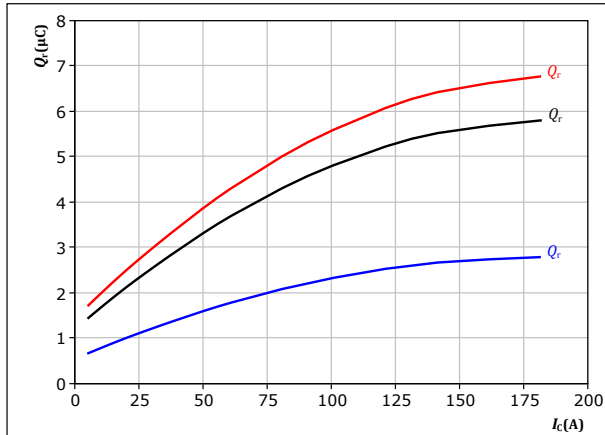
Inverter Switching Characteristics

figure 18.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 2$ Ω

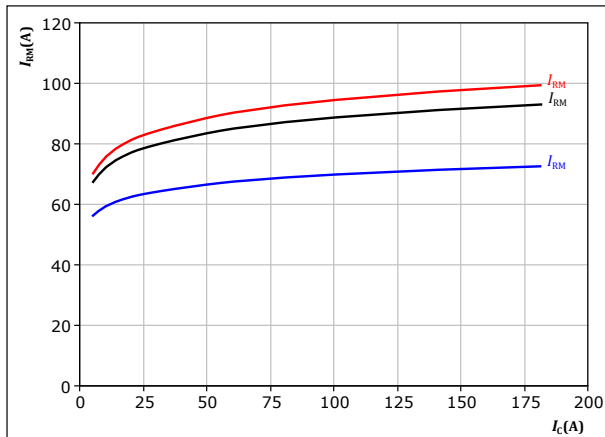
T_j : 25 °C
125 °C
150 °C

figure 20.

FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 2$ Ω

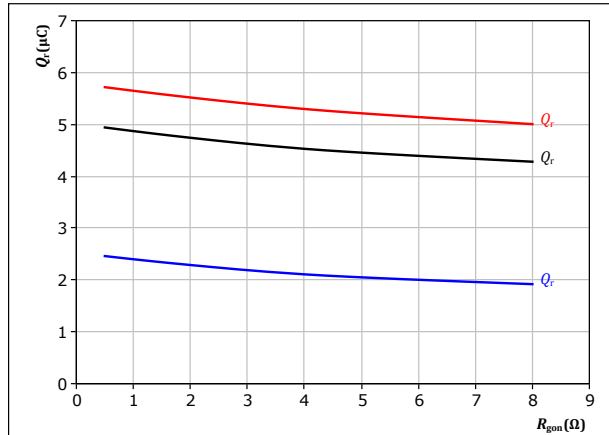
T_j : 25 °C
125 °C
150 °C

figure 19.

FWD

Typical recovered charge as a function of IGBT turn on gate resistor

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A

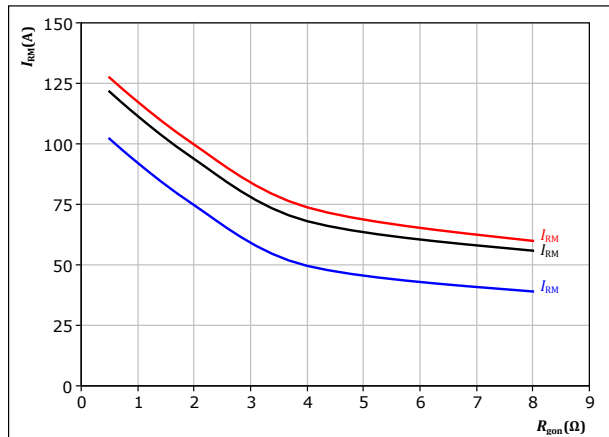
T_j : 25 °C
125 °C
150 °C

figure 21.

FWD

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

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_c = 100$ A

T_j : 25 °C
125 °C
150 °C



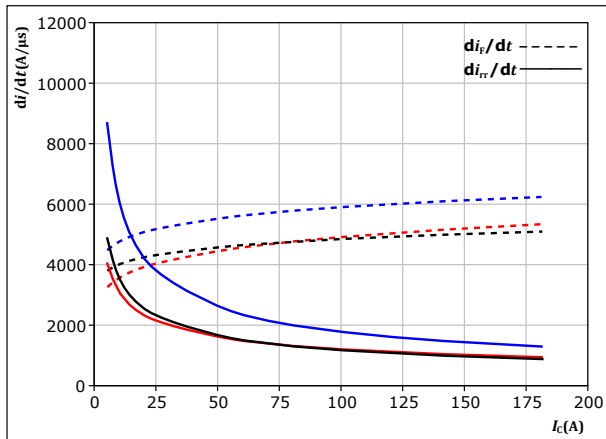
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Inverter Switching Characteristics

