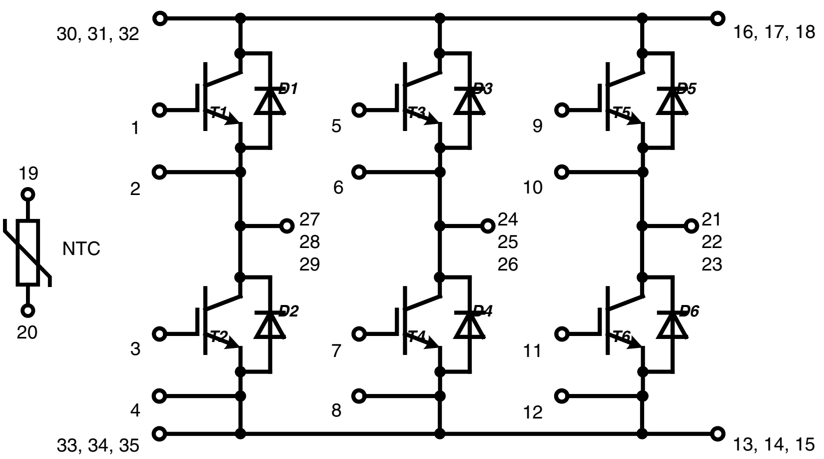
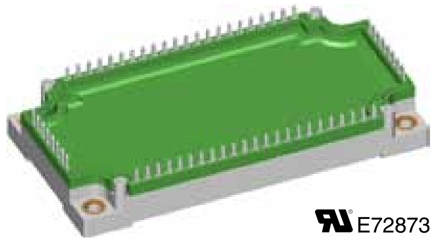
Six-Pack
Trench IGBT

V_{CES} = 1200 V
I_{C25} = 110 A
$V_{CE(sat)}$ = 1.7 V

Part name (Marking on product)

MWI75-12T8T





E72873

Pin configuration see outlines.

Features:

- Trench IGBT technology
- low saturation voltage
- low switching losses
- square RBSOA, no latch up
- high short circuit capability
- positive temperature coefficient for easy parallelling
- MOS input, voltage controlled
- ultra fast free wheeling diodes
- solderable pins for PCB mounting
- package with copper base plate

Application:

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies

Package:

- "E3-Pack" standard outline
- Insulated copper base plate
- Soldering pins for PCB mounting
- Temperature sense included

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Ouput Inverter T1 - T6

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			1200	V
V_{GES} V_{GEM}	*max. DC gate voltage* *max. transient collector gate voltage*	continuous transient				±20 ±30	V V
I_{C25} I_{C80}	*collector current*		T_C = 25°C T_C = 80°C			110 75	A A
P_{tot}	*total power dissipation*		T_C = 25°C			360	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 75 A; V_{GE} = 15 V	T_{VJ} = 25°C T_{VJ} = 125°C		1.7 2.0	2.1	V V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 3 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5.0	5.8	6.5	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C T_{VJ} = 125°C		 1	3	mA mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V				500	nA
C_{ies}	*input capacitance*	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz			5350		pF
$Q_{G(on)}$	*total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 75 A			420		nC
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	*turn-on delay time* *current rise time* *turn-off delay time* *current fall time* *turn-on energy per pulse* *turn-off energy per pulse*	inductive load V_{CE} = 600 V; I_C = 75 A V_{GE} = ±15 V; R_G = 4.7 Ω L_S = 70 nH	T_{VJ} = 125°C		270 50 400 340 7 10		ns ns ns ns mJ mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 4.7 Ω;	T_{VJ} = 125°C V_{CEK} = 1200 V			150	A
SCSOA t_{SC} I_{SC}	*short circuit safe operating area* *short circuit duration* *short circuit current*	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 4.7 Ω; non-repetitive	T_{VJ} = 125°C		 300	 10	 µs A
R_{thJC}	*thermal resistance junction to case*	(per IGBT)				0.35	K/W

Output Inverter D1 - D6

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
V_{RRM}	*max. repetitve reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25} I_{F80}	*forward current*		T_C = 25°C T_C = 80°C			135 90	A A
V_F	*forward voltage*	I_F = 100 A; V_{GE} = 0 V	T_{VJ} = 25°C T_{VJ} = 125°C		1.95 1.95	2.2	V V
Q_{rr} I_{RM} t_{rr} E_{rec}	*reverse recovery charge* *max. reverse recovery current* *reverse recovery time* *reverse recovery energy*	V_R = 600 V di_F/dt = -1600 A/µs I_F = 100 A; V_{GE} = 0 V	T_{VJ} = 125°C		12.5 100 350 4		µC A ns mJ
R_{thJC}	*thermal resistance junction to case*	(per diode)				0.4	K/W

