

XPT IGBT phaseleg

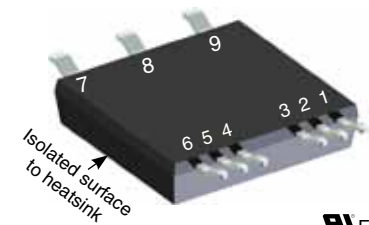
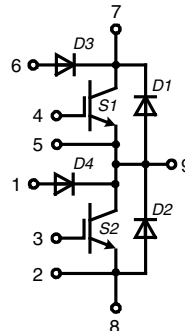
ISOPLUS™

Surface Mount Power Device

$$I_{C25} = 32 \text{ A}$$

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

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



E72873

IGBTs S1, S2

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	1200	V
V_{GES}		± 20	V
I_{C25}	$T_C = 25^{\circ}\text{C}$	32	A
I_{C80}	$T_C = 80^{\circ}\text{C}$	23	A
I_{CM}	$V_{GE} = 15 \text{ V}; R_G = 56 \Omega; T_{VJ} = 125^{\circ}\text{C}$ RBSOA, clamped inductive load; $L = 100 \mu\text{H}$	45	A
V_{CEK}		V_{CES}	
t_{SC} (SCSOA)	$V_{CE} = 900 \text{ V}; V_{GE} = \pm 15 \text{ V}; R_G = 56 \Omega; T_{VJ} = 125^{\circ}\text{C}$ none repetitive	10	μs
P_{tot}	$T_C = 25^{\circ}\text{C}$	130	W

Symbol	Conditions	Characteristic Values			
--------	------------	-----------------------	--	--	--

($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified)

		min.	typ.	max.		
$V_{CE(sat)}$	$I_C = 15 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		1.8 2.1	2.1	V V	
$V_{GE(th)}$	$I_C = 0.6 \text{ mA}; V_{GE} = V_{CE}$	5.4		6.5	V	
I_{CES}	$V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		250	125	μA μA	
I_{GES}	$V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$			500	nA	
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} $E_{(rec)off}$	Inductive load; $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 600 \text{ V}; I_C = 15 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 56 \Omega$		70 40 250 100 1.55 1.7		ns ns ns ns mJ mJ	
C_{ies}		$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$		tbd		pF
Q_{Gon}		$V_{CE} = 600 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 15 \text{ A}$		48		nC
R_{thJC}					1.0	K/W
R_{thJH}		with heatsink compound (IXYS test setup)		1.35	1.7	K/W

Features

- **XPT IGBT**
 - low saturation voltage
 - positive temperature coefficient for easy paralleling
 - fast switching
 - short tail current for optimized performance in resonant circuits
- **Sonic™ diode**
 - fast reverse recovery
 - low operating forward voltage
 - low leakage current
- **$V_{CE(sat)}$ detection diode**
 - integrated into package
 - very fast diode
- **Package**
 - isolated back surface
 - low coupling capacity between pins and heatsink
 - PCB space saving
 - enlarged creepage towards heatsink
 - application friendly pinout
 - low inductive current path
 - high reliability

Applications

- **Phaseleg**
 - buck-boost chopper
- **Full bridge**
 - power supplies
 - induction heating
 - four quadrant DC drives
 - controlled rectifier
- **Three phase bridge**
 - AC drives
 - controlled rectifier

Diodes D1, D2

Symbol	Conditions	Maximum Ratings			
I_{F25}	$T_C = 25^\circ\text{C}$	27	A		
I_{F80}	$T_C = 80^\circ\text{C}$	18	A		
Symbol	Conditions	Characteristic Values			
($T_{VJ} = 25^\circ\text{C}$, unless otherwise specified)					
		min.	typ.	max.	
V_F	$I_F = 20\text{ A}$		2.0	2.3	V
			2.0		V
I_{RM}	$I_F = 20\text{ A}; R_G = 56\ \Omega; T_{VJ} = 125^\circ\text{C}$ $V_R = 600\text{ V}; V_{GE} = -15\text{ V}$		20		A
t_{rr}			350		ns
E_{rec}			tdb		mJ
R_{thJC}	per diode			1.35	K/W
R_{thJH}	with heatsink compound (IXYS test setup)		1.75	2.2	K/W

