Vincotech

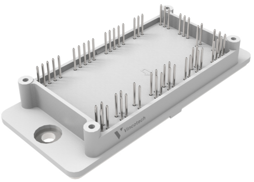
30-F212PNA075M7-L889C79
datasheet

***flow*PIM 2** **1200 V / 75 A**

Topology features

- Converter+Inverter
- Open Emitter configuration
- Temperature sensor

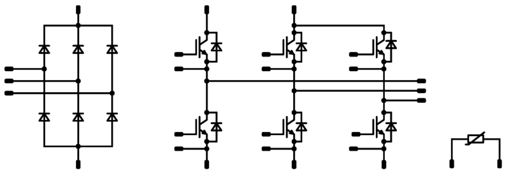
flow 2 17 mm housing



Component features

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

Schematic



Housing features

- Base isolation: Al_2O_3
- Convex shaped baseplate for superior thermal contact
- Cu baseplate
- Thermo-mechanical push-and-pull force relief
- Solder pin

Target applications

- Embedded Drives
- Industrial Drives

Types

- 30-F212PNA075M7-L889C79

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	94	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 °C	190	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	87	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}		200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	165	W
Maximum junction temperature	T_{jmax}			175	°C
Rectifier Diode					
Peak repetitive reverse voltage	V_{RRM}			1600	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	126	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 150 °C	890	A
Surge current capability	I^2t			3960	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	156	W
Maximum junction temperature	T_{jmax}			150	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
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				12,01	mm
Comparative Tracking Index	CTI			≥ 200	

*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
Inverter Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$			10	0,0075	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		75	25 125 150		1,55 1,7 1,75	1,9[1]	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			100	µA
Gate-emitter leakage current	I_{GES}		20	0		25			500	nA
Internal gate resistance	r_g							4		Ω
Input capacitance	C_{ies}		0	10		25		16000		pF
Output capacitance	C_{oes}							480		pF
Reverse transfer capacitance	C_{res}							190		pF
Gate charge	Q_g	V_{CC} = 600 V	0/15		75	25		570		nC
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,5		K/W
Dynamic										
Turn-on delay time	$t_{d(on)}$	R_{gon} = 2 Ω R_{goff} = 2 Ω	±15	600	75	25 125 150		197,2 208,2 211,8		ns
Rise time	t_r					25 125 150		28,6 37,6 38,6		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		203,4 233 241,8		ns
Fall time	t_f					25 125 150		86,36 112,58 111,22		ns
Turn-on energy (per pulse)	E_{on}	Q_{rFWD}=8,54 µC Q_{rFWD}=13,39 µC Q_{rFWD}=15,31 µC				25 125 150		5,56 7,82 8,5		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		5,08 6,8 7,28		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				100	25 125 150		1,82 1,96 1,97	2,1[1]	V
Reverse leakage current	I_R	V_r = 1200 V				25			40	µA
Thermal										
Thermal resistance junction to sink[2]	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,58		K/W
Dynamic										
Peak recovery current	I_{RM}	d*i*/d*t*=2268 A/µs d*i*/d*t*=1969 A/µs d*i*/d*t*=1970 A/µs	±15	600	75	25 125 150		74,72 76,64 78,09		A
Reverse recovery time	t_{rr}					25 125 150		277,69 432,14 458,54		ns
Recovered charge	Q_r					25 125 150		8,54 13,39 15,31		µC
Reverse recovered energy	E_{rec}					25 125 150		3,2 5,19 6		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		801,95 613,64 544,2		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	
Rectifier Diode										
Static										
Forward voltage	V_F				45	25 125 150		1,01 0,929 0,92	1,21(1) 1,1(1)	V
Reverse leakage current	I_R	V_r = 1600 V				25			50	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,45		K/W
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	

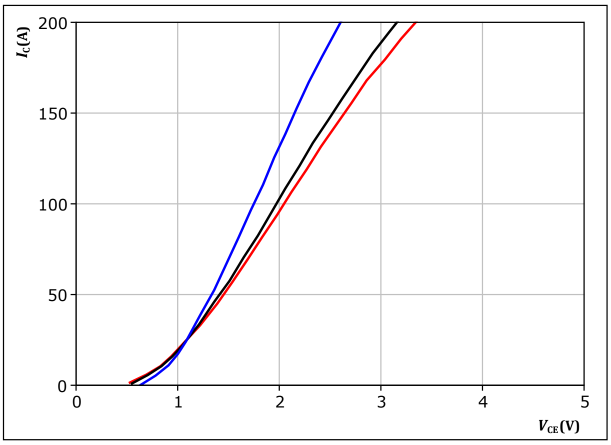
(1) Value at chip level
(2) Only valid with pre-applied Vincotech thermal interface material.