figure 22. FWD

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

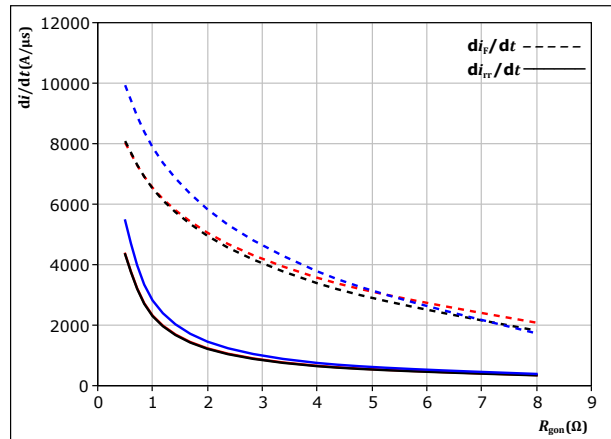


With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 2$ Ω
 $T_j = 25$ °C
 $T_j = 125$ °C
 $T_j = 150$ °C

figure 23. FWD

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



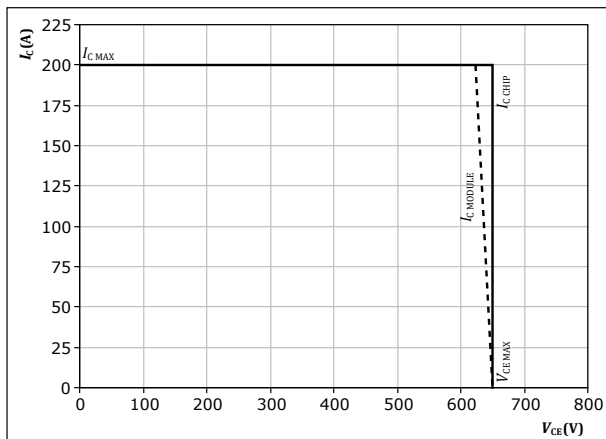
With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 100$ A
 $T_j = 25$ °C
 $T_j = 125$ °C
 $T_j = 150$ °C

figure 24. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 150$ °C
 $R_{gon} = 2$ Ω
 $R_{goff} = 2$ Ω



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Inverter Switching Definitions