T_C = 25°C unless otherwise stated

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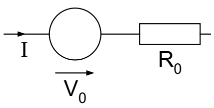
Temperature Sensor NTC

Symbol	Definitions	Conditions		min.	Ratings typ.	max.	Unit
R_{25}	*resistance*		T_C = 25°C	4.75	5.0	5.25	kΩ
$B_{25/50}$					3375		K

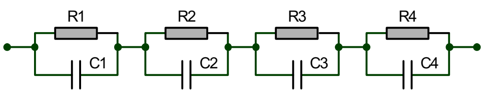
Module

Symbol	Definitions	Conditions	min.	Ratings typ.	max.	Unit
T_{VJ}	*operating temperature*		-40		125	°C
T_{VJM}	*max. virtual junction temperature*				150	°C
T_{stg}	*storage temperature*		-40		125	°C
V_{ISOL}	*isolation voltage*	$I_{ISOL} \leq$ 1 mA; 50/60 Hz			2500	V~
CTI	*comparative tracking index*				200	
M_d	*mounting torque (M5)*		2.7		3.3	Nm
d_S	*creep distance on surface*		10			mm
d_A	*strike distance through air*		7.5			mm
$R_{pin\text{-}chip}$	*resistance pin to chip*			2.5		mΩ
R_{thCH}	*thermal resistance case to heatsink*	with heatsink compound		0.02		K/W
Weight				300		g

0.0 Equivalent Circuits for Simulation



Symbol	Definitions	Conditions		min.	Ratings typ.	max.	Unit
V_0	*IGBT*	T1 - T6	T_{VJ} = 125°C		1.0		V
R_0					13.3		mΩ
V_0	*Diode*	D1 - D6	T_{VJ} = 150°C		1.09		V
R_0					9.1		mΩ



$$Z_{th}(t) = \sum_{i=1}^{n}\left[R_i \cdot \left(1 - \exp\left(-\frac{t}{\tau_i}\right)\right)\right]$$

$$\tau_i = R_i \cdot C_i$$

	IGBT	Diode
R_1	0.056	0.084
R_2	0.071	0.069
R_3	0.123	0.146
R_4	0.100	0.101
τ_1	0.0025	0.0025
τ_2	0.076	0.076
τ_3	0.036	0.036
τ_4	0.076	0.076

