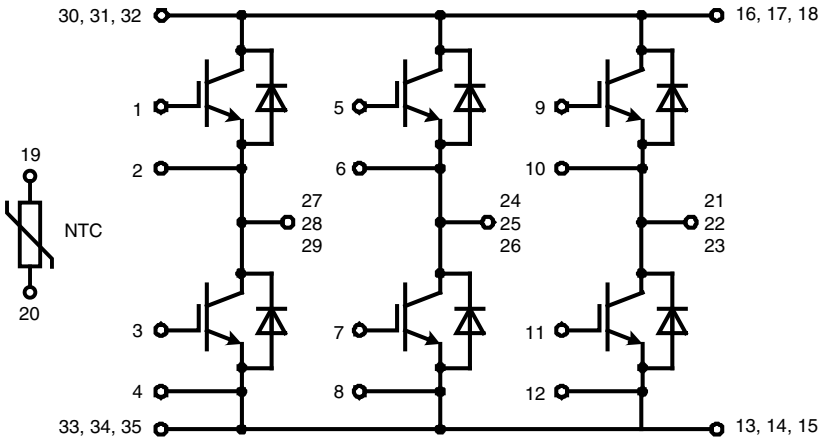
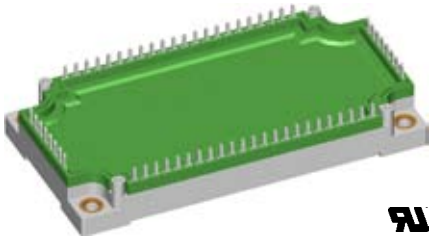
Six-Pack
Trench IGBT

V_{CES} = 1200 V
I_{C25} = 215 A
$V_{CE(sat)}$ = 1.7 V

Part name (Marking on product)

MWI150-12T8T





E 72873

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

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			215	A
I_{C80}			T_C = 80°C			150	A
P_{tot}	*total power dissipation*		T_C = 25°C			690	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 150 A; V_{GE} = 15 V	T_{VJ} = 25°C		1.7	2.1	V
			T_{VJ} = 125°C		2.0		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 6 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			6	mA
			T_{VJ} = 125°C		2		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			10770		pF
$Q_{G(on)}$	*total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 150 A			860		nC
$t_{d(on)}$	*turn-on delay time*				270		ns
t_r	*current rise time*	inductive load	T_{VJ} = 125°C		50		ns
$t_{d(off)}$	*turn-off delay time*	V_{CE} = 600 V; I_C = 150 A			500		ns
t_f	*current fall time*	V_{GE} = ±15 V; R_G = 2.4 Ω			340		ns
E_{on}	*turn-on energy per pulse*	L_S = 70 nH			15.5		mJ
E_{off}	*turn-off energy per pulse*				20		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 2.4 Ω;	T_{VJ} = 125°C				
			V_{CEK} = 1200 V			300	A
SCSOA	*short circuit safe operating area*						
t_{SC}	*short circuit duration*	V_{CE} = 900 V; V_{GE} = ±15 V;	T_{VJ} = 125°C			10	µs
I_{SC}	*short circuit current*	R_G = 2.4 Ω; non-repetitive			600		A
R_{thJC}	*thermal resistance junction to case*	(per IGBT)				0.18	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			196	A
I_{F80}			T_C = 80°C			132	A
V_F	*forward voltage*	I_F = 150 A; V_{GE} = 0 V	T_{VJ} = 25°C		1.95	2.2	V
			T_{VJ} = 125°C		1.85		V
Q_{rr}	*reverse recovery charge*	V_R = 600 V			20		µC
I_{RM}	*max. reverse recovery current*	di_F/dt = -2900 A/µs	T_{VJ} = 125°C		160		A
t_{rr}	*reverse recovery time*	I_F = 150 A; V_{GE} = 0 V			320		ns
E_{rec}	*reverse recovery energy*				7		mJ
R_{thJC}	*thermal resistance junction to case*	(per diode)				0.28	K/W