figure 25. IGBT

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

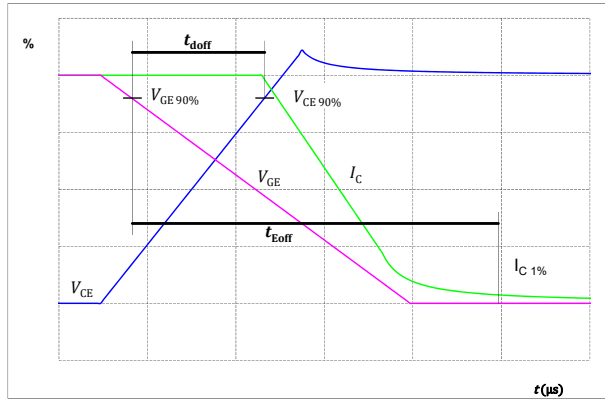


figure 26. IGBT

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

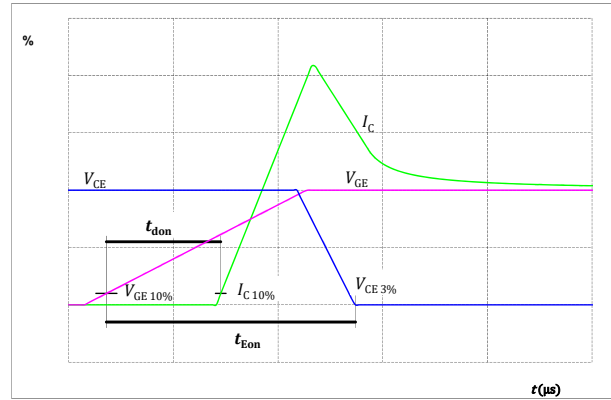


figure 27. IGBT

Turn-off Switching Waveforms & definition of t_f

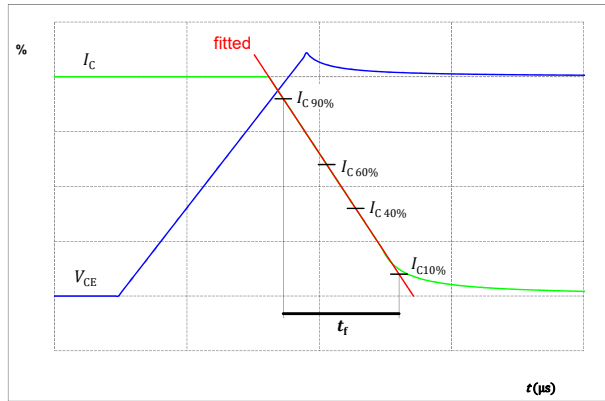
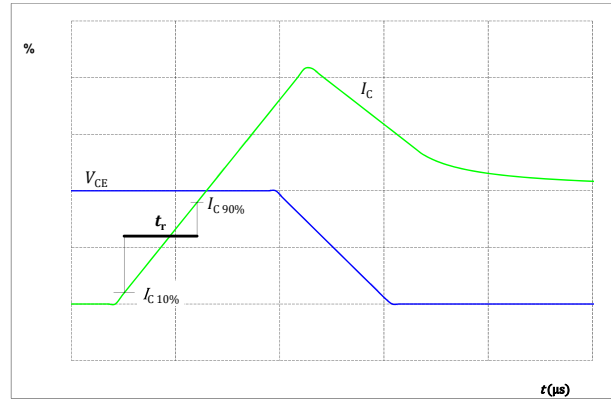


figure 28. IGBT

Turn-on Switching Waveforms & definition of t_r





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Inverter Switching Definitions

figure 29.

FWD

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

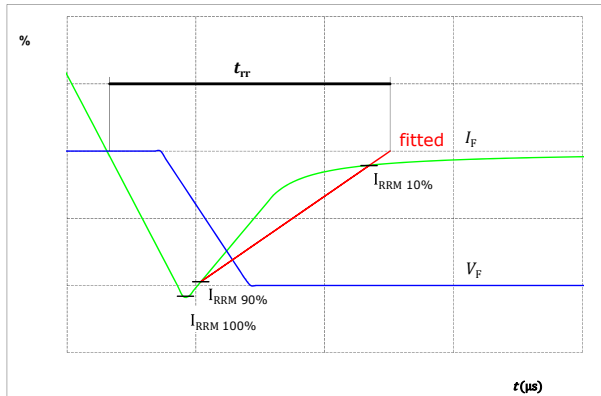
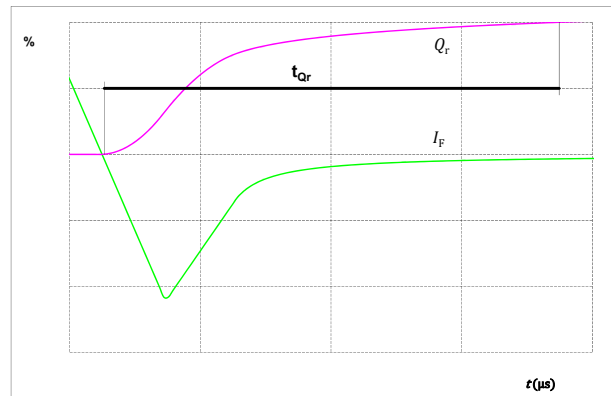


figure 30.

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-P1076PA100I7-L825F09Y
With thermal paste (5,2 W/mK, PTM6000HV)	10-P1076PA100I7-L825F09Y-/7/

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

Outline
Pin table [mm]

Pin	X	Y	Function
1	52,6	0	DC-123
2	49,9	0	DC-123
3	42,65	0	G15
4	39,65	0	S15
5	35,15	0	Therm1
6	28,4	0	Therm2
7	24	0	G13
8	21	0	S13
9	12,2	0	G11
10	9,2	0	S11
11	2,7	0	DC-123
12	0	0	DC-123
13	0	14,65	DC+123
14	2,7	14,65	DC+123
15	0	28,6	Ph1
16	2,7	28,6	Ph1
17	5,4	28,6	Ph1
18	9,6	28,6	S12
19	12,6	28,6	G12
20	19,6	28,6	Ph2
21	22,3	28,6	Ph2
22	25	28,6	Ph2
23	29,7	28,6	S14
24	32,7	28,6	G14
25	39,7	28,6	S16
26	42,7	28,6	G16
27	47,2	28,6	Ph3
28	49,9	28,6	Ph3
29	52,6	28,6	Ph3
30	52,6	14,65	DC+123
31	49,9	14,65	DC+123

