Vincotech

10-EZ126PA050M702-L850F76T
datasheet

***flow*PACK E2** **1200 V / 50 A**

Topology features

- Open Emitter configuration
- Temperature sensor
- Inverter
- Low side Kelvin Emitter for improved switching performance

Component features

- Easy paralleling
- Low turn-off losses
- Low collector emitter saturation voltage
- Positive temperature coefficient
- Short tail current
- Switching optimized for EMC

Housing features

- Base isolation: Al_2O_3
- Convex shaped substrate for superior thermal contact
- Compact housing
- CTI600 housing material
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

Target applications

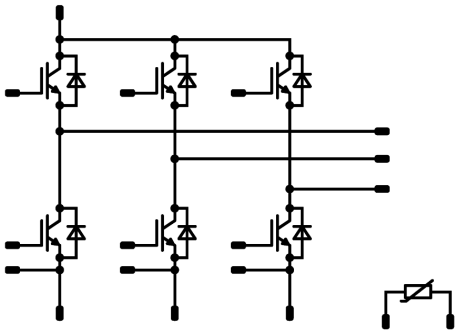
- Heat Pumps
- Servo Drives

Types

- 10-EZ126PA050M702-L850F76T

flow E1 12 mm housing

Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Inverter Switch				
Collector-emitter voltage	V_{CES}		1200	V
Collector current (DC current)	I_C	T_j = T_{jmax} T_s = 80 °C	61	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	100	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	127	W
Gate-emitter voltage	V_{GES}		±20	V
Short circuit ratings	t_{SC}	V_{GE} = 15 V, V_{CC} = 800 V T_j = 150 °C	9,5	µs
Maximum junction temperature	T_{jmax}		175	°C
Inverter Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	T_j = T_{jmax} T_s = 80 °C	34	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	50	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	66	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 s	6000	V
Creepage distance			>12,7	mm
Clearance			8,62	mm
Comparative Tracking Index	CTI		≥ 600	

*100 % tested in production

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	$V_{GE(th)}$			10	0,005	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		50	25 125 150		1,55 1,77 1,83	1,9(1)	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			0,09	mA
Gate-emitter leakage current	I_{GES}		20	0		25			0,5	µA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}		0	10		25		10000		pF
Output capacitance	C_{oes}							350		pF
Reverse transfer capacitance	C_{res}							130		pF
Gate charge	Q_g	V_{CC} = 600 V	0/15		50	25		380		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,75		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 2 Ω R_{goff} = 2 Ω	±15	600	50	25 125 150		51,74 52,65 52,73		ns
Rise time	t_r					25 125 150		8,85 10,67 11,31		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		135,8 163,41 170,14		ns
Fall time	t_f					25 125 150		80,39 104,54 112,68		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=3,5 µC Q_{rFWD}=4,91 µC Q_{rFWD}=5,44 µC				25 125 150		2,26 2,86 3,16		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		3,57 4,89 5,31		mWs

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				25	25 125 150		1,63 1,7 1,69	2,1[1]	V
Reverse leakage current	I_R	V_r = 1200 V				25			35	µA
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						1,43		K/W
Dynamic										
Peak recovery current	I_{RM}	di/dt=4229 A/µs di/dt=3941 A/µs di/dt=2603 A/µs	±15	600	50	25 125 150		38,53 41,47 42,35		A
Reverse recovery time	t_{rr}					25 125 150		322,99 430,57 470,76		ns
Recovered charge	Q_r					25 125 150		3,5 4,91 5,44		µC
Reverse recovered energy	E_{rec}					25 125 150		1,33 1,96 2,19		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		817,22 601,36 523,15		A/µs

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		5		kΩ
Deviation of R100	$\Delta_{R/R}$	R_{100} = 499 Ω				100	3,2		3,3	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,3		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %						3380		K
Vincotech Thermistor Reference									V	

(1) Value at chip level

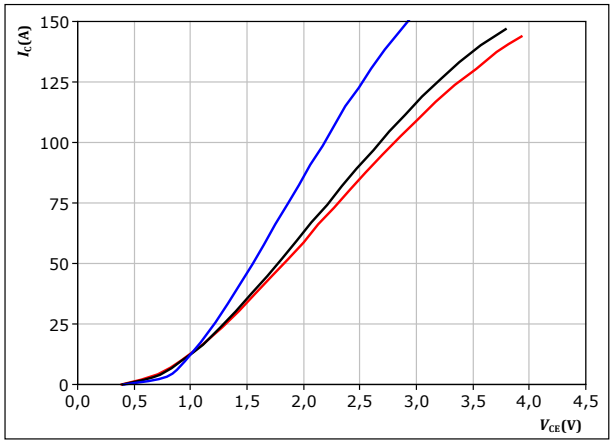
(2) Only valid with pre-applied Vincotech thermal interface material.