T_C = 25°C unless otherwise stated

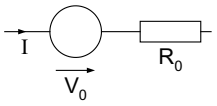
Temperature Sensor NTC

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

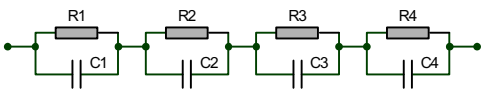
Module

Symbol	Definitions	Conditions	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			2500	V~
CTI	*comparative tracking index*				-	
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
$R_{pin-chip}$	*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		Ratings min.	typ.	max.	Unit
V_0	*IGBT*	T1 - T6	T_{VJ} = 125°C		1.0		V
R_0					6.7		mΩ
V_0	*Diode*	D1 - D6	T_{VJ} = 125°C		1.15		V
R_0					4.7		mΩ



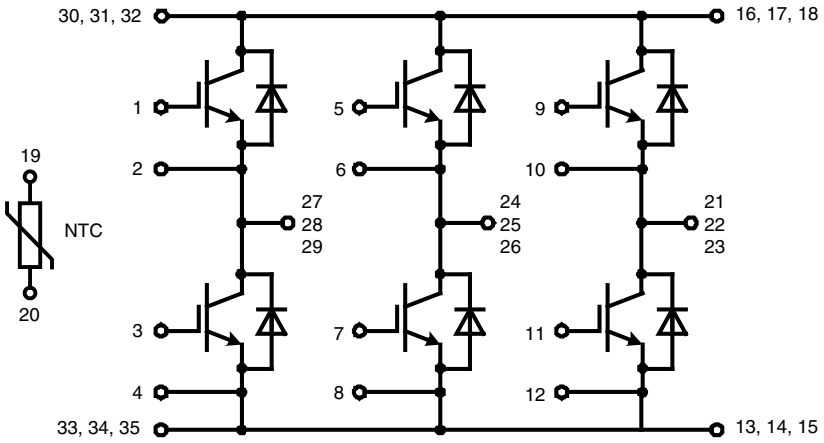
$$Zth(t) = \sum_{i=1}^{n} \left[R_i \cdot \left(1 - \exp\left(-\frac{t}{\tau_i} \right) \right) \right]$$

$$\tau_i = R_i \cdot C_i$$

	IGBT	Diode
R_1	0.0267	0.054
R_2	0.0309	0.05
R_3	0.061	0.096
R_4	0.0614	0.08
τ_1	0.0025	0.0025
τ_2	0.076	0.076
τ_3	0.036	0.036
τ_4	0.076	0.076