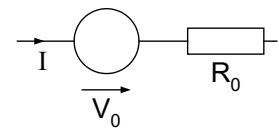
Diodes D3, D4

Symbol	Conditions	Maximum Ratings			
V_R	$T_C = 25^\circ\text{C}$ to 150°C	1200	V		
Symbol	Conditions	Characteristic Values			
($T_{VJ} = 25^\circ\text{C}$, unless otherwise specified)					
		min.	typ.	max.	
V_F	$I_F = 1\text{ A}$		1.7	2.2	V
			1.5		V
I_R	$V_R = 1200\text{ V}$			2	μA
			30		μA
I_{RM}	$I_F = 1\text{ A}; di_F/dt = -100\text{ A}/\mu\text{s}; T_{VJ} = 25^\circ\text{C}$ $V_R = 100\text{ V}; V_{GE} = 0\text{ V}$		2.3		A
t_{rr}			40		ns

Component

Symbol	Conditions	Maximum Ratings			
T_{VJ}		-55...+150	$^\circ\text{C}$		
T_{stg}		-55...+125	$^\circ\text{C}$		
V_{ISOL}	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}$	2500	V~		
F_C	mounting force	40 ... 130	N		
Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
C_P	coupling capacity between shorted pins and backside metal		90		pF
d_S, d_A	pin - pin	1.65			mm
d_S, d_A	pin - backside metal	4			mm
CTI		400			
Weight			8		g

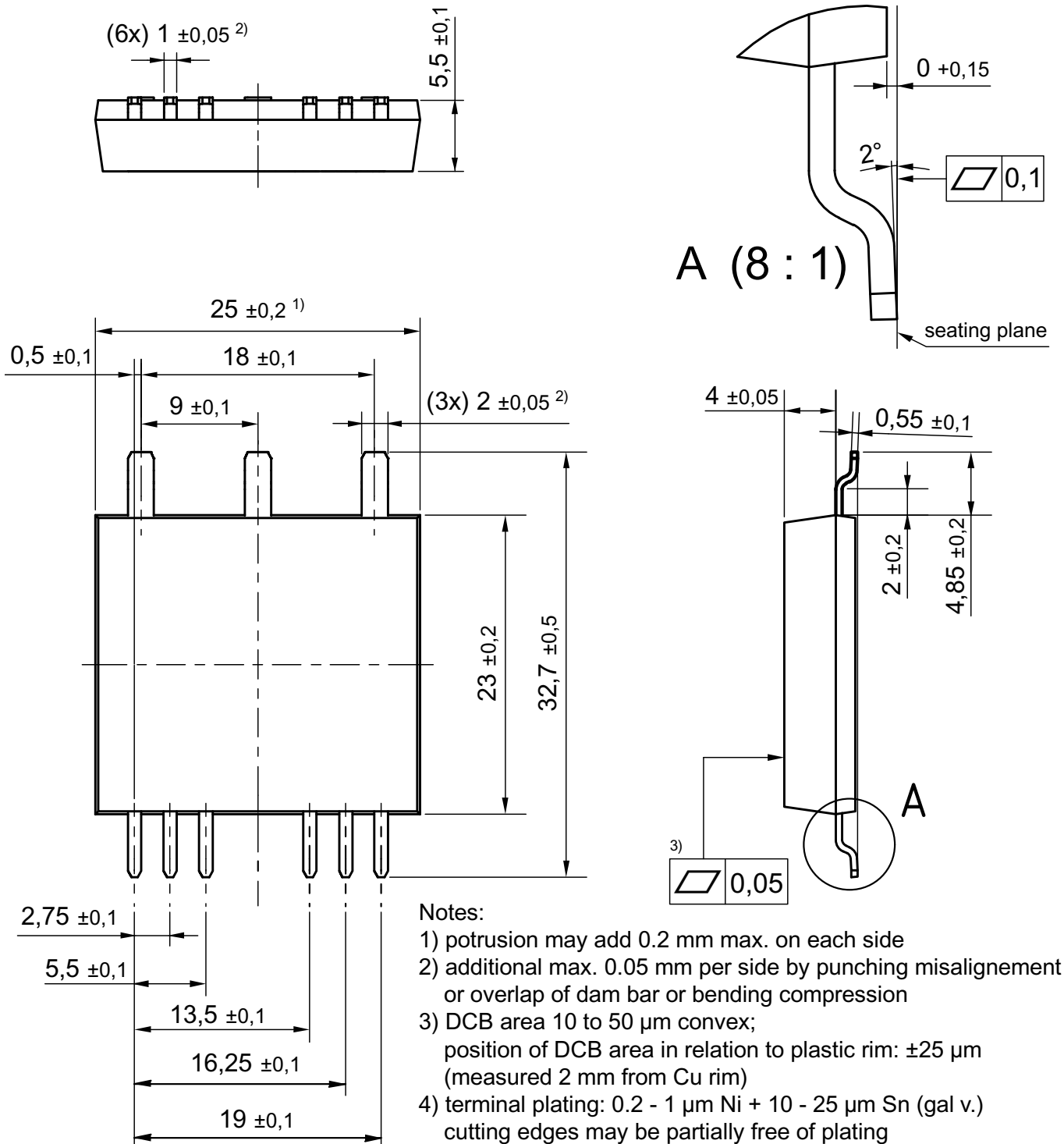
Ordering	Ordering Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	IXA20PG1200DHGLB	IXA20PG1200DHGLB	Tape&Reel	200	tdb