Inverter Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$

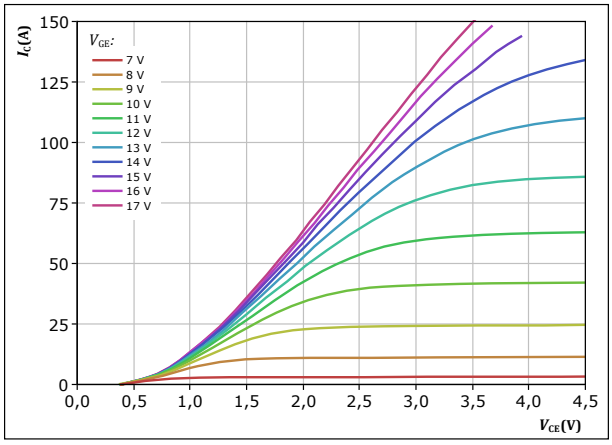


t_p =	250	µs		
V_{GE} =	15	V	T_j:	25 °C
				125 °C
				150 °C

figure 2. **IGBT**

Typical output characteristics

$I_C = f(V_{CE})$



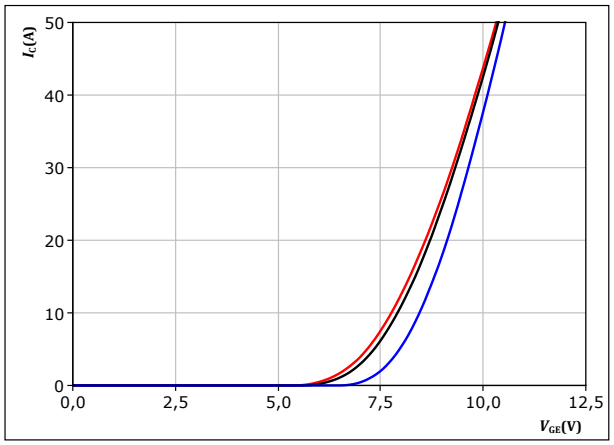
t_p =	250	µs
T_j =	150	°C

V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. **IGBT**

Typical transfer characteristics

$I_C = f(V_{GE})$

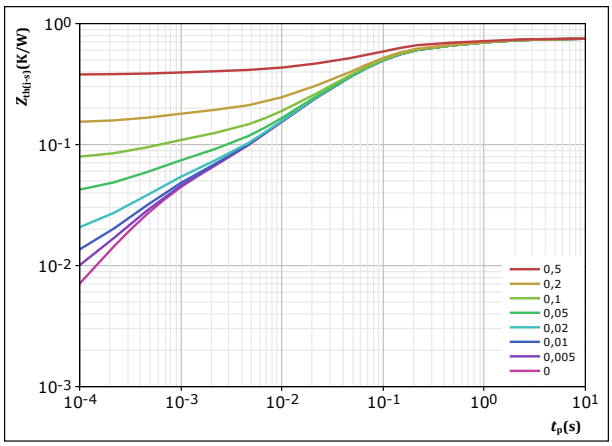


t_p =	250	µs		
V_{CE} =	10	V	T_j:	25 °C
				125 °C
				150 °C

figure 4. **IGBT**

Transient thermal impedance as a function of pulse width

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



D =	t_p / T	
$R_{th(j-s)}$ =	0,751	K/W

IGBT thermal model values

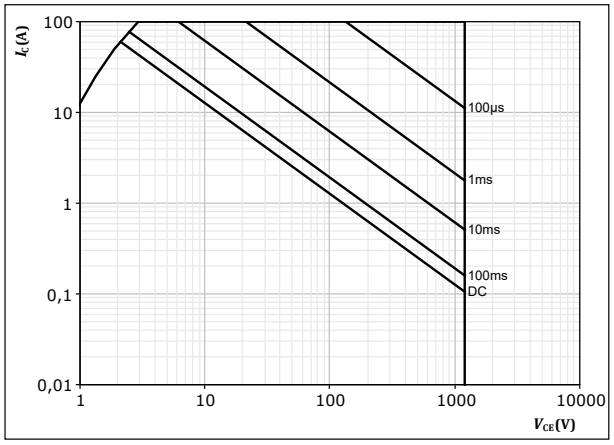
R (K/W)	τ (s)
2,79E-02	6,92E+00
1,38E-01	7,04E-01
4,58E-01	7,12E-02
9,50E-02	1,14E-02
3,73E-02	6,15E-04