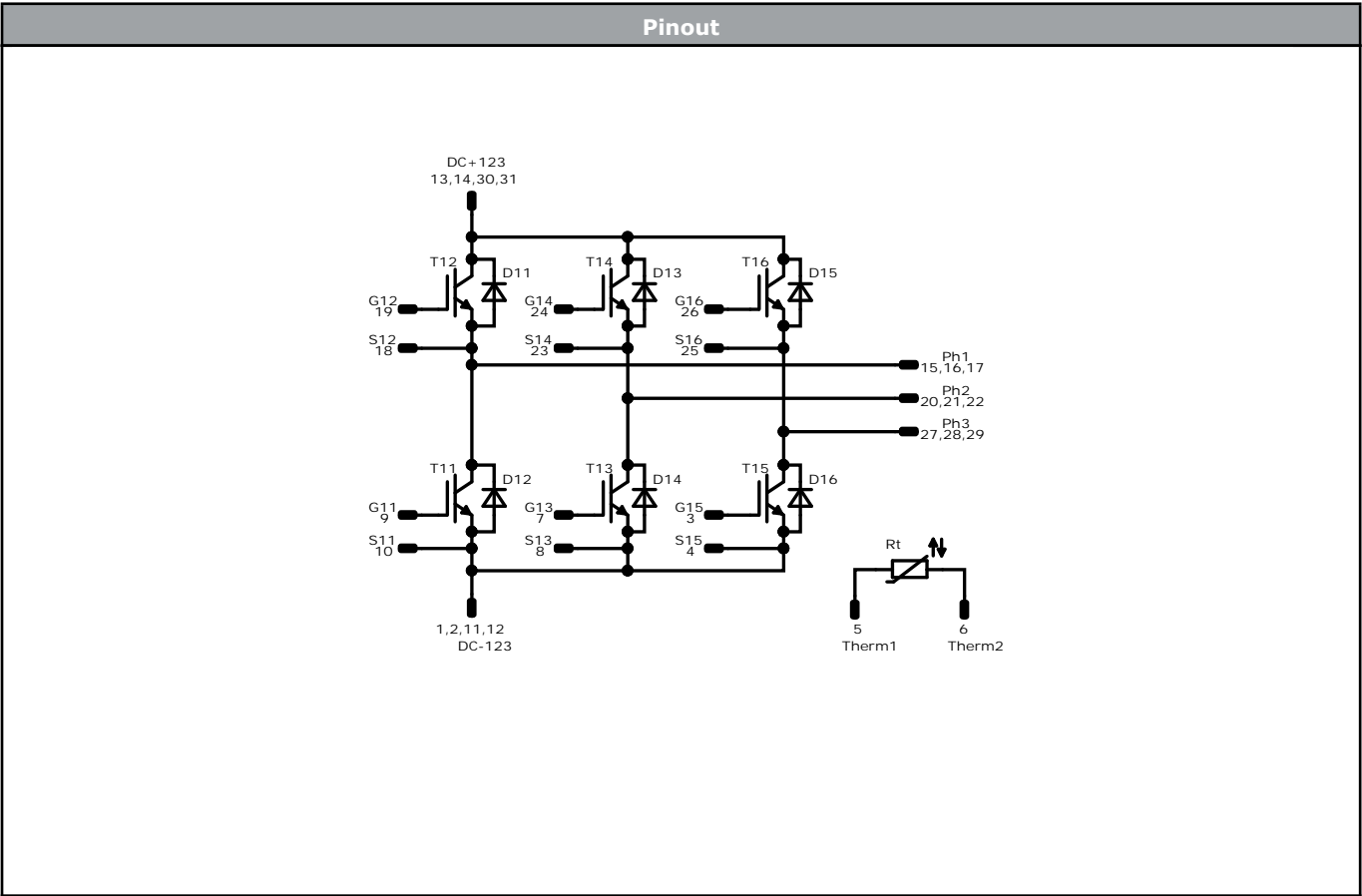
The technical drawing shows the PCB layout with dimensions in mm. The top view shows a rectangular board with a central cutout. The bottom view shows the pin locations. Dimensions include: overall width 81.5 mm, overall height 22.5 mm, pin pitch 2.5 mm, and various offsets for pin groups. A note indicates that the center of the press-fit pin head is at least 1mm from the PCB drilled through-hole, with a tolerance of ±0.09 mm.

*tolerance of positions: ±0.5mm at the end of pins
 Dimension of coordinate axis is only offset without tolerance



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Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	IGBT	650 V	100 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	650 V	100 A	Inverter Diode	
Rt	Thermistor			Thermistor	



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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 UL 1557 recognized under E192116 up to a junction temperature under switching condition $T_{j,sp}=175^{\circ}\text{C}$ and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.				

Document No.:	Date:	Modification:	Pages
10-P1076PA100I7-L825F09Y-D1-14	13 Mar. 2026	Initial Release	

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