

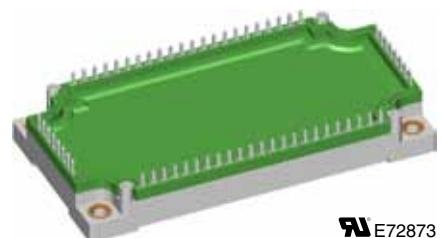
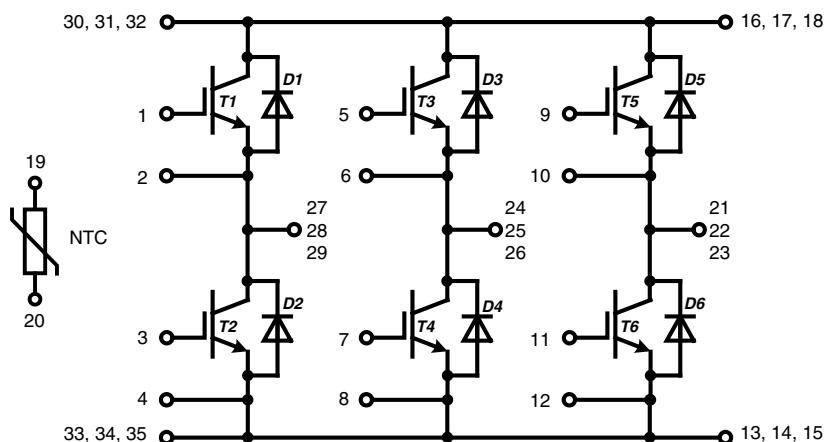
Six-Pack

SPT⁺ IGBT

V_{CES} = 1200 V
 I_{C25} = 183 A
 $V_{CE(sat)}$ = 1.8 V

Part name (Marking on product)

MIEB100W1200TEH



E72873

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

Ratings

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
V_{CES}	collector emitter voltage	$T_{VJ} = 25^\circ C$		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	$T_c = 25^\circ C$	183		A	
I_{C80}		$T_c = 80^\circ C$	128		A	
P_{tot}	total power dissipation	$T_c = 25^\circ C$	630		W	
$V_{CE(sat)}$	collector emitter saturation voltage (on chip level) ①	$I_c = 100 A; V_{GE} = 15 V$ $T_{VJ} = 25^\circ C$ $T_{VJ} = 125^\circ C$	1.8 2.0	2.2 2.4	V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_c = 4 mA; V_{GE} = V_{CE}$	$T_{VJ} = 25^\circ C$	5	6	V
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0 V$	$T_{VJ} = 25^\circ C$ $T_{VJ} = 125^\circ C$	0.9	0.3 3	mA mA
I_{GES}	gate emitter leakage current	$V_{GE} = \pm 20 V$		200	nA	
C_{ies}	input capacitance	$V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz$	7430		pF	
$Q_{G(on)}$	total gate charge	$V_{CE} = 600 V; V_{GE} = 15 V; I_c = 100 A$	750		nC	
$t_{d(on)}$	turn-on delay time	$T_{VJ} = 125^\circ C$ inductive load $V_{CE} = 600 V; I_c = 100 A$ $V_{GE} = \pm 15 V; R_G = 10 \Omega$ $L_S = 70 nH$	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	$V_{GE} = \pm 15 V; R_G = 10 \Omega;$ $V_{CEK} = 1200 V$		200	A	
SCSOA	short circuit safe operating area					
t_{sc}	short circuit duration	$V_{CE} = 900 V; V_{GE} = \pm 10 V;$		10	μs	
	short circuit current	$R_G = 3.9 \Omega$; non-repetitive				
R_{thJC}	thermal resistance junction to case	(per IGBT)		0.2	K/W	

Output Inverter D1 - D6

Ratings

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
V_{RRM}	max. repetitive reverse voltage	$T_{VJ} = 25^\circ C$		1200		V
I_{F25}	forward current	$T_c = 25^\circ C$		135	A	
I_{F80}		$T_c = 80^\circ C$		90	A	
V_F	forward voltage (on chip level) ①	$I_F = 100 A; V_{GE} = 0 V$ $T_{VJ} = 25^\circ C$ $T_{VJ} = 125^\circ C$	2.00 1.95	2.20 2.25	V	
I_{rr}	max. reverse recovery current	$T_{VJ} = 125^\circ C$ inductive load $V_{CE} = 600 V; I_c = 100 A$ $V_{GE} = \pm 15 V; R_G = 10 \Omega$ $L_S = 70 nH$	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	K/W	