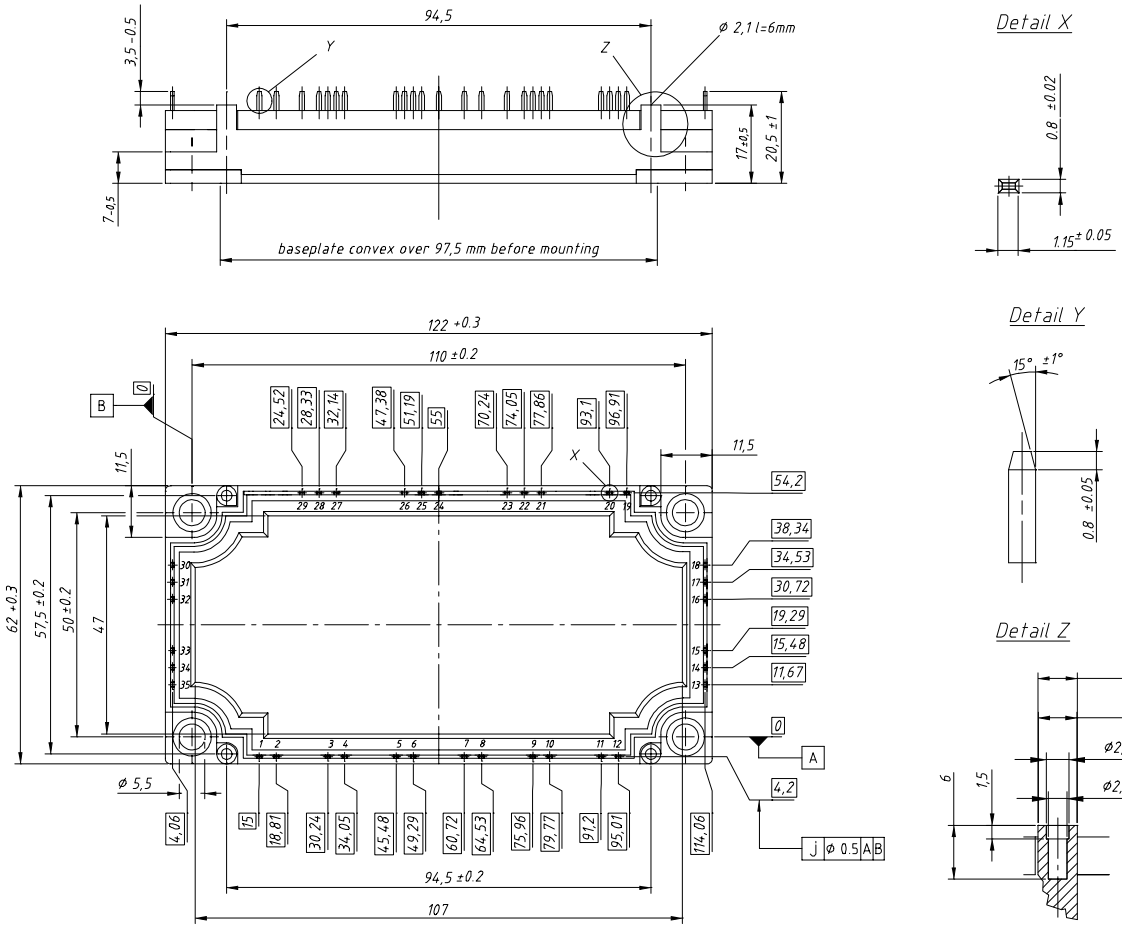
T_C = 25°C unless otherwise stated

Circuit Diagram



Outline Drawing

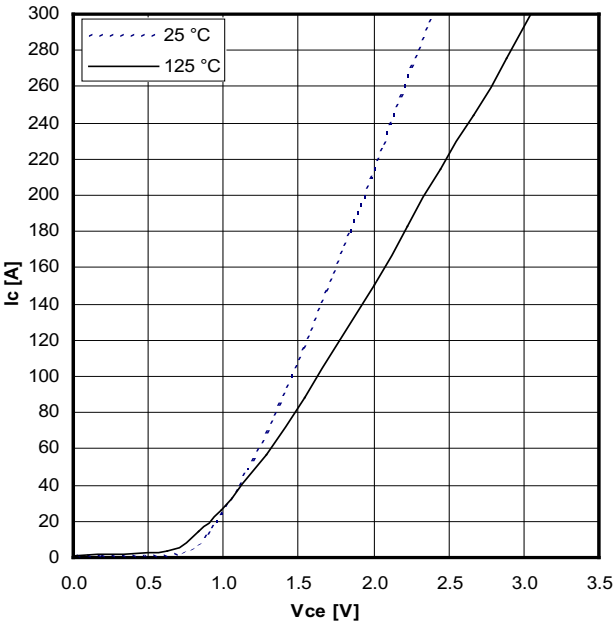
Dimensions in mm (1 mm = 0.0394“)



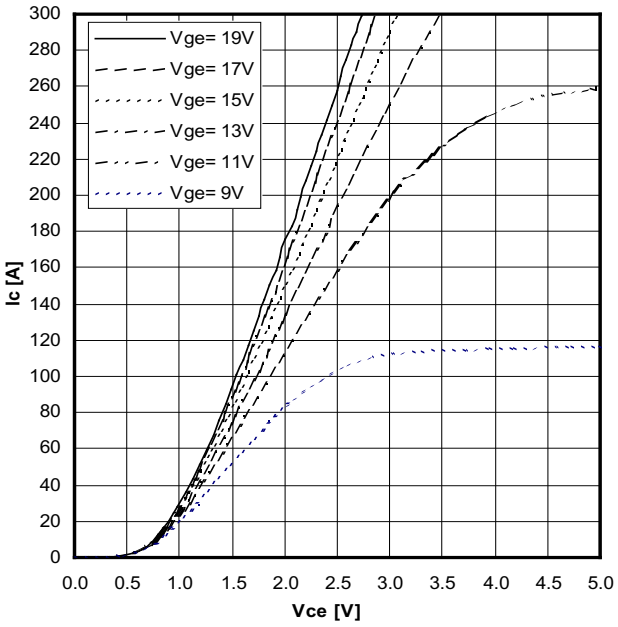
Product Marking

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MWI150-12T8T	MWI150-12T8T	Box	5	502301

