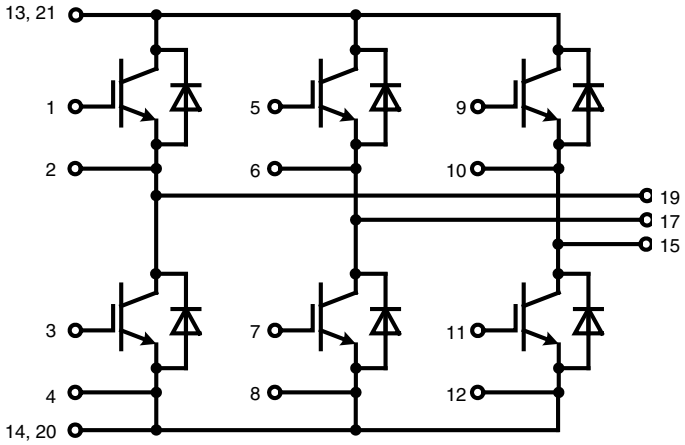
Six-Pack
SPT+ IGBT

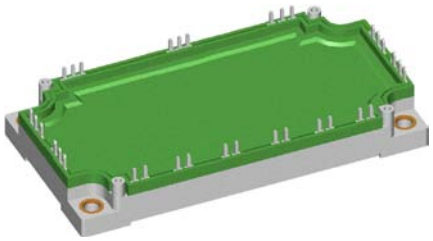
V_{CES} = 1200 V
I_{C25} = 170 A
$V_{CE(sat)\ typ.}$ = 1.9 V

Preliminary data

Part name (Marking on product)

MIEB101W1200DPFEH





E 72873

Features:

- SPT+ IGBT technology
- low saturation voltage
- low switching losses
- switching frequency up to 30 kHz
- 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
- space savings
- HiPerFRED™ diode

Application:

- AC motor control
- AC servo and robot drives
- power supplies

Package:

- designed for wave soldering
- with copper base plate

Ouput Inverter T1 - T6

Symbol	Definitions	Conditions		Ratings min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°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°C			171	A
I_{C80}			T_C = 80°C			119	A
P_{tot}	*total power dissipation*		T_C = 25°C			600	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 100 A; V_{GE} = 15 V	T_{VJ} = 25°C		1.9	2.3	V
	(on chip level) ①		T_{VJ} = 125°C		2.1	2.5	V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 4 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5	6	7	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C			1.4	mA
			T_{VJ} = 125°C			6	mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V				1	µA
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*	inductive load	T_{VJ} = 125°C		120		ns
t_r	*current rise time*	V_{CE} = 600 V; I_C = 100 A			60		ns
$t_{d(off)}$	*turn-off delay time*	V_{GE} = ±15 V; R_G = 10 Ω			480		ns
t_f	*current fall time*	L_S = 70 nH			240		ns
E_{on}	*turn-on energy per pulse*				12		mJ
E_{off}	*turn-off energy per pulse*				10		mJ
$E_{rec(off)}$	*reverse recovery losses at turn-off*				6		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 10 Ω;	T_{VJ} = 125°C				
			V_{CEK} = 1200 V			200	A
SCSOA	*short circuit safe operating area*						
t_{SC}	*short circuit duration*	V_{CE} = 900 V; V_{GE} = ±10 V;	T_{VJ} = 125°C			10	µs
	short circuit current	R_G = 3.9 Ω; non-repetitive					
R_{thJC}	*thermal resistance junction to case*	(per IGBT)				0.21	K/W
R_{thJH}	*thermal resistance junction to heatsink*	(IXYS test setup)			0.27	0.37	K/W

Output Inverter D1 - D6

Symbol	Definitions	Conditions		Ratings min.	typ.	max.	Unit
V_{RRM}	*max. repetitve reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			199	A
I_{F80}			T_C = 80°C			127	A
V_F	*forward voltage*	I_F = 100 A; V_{GE} = 0 V	T_{VJ} = 25°C			2.5	V
	(on chip level) ①		T_{VJ} = 125°C			1.8	V
I_{rr}	*max. reverse recovery current*	inductive load			165		A
t_{rr}	*reverse recovery time*	V_{CE} = 600 V; I_C = 100 A			290		ns
Q_{rr}		V_{GE} = ±15 V; R_G = 10 Ω	T_{VJ} = 125°C		18.6		µC
E_{rec}		L_S = 70 nH; -di/dt = 2300 A/µs			6		mJ
R_{thJC}	*thermal resistance junction to case*	(per diode)				0.30	K/W
R_{thJH}	*thermal resistance junction to heatsink*	(IXYS test setup)			0.39	0.45	K/W