Inverter Switch Characteristics

figure 5. **IGBT**

Safe operating area

$I_C = f(V_{CE})$

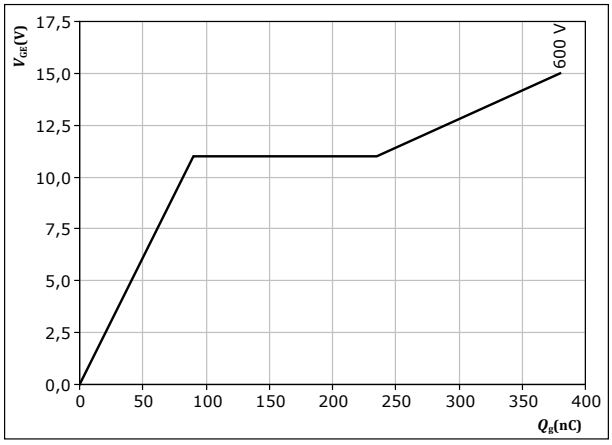


$D =$ single pulse
$T_s =$ 80 °C
$V_{GE} =$ 15 V
$T_j =$ T_{jmax}

figure 6. **IGBT**

Gate voltage vs gate charge

$V_{GE} = f(Q_g)$



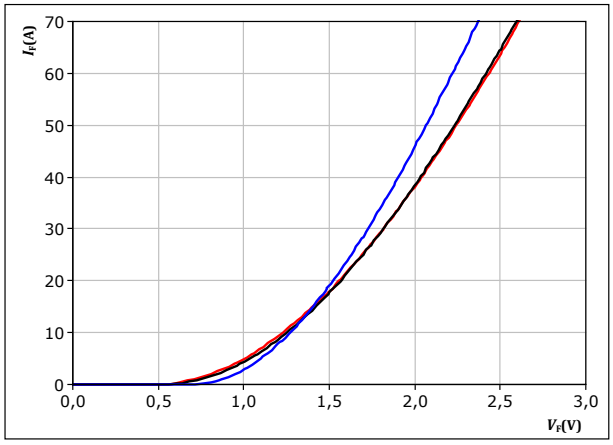
$I_C =$ 50 A
$T_j =$ 25 °C

Inverter Diode Characteristics

figure 7. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



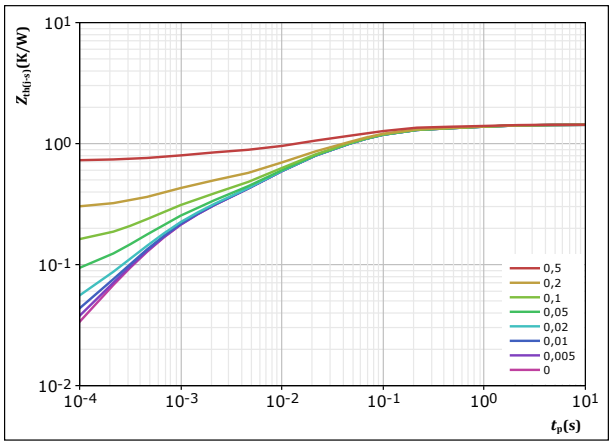
t_p = 250 µs

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

$R_{th(j-s)}$ = 1,434 K/W

FWD thermal model values

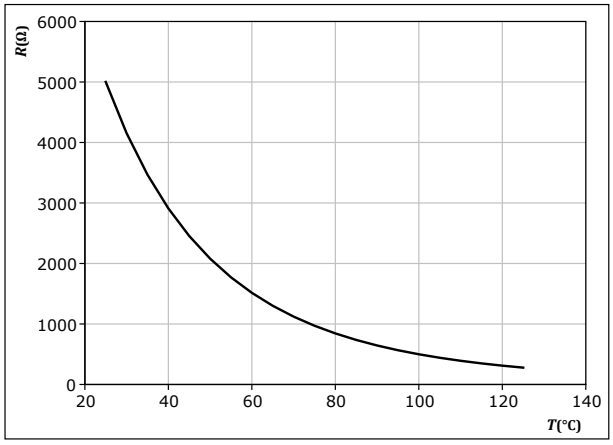
R (K/W)	τ (s)
2,24E-02	1,46E+01
1,45E-01	7,62E-01
6,46E-01	5,62E-02
4,20E-01	9,32E-03
2,08E-01	6,92E-04

