



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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XPT IGBT Module

$$V_{CES} = 2 \times 1200V$$

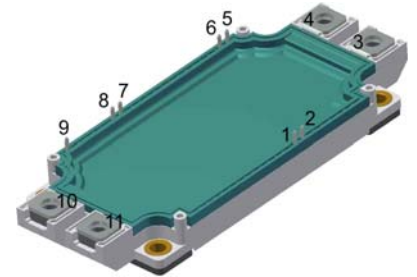
$$I_{C25} = 650A$$

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

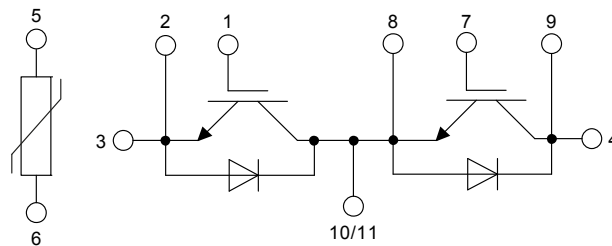
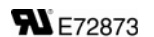
Phase leg + free wheeling Diodes + NTC

Part number

MIXA450PF1200TSF



Backside: isolated



Features / Advantages:

- High level of integration - only one power semiconductor module required for the whole drive
- Rugged XPT design (Xtreme light Punch Through) results in:
 - short circuit rated for 10 μ sec.
 - very low gate charge
 - low EMI
 - square RBSOA @ 3x Ic
- Thin wafer technology combined with the XPT design results in a competitive low VCE(sat)
- Temperature sense included
- SONIC™ diode
 - fast and soft reverse recovery
 - low operating forward voltage

Applications:

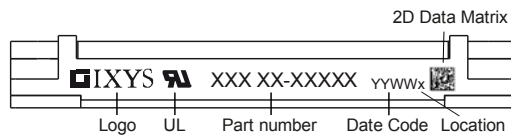
- AC motor drives
- Pumps, Fans
- Air-conditioning system
- Inverter and power supplies
- UPS

Package: SimBus F

- Isolation Voltage: 3000V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 17 mm
- Base plate: Copper internally DCB isolated
- Advanced power cycling

IGBT				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{CES}	collector emitter voltage	$T_{VJ} = 25^{\circ}\text{C}$			1200	V	
V_{GES}	max. DC gate voltage				± 20	V	
V_{GEM}	max. transient gate emitter voltage				± 30	V	
I_{C25}	collector current	$T_C = 25^{\circ}\text{C}$			650	A	
I_{C80}		$T_C = 80^{\circ}\text{C}$			450	A	
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$			2100	W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 450\text{A}; V_{GE} = 15\text{V}$		1.8	2.15	V	
				2.15		V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 18\text{mA}; V_{GE} = V_{CE}$	5.4	5.9	6.5	V	
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{V}$			1	mA	
				6		mA	
I_{GES}	gate emitter leakage current	$V_{GE} = \pm 20\text{V}$			1.5	μA	
$Q_{G(on)}$	total gate charge	$V_{CE} = 600\text{V}; V_{GE} = 15\text{V}; I_C = 450\text{A}$		1400		nC	
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 600\text{V}; I_C = 450\text{A}$ $V_{GE} = \pm 15\text{V}; R_G = 1.6\ \Omega$		85		ns	
t_r	current rise time		$T_{VJ} = 125^{\circ}\text{C}$		80		ns
$t_{d(off)}$	turn-off delay time				310		ns
t_f	current fall time				360		ns
E_{on}	turn-on energy per pulse				22		mJ
E_{off}	turn-off energy per pulse				68		mJ
RBSOA	reverse bias safe operating area	$V_{GE} = \pm 15\text{V}; R_G = 1.6\ \Omega$					
I_{CM}		$V_{CEmax} = 1200\text{V}$			900	A	
SCSOA	short circuit safe operating area	$V_{CEmax} = 1200\text{V}$					
t_{sc}	short circuit duration	$V_{CE} = 900\text{V}; V_{GE} = \pm 15\text{V}$			10	μs	
I_{sc}	short circuit current	$R_G = 1.6\ \Omega; \text{non-repetitive}$		1900		A	
R_{thJC}	thermal resistance junction to case				0.06	K/W	
R_{thCH}	thermal resistance case to heatsink				0.03	K/W	
Diode							
V_{RRM}	max. repetitive reverse voltage	$T_{VJ} = 25^{\circ}\text{C}$			1200	V	
I_{F25}	forward current	$T_C = 25^{\circ}\text{C}$			380	A	
I_{F80}		$T_C = 80^{\circ}\text{C}$			265	A	
V_F	forward voltage	$I_F = 450\text{A}$			2.30	V	
				2.00		V	
I_R	reverse current	$V_R = V_{RRM}$			*	mA	
	* not applicable, see Ices value above				*	mA	
Q_{rr}	reverse recovery charge	$V_R = 600\text{V}$ $-di_F/dt = 5400\text{A}/\mu\text{s}$ $I_F = 450\text{A}; V_{GE} = 0\text{V}$		62		μC	
I_{RM}	max. reverse recovery current		$T_{VJ} = 125^{\circ}\text{C}$		425		A
t_{rr}	reverse recovery time				360		ns
E_{rec}	reverse recovery energy				26		mJ
R_{thJC}	thermal resistance junction to case				0.095	K/W	
R_{thCH}	thermal resistance case to heatsink				0.04	K/W	