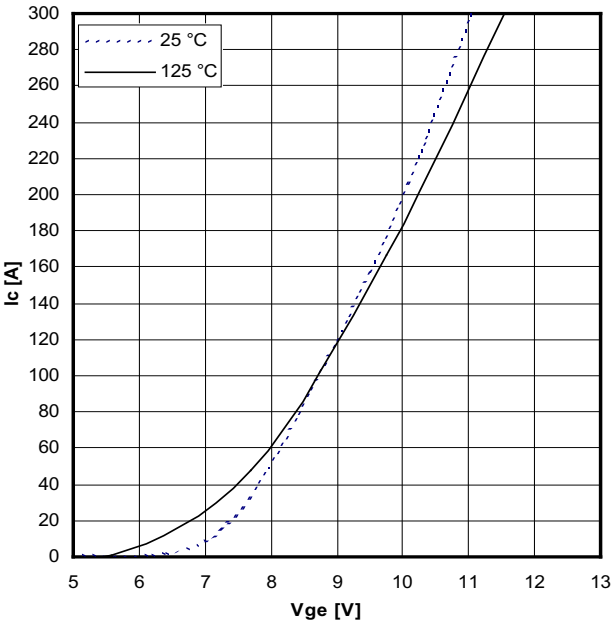
Inverter T1 - T6



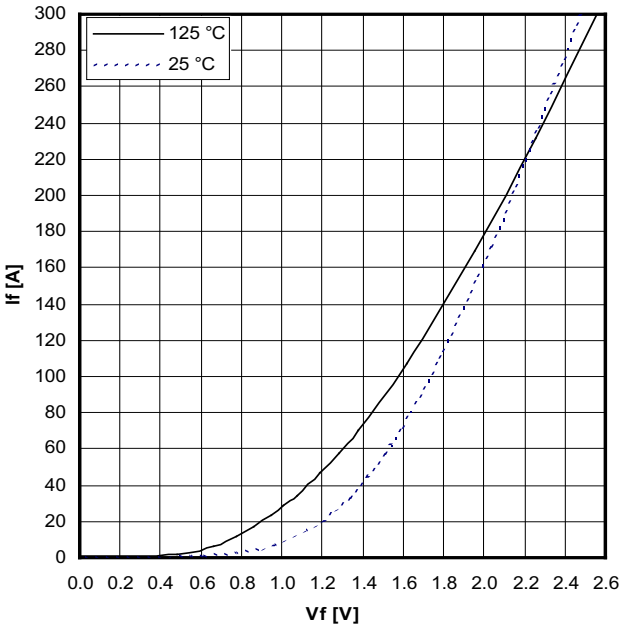
Typ. output characteristics



Typ. output characteristics



Typ. tranfer characteristics



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