Inverter Switch Characteristics

figure 1. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



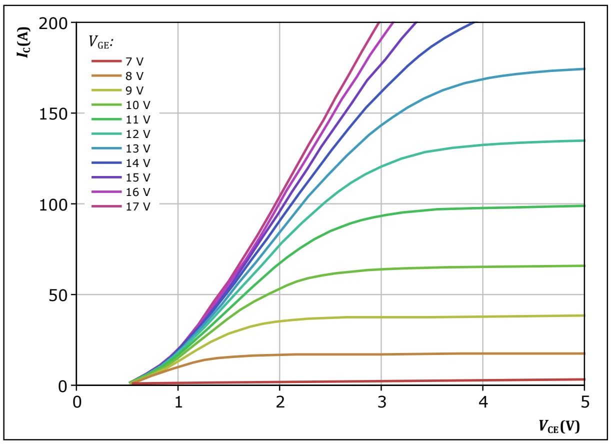
t_p =	250	µs
V_{GE} =	15	V

T_j: 25 °C, 125 °C, 150 °C

figure 2. **IGBT**

Typical output characteristics

I_C = f(V_{CE})



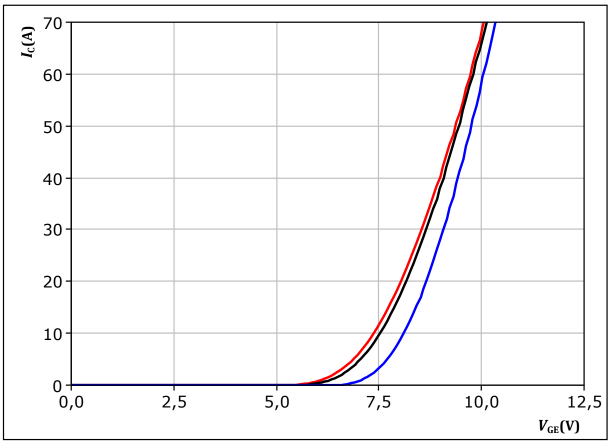
t_p =	250	µs
T_j =	150	°C

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

figure 3. **IGBT**

Typical transfer characteristics

I_C = f(V_{GE})



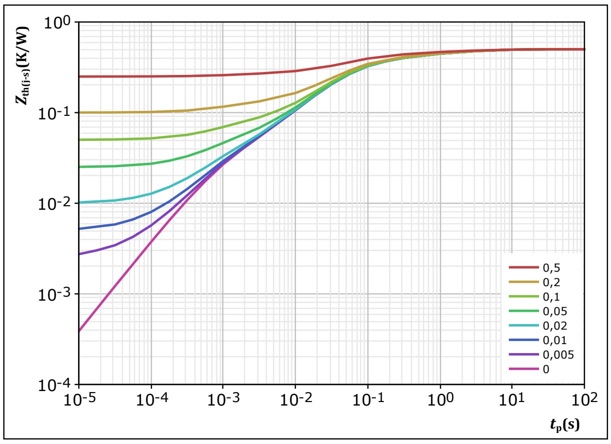
t_p =	250	µs
V_{CE} =	10	V

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	
$R_{th(j-s)}$ =	0,5	K/W

IGBT thermal model values

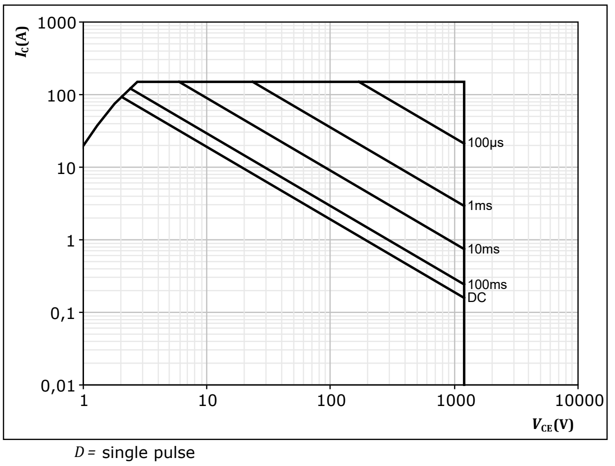
R (K/W)	τ (s)
3,92E-02	4,73E+00
6,01E-02	9,48E-01
1,18E-01	1,70E-01
2,25E-01	3,80E-02
3,32E-02	9,18E-03
2,48E-02	8,63E-04

Inverter Switch Characteristics

figure 5. **IGBT**

Safe operating area

I_C = f(V_{CE})

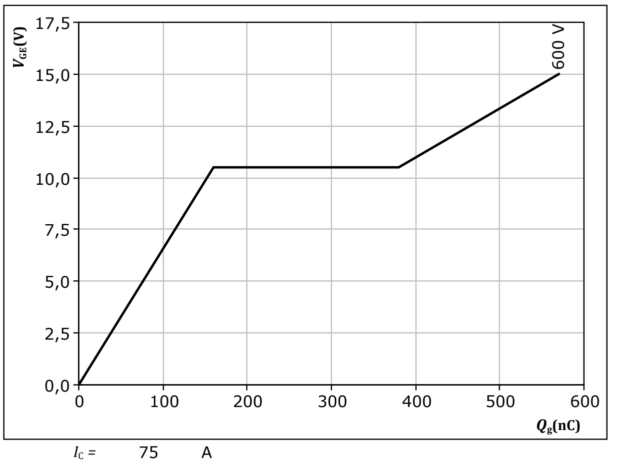


D =	single pulse	
T_s =	80	°C
V_{GE} =	15	V
T_j =	T_{jmax}	

figure 6. **IGBT**

Gate voltage vs gate charge

V_{GE} = f(Q_g)