 $T_c = 25^\circ C$ unless otherwise stated

Temperature Sensor NTC

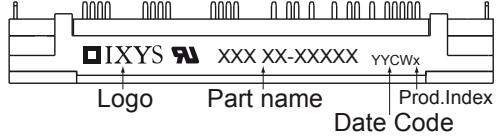
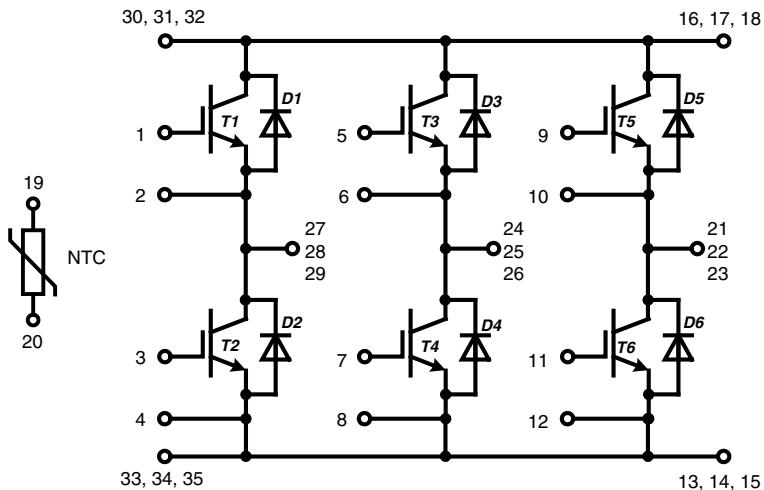
Ratings						
Symbol	Definitions	Conditions	min.	typ.	max.	Unit
R_{25}	<i>resistance</i>		$T_c = 25^\circ C$	4.75	5.0	$k\Omega$
$B_{25/50}$				3510	5.25	K

Module

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

① $V_{CE} = V_{CE(\text{sat})} + 2 \times R_{\text{pin to chip}} \cdot I_C$ $T_c = 25^\circ C$ unless otherwise stated

