

Six-Pack SPT+ IGBT

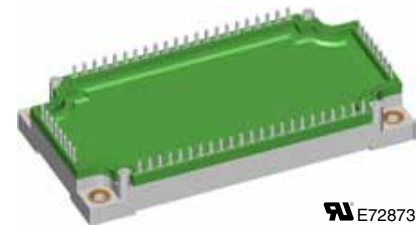
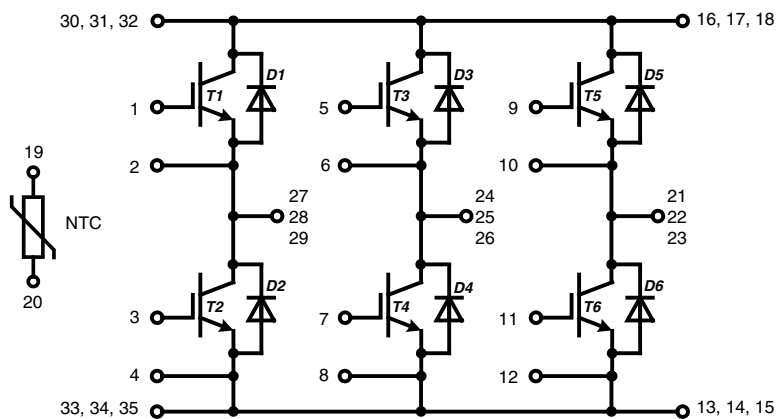
$$V_{CES} = 1200 \text{ V}$$

$$I_{C25} = 183 \text{ A}$$

$$V_{CE(sat)} = 1.8 \text{ V}$$

Part name (Marking on product)

MIEB100W1200TEH



Pin configuration see outlines.

Features:

- SPT+ IGBT technology
- low saturation voltage
- low switching losses
- square RBSOA, no latch up
- high short circuit capability
- positive temperature coefficient for easy paralleling
- MOS input, voltage controlled
- SONIC™ free wheeling diode
 - fast and soft reverse recovery
 - low operation forward voltage
- 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

Output Inverter T1 - T6

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
V_{CES}	collector emitter voltage				1200	V
V_{GES}	max. DC gate voltage	continuous			±20	V
V_{GEM}	max. transient collector gate voltage	transient			±30	V
I_{C25}	collector current				183	A
I_{C80}					128	A
P_{tot}	total power dissipation				630	W
$V_{CE(sat)}$	collector emitter saturation voltage (on chip level) ①	$I_C = 100 \text{ A}; V_{GE} = 15 \text{ V}$		1.8	2.2	V
				2.0	2.4	V
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 4 \text{ mA}; V_{GE} = V_{CE}$		5	6	7
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}$		0.9	0.3	3
						mA
I_{GES}	gate emitter leakage current	$V_{GE} = \pm 20 \text{ V}$			200	nA
C_{ies}	input capacitance	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$		7430		pF
$Q_{G(on)}$	total gate charge	$V_{CE} = 600 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 100 \text{ A}$		750		nC
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 600 \text{ V}; I_C = 100 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 10 \Omega$ $L_S = 70 \text{ nH}$	$T_{VJ} = 125^\circ\text{C}$		120	ns
t_r	current rise time				55	ns
$t_{d(off)}$	turn-off delay time				460	ns
t_f	current fall time				240	ns
E_{on}	turn-on energy per pulse				9.5	mJ
E_{off}	turn-off energy per pulse				9.7	mJ
$E_{rec(off)}$	reverse recovery losses at turn-off				4.2	mJ
RBSOA	reverse bias safe operating area	$V_{GE} = \pm 15 \text{ V}; R_G = 10 \Omega;$	$T_{VJ} = 125^\circ\text{C}$ $V_{CEK} = 1200 \text{ V}$		200	A
SCSOA	short circuit safe operating area					
t_{SC}	short circuit duration	$V_{CE} = 900 \text{ V}; V_{GE} = \pm 10 \text{ V};$	$T_{VJ} = 125^\circ\text{C}$		10	µs
	short circuit current	$R_G = 3.9 \Omega; \text{non-repetitive}$				
R_{thJC}	thermal resistance junction to case	(per IGBT)			0.2	K/W