T_C = 25°C unless otherwise stated

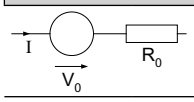
Module

Symbol	Definitions	Conditions		Ratings min.	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	t = 1 min			3000	V~
			t = 1 s			3600	V~
CTI	*comparative tracking index*					200	
M_d	*mounting torque (M5)*			3		6	Nm
$R_{pin\ to\ chip}$	*see* ①				2.5		mΩ
d_S	*creep distance on surface*			12.7			mm
d_A	*strike distance through air*			9.6			mm
Weight					300		g

① $V_{CE} = V_{CE(sat)} + 2x\ R_{pin\ to\ chip} \cdot I_C$ $T_C = 25°C$ unless otherwise stated

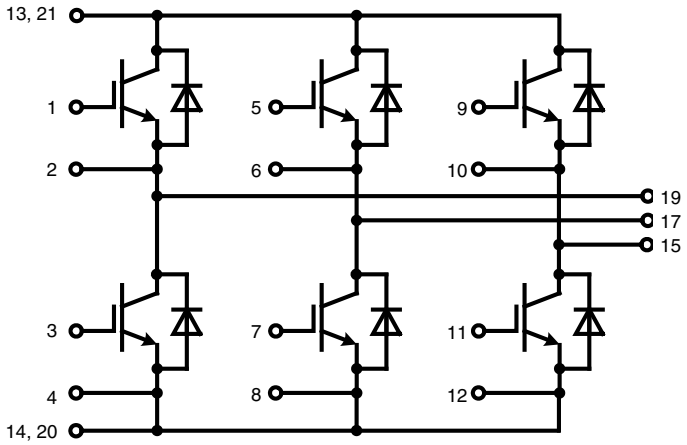
Curves are measured on modul level except Fig. 14 to Fig. 17