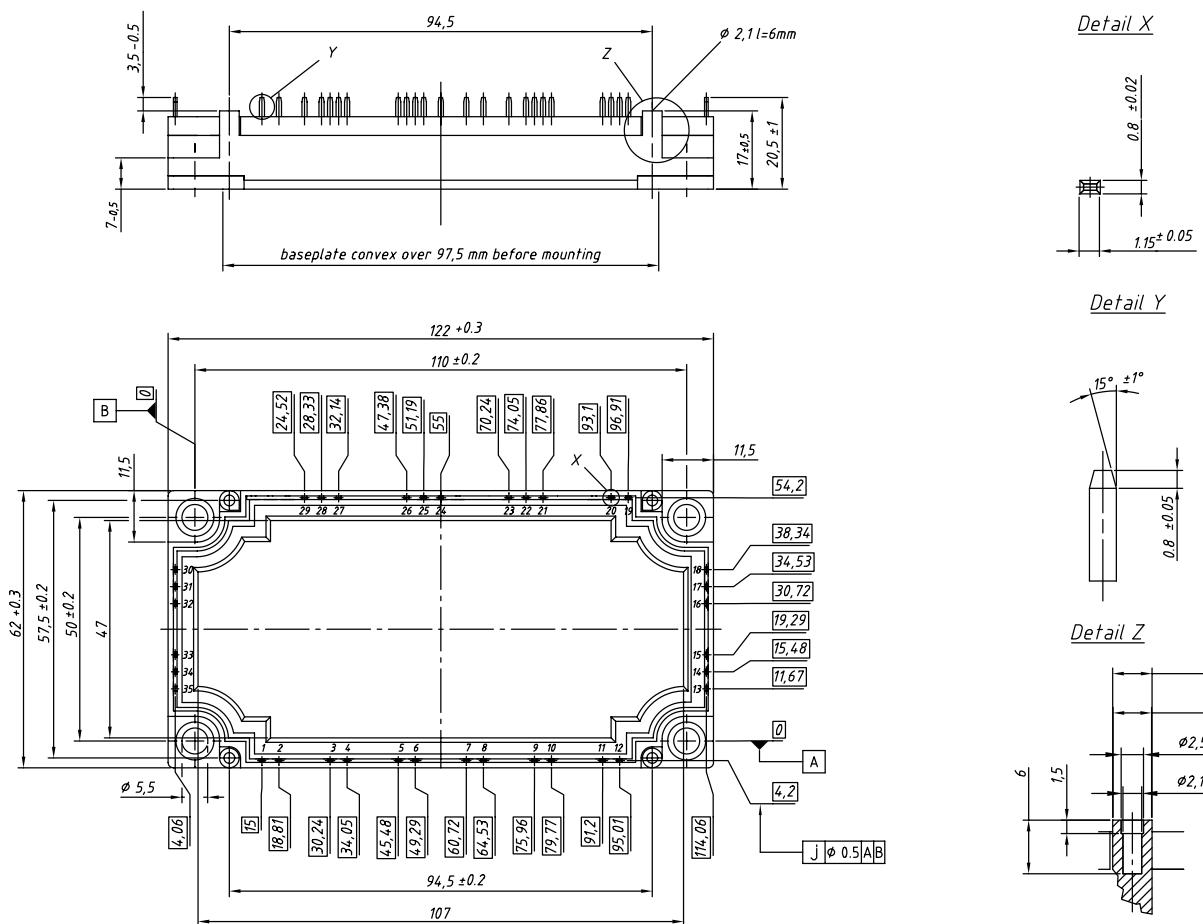
Curves are measured on modul level except Fig. 14 to Fig. 17

