B0-SP122PB300M7-PT07F78T
datasheet

***flow*DUAL S3** | **1200 V / 300 A**

Topology features

- Common emitter point Half Bridge
- Temperature sensor

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
- CTI600 housing material
- Compact, baseplate-less housing
- VINcoPress Technology
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

Target applications

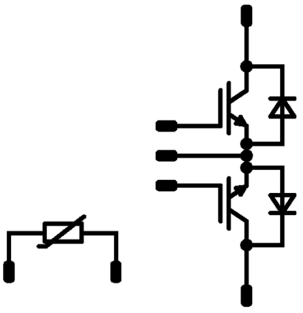
- Embedded Drives
- Industrial Drives

Types

- B0-SP122PB300M7-PT07F78T

flow S3 12 mm housing

Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
AC Switch					
Collector-emitter voltage	V_{CES}			1200	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$	T_s = 80 °C	230	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}		600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	390	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
AC Diode					
Peak repetitive reverse voltage	V_{RRM}			1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	193	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	307	W
Maximum junction temperature	T_{jmax}			175	°C

Module Properties

Parameter	Symbol	Conditions		Value	Unit
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				>12,7	mm
Comparative Tracking Index	CTI			≥ 600	

*100 % tested in production

Characteristic Values

Parameter	Symbol	Conditions	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	Unit
AC Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$			10	0,03	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		300	25 125 150		1,58 1,8 1,86	1,85(1)	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			200	μA
Gate-emitter leakage current	I_{GES}		20	0		25			1000	nA
Internal gate resistance	r_{g}							1,5		Ω
Input capacitance	C_{ies}							60000		pF
Output capacitance	C_{oes}		0	10		25		1760		pF
Reverse transfer capacitance	C_{res}							640		pF
Gate charge	Q_{g}	V_{CC} = 600 V	0/15		300	25		2000		nC
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,24		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$					25 125 150		419,24 428,11 431,59		ns
Rise time	t_{r}	R_{gon} = 2 Ω R_{goff} = 2 Ω				25 125 150		91,87 106,3 108,48		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		296,68 340,72 352		ns
Fall time	t_{f}		±15	600	300	25 125 150		84,41 115,24 124,12		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=23,69 μC Q_{rFWD}=37,3 μC Q_{rFWD}=41,42 μC				25 125 150		28,96 38,69 42,06		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		24,73 35,34 38,11		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	
AC Diode										
Static										
Forward voltage	V_F				300	25 125 150		1,8 1,9 1,9	2,1(1)	V
Reverse leakage current	I_R	V_r = 1200 V				25			80	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 5,2 W/mK (PTM)						0,31		K/W
Dynamic										
Peak recovery current	I_{RM}	d*i*/d*t*=2948 A/µs d*i*/d*t*=2463 A/µs d*i*/d*t*=3021 A/µs	±15	600	300	25 125 150		175,85 179,97 182,91		A
Reverse recovery time	t_{rr}					25 125 150		311,83 476,2 524,06		ns
Recovered charge	Q_r					25 125 150		23,69 37,3 41,42		µC
Reverse recovered energy	E_{rec}					25 125 150		7,92 12,72 14,1		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		1393,57 830,89 779,14		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		22		kΩ
Deviation of R100	$\Delta_{R/R}$	R_{100} = 1484 Ω				100	-5		5	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %						3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %						4000		K
Vincotech Thermistor Reference									I	

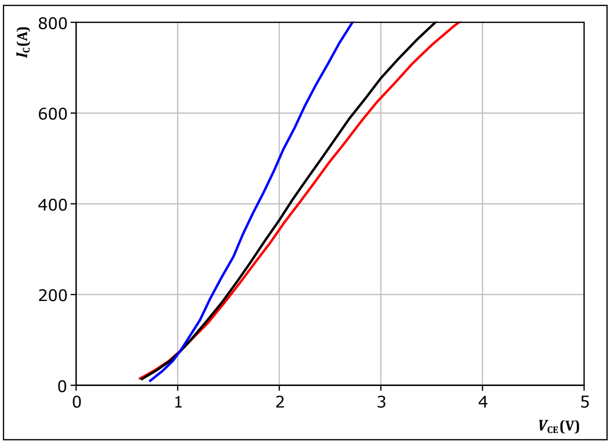
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