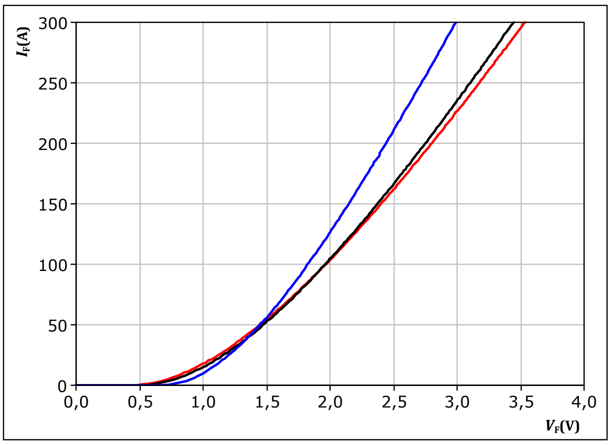
I_C =	75	A
T_j =	25	°C

Inverter Diode Characteristics

figure 7. **FWD**

Typical forward characteristics

$I_F = f(V_F)$



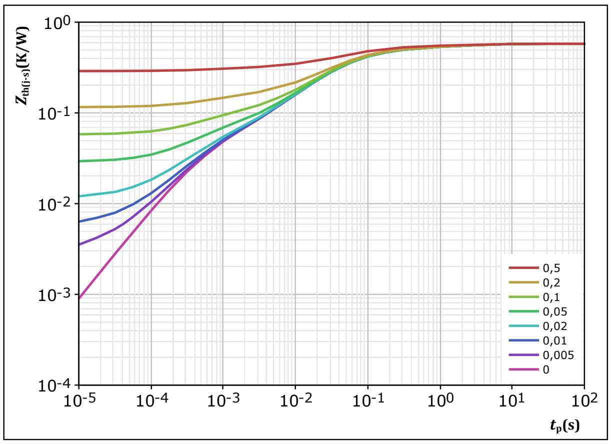
t_p = 250 µs

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

$R_{th(j-s)}$ = 0,578 K/W

FWD thermal model values

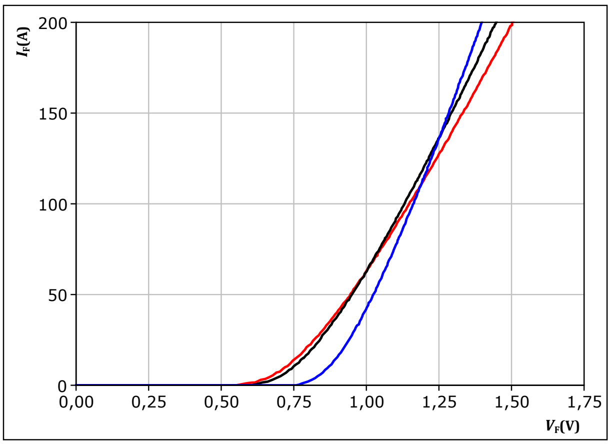
R (K/W)	τ (s)
4,89E-02	3,41E+00
7,07E-02	4,06E-01
2,02E-01	7,46E-02
1,90E-01	2,27E-02
3,24E-02	3,47E-03
3,35E-02	4,78E-04

Rectifier Diode Characteristics

figure 9. **Rectifier**

Typical forward characteristics

$I_F = f(V_F)$



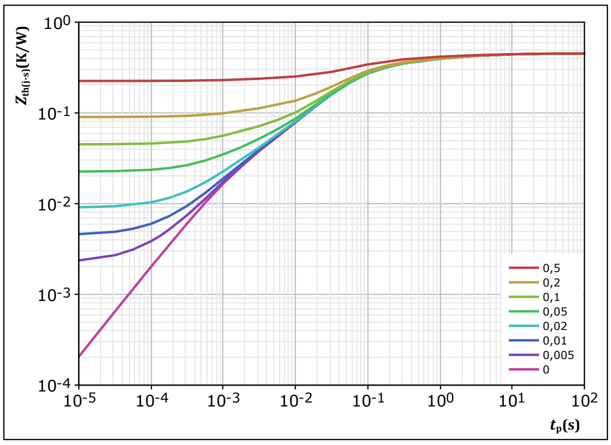
t_p = 250 µs

T_j: 25 °C, 125 °C, 150 °C

figure 10. **Rectifier**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)}$ = 0,45 K/W

Rectifier thermal model values

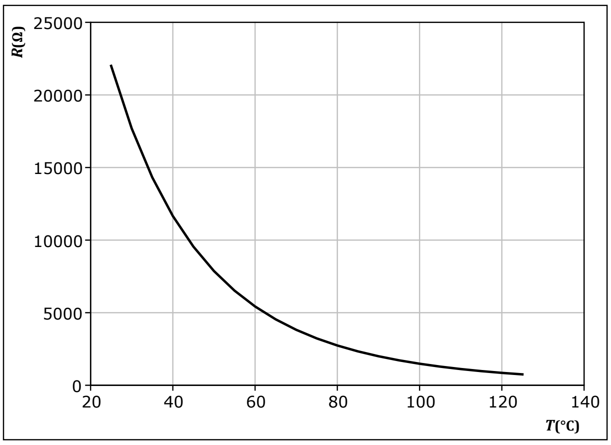
R (K/W)	τ (s)
3,06E-02	7,38E+00
5,87E-02	1,30E+00
1,21E-01	1,90E-01
2,00E-01	4,49E-02
2,12E-02	9,83E-03
1,85E-02	1,38E-03