Output Inverter D1 - D6

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
V_{RRM}	max. repetitive reverse voltage				1200	V
I_{F25}	forward current				135	A
I_{F80}					90	A
V_F	forward voltage (on chip level) ①	$I_F = 100 \text{ A}; V_{GE} = 0 \text{ V}$		2.00	2.20	V
				1.95	2.25	V
I_{rr}	max. reverse recovery current	inductive load $V_{CE} = 600 \text{ V}; I_C = 100 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 10 \Omega$ $L_S = 70 \text{ nH}$	$T_{VJ} = 125^\circ\text{C}$		120	A
t_{rr}	reverse recovery time				330	ns
Q_{rr}					12.5	µC
E_{rec}					4.2	mJ
R_{thJC}	thermal resistance junction to case			(per diode)		0.4

$T_C = 25^\circ\text{C}$ unless otherwise stated

Temperature Sensor NTC

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
R_{25}	resistance	$T_C = 25^\circ\text{C}$	4.75	5.0	5.25	k Ω
$B_{25/50}$				3510		K

Module

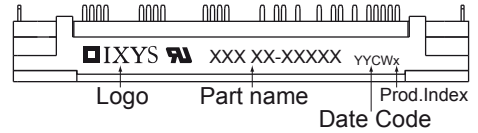
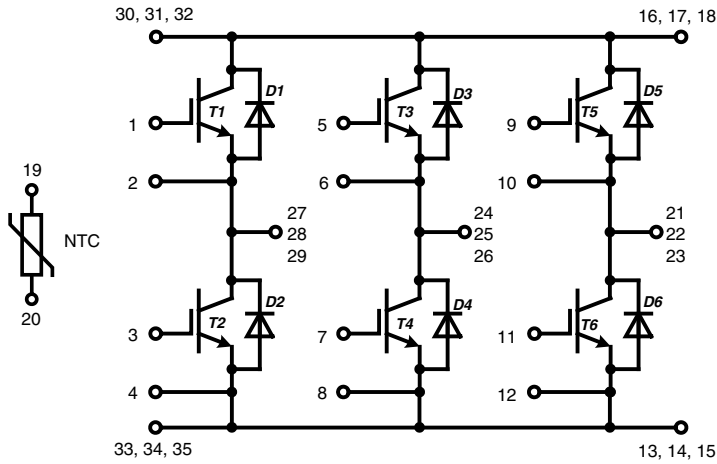
Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
T_{VJ}	operating temperature		-40		125	$^\circ\text{C}$
T_{VJM}	max. virtual junction temperature				150	$^\circ\text{C}$
T_{stg}	storage temperature		-40		125	$^\circ\text{C}$
V_{ISOL}	isolation voltage	$I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}$	$t = 1 \text{ min}$ $t = 1 \text{ s}$		3000 3600	V~ V~
CTI	comparative tracking index				200	
M_d	mounting torque (M5)		3		6	Nm
$R_{\text{pin to chip}}$	see ①			1.8		m Ω
d_s	creep distance on surface		12.7			mm
d_A	strike distance through air		9.6			mm
R_{thCH}	thermal resistance case to heatsink	with heatsink compound		0.1		K/W
Weight				300		g