AC Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



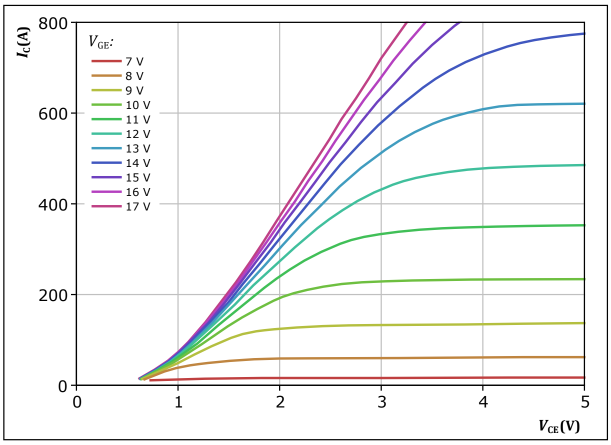
t_p =	250	μs
V_{GE} =	15	V

T_j: 25 °C, 125 °C, 150 °C

figure 2. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



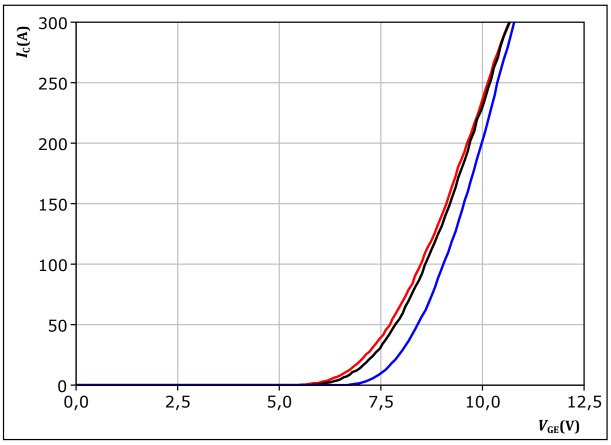
t_p =	250	μs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})



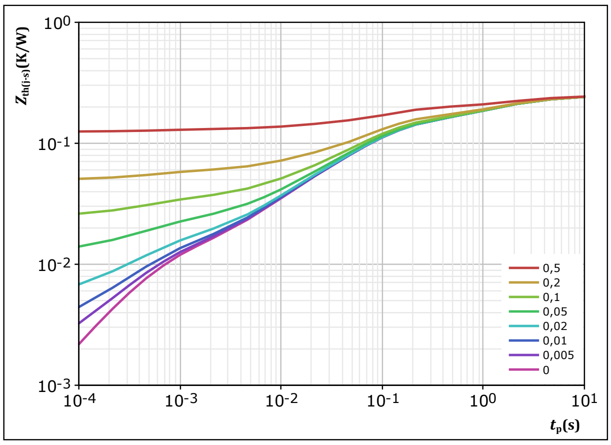
t_p =	250	μs
V_{CE} =	10	V

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	
$R_{th(j-s)}$ =	0,243	K/W

IGBT thermal model values

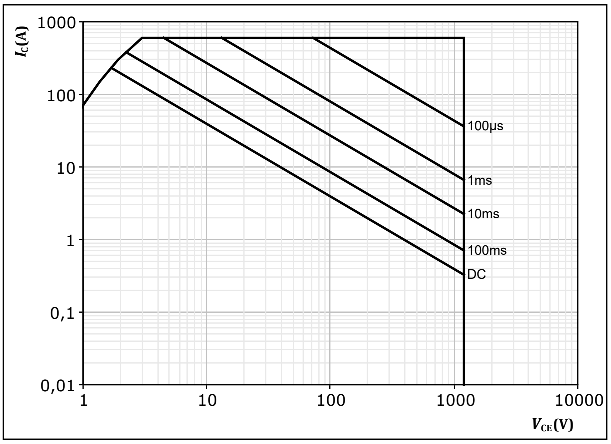
R (K/W)	τ (s)
3,52E-02	6,27E+00
7,70E-02	1,18E+00
1,07E-01	8,29E-02
2,00E-02	1,07E-02
1,01E-02	4,93E-04

AC Switch Characteristics

figure 5. **IGBT**

Safe operating area

I_C = f(V_{CE})

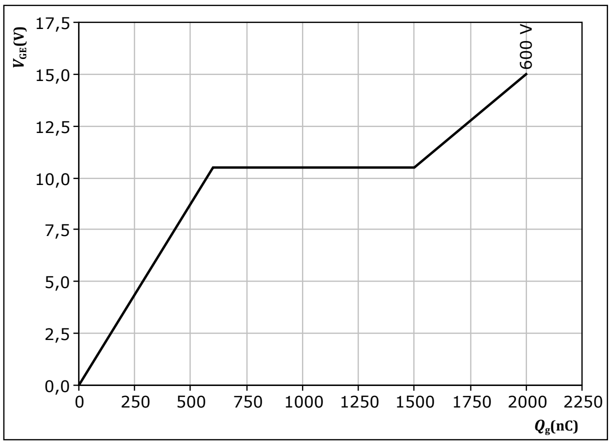


D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

figure 6. **IGBT**

Gate voltage vs gate charge

V_{GE} = f(Q_g)