Thermistor Characteristics

figure 11. **Thermistor**

Typical NTC characteristic as function of temperature

R_T = f(T)

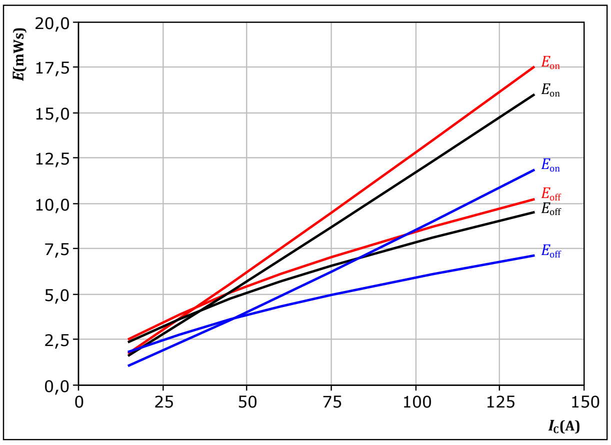


Inverter Switching Characteristics

figure 12. **IGBT**

Typical switching energy losses as a function of collector current

E = f(I_C)



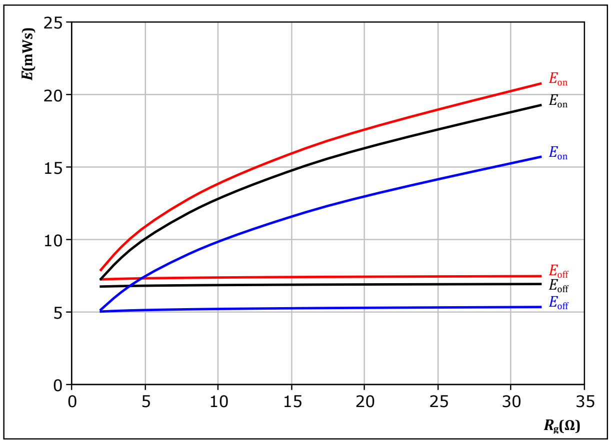
With an inductive load at

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 13. **IGBT**

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

E = f(R_g)



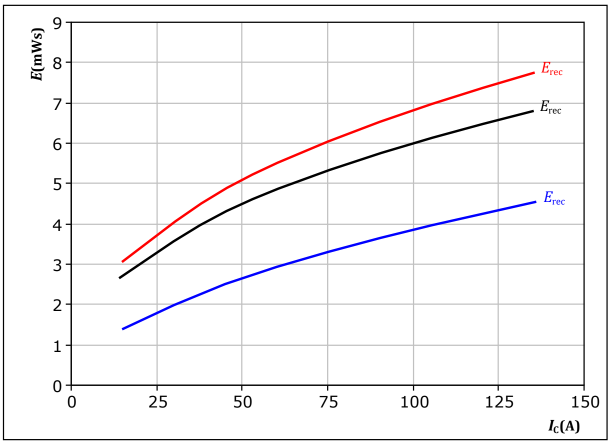
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	75	A		150 °C

figure 14. **FWD**

Typical reverse recovered energy loss as a function of collector current

E_{rec} = f(I_C)



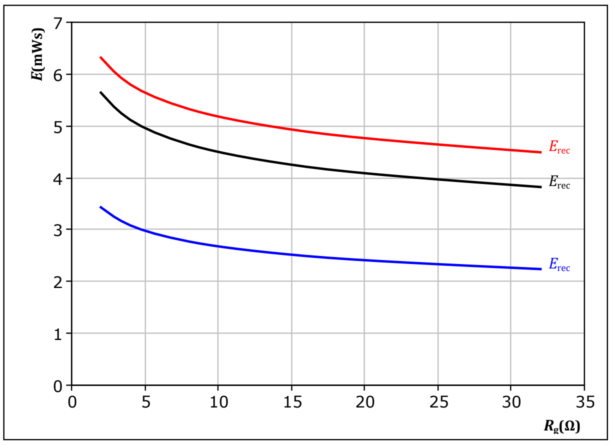
With an inductive load at

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

figure 15. **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

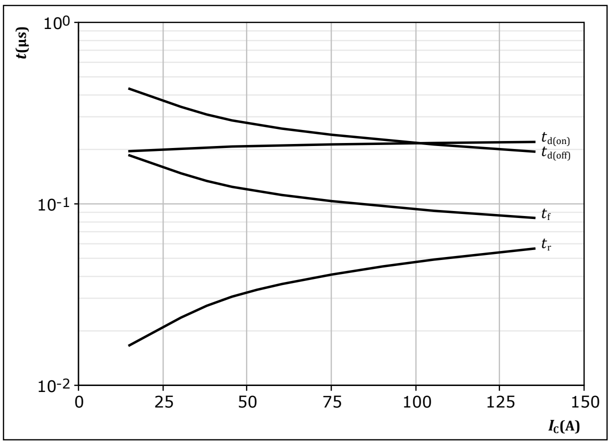
V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	75	A		150 °C