Package SimBus F			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal				A
T_{stg}	storage temperature		-40		125	°C
T_{VJ}	virtual junction temperature		-40		150	°C
Weight				350		g
M_D	mounting torque		3		6	Nm
M_T	terminal torque		3		6	Nm
$d_{Spp/App}$	creepage distance on surface striking distance through air	terminal to terminal	12.7			mm
$d_{Spb/Apb}$		terminal to backside	10.0			mm
V_{ISOL}	isolation voltage	t = 1 second t = 1 minute 50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	3000 2500			V V
$R_{pin-chip}$	resistance pin to chip	$V = V_{CEsat} + 2 \cdot R \cdot I_C$ resp. $V = V_F + 2 \cdot R \cdot I_F$		0.65		mΩ



Part number

- M = Module
- I = IGBT
- X = XPT IGBT
- A = Gen 1 / std
- 450 = Current Rating [A]
- PF = Phase leg + free wheeling Diodes
- 1200 = Reverse Voltage [V]
- T = Thermistor \ Temperature sensor
- SF = SimBus F

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MIXA450PF1200TSF	MIXA450PF1200TSF	Box	3	511202

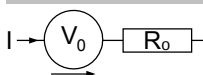
Temperature Sensor NTC

Symbol	Definition	Conditions	min.	typ.	max.	Unit
R_{25}	resistance	$T_{VJ} = 25^\circ$	4.75	5	5.25	kΩ
$B_{25/50}$	temperature coefficient			3375		K

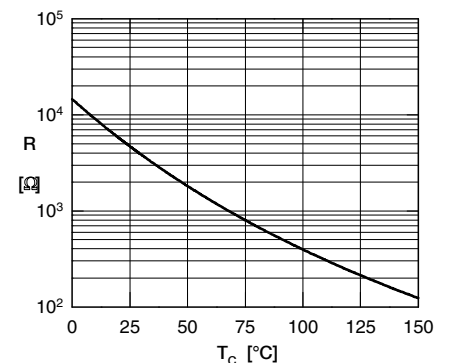
Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 150^\circ\text{C}$