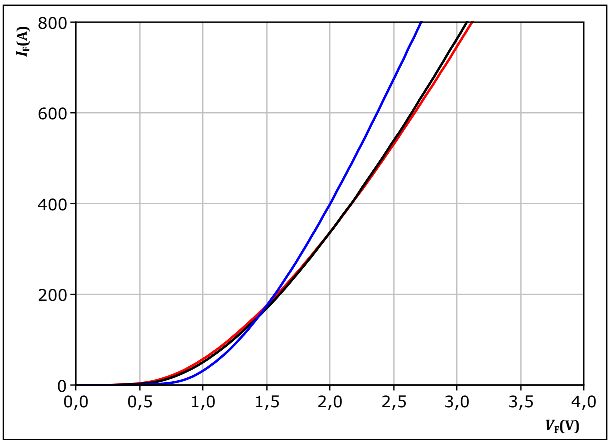
I_C =	300	A
T_j =	25	°C

AC Diode Characteristics

figure 7. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



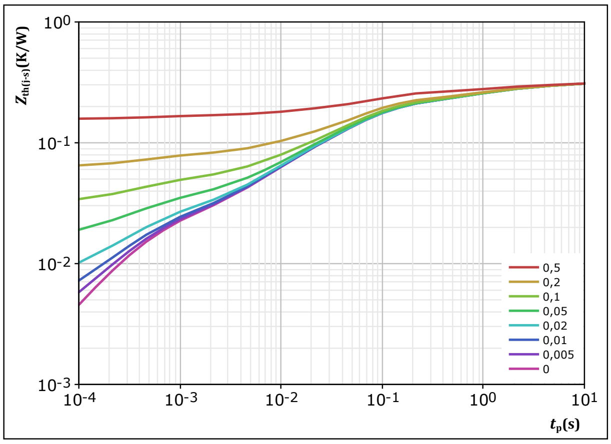
t_p = 250 µs

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

$R_{th(j-s)}$ = 0,31 K/W

FWD thermal model values

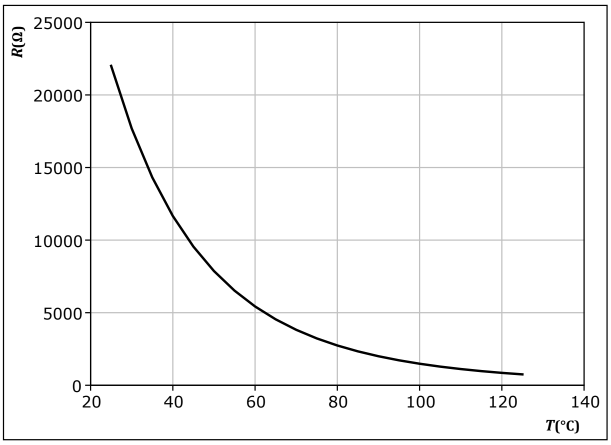
R (K/W)	τ (s)
5,05E-02	4,34E+00
6,70E-02	7,19E-01
1,45E-01	6,38E-02
3,35E-02	8,81E-03
1,83E-02	4,12E-04

Thermistor Characteristics

figure 9.	Thermistor

Typical NTC characteristic as function of temperature

R_T = f(T)