Inverter Switching Characteristics

figure 16. **IGBT**

Typical switching times as a function of collector current

t = f(I_C)



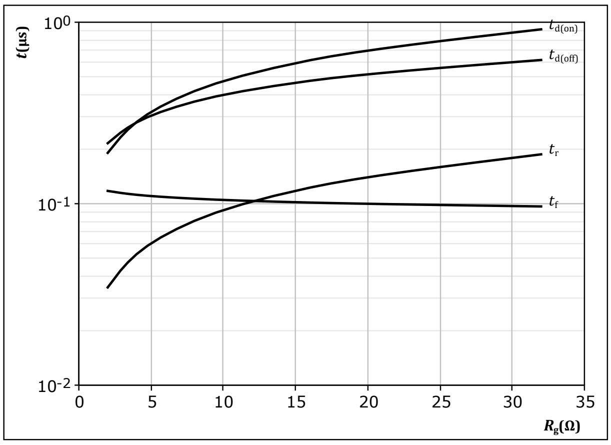
With an inductive load at

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

figure 17. **IGBT**

Typical switching times as a function of IGBT turn on gate resistor

t = f(R_g)



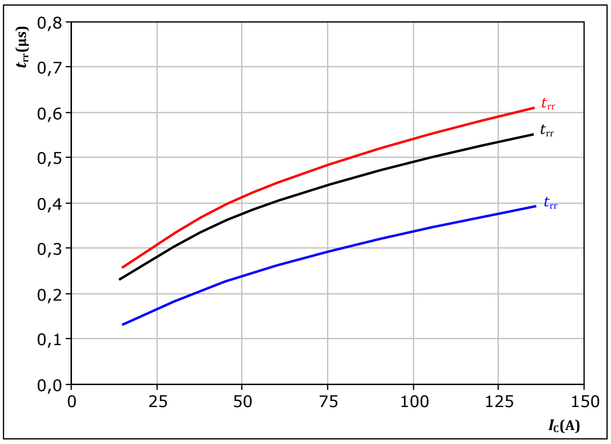
With an inductive load at

T_j =	150	°C
V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	75	A

figure 18. **FWD**

Typical reverse recovery time as a function of collector current

t_{rr} = f(I_C)



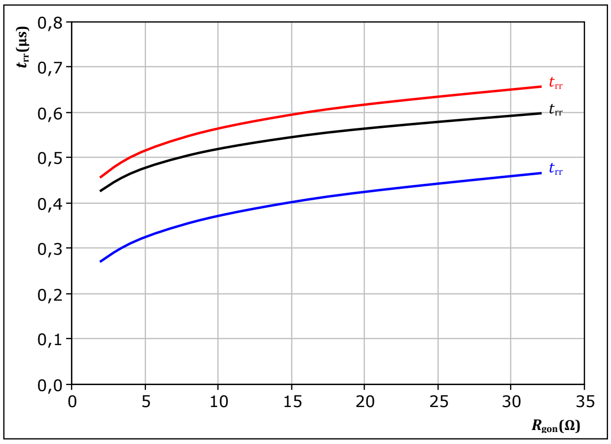
With an inductive load at

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

figure 19. **FWD**

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

t_{rr} = f(R_{gon})



With an inductive load at

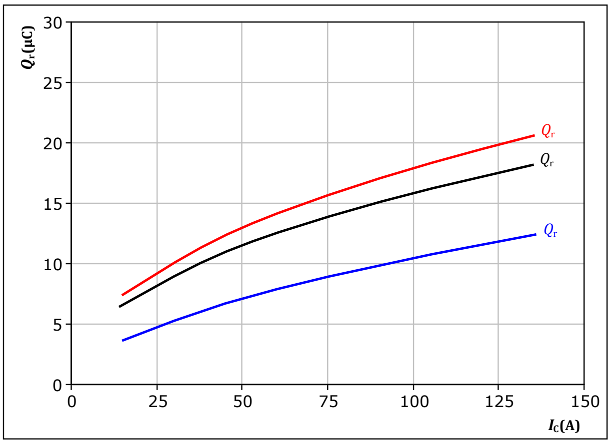
V_{CE} =	600	V
V_{GE} =	±15	V
I_C =	75	A

Inverter Switching Characteristics

figure 20. **FWD**

Typical recovered charge as a function of collector current

Q_r = f(I_C)



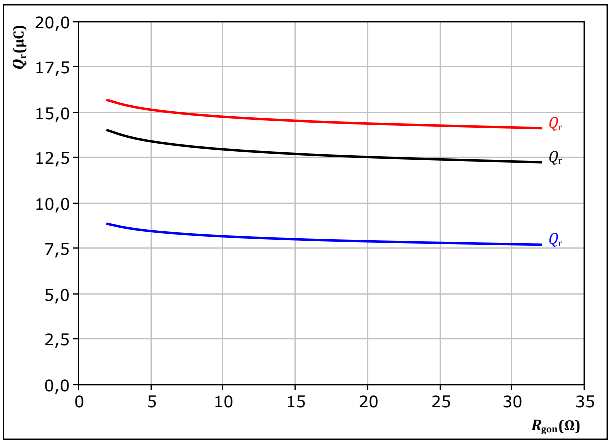
With an inductive load at

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

figure 21. **FWD**

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

Q_r = f(R_{gon})