Equivalent Circuits for Simulation



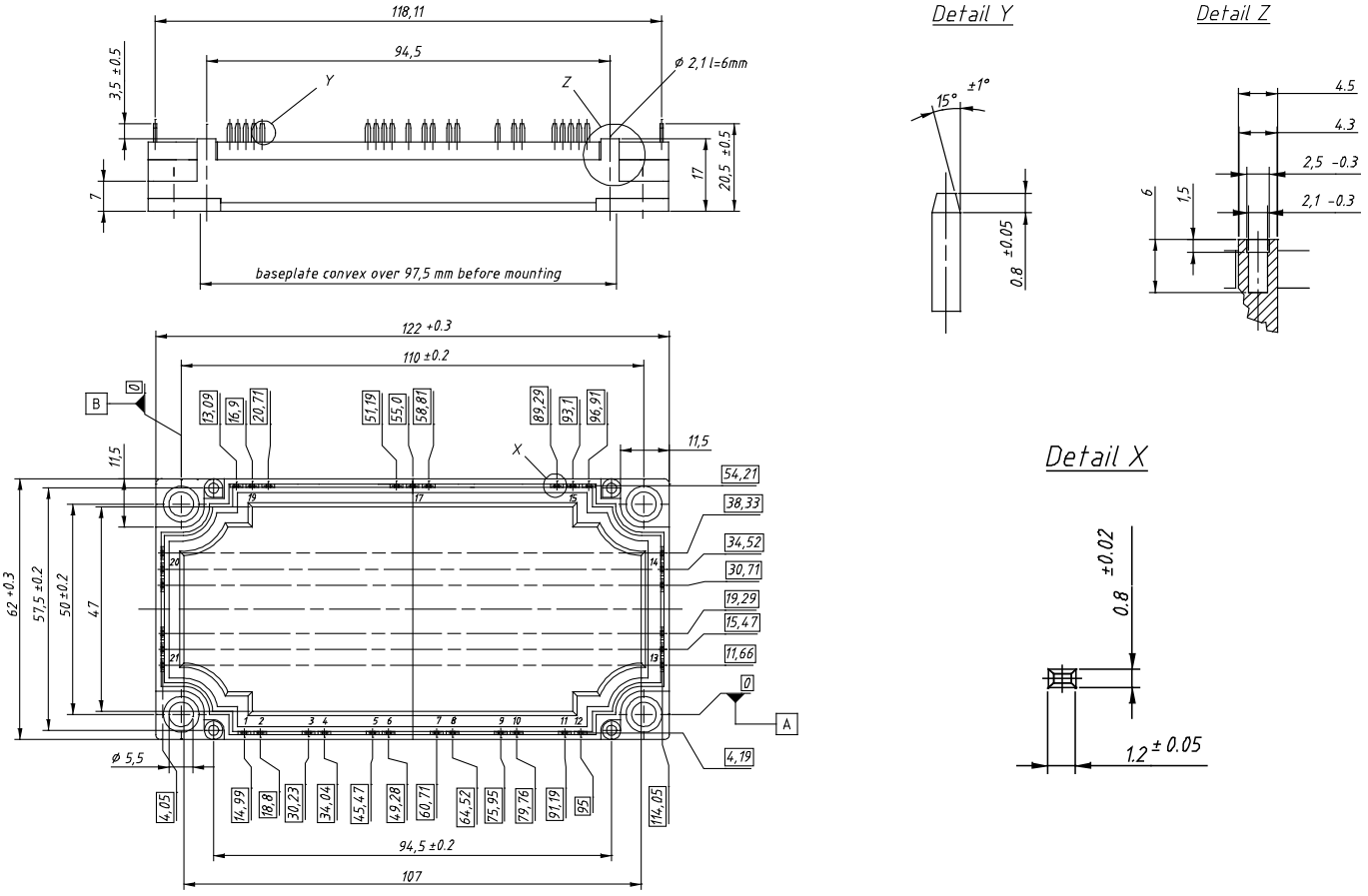
Symbol	Definitions	Conditions		Ratings min.	typ.	max.	Unit
V_0	*IGBT*	T1 - T6	$T_{VJ} = 150°C$			1.25	V
R_0						13	mΩ
V_0	*free wheeling diode*	D1 - D6	$T_{VJ} = 150°C$			1.40	V
R_0						3.5	mΩ

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	MIEB101W1200DPFEH	MIEB101W1200DPFEH	Box	5	512193