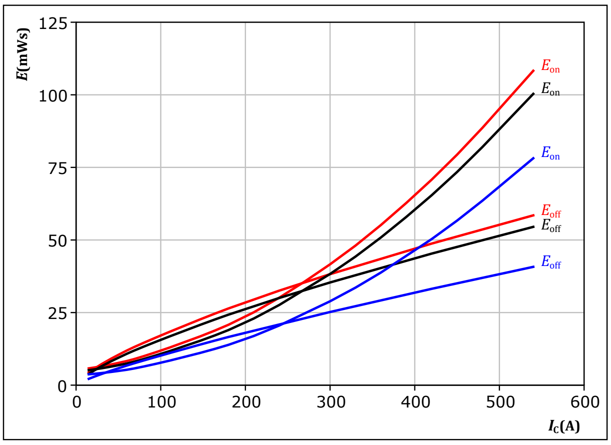


AC Switching Characteristics

figure 10. **IGBT**

Typical switching energy losses as a function of collector current

$E = f(I_C)$



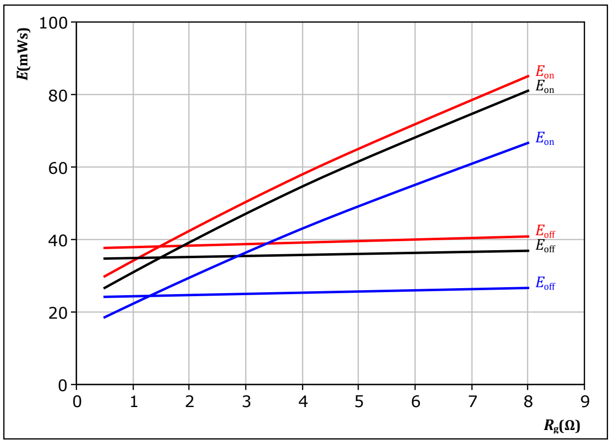
With an inductive load at

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

$E = f(R_g)$



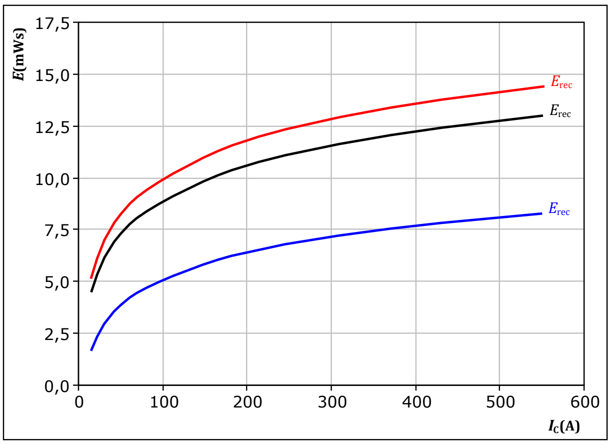
With an inductive load at

V_{CE} =	600	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
I_C =	300	A	150 °C

figure 12. **FWD**

Typical reverse recovered energy loss as a function of collector current

$E_{rec} = f(I_C)$



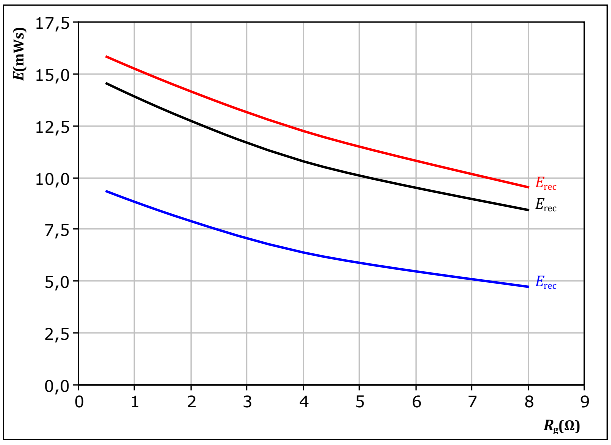
With an inductive load at

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

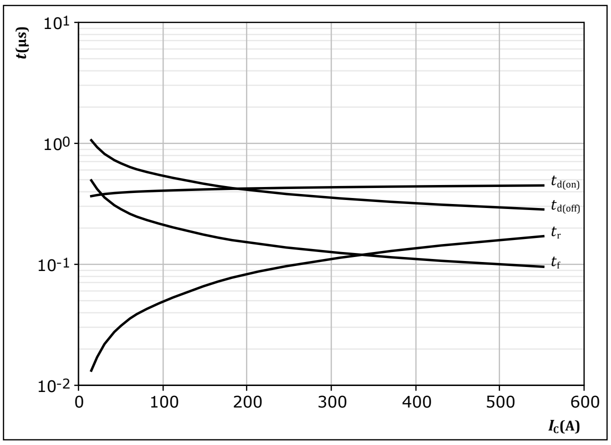
V_{CE} =	600	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
I_C =	300	A	150 °C

AC Switching Characteristics

figure 14. **IGBT**

Typical switching times as a function of collector current

$t = f(I_C)$



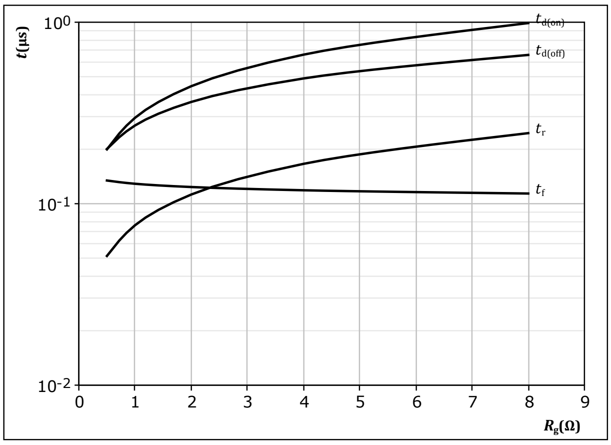
With an inductive load at

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

$t = f(R_g)$



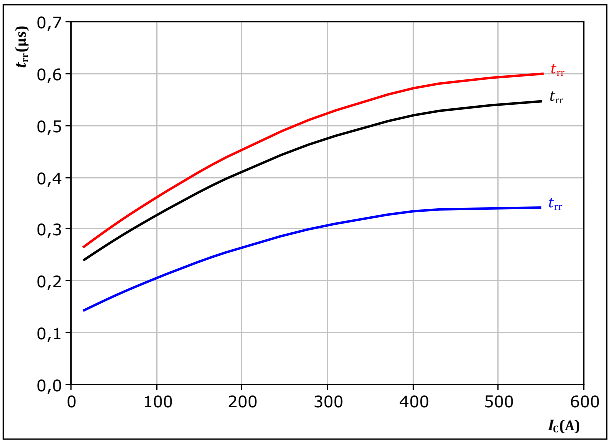
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	300	A