$$\textcircled{1} V_{CE} = V_{CE(sat)} + 2x R_{\text{pin to chip}} \cdot I_C$$

$T_C = 25^\circ\text{C}$ unless otherwise stated

Curves are measured on modul level except Fig. 14 to Fig. 17

Circuit Diagram

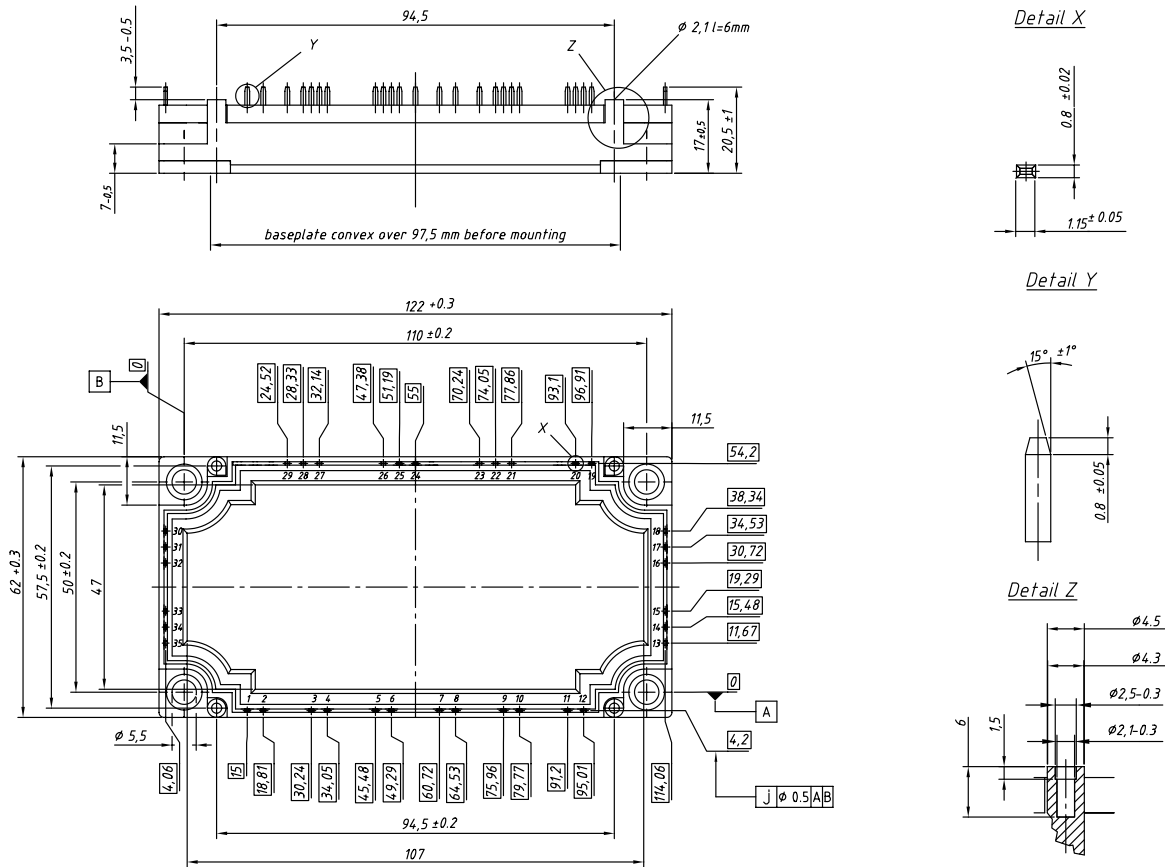


Part number

- M = Module
- I = IGBT
- E = NPT
- B = 2nd Generation
- 100 = Current Rating [A]
- W = Six-Pack
- 1200 = Reverse Voltage [V]
- T = NTC
- EH = E3-Pack

Outline Drawing

Dimensions in mm (1 mm = 0.0394")



Product Marking

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MIEB100W1200TEH	MIEB100W1200TEH	Box	5	510118

IXYS reserves the right to change limits, test conditions and dimensions.