Equivalent Circuits for Simulation
Conduction


IGBTs (typ. at $V_{GE} = 15\text{ V}; T_J = 125^\circ\text{C}$)
S1, S2 $V_0 = 1.1\text{ V}; R_0 = 90\text{ m}\Omega$

Diodes (typ. at $T_J = 125^\circ\text{C}$)
D1, D2 $V_0 = 1.3\text{ V}; R_0 = 41\text{ m}\Omega$

Dimensions in mm (1 mm = 0.0394")



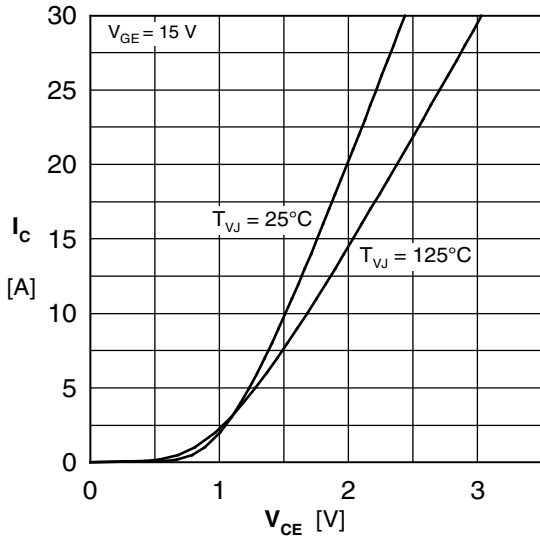


Fig. 1 Typ. output characteristics

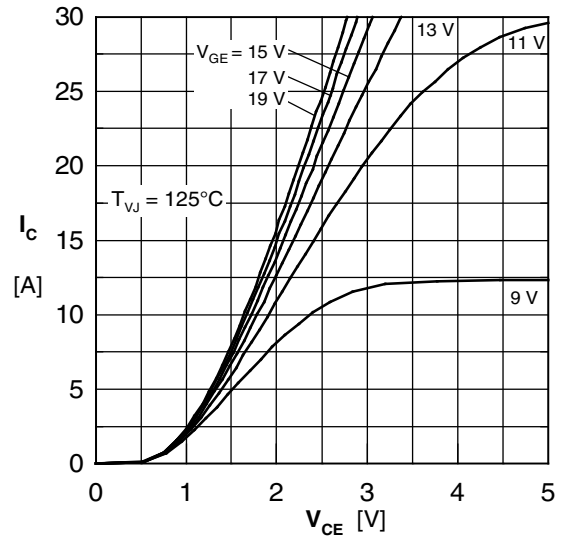


Fig. 2 Typ. output characteristics

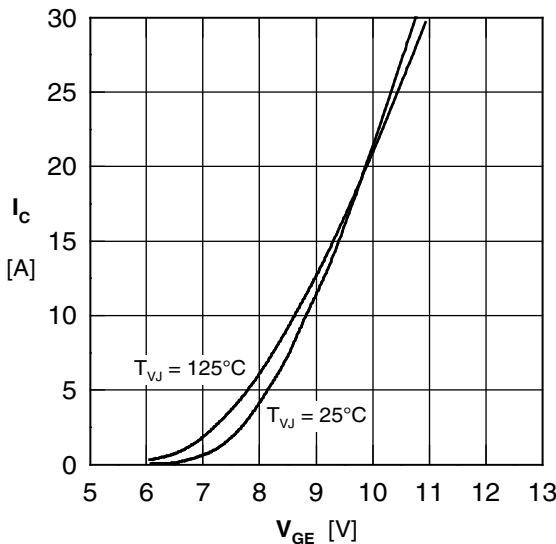


Fig. 3 Typ. transfer characteristics

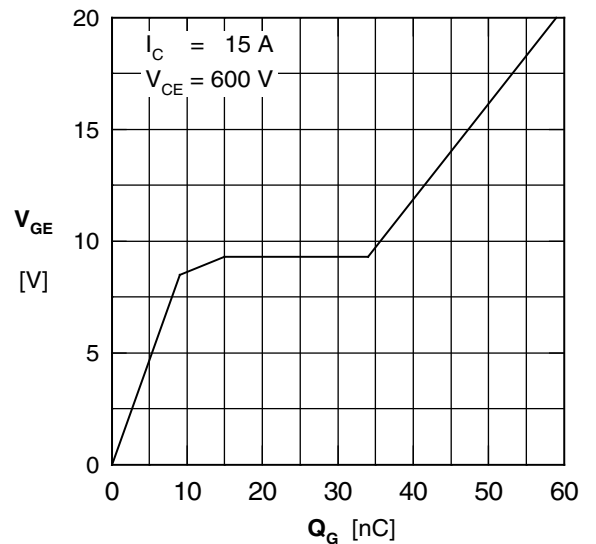


Fig. 4 Typ. turn-on gate charge