figure 16. **FWD**

Typical reverse recovery time as a function of collector current

$t_{rr} = f(I_C)$



With an inductive load at

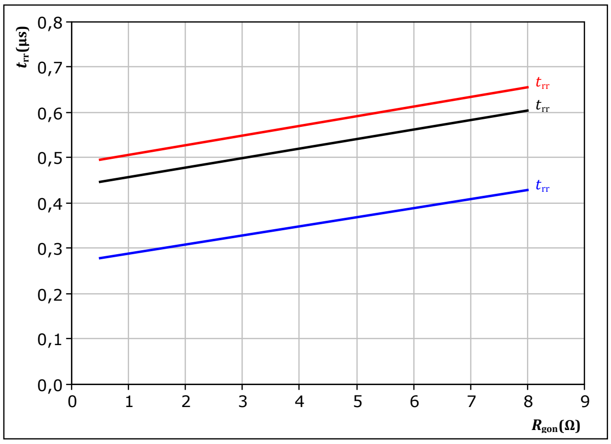
V_{CE} =	600	V
V_{GE} =	±15	V
R_{gon} =	2	Ω

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 =	300	A

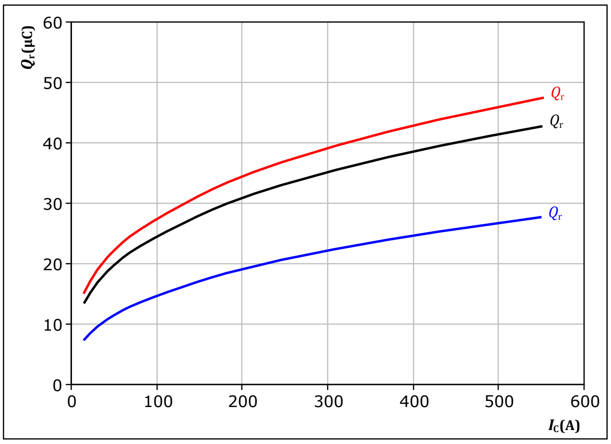
T_j: 25 °C, 125 °C, 150 °C

AC Switching Characteristics

figure 18. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



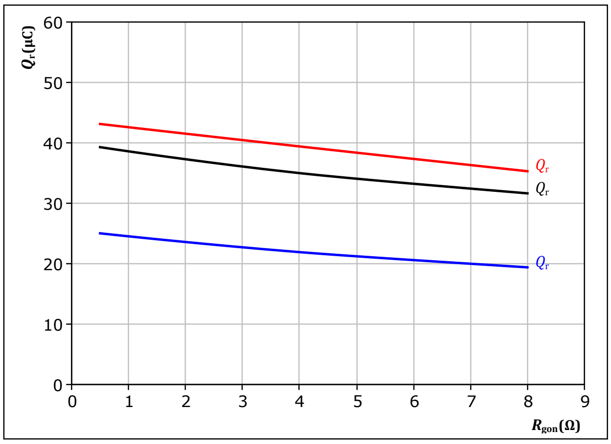
With an inductive load at

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})



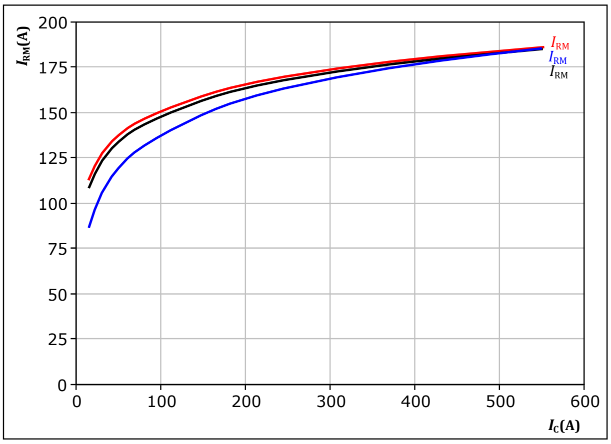
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