T_C = 25°C unless otherwise stated

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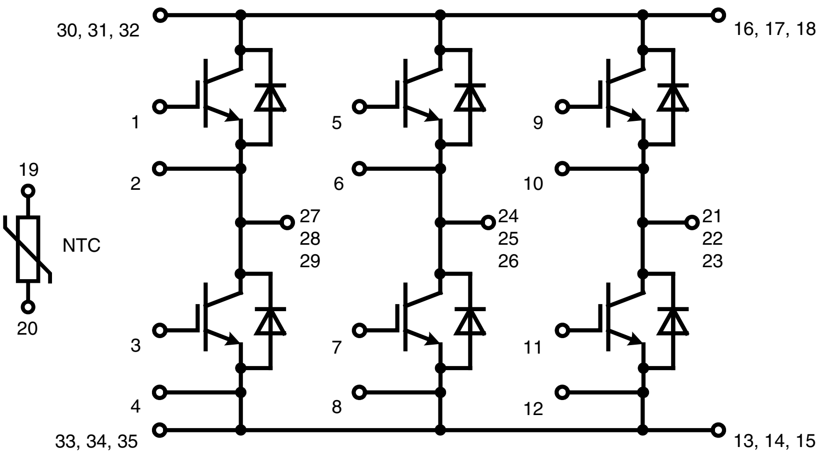
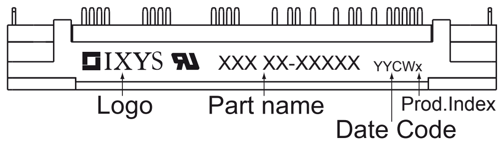
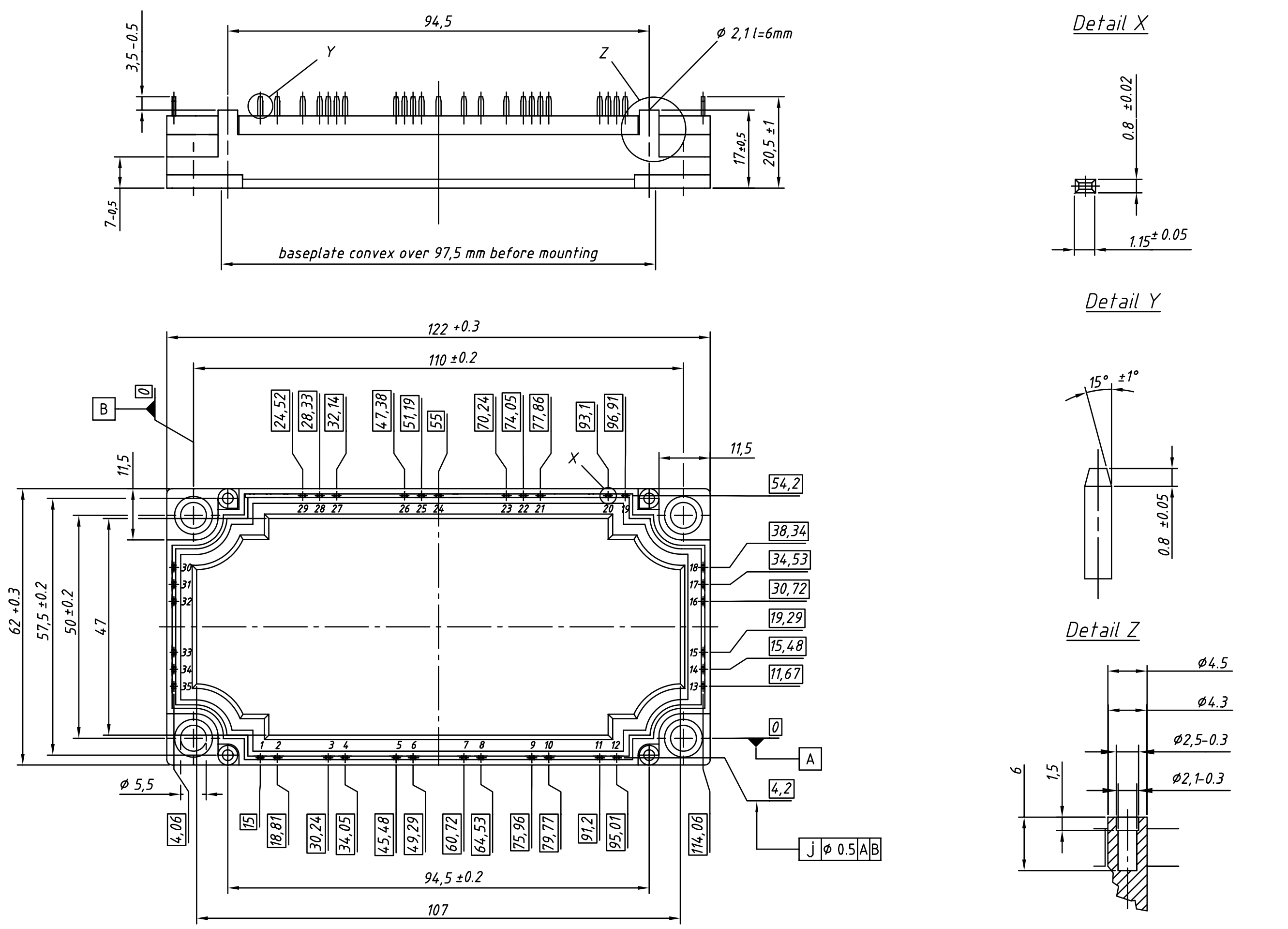
Circuit Diagram





Outline Drawing

Dimensions in mm (1 mm = 0.0394")



Product Marking

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MWI75-12T8T	MWI75-12T8T	Box	5	502425