Thermistor Characteristics

figure 9. **Thermistor**

Typical NTC characteristic as function of temperature

$R_T = f(T)$

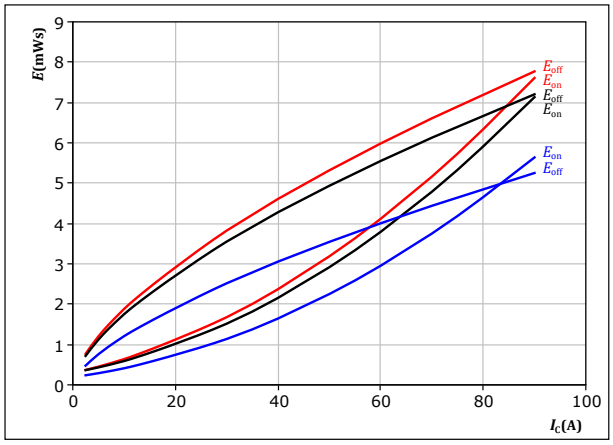


Inverter Switching Characteristics

figure 10. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



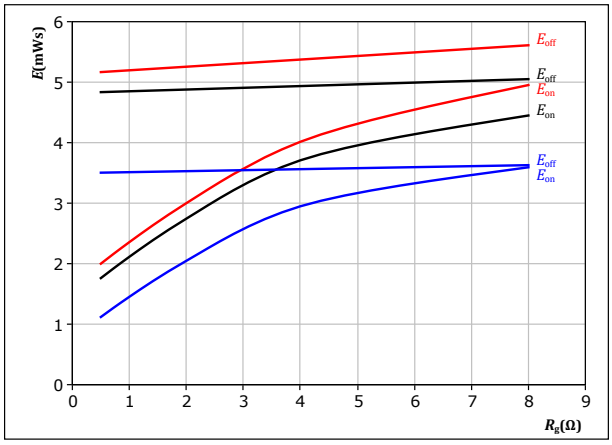
With an inductive load at

V_{CE} =	600	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
R_{gon} =	2	Ω	150 °C
R_{goff} =	2	Ω	

figure 11. **IGBT**

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

$E = f(R_g)$



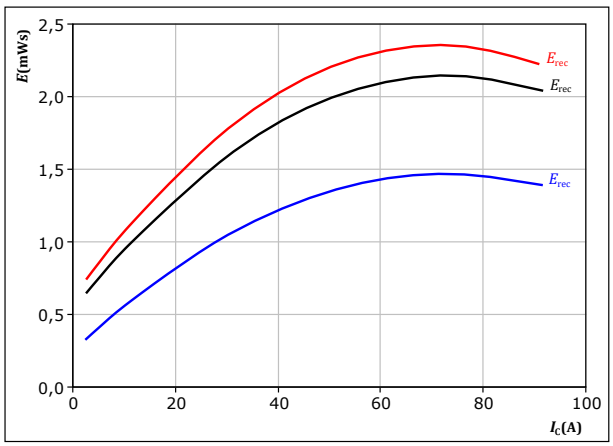
With an inductive load at

V_{CE} =	600	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
I_C =	50	A	150 °C

figure 12. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



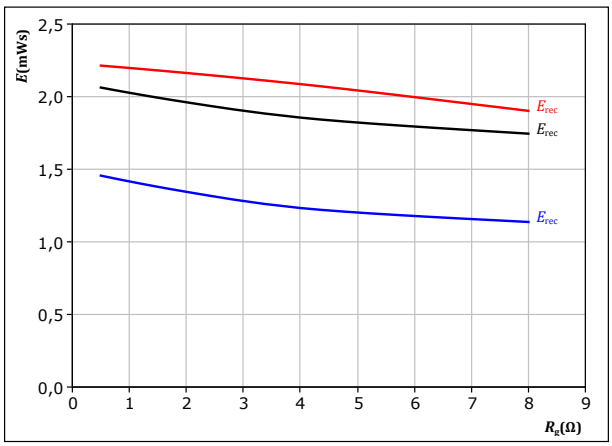
With an inductive load at

V_{CE} =	600	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
R_{gon} =	2	Ω	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

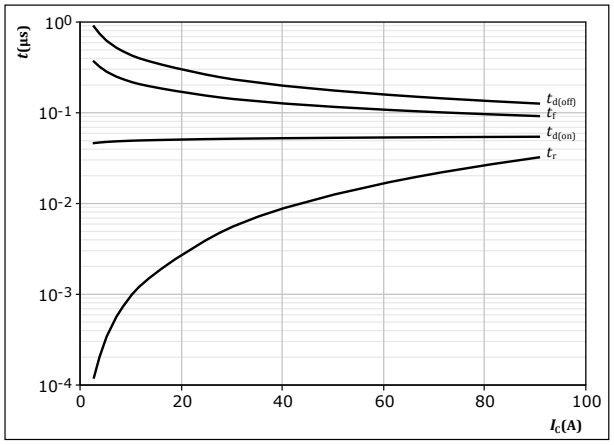
V_{CE} =	600	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
I_C =	50	A	150 °C

Inverter Switching Characteristics

figure 14. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



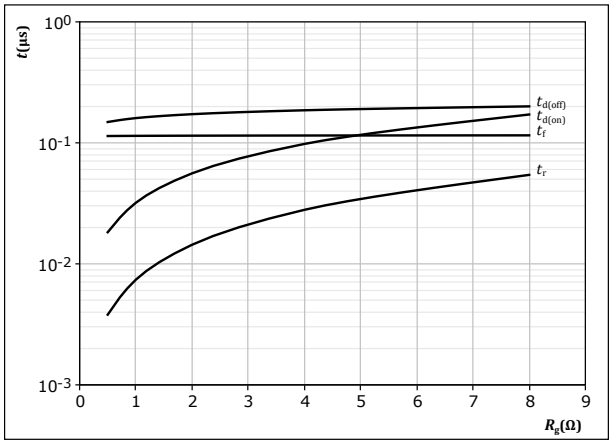
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±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