figure 20. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



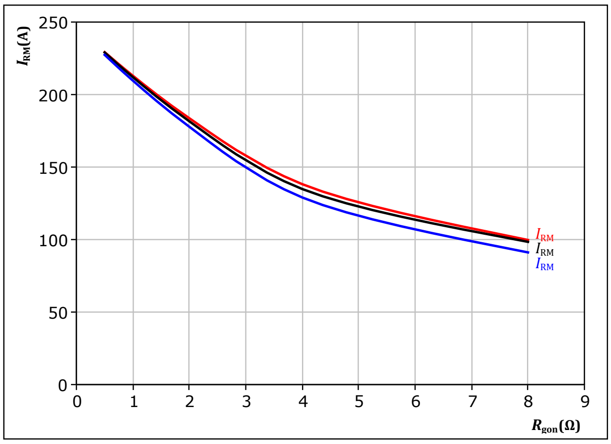
With an inductive load at

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

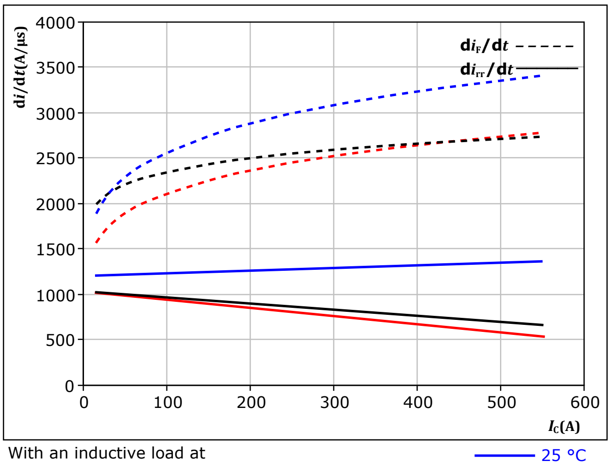
V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	A		150 °C

AC Switching Characteristics

figure 22. **FWD**

Typical rate of fall of forward and reverse recovery current as a function of collector current

$di_F/dt,\ di_{rr}/dt = f(I_C)$



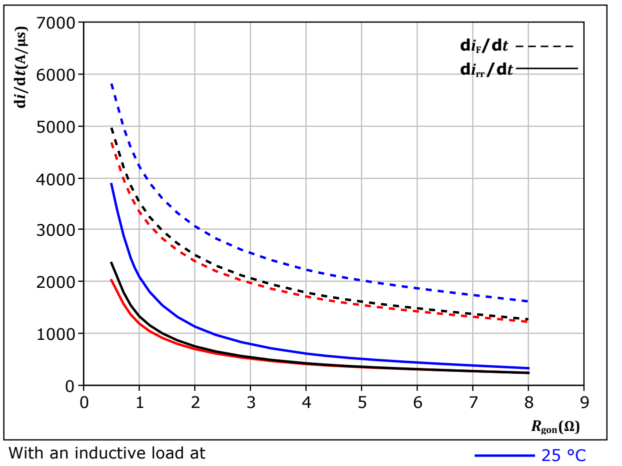
With an inductive load at

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

$di_F/dt,\ di_{rr}/dt = f(R_{gon})$



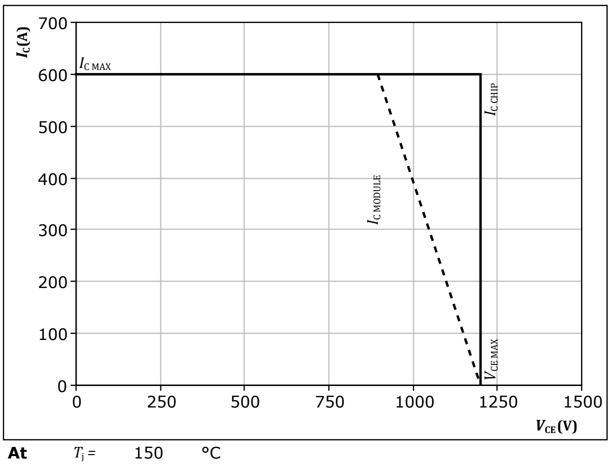
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	300	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