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

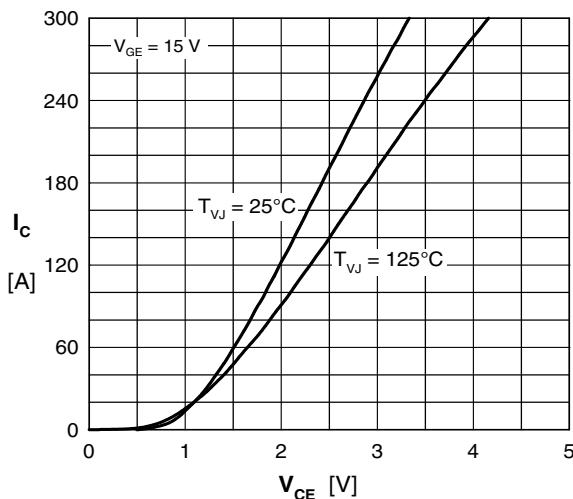
Transistor T1 - T6


Fig. 1 Typ. output characteristics

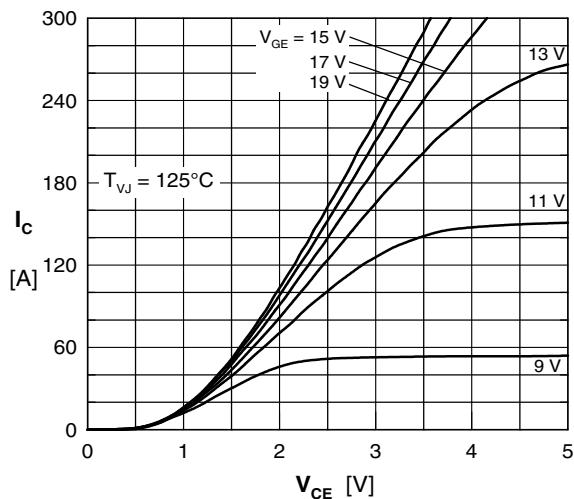


Fig. 2 Typ. output characteristics

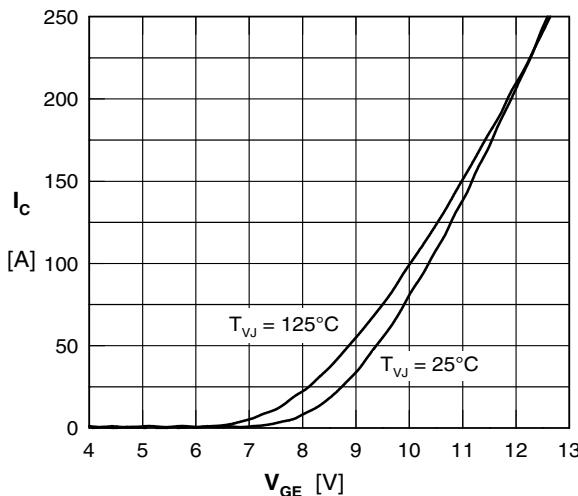


Fig. 3 Typ. tranfer characteristics

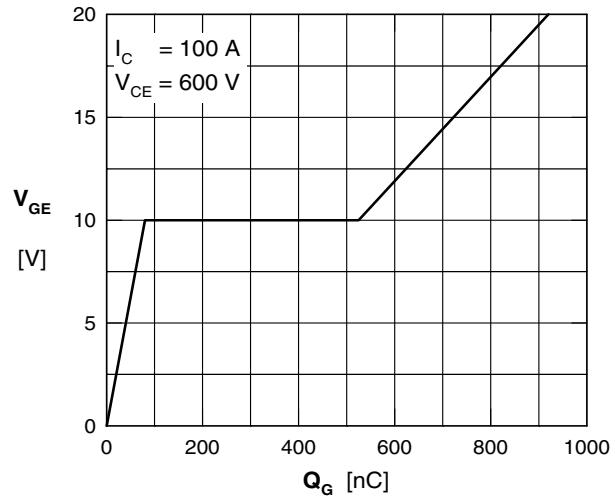


Fig. 4 Typ. turn-on gate charge

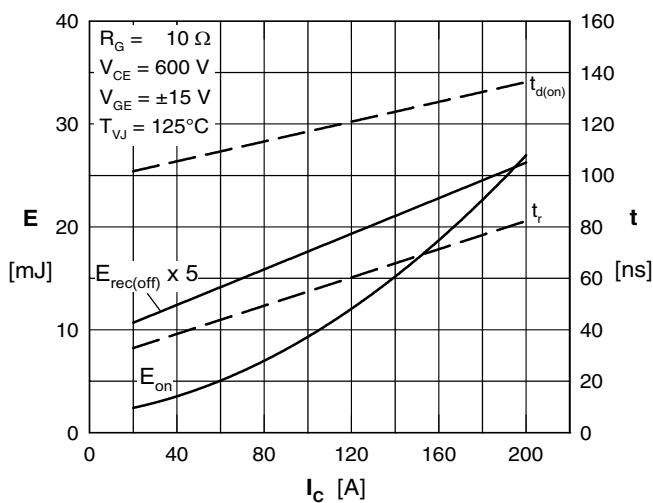