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Inverter T1 - T6

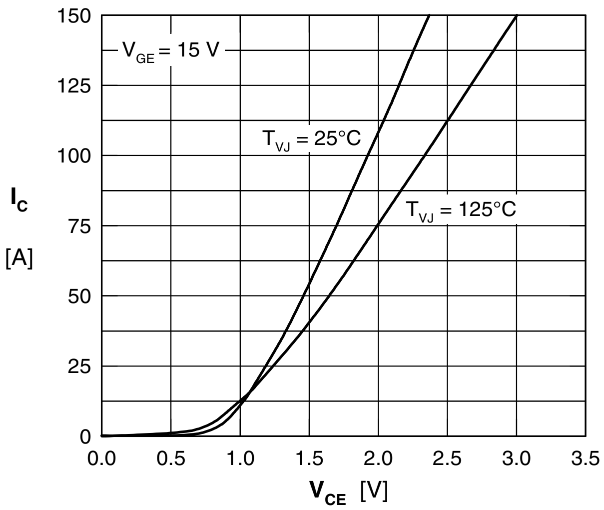

Fig. 1 Typ. output characteristics

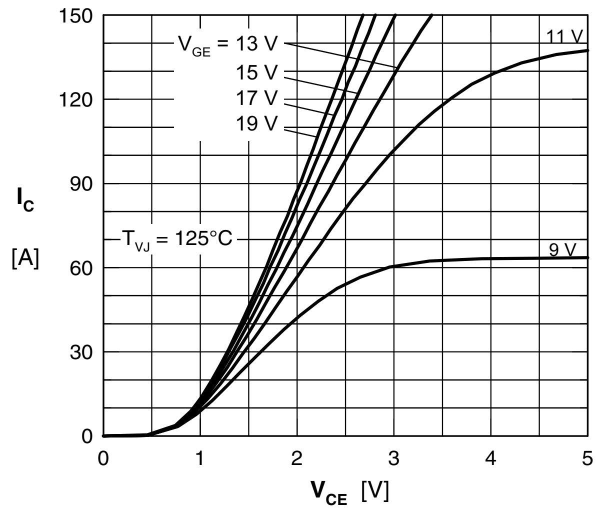

Fig. 2 output characteristics

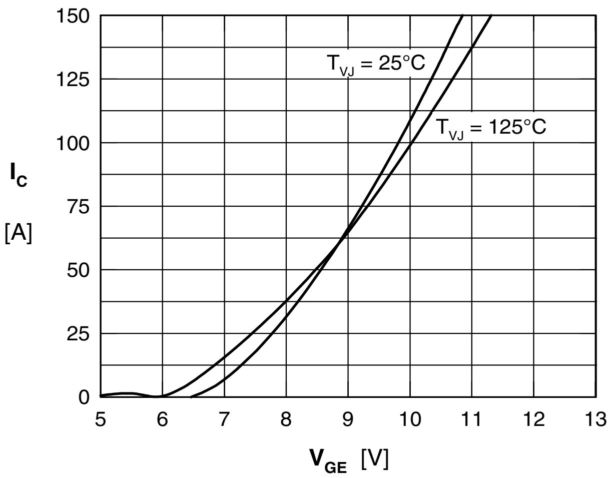

Fig. 3 Typ. transfer characteristics

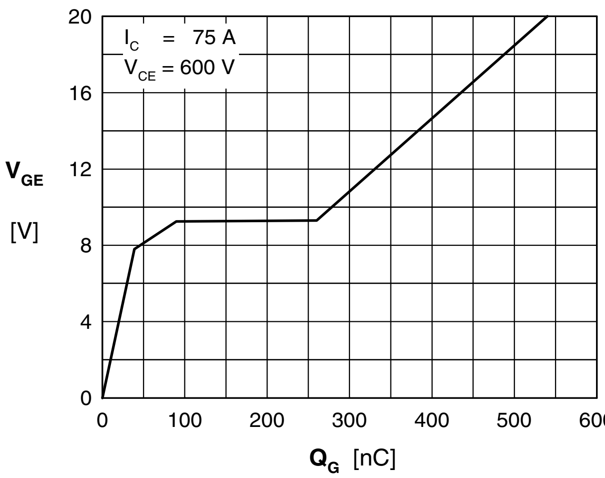

Fig. 4 Typ. turn-on gate charge

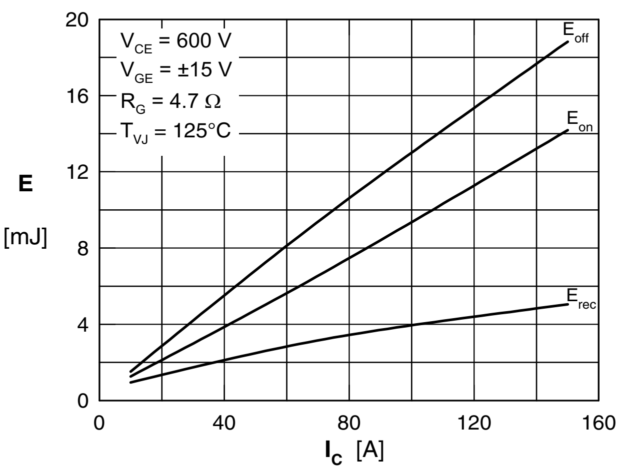

Fig. 5 Typ. switching energy vs. collector current