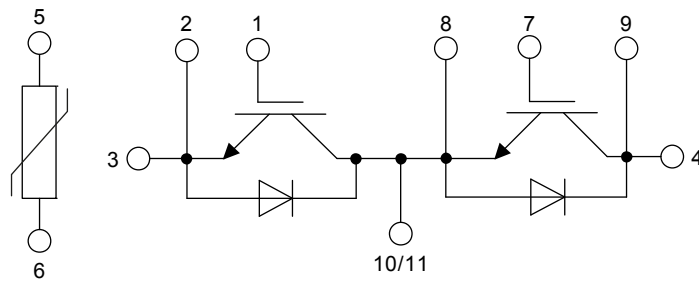
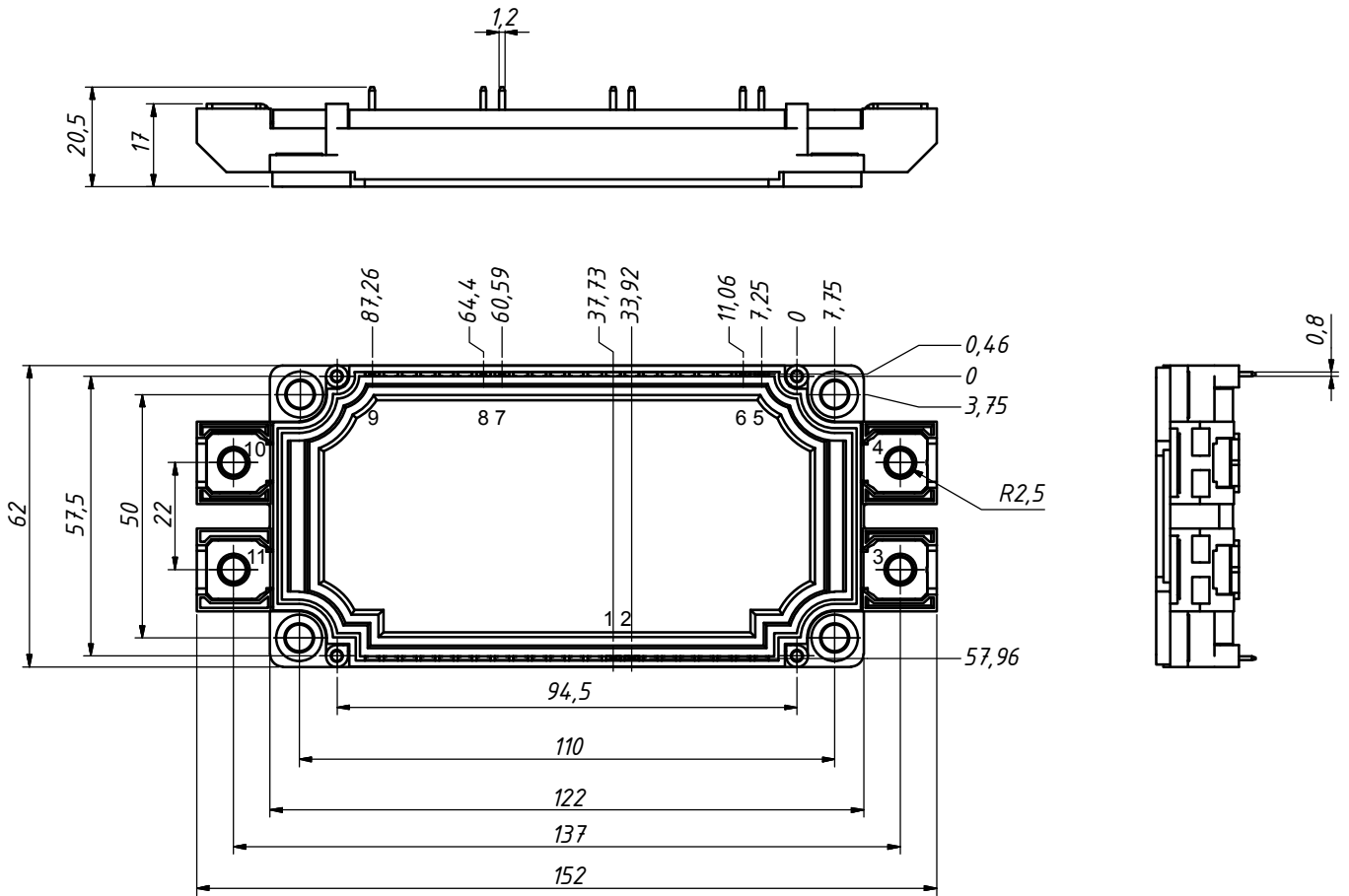


		IGBT	Diode	
$V_{0\ max}$	threshold voltage	1.1	1.25	V
$R_{0\ max}$	slope resistance *	3.1	1.9	mΩ