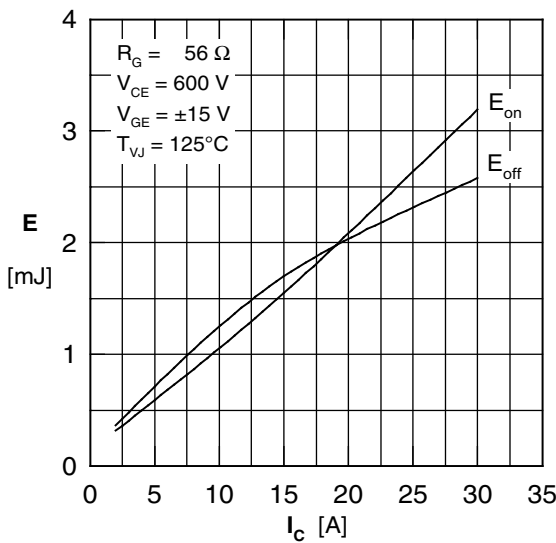


Fig. 5 Typ. switching energy vs. collector current

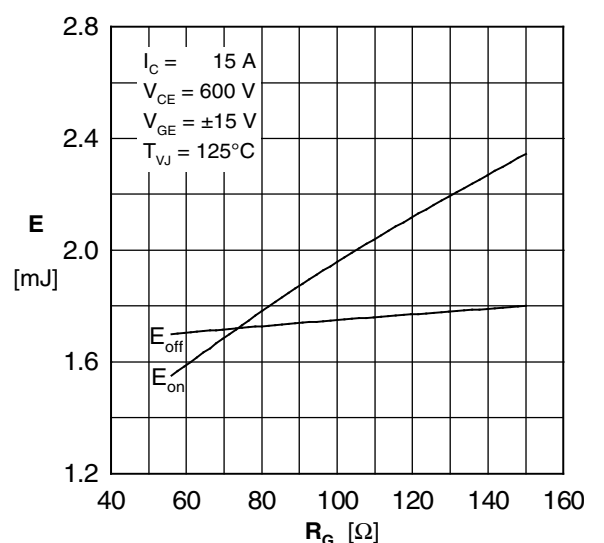


Fig. 6 Typ. switching energy vs. gate resistance

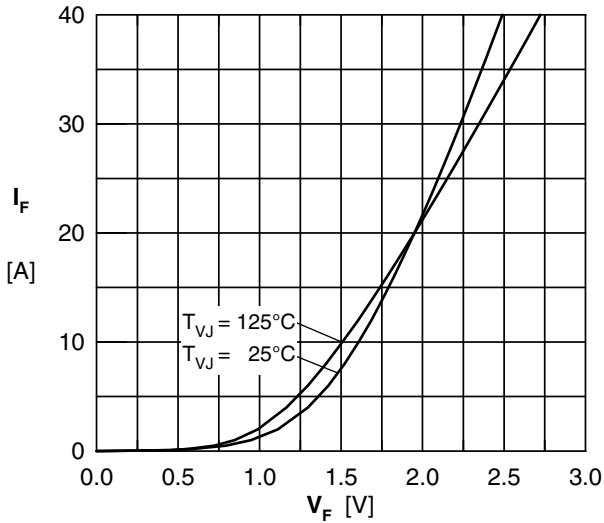
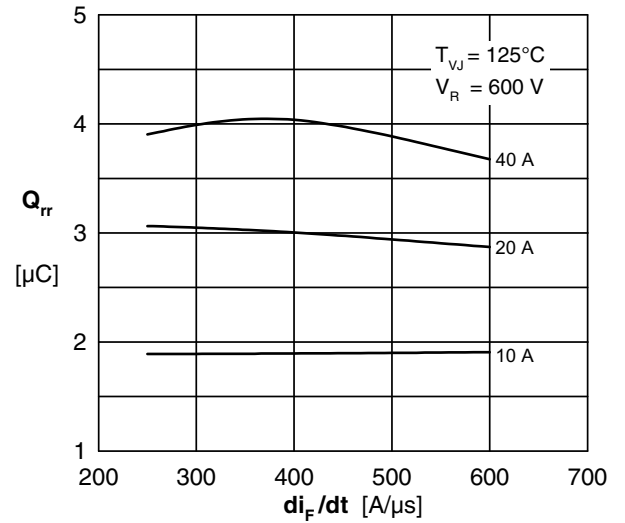
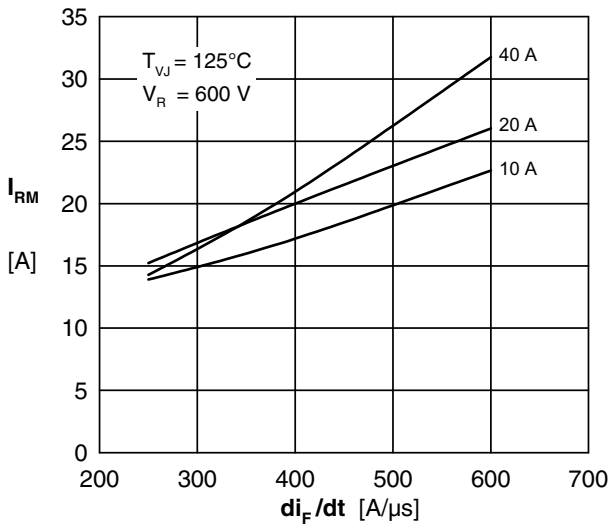