Fig. 5 Typ. turn-on energy & switching times versus collector current

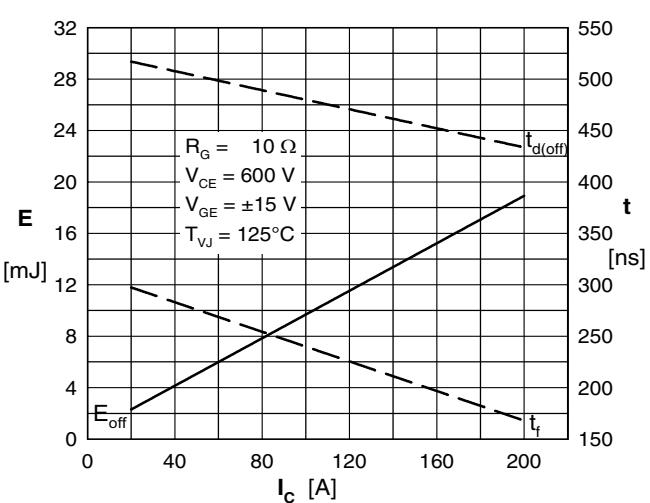


Fig. 6 Typ. turn-off energy & switching times versus collector current

Transistor T1 - T6

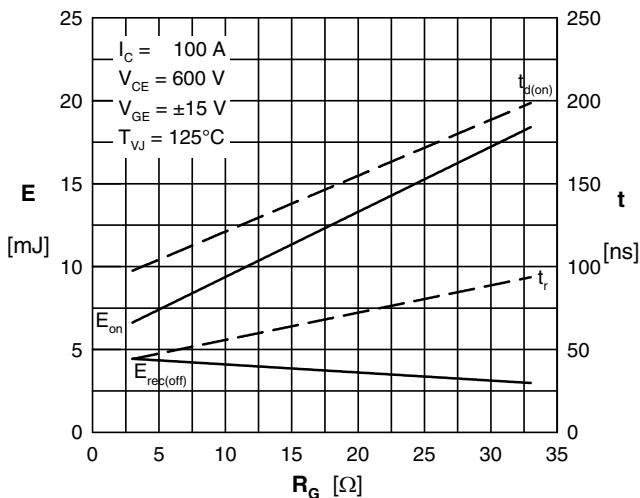


Fig. 7 Typ. turn on energy & switching times versus gate resistor

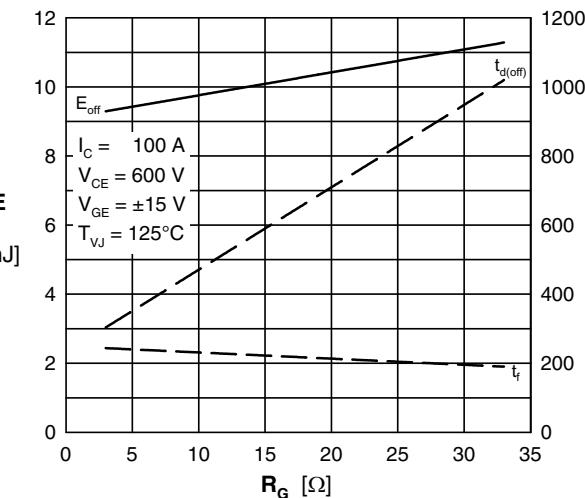


Fig. 8 Typ. turn off energy & switching times versus gate resistor