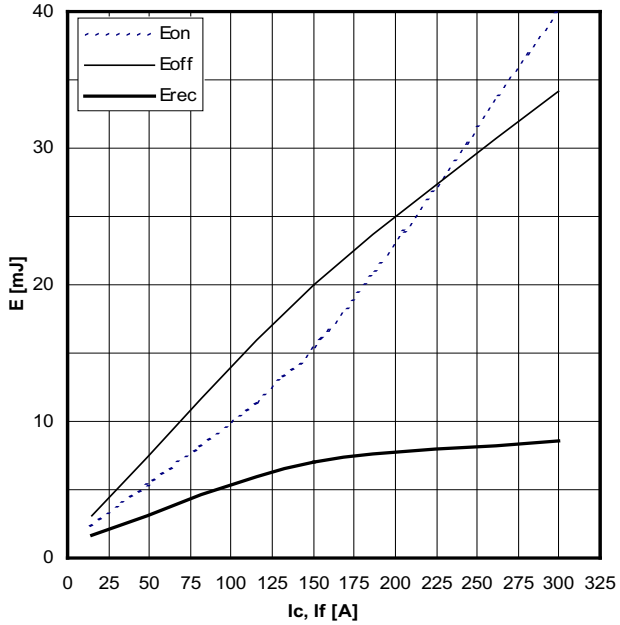
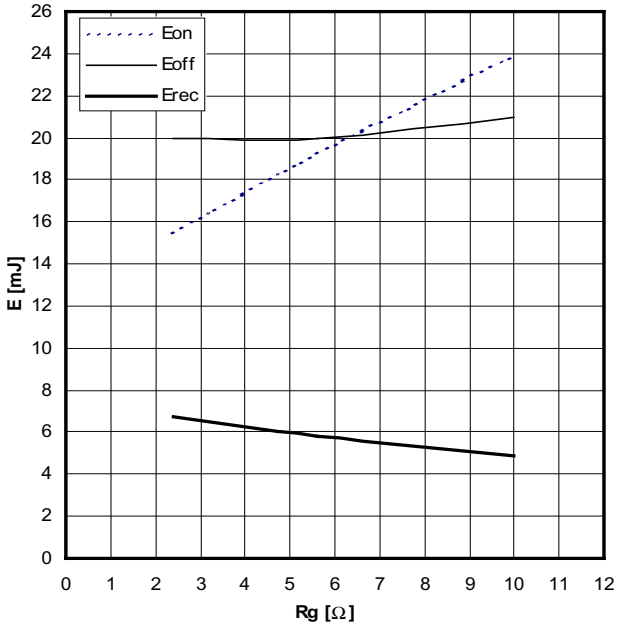
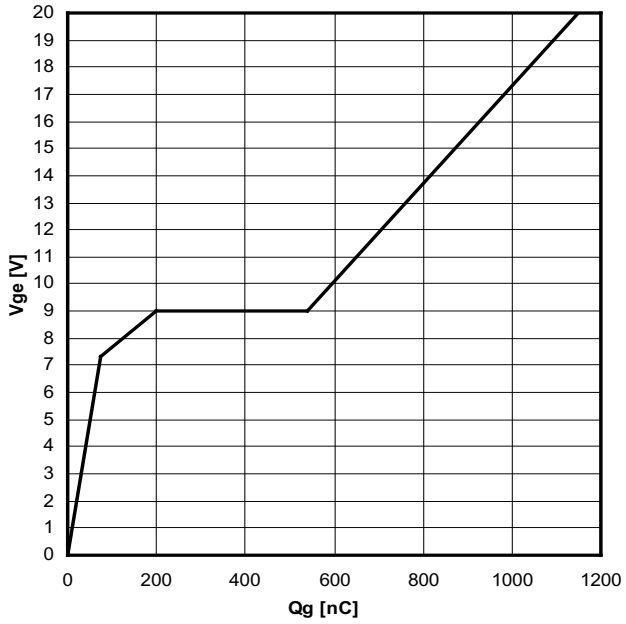


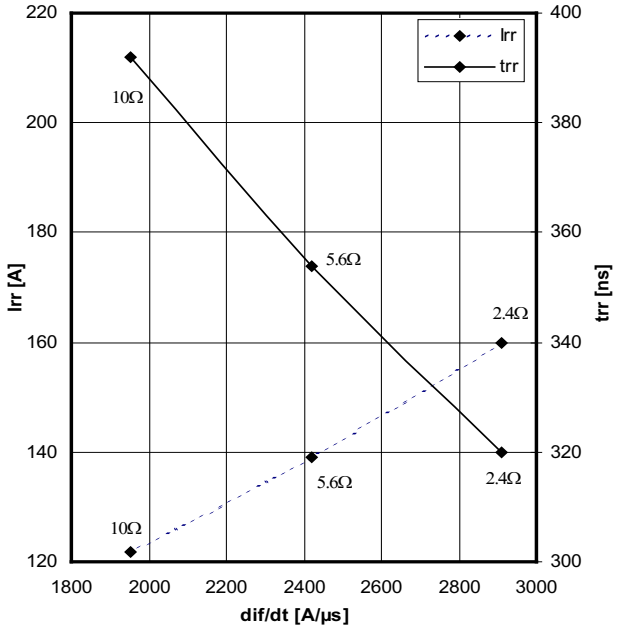
Typ. switching energy vs. collector current