AC Switching Definitions

figure 25. **IGBT**

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

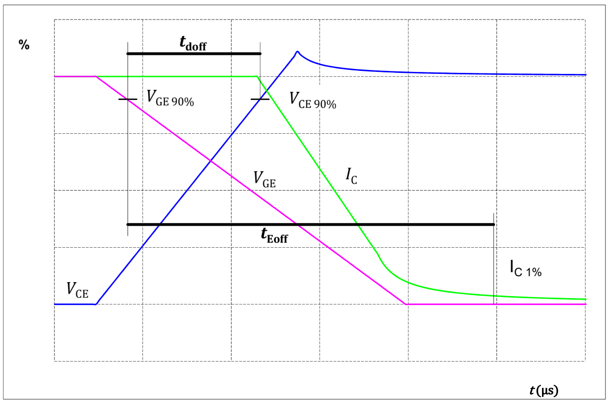


figure 26. **IGBT**

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

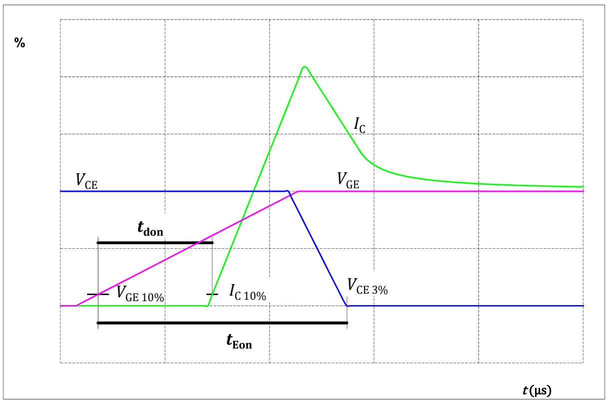


figure 27. **IGBT**

Turn-off Switching Waveforms & definition of t_f

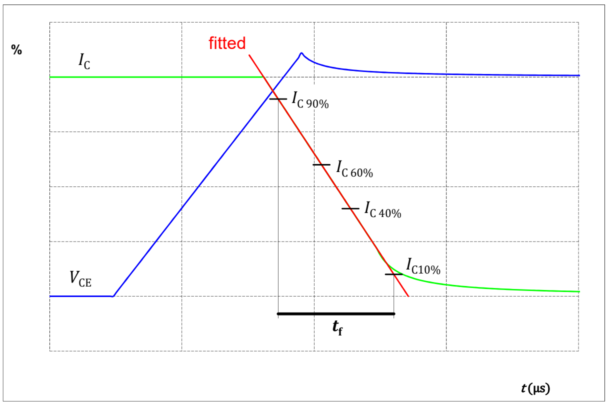
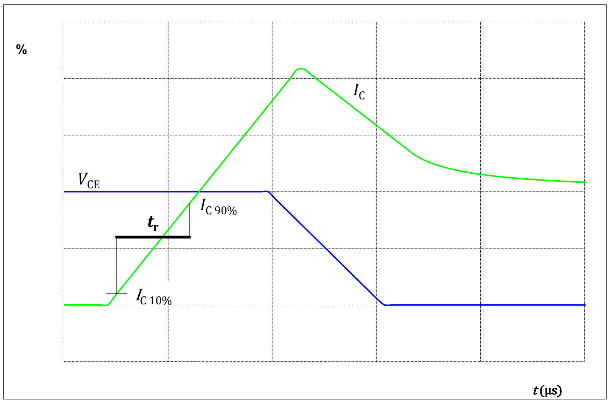


figure 28. **IGBT**

Turn-on Switching Waveforms & definition of t_r



AC Switching Definitions

figure 29.	FWD

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

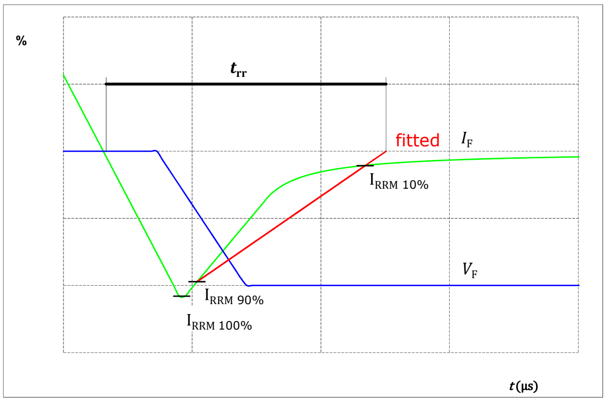
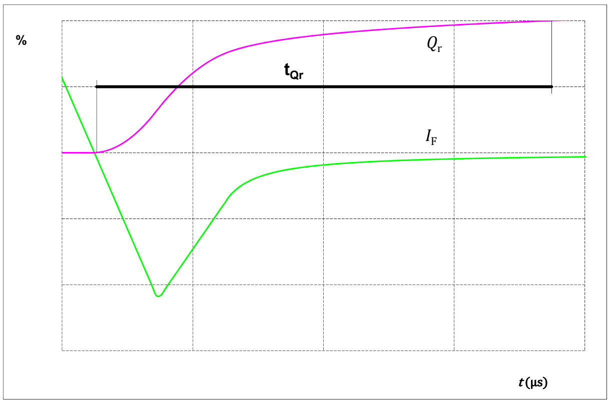


figure 30.	FWD

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



Ordering Code

Version	Ordering Code
Without thermal paste	B0-SP122PB300M7-PT07F78T
With thermal paste (5,2 W/mK, PTM6000HV)	B0-SP122PB300M7-PT07F78T-/7/
With thermal paste (5,2 W/mK, PTM6000HV) and Protection Foil	B0-SP122PB300M7-PT07F78T-/7F/