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4 - 8

Transistor T1 - T6

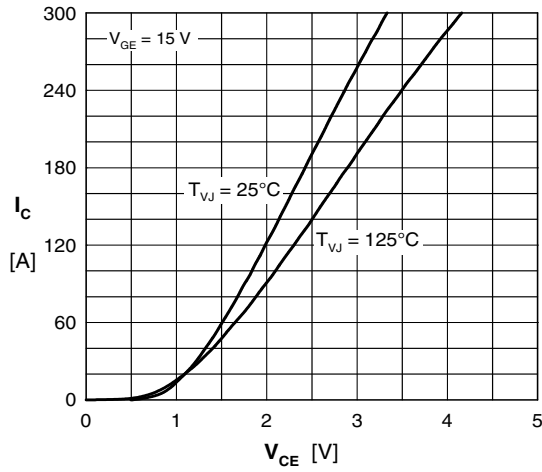


Fig. 1 Typ. output characteristics

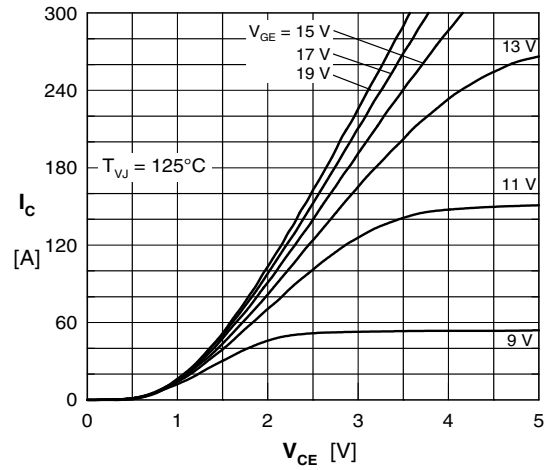


Fig. 2 Typ. output characteristics

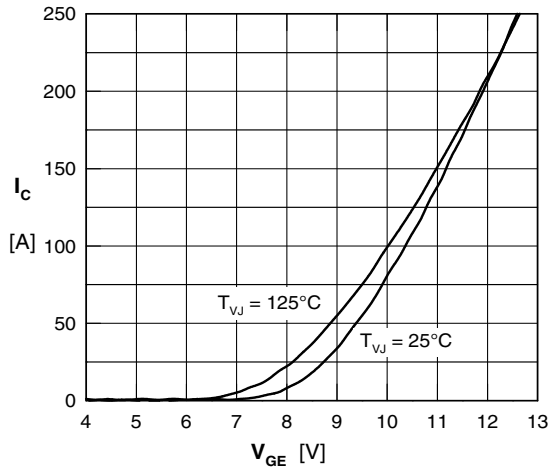


Fig. 3 Typ. transfer characteristics

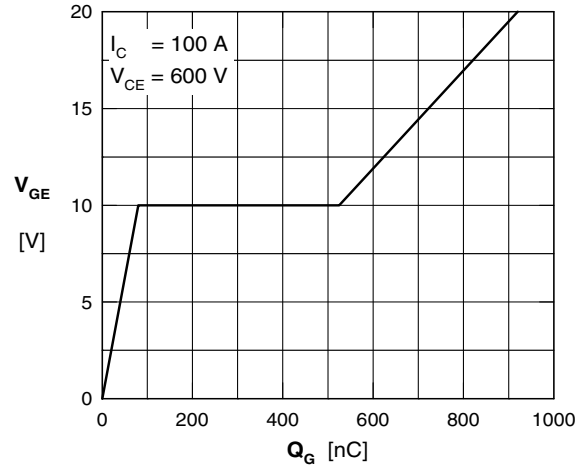


Fig. 4 Typ. turn-on gate charge

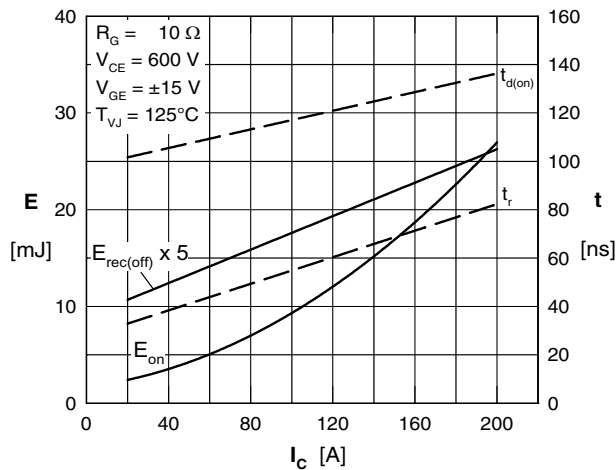