Typ. NTC resistance vs. temperature

Outlines SimBus F



IGBT

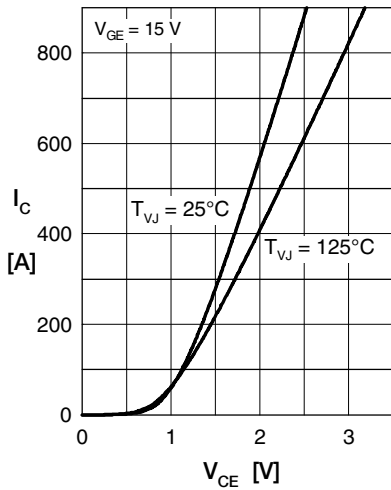


Fig. 1 Typ. output characteristics

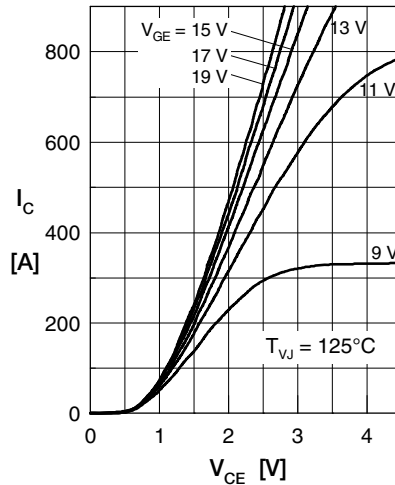


Fig. 2 Typ. output characteristics

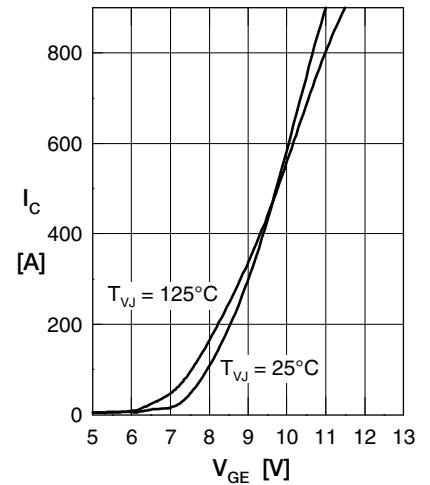


Fig. 3 Typ. transfer characteristics

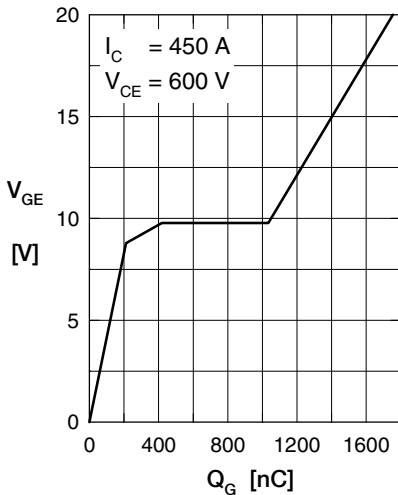


Fig. 4 Typ. turn-on gate charge

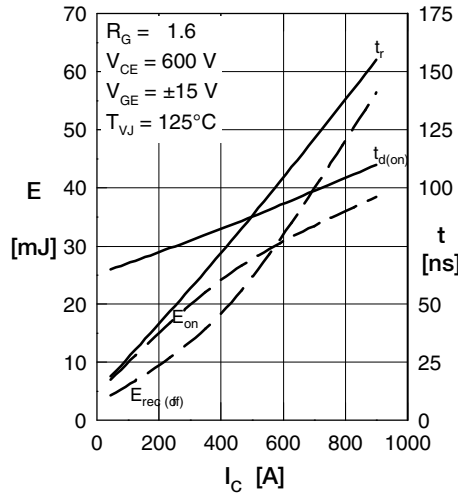


Fig. 5 Typ. turn-on energy & switching times vs. collector current, inductive switching