Transistor T1 - T6

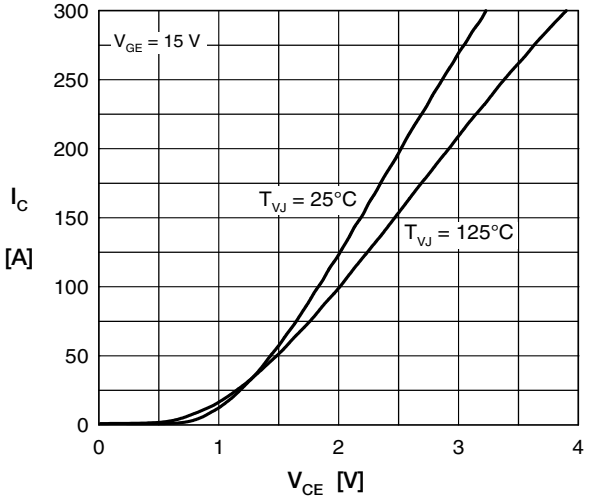


Fig. 1 Typ. output characteristics

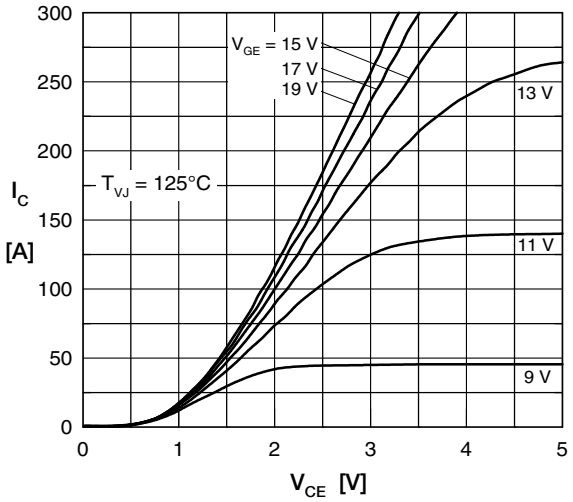


Fig. 2 Typ. output characteristics

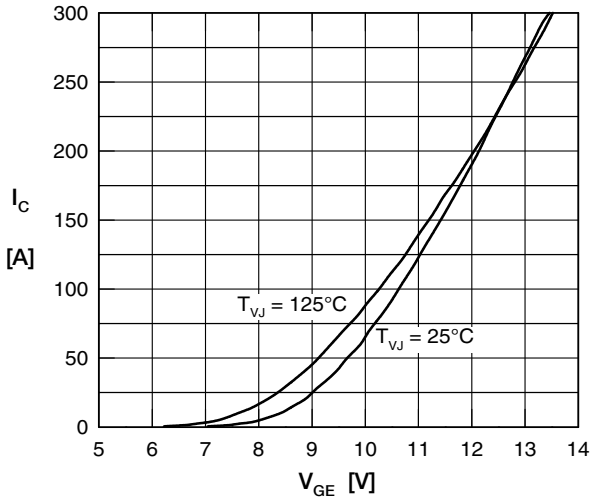


Fig. 3 Typ. transfer characteristics

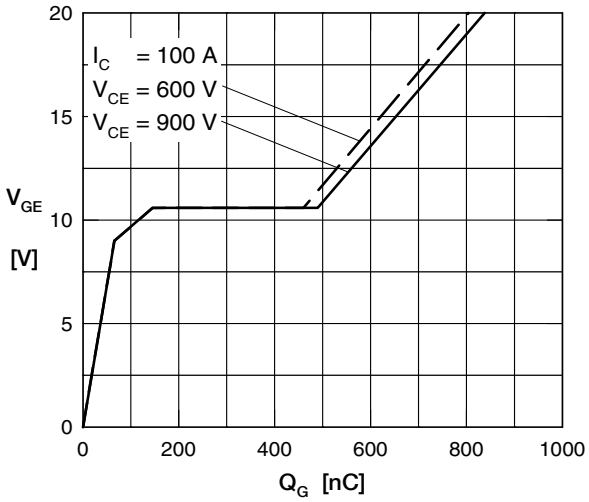


Fig. 4 Typ. turn-on gate charge

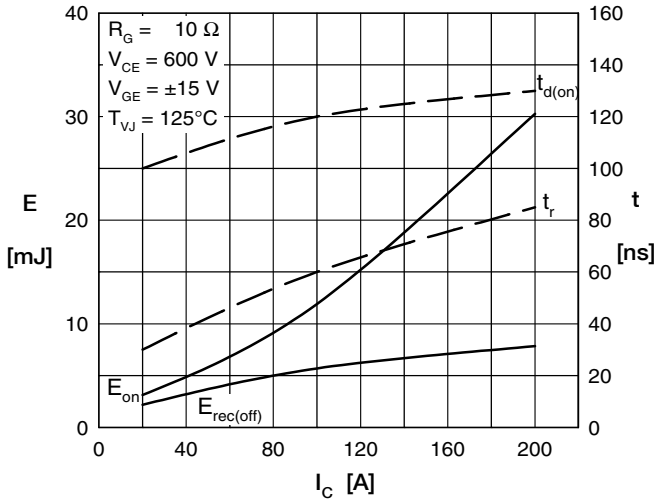


Fig. 5 Typ. turn-on energy & switching times versus collector current