$t = f(R_g)$



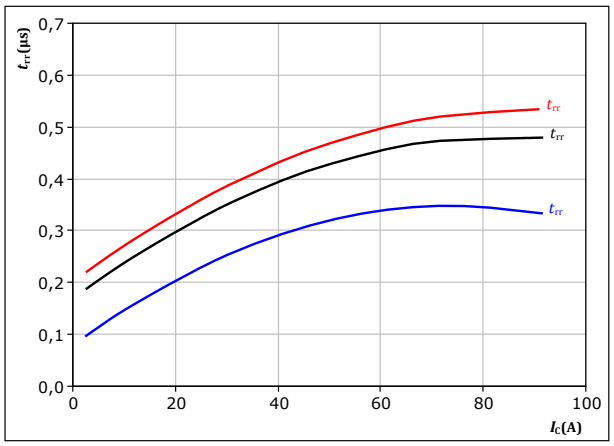
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	50	A

figure 16. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

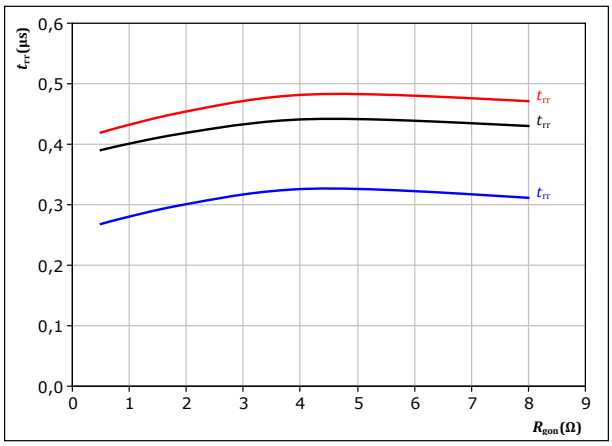
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	2	Ω

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} =	600	V
V_{GE} =	±15	V
I_C =	50	A

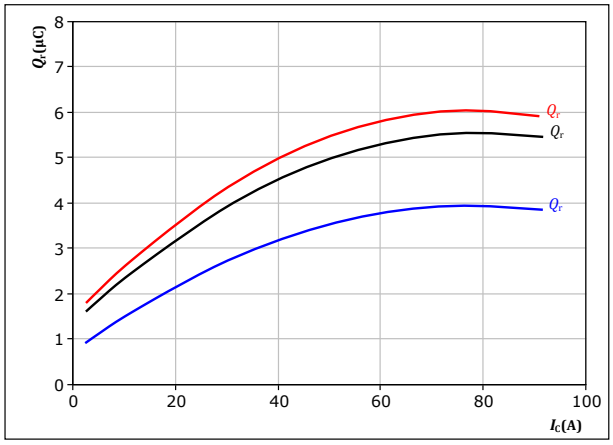
T_j: 25 °C, 125 °C, 150 °C

Inverter Switching Characteristics

figure 18. **FWD**

Typical recovered charge as a function of collector current

$Q_r = f(I_C)$



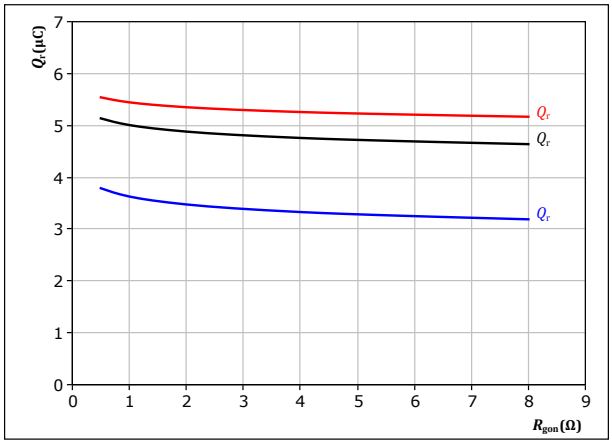
With an inductive load at

V_{CE} =	600	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
R_{gon} =	2	Ω	150 °C

figure 19. **FWD**

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

$Q_r = f(R_{gon})$



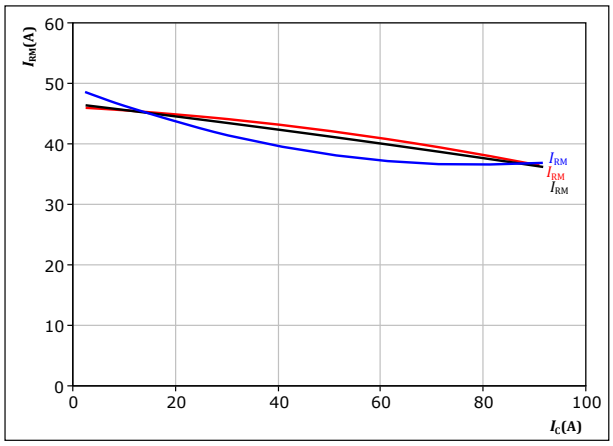
With an inductive load at

V_{CE} =	600	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
I_C =	50	A	150 °C