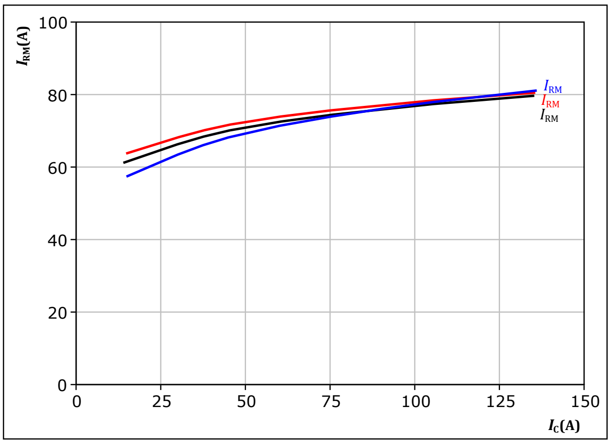
With an inductive load at

V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	75	A		150 °C

figure 22. **FWD**

Typical peak reverse recovery current as a function of collector current

I_{RM} = f(I_C)



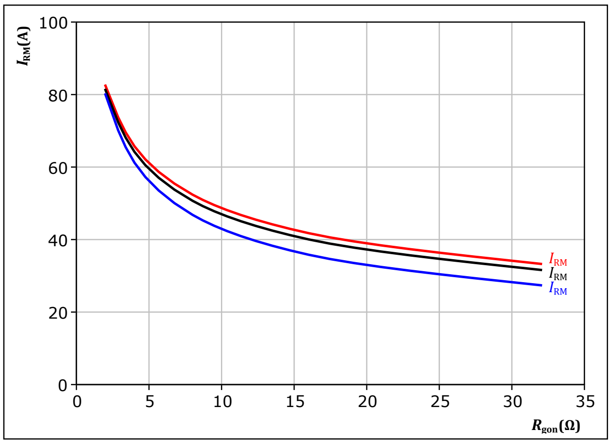
With an inductive load at

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

figure 23. **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

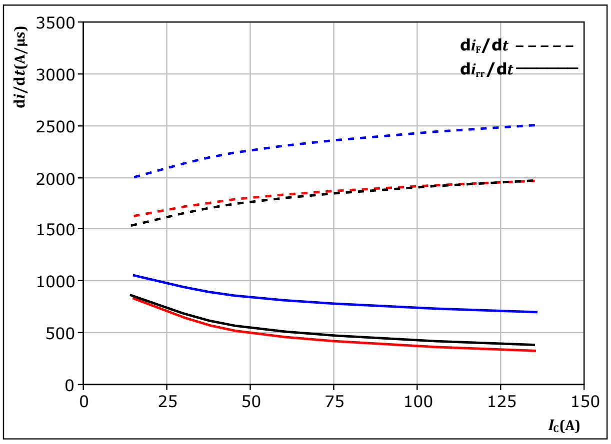
V_{CE} =	600	V	T_j:	25 °C
V_{GE} =	±15	V		125 °C
I_C =	75	A		150 °C

Inverter Switching Characteristics

figure 24. 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)



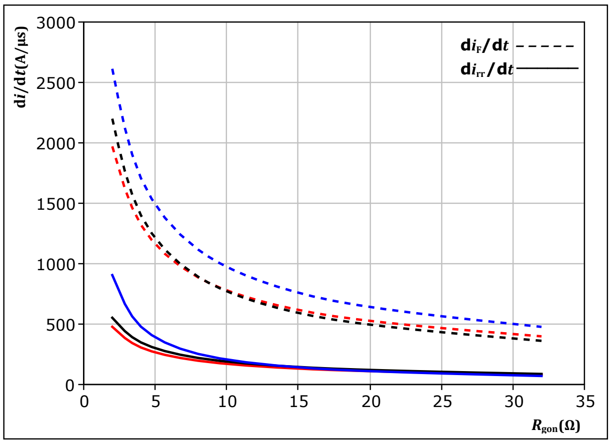
With an inductive load at

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

figure 25. 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})