Fig. 5 Typ. turn-on energy & switching times versus collector current

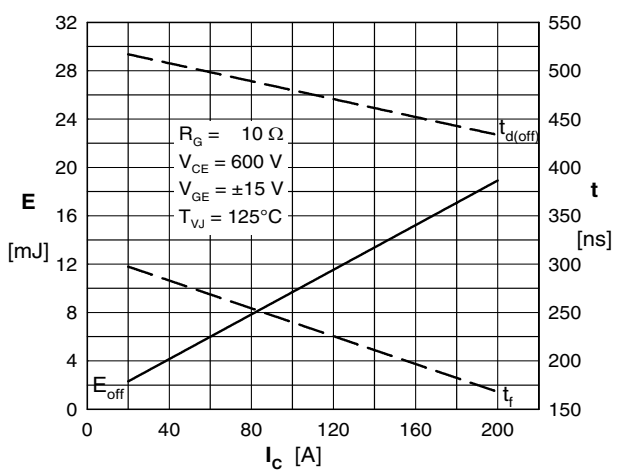


Fig. 6 Typ. turn-off energy & switching times versus collector current

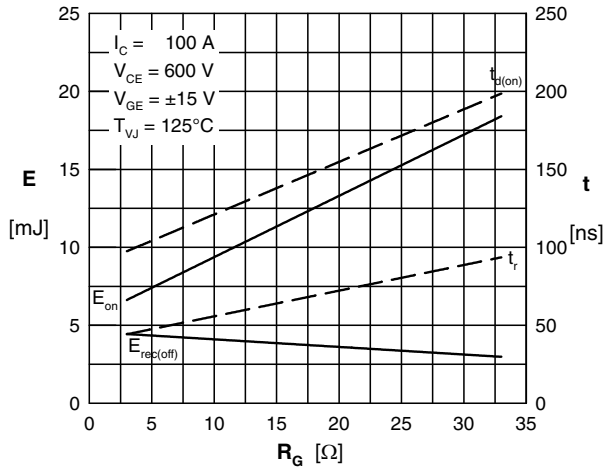
Transistor T1 - T6


Fig. 7 Typ. turn on energy & switching times versus gate resistor

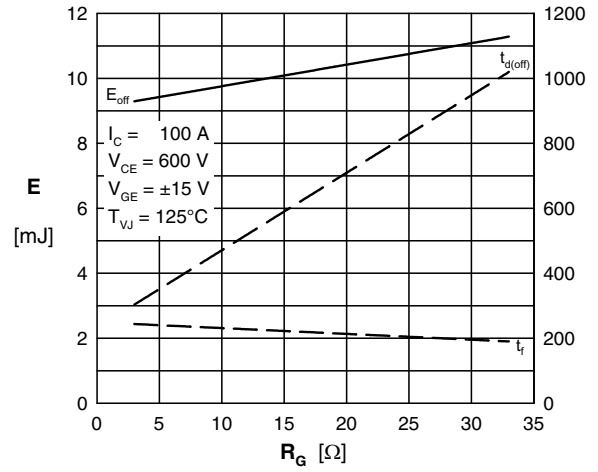


Fig. 8 Typ. turn off energy & switching times versus gate resistor