figure 20. **FWD**

Typical peak reverse recovery current as a function of collector current

$I_{RM} = f(I_C)$



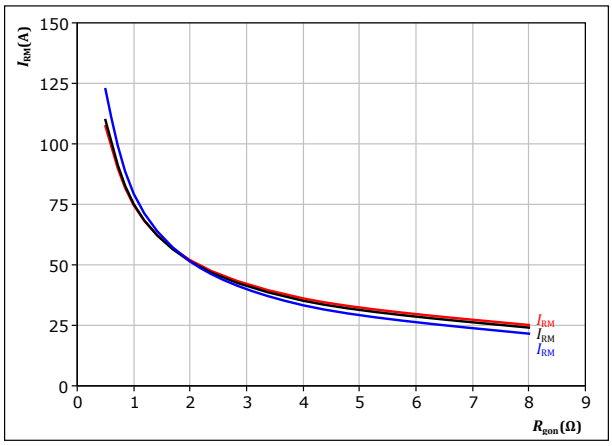
With an inductive load at

V_{CE} =	600	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
R_{gon} =	2	Ω	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

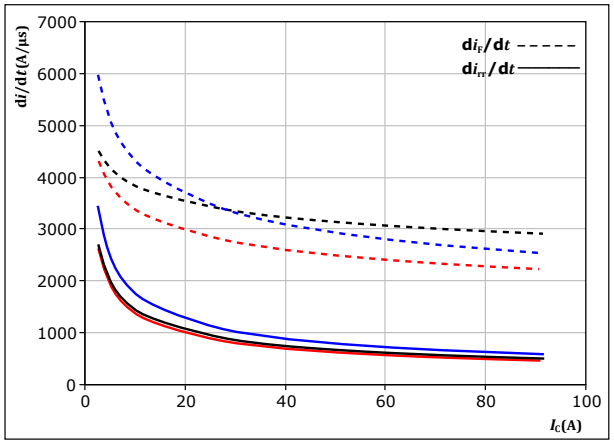
V_{CE} =	600	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
I_C =	50	A	150 °C

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_{rr}/dt = f(I_C)



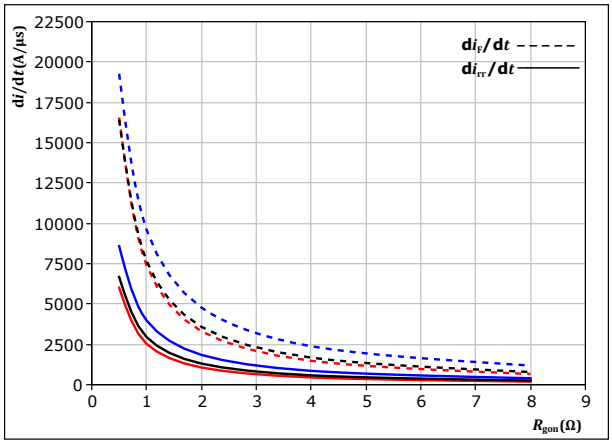
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
R_{gon} =	2	Ω		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_{rr}/dt = f(R_{gon})



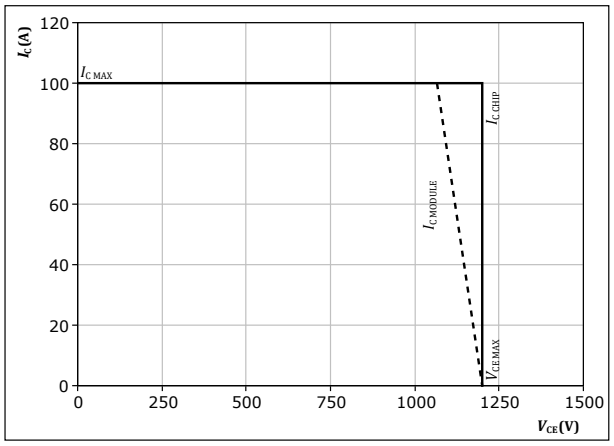
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	50	A		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	