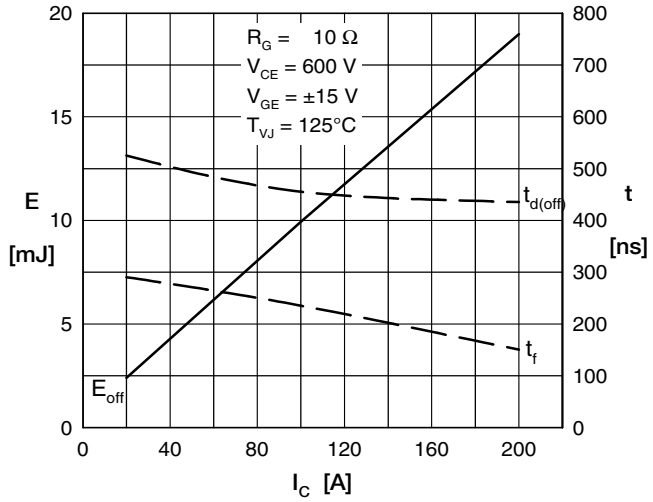


Fig. 6 Typ. turn-off energy & switching times versus collector current

Transistor T1 - T6

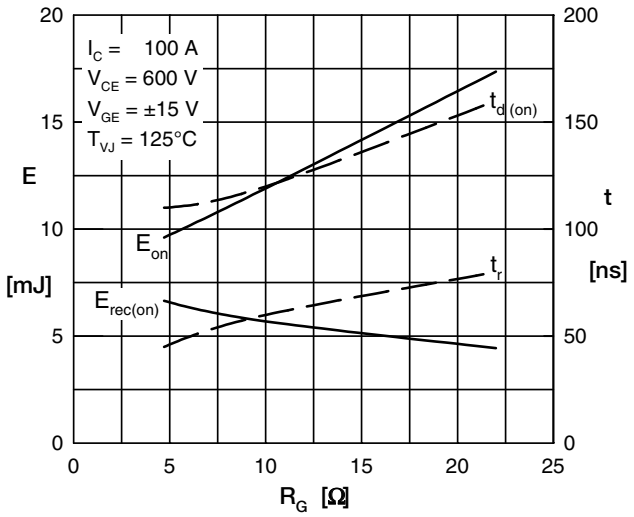


Fig. 7 Typ. turn-on energy and switching times versus gate resistor

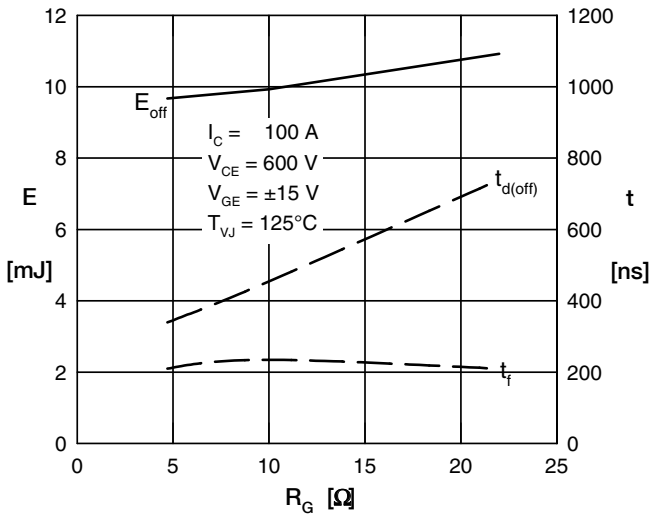


Fig. 8 Typ. turn-off energy and switching times versus gate resistor

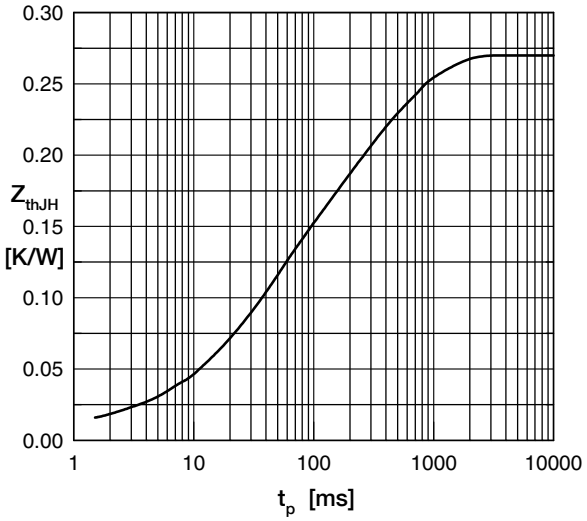