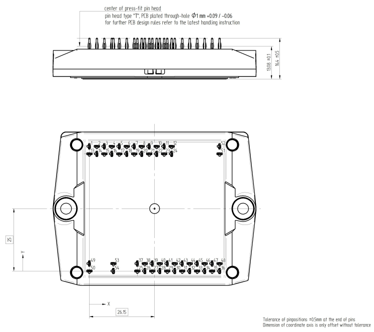
Marking

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

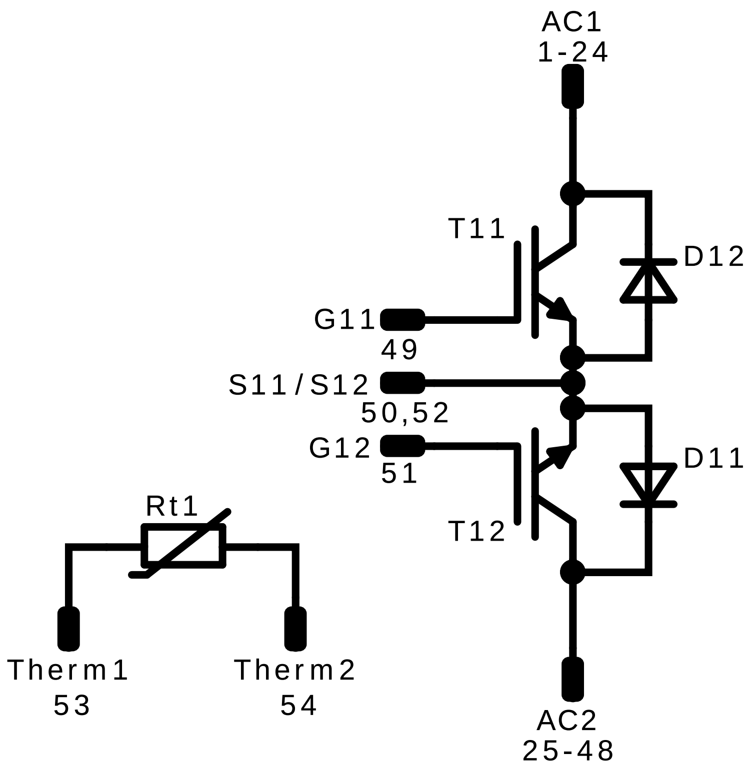
Outline

Pin table [mm]

Pin	X	Y	Function	Pin	X	Y	Function
1	0	50	AC1	28	28,25	0	AC2
2	3	50	AC1	29	31,25	0	AC2
3	6	50	AC1	30	34,25	0	AC2
4	9	50	AC1	31	37,25	0	AC2
5	12	50	AC1	32	40,25	0	AC2
6	15	50	AC1	33	43,25	0	AC2
7	18	50	AC1	34	46,25	0	AC2
8	21	50	AC1	35	49,25	0	AC2
9	24	50	AC1	36	52,25	0	AC2
10	27	50	AC1	37	19,25	3	AC2
11	30	50	AC1	38	22,25	3	AC2
12	33	50	AC1	39	25,25	3	AC2
13	0	47	AC1	40	28,25	3	AC2
14	3	47	AC1	41	31,25	3	AC2
15	6	47	AC1	42	34,25	3	AC2
16	9	47	AC1	43	37,25	3	AC2
17	12	47	AC1	44	40,25	3	AC2
18	15	47	AC1	45	43,25	3	AC2
19	18	47	AC1	46	46,25	3	AC2
20	21	47	AC1	47	49,25	3	AC2
21	24	47	AC1	48	52,25	3	AC2
22	27	47	AC1	49	0	3	G11
23	30	47	AC1	50	0	0	S11
24	33	47	AC1	51	52,25	47	G12
25	19,25	0	AC2	52	52,25	50	S12
26	22,25	0	AC2	53	9,65	3	Therm1
27	25,25	0	AC2	54	9,65	0	Therm2



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12	IGBT	1200 V	300 A	AC Switch	
D12, D11	FWD	1200 V	300 A	AC Diode	
Rt1	Thermistor			Thermistor	

Packaging instruction				
Standard packaging quantity (SPQ) 45	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* S3 packages see vincotech.com website.

Package data
Package data for *flow* S3 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 $T_{j,op}$=150°C and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.

Document No.:	Date:	Modification:	Pages
B0-SP122PB300M7-PT07F78T-D1-14	26 May. 2026	Initial Release	