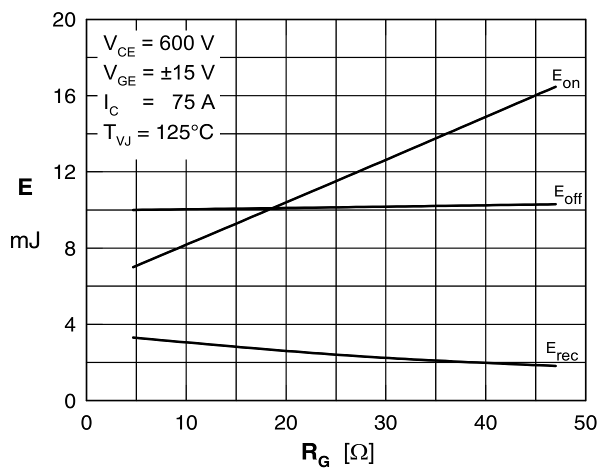

Fig. 6 Typ. switching energy vs. gate resistance

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Inverter D1 - D6

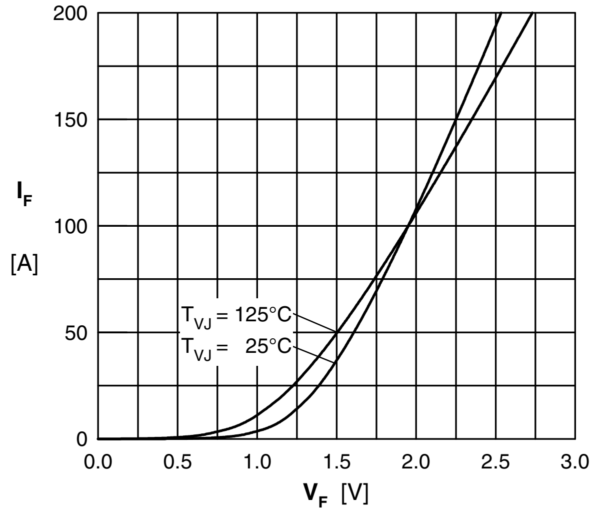

Fig. 7 Typ. Forward current versus V_F

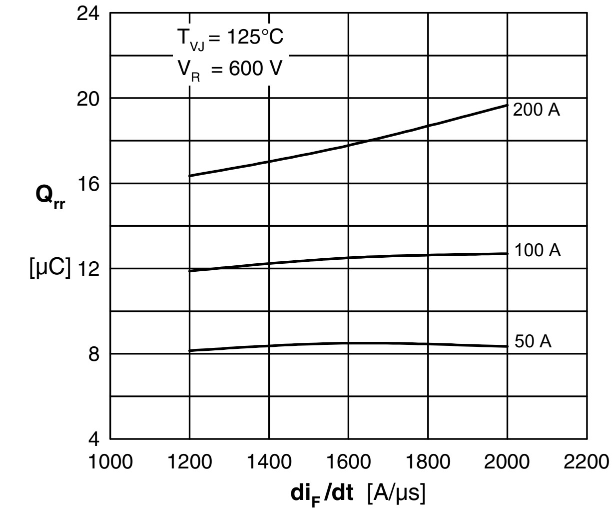

Fig. 8 Typ. reverse recov.charge Q_{rr} vs. di/dt

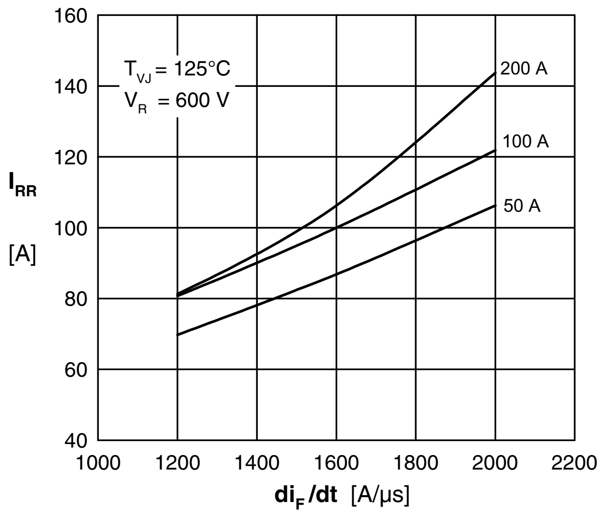

Fig. 9 Typ. peak reverse current I_{RM} vs. di/dt