Fig. 9 Typ. transient thermal impedance

Diode D1 - D6 & NTC

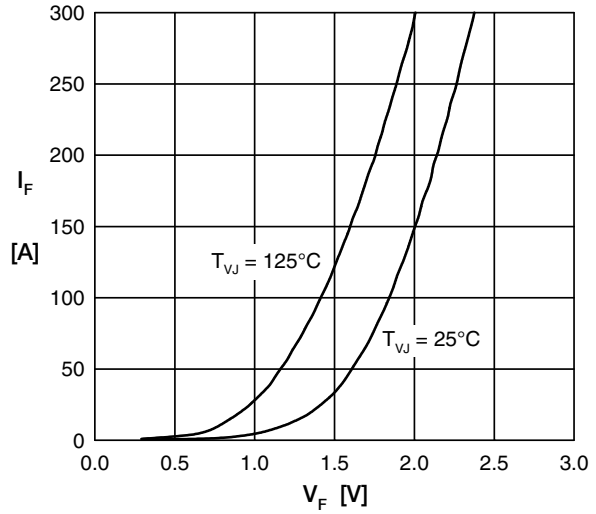


Fig. 10 Typ. forward characteristics

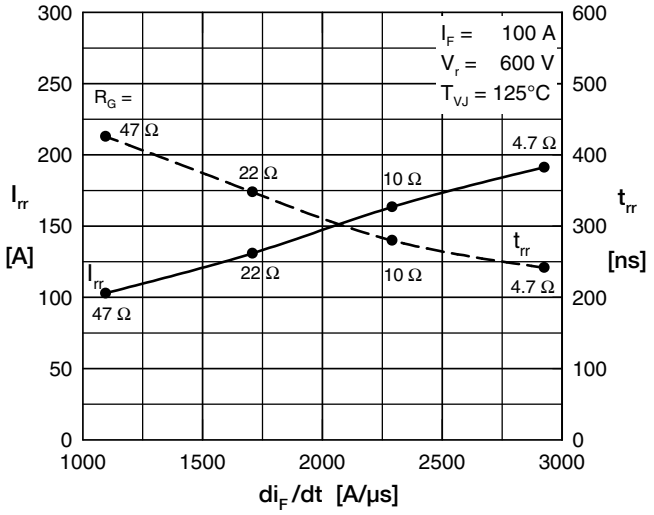


Fig. 11 Typ. reverse recovery characteristics

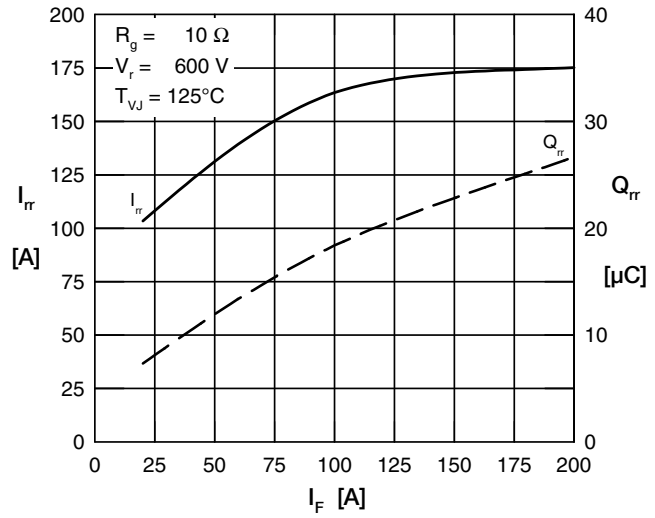


Fig. 12 Typ. reverse recovery characteristics

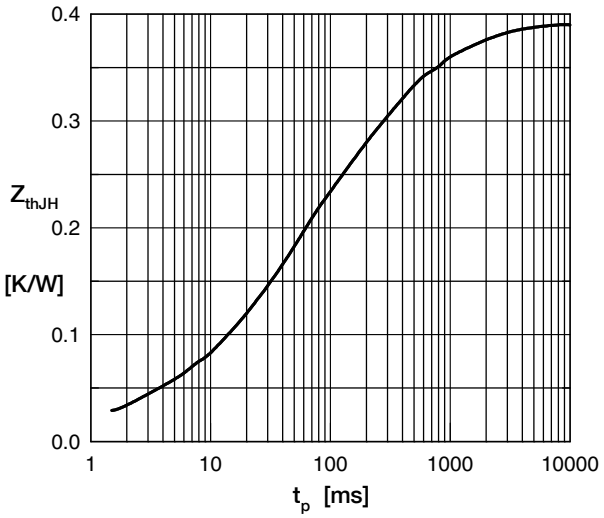


Fig. 13 Typ. transient thermal impedance