Inverter Switching Definitions

figure 25. **IGBT**

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

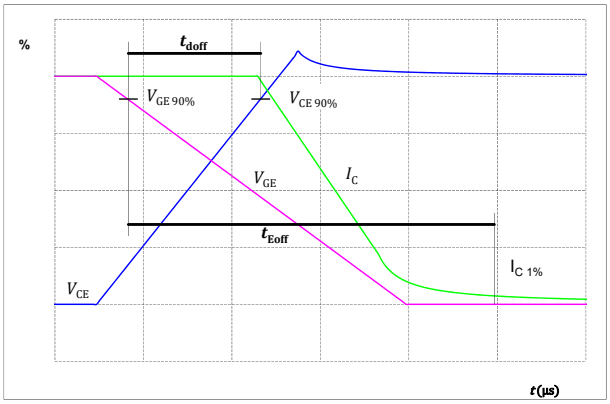


figure 26. **IGBT**

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

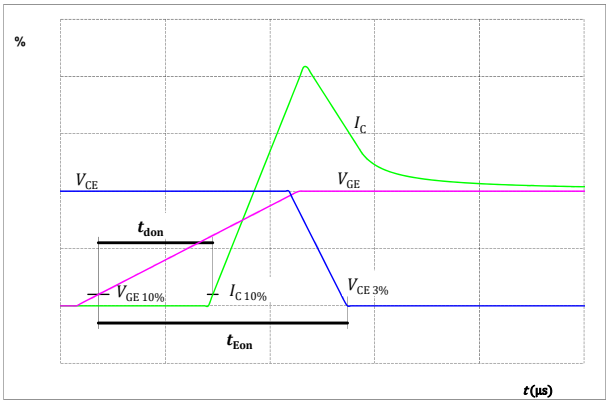


figure 27. **IGBT**

Turn-off Switching Waveforms & definition of t_f

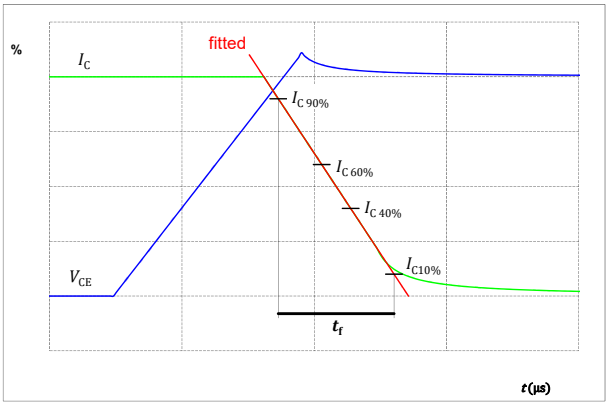
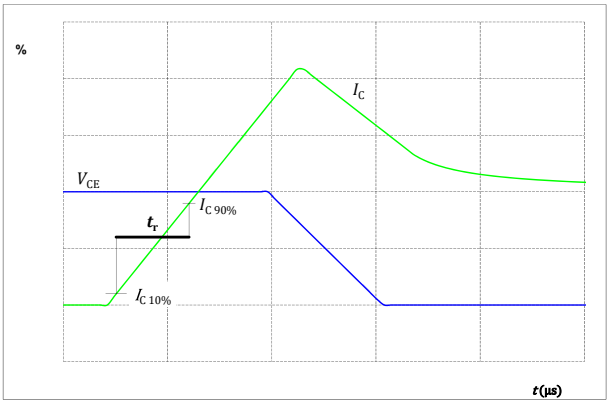


figure 28. **IGBT**

Turn-on Switching Waveforms & definition of t_r



Inverter Switching Definitions

figure 29. **FWD**

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

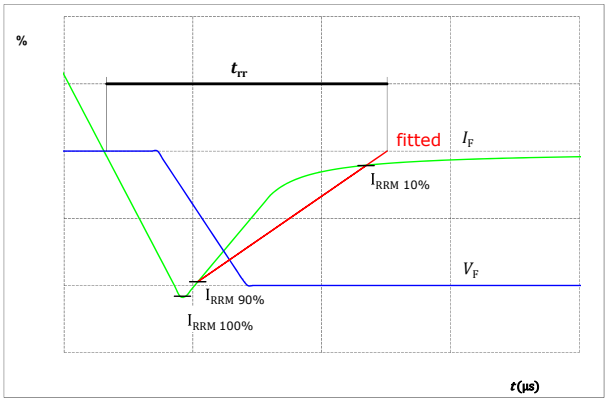
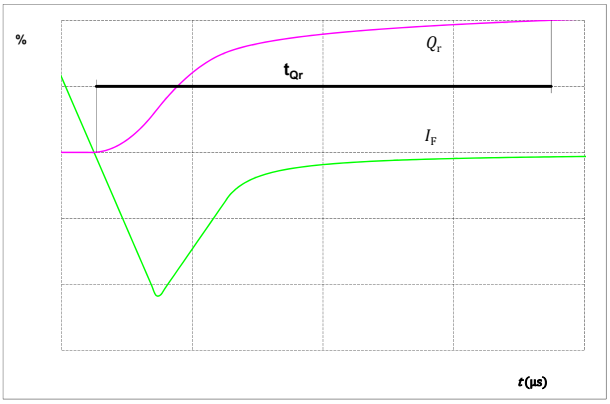


figure 30. **FWD**

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



Ordering Code

Version	Ordering Code
Without thermal paste	10-EZ126PA050M702-L850F76T
With thermal paste (5,2 W/mK, PTM6000HV)	10-EZ126PA050M702-L850F76T-/7/