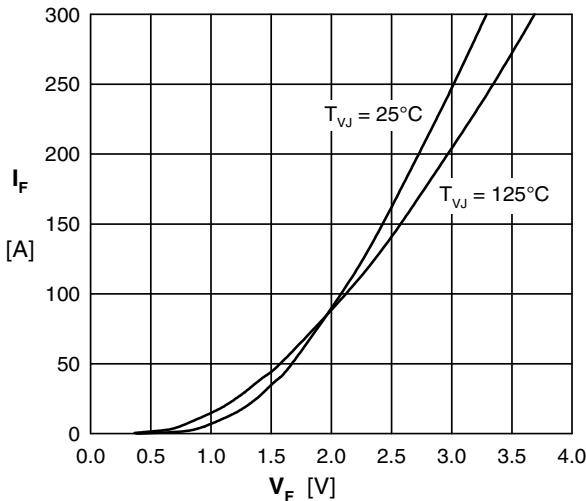
Diode D1 - D6 & NTC


Fig. 9 Typ. forward characteristics

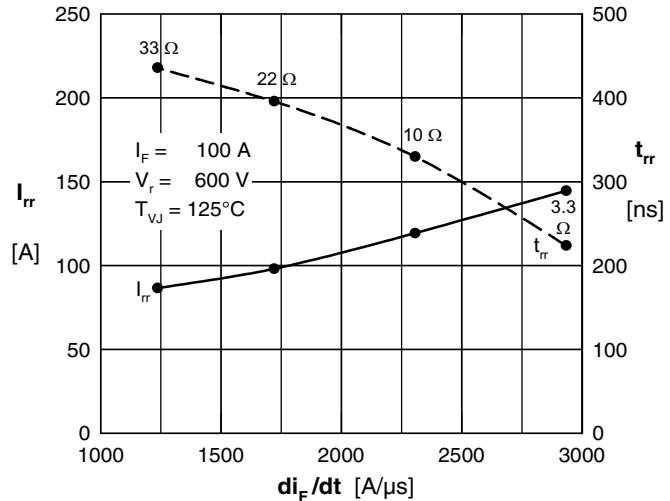


Fig. 10 Typ. reverse recovery characteristics

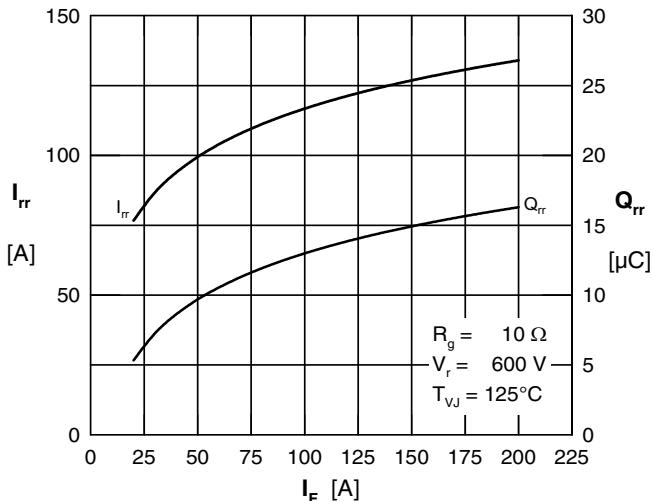


Fig. 11 Typ. reverse recovery characteristics

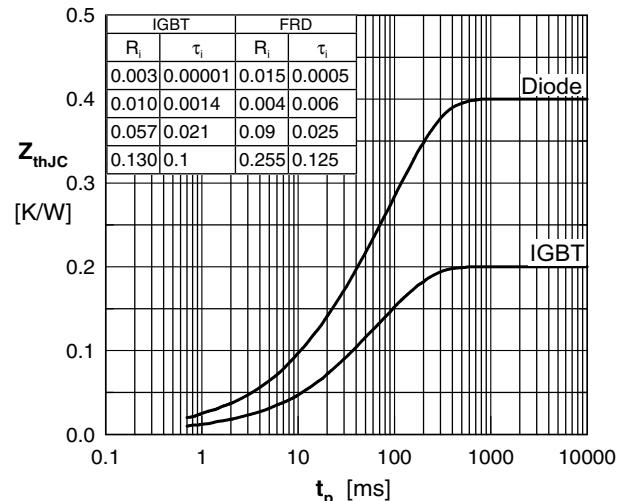


Fig. 12 Typ. transient thermal impedance

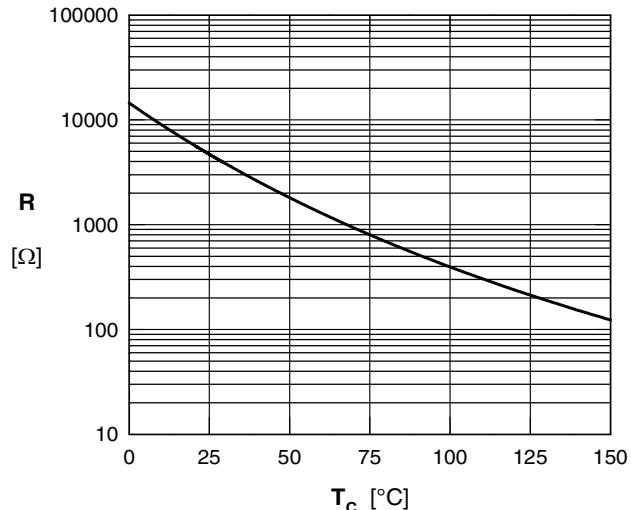