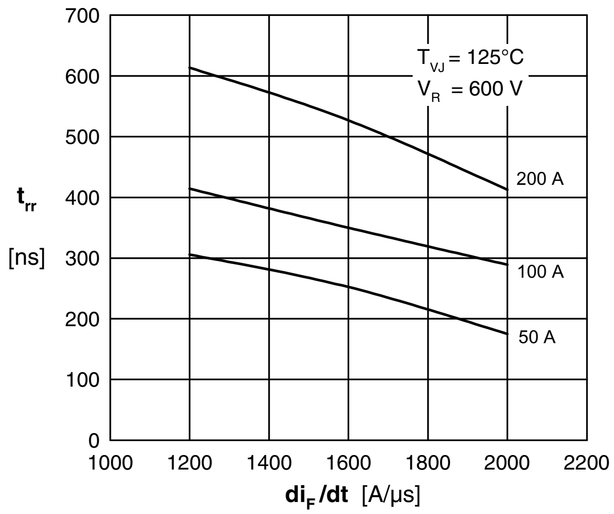

Fig. 10 Typ. recovery time t_{rr} versus di/dt

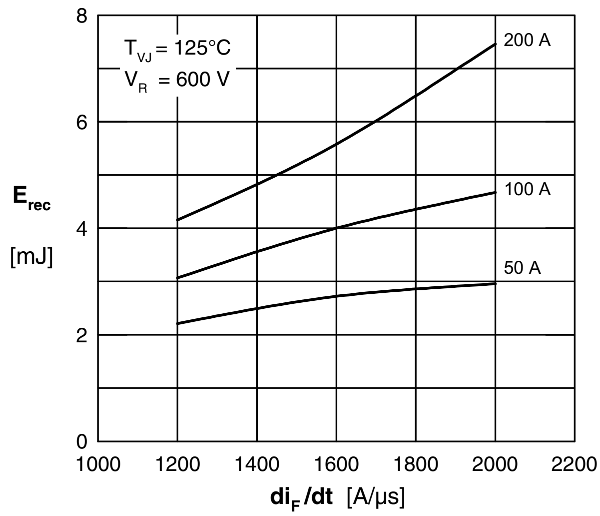

Fig. 11 Typ. recovery energy E_{rec} versus di/dt

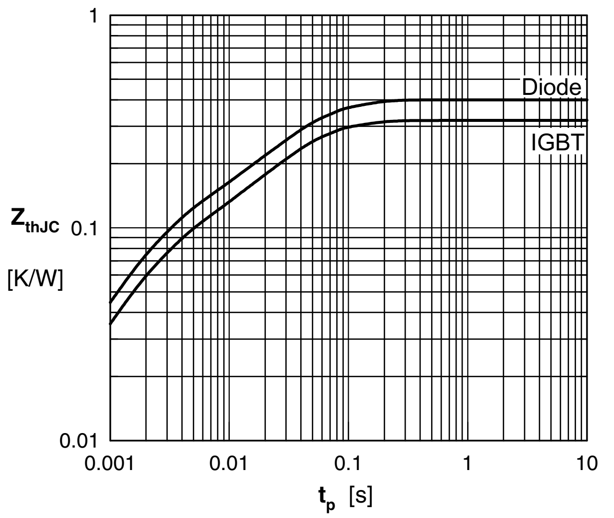

Fig. 12 Typ. transient thermal impedance

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NTC

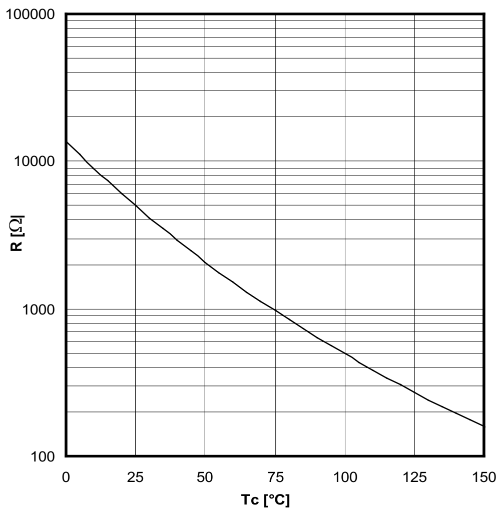

Fig. 13 Typ. NTC resistance vs. temperature

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