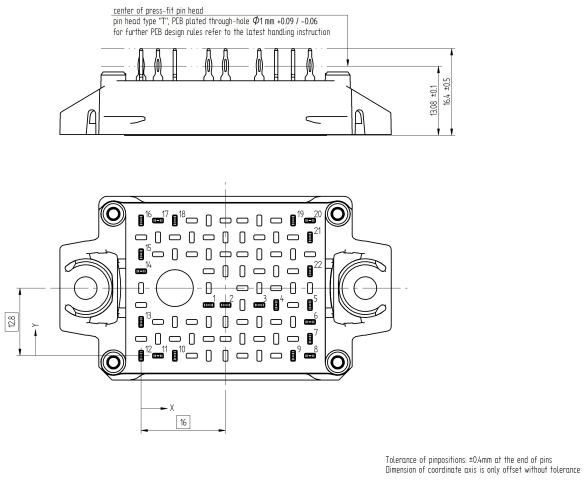
Marking

	Name		Date code	UL & VIN	Lot	Serial
Text	NN-NNNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
Datamatrix	**Type&Ver**	**Lot number**	**Serial**	**Date code**		
	TTTTTTTVV	LLLLL	SSSS	WWYY		

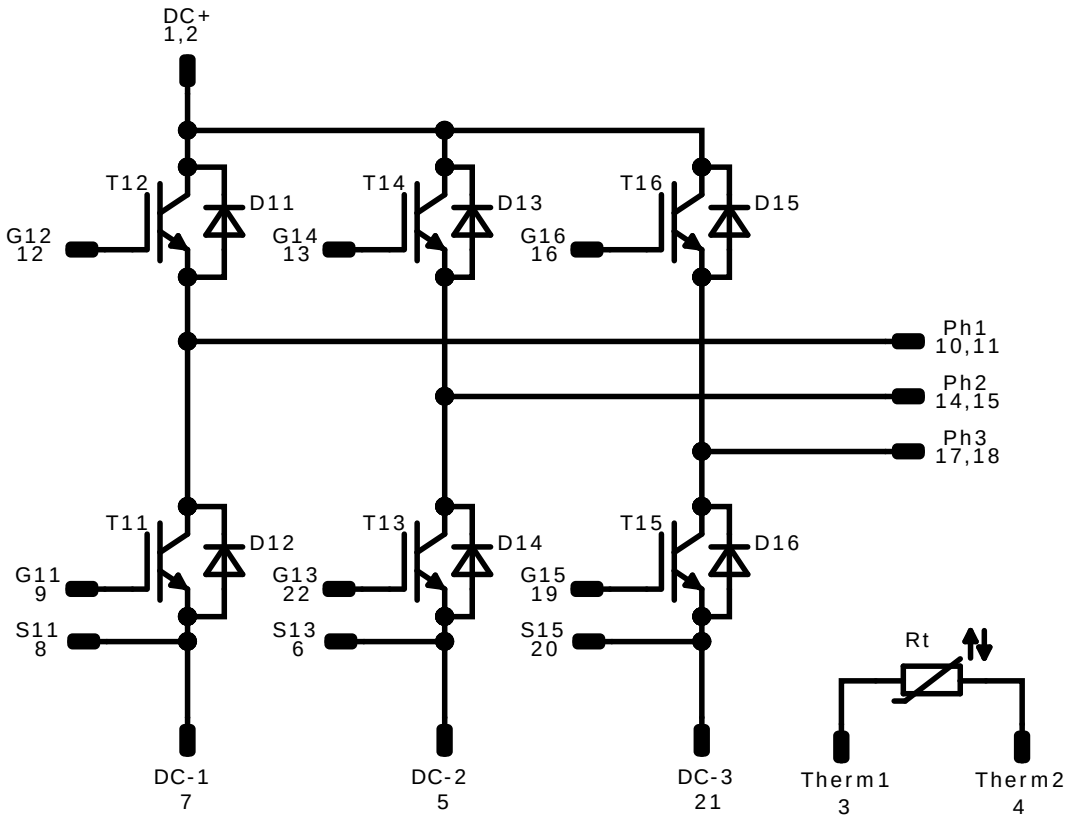
Outline

Pin table [mm]

Pin	X	Y	Function
1	12,8	9,6	DC+
2	16	9,6	DC+
3	22,4	9,6	Therm1
4	25,6	9,6	Therm2
5	32	9,6	DC-2
6	32	6,4	S13
7	32	3,2	DC-1
8	32	0	S11
9	28,8	0	G11
10	6,4	0	Ph1
11	3,2	0	Ph1
12	0	0	G12
13	0	6,4	G14
14	0	16	Ph2
15	0	19,2	Ph2
16	0	25,6	G16
17	3,2	25,6	Ph3
18	6,4	25,6	Ph3
19	28,8	25,6	G15
20	32	25,6	S15
21	32	22,4	DC-3
22	32	16	G13



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	IGBT	1200 V	50 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	1200 V	25 A	Inverter Diode	
Rt	Thermistor			Thermistor	

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

Handling instruction
Handling instructions for *flow* E1 packages see vincotech.com website.

Package data
Package data for *flow* E1 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 $T_{j,op}$=175°C and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
10-EZ126PA050M702-L850F76T-D1-14	4 Mar. 2026	Initial Release	