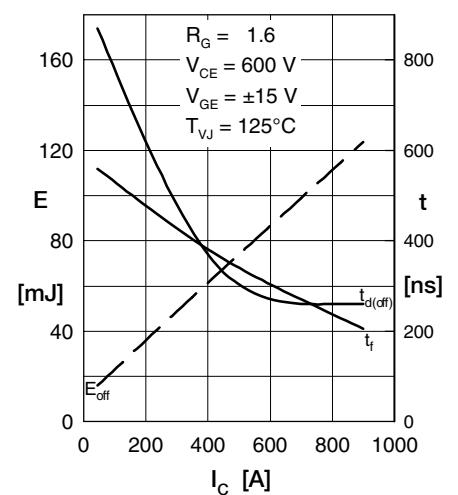


Fig. 6 Typ. switching energy versus gate resistance

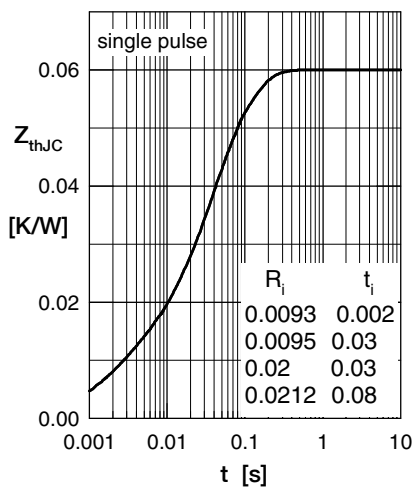


Fig. 7 Typ. trans. therm. impedance

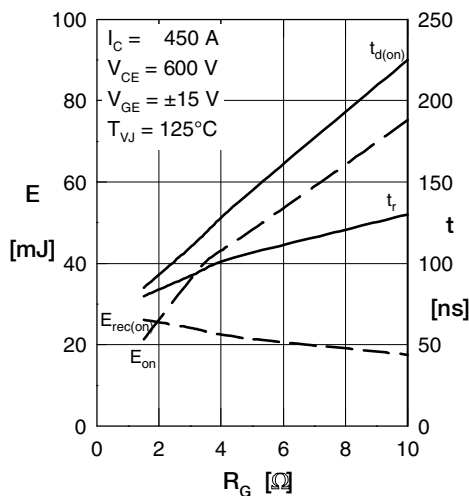


Fig. 8 Typ. turn-on energy, switching times vs. gate resistor, inductive switching

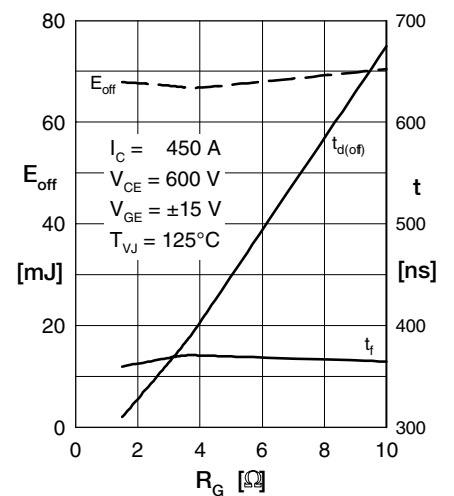


Fig. 9 Typ. turn-off energy, switching times vs. gate resistor, inductive switching