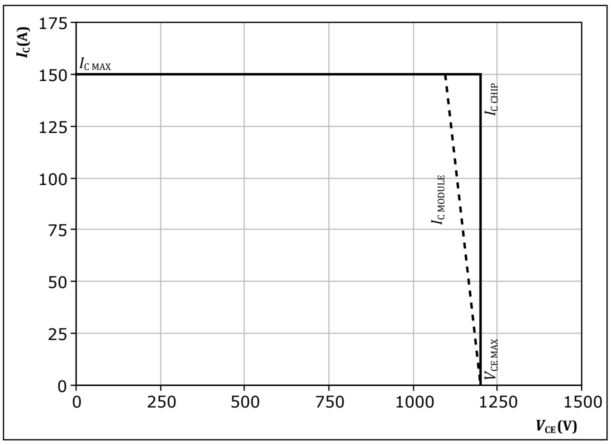
With an inductive load at

V_{CE} =	600	V	T_j: 25 °C
V_{GE} =	±15	V	125 °C
I_C =	75	A	150 °C

figure 26. 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 27. IGBT

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

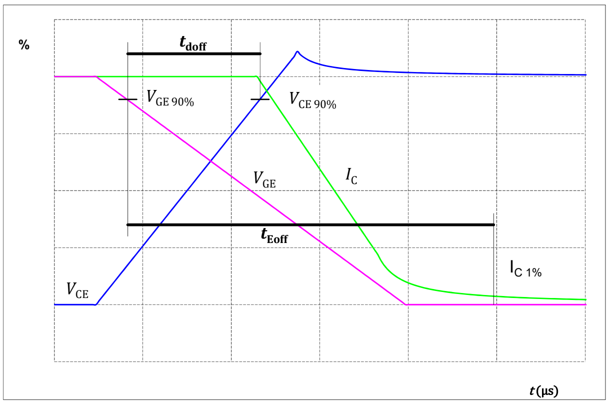


figure 28. IGBT

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

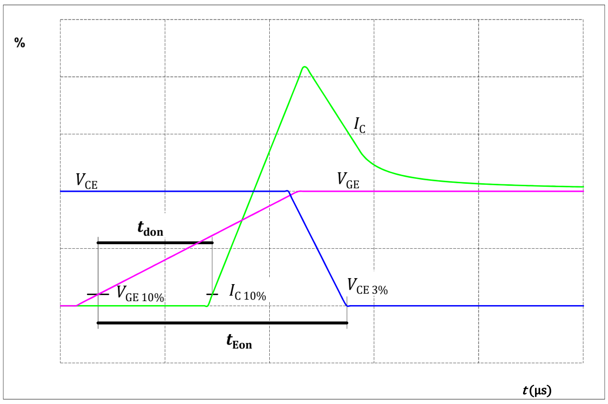


figure 29. IGBT

Turn-off Switching Waveforms & definition of t_f

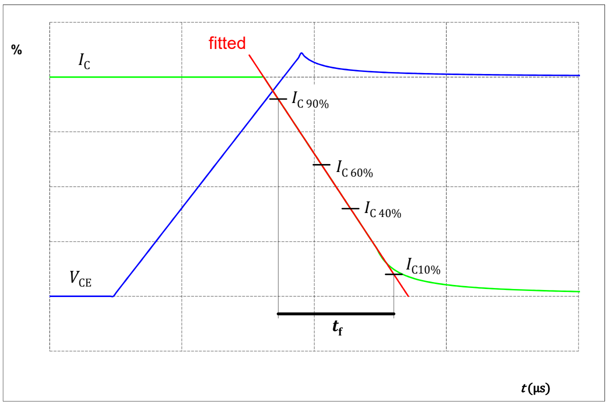
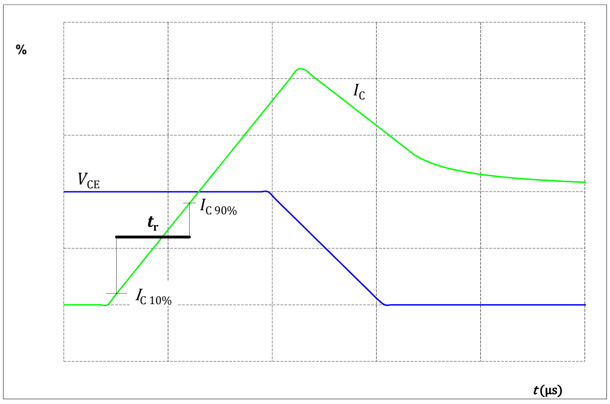


figure 30. IGBT

Turn-on Switching Waveforms & definition of t_r



Inverter Switching Definitions

figure 31.	FWD

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

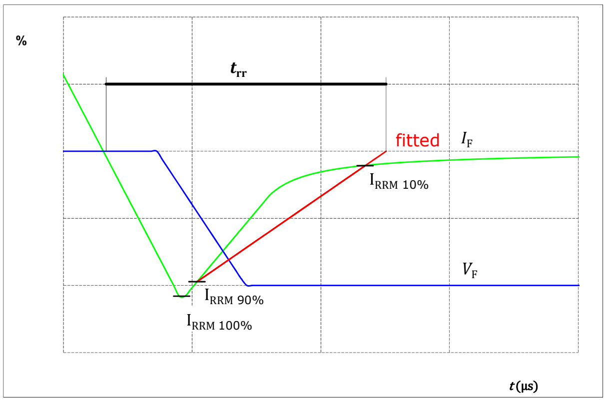
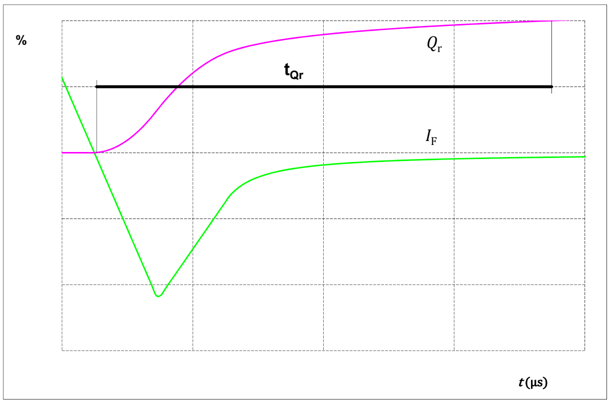


figure 32.	FWD

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



Ordering Code

Version	Ordering Code
Without thermal paste	30-F212PNA075M7-L889C79
With thermal paste (3,4 W/mK, PSX-P7)	30-F212PNA075M7-L889C79-/3/