Diode D1 - D6 & NTC

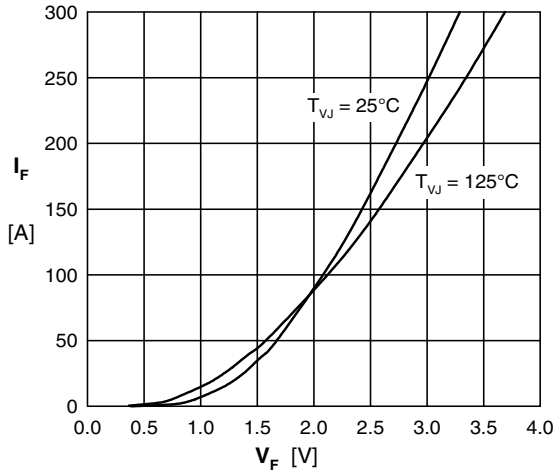


Fig. 9 Typ. forward characteristics

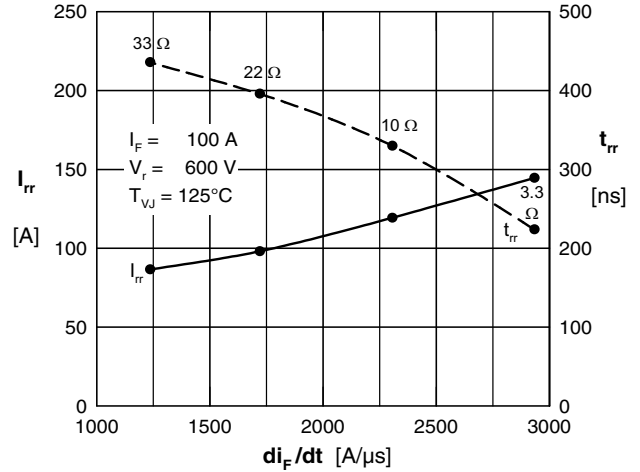


Fig. 10 Typ. reverse recovery characteristics

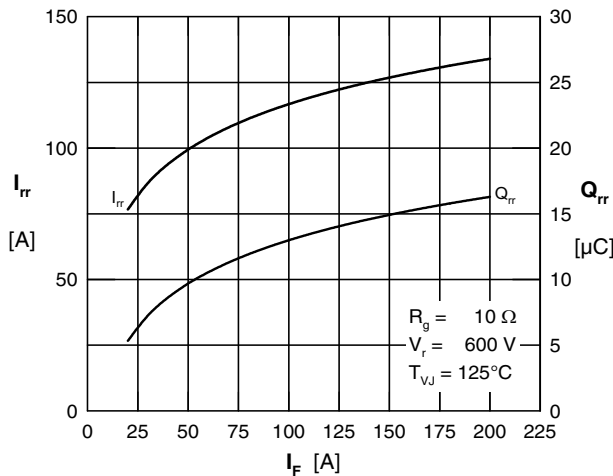


Fig. 11 Typ. reverse recovery characteristics

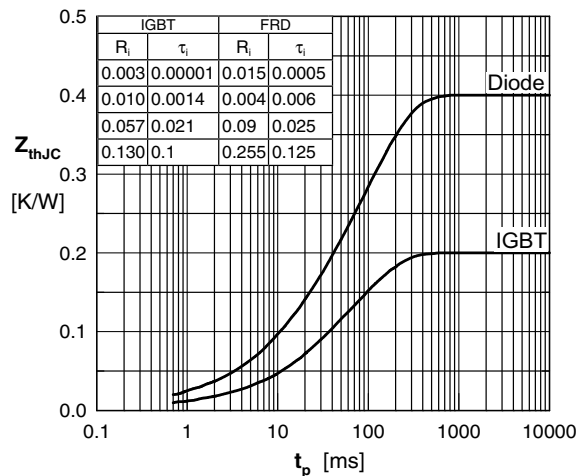


Fig. 12 Typ. transient thermal impedance

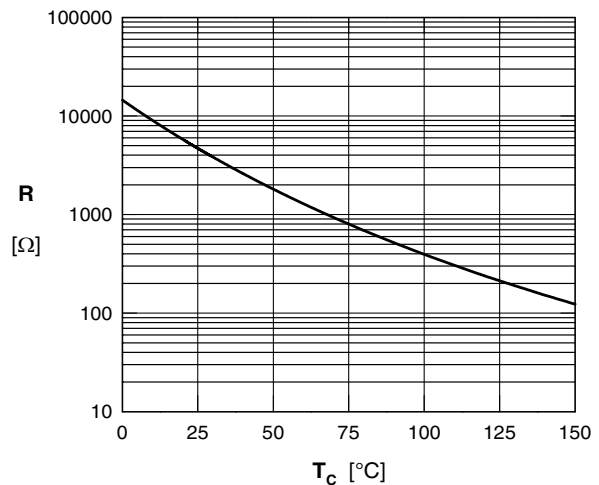