Diode

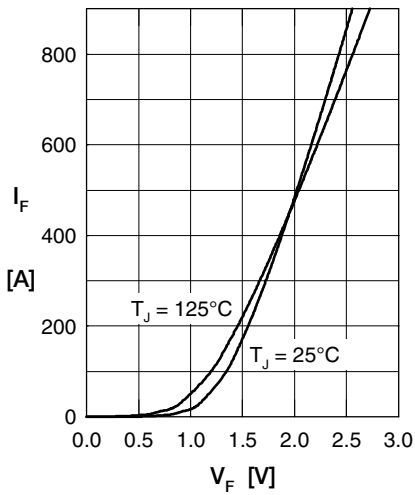


Fig. 1 Typ. Forward current versus V_F

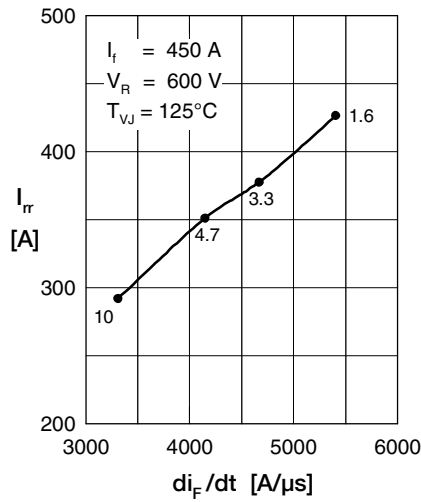


Fig. 2 Typ. reverse recovery characteristics

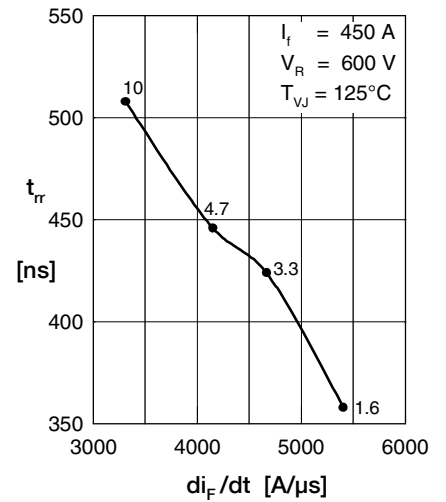


Fig. 3 Typ. reverse recovery characteristics

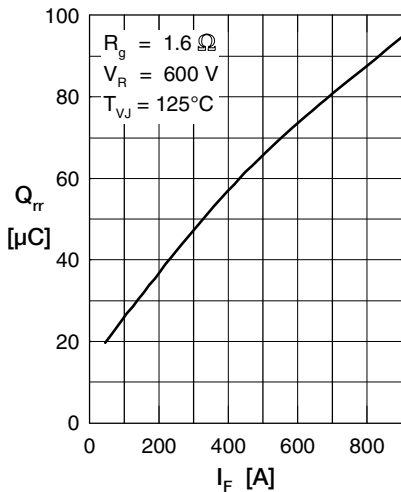


Fig. 4 Typ. reverse recovery characteristics

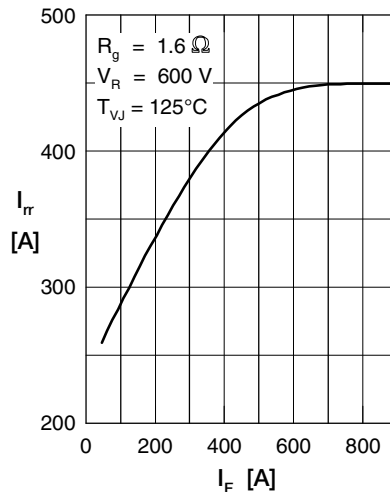


Fig. 5 Typ. reverse recovery characteristics

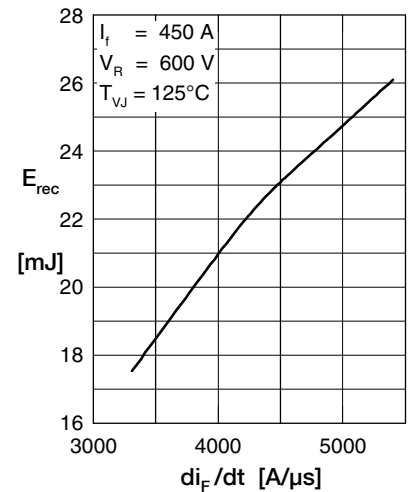


Fig. 6 Typ. recovery energy E_{rec} versus $-di/dt$

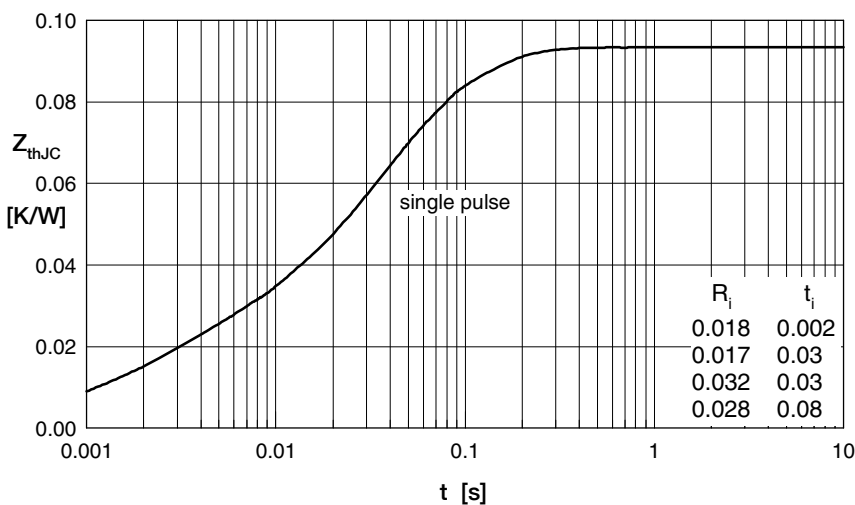


Fig. 7 Typ. transient thermal impedance junction to case