Fig. 13 Typ. NTC resistance vs. temperature

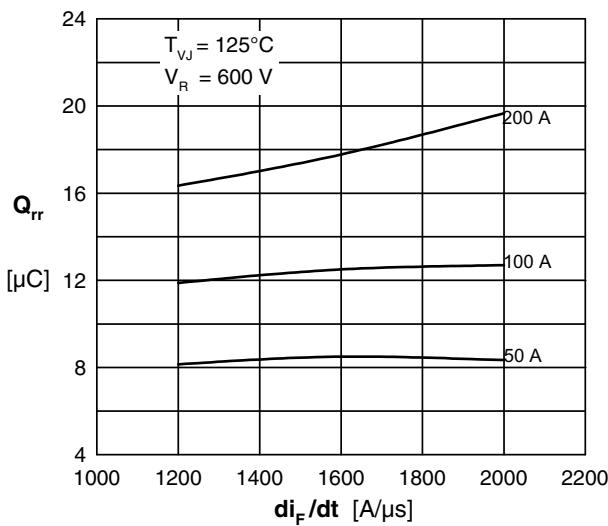


Fig. 14 Typ. reverse recov.charge Q_{rr} vs. di/dt

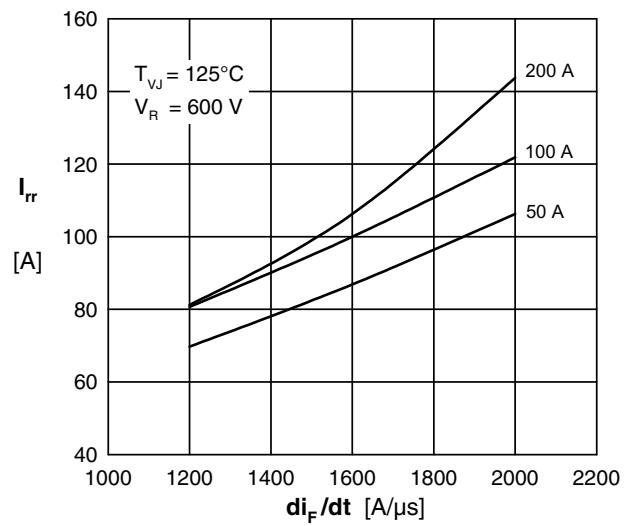


Fig. 15 Typ. peak reverse current I_{RM} vs. di/dt

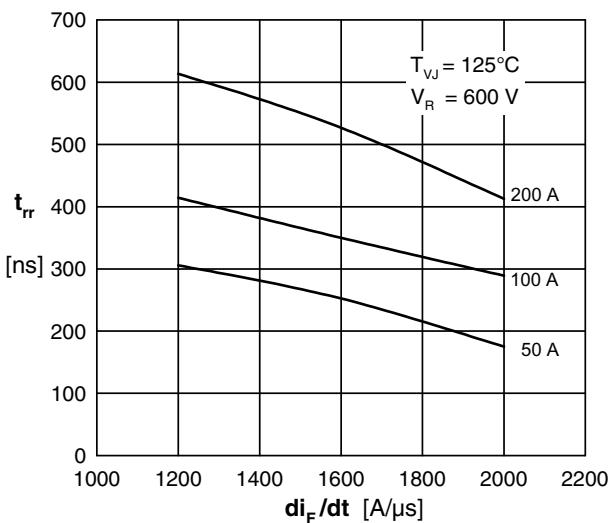


Fig. 16 Typ. recovery time t_{rr} versus di/dt

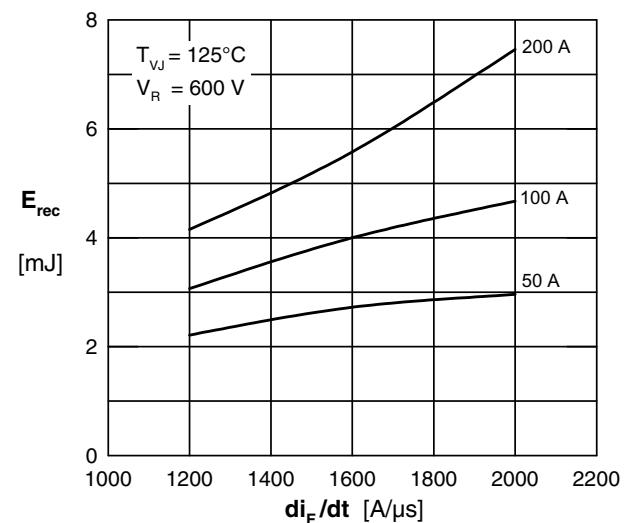


Fig. 17 Typ. recovery energy E_{rec} versus di/dt