Fig.13 Typ. NTC resistance vs. temperature

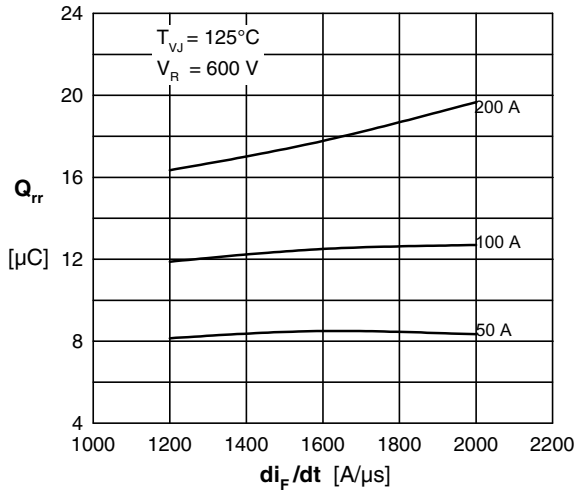


Fig. 14 Typ. reverse recov.charge Q_{rr} vs. di/dt

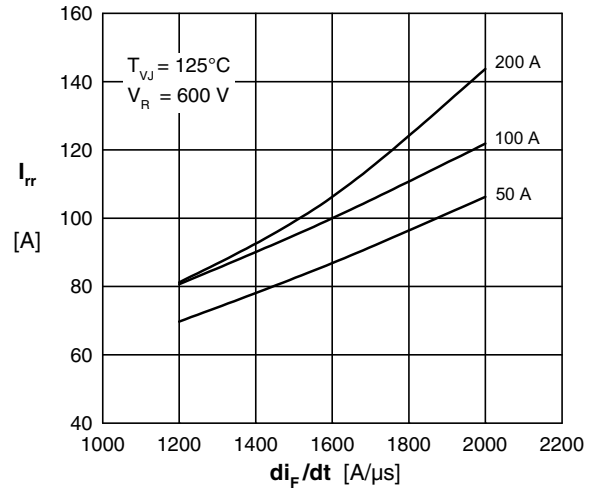


Fig. 15 Typ. peak reverse current I_{RM} vs. di/dt

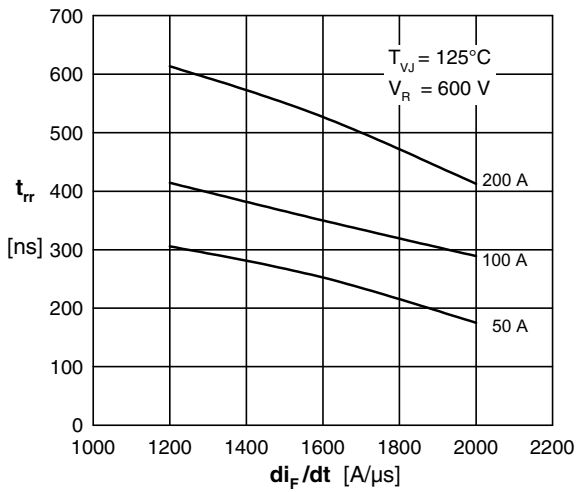


Fig. 16 Typ. recovery time t_{rr} versus di/dt

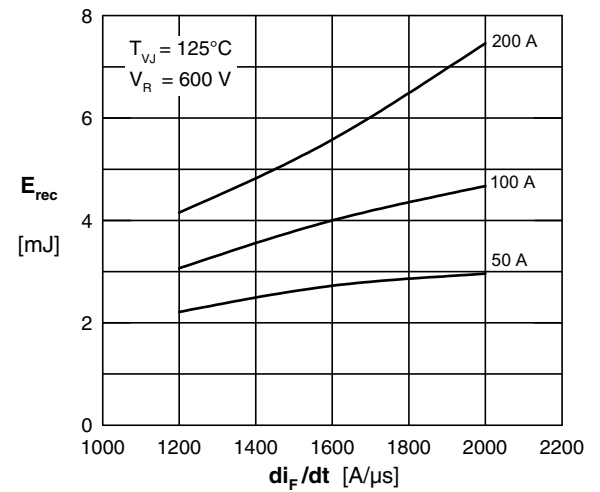


Fig. 17 Typ. recovery energy E_{rec} versus di/dt