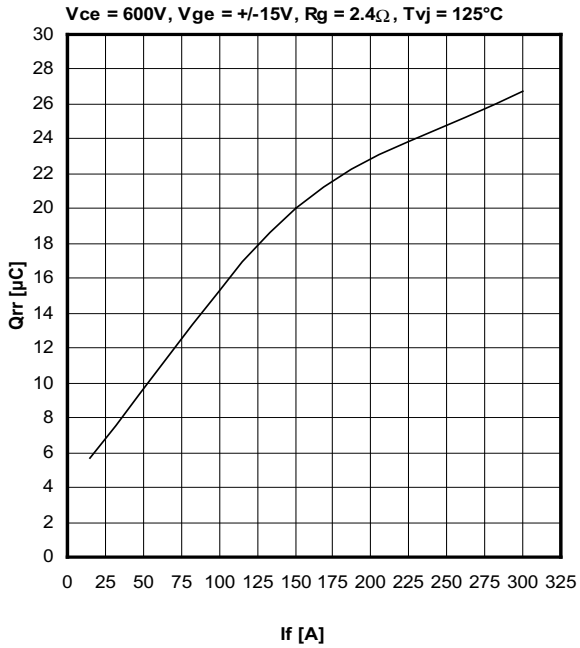
Typ. switching energy vs. gate resistance



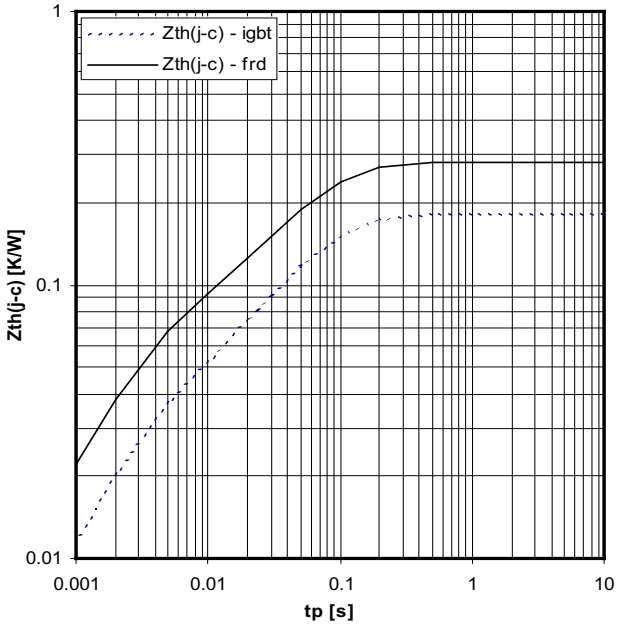
Typ. turn-on gate charge



Reverse recovery characteristics

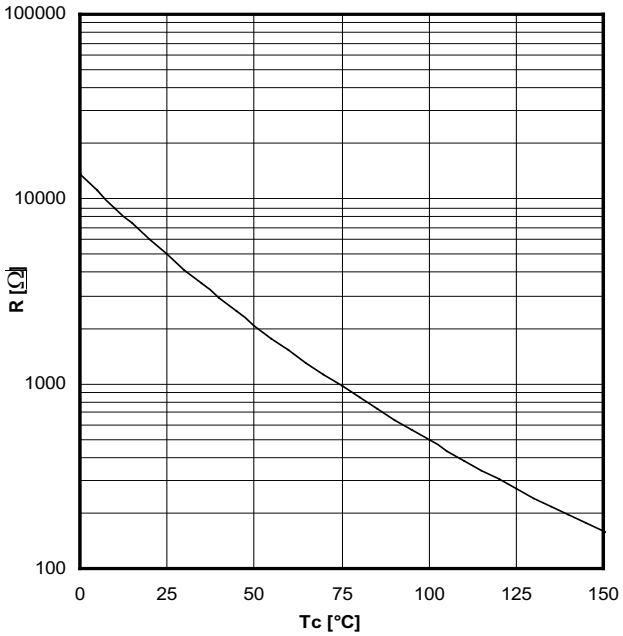


Reverse recovery characteristics



Typ. transient thermal impedance

NTC



Typ. NTC resistance versus temperature