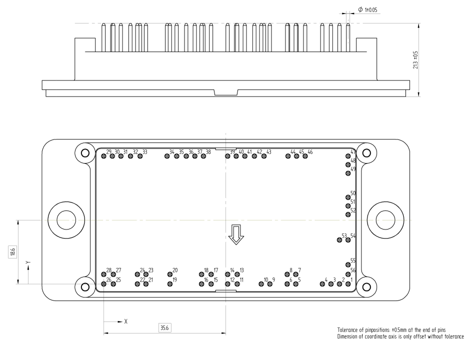
Marking

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

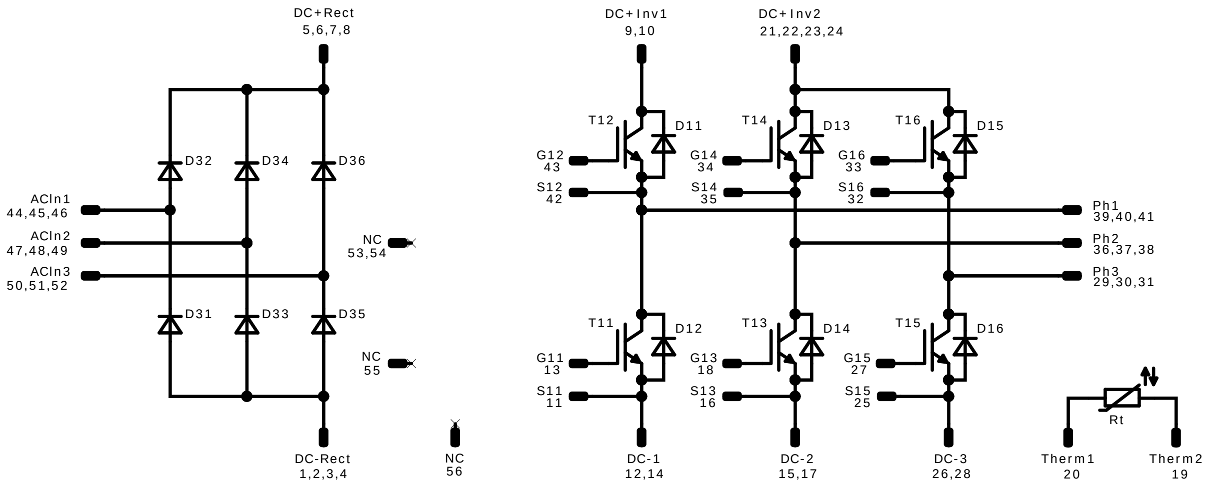
Outline

Pin table [mm]

Pin	X	Y	Function	29	0	37,2	Ph3
1	71,2	0	DC-Rect	30	2,5	37,2	Ph3
2	68,7	0	DC-Rect	31	5	37,2	Ph3
3	66,2	0	DC-Rect	32	7,8	37,2	S16
4	63,7	0	DC-Rect	33	10,6	37,2	G16
5	55,95	0	DC+Rect	34	18,45	37,2	G14
6	53,45	0	DC+Rect	35	21,25	37,2	S14
7	55,95	2,8	DC+Rect	36	24,05	37,2	Ph2
8	53,45	2,8	DC+Rect	37	26,55	37,2	Ph2
9	48,4	0	DC+Inv1	38	29,05	37,2	Ph2
10	45,9	0	DC+Inv1	39	36,1	37,2	Ph1
11	38,9	0	S11	40	38,6	37,2	Ph1
12	36,1	0	DC-1	41	41,1	37,2	Ph1
13	38,9	2,8	G11	42	43,9	37,2	S12
14	36,1	2,8	DC-1	43	46,7	37,2	G12
15	31,3	0	DC-2	44	53,7	37,2	ACIn1
16	28,5	0	S13	45	56,2	37,2	ACIn1
17	31,3	2,8	DC-2	46	58,7	37,2	ACIn1
18	28,5	2,8	G13	47	71,2	37,2	ACIn2
19	19,3	0	Therm2	48	71,2	34,7	ACIn2
20	19,3	2,8	Therm1	49	71,2	32,2	ACIn2
21	12,3	0	DC+Inv2	50	71,2	25,2	ACIn3
22	9,8	0	DC+Inv2	51	71,2	22,7	ACIn3
23	12,3	2,8	DC+Inv2	52	71,2	20,2	ACIn3
24	9,8	2,8	DC+Inv2	53	71,2	12,8	NC
25	2,8	0	S15	54	68,7	12,8	NC
26	0	0	DC-3	55	71,2	5,6	NC
27	2,8	2,8	G15	56	71,2	2,8	NC
28	0	2,8	DC-3				



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	IGBT	1200 V	75 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	1200 V	100 A	Inverter Diode	
D31, D32, D33, D34, D35, D36	Rectifier	1600 V	75 A	Rectifier Diode	
Rt	Thermistor			Thermistor	

Packaging instruction				
Standard packaging quantity (SPQ) 36	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 2 packages see vincotech.com website.

Package data
Package data for *flow* 2 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
30-F212PNA075M7-L889C79-D1-14	15 May. 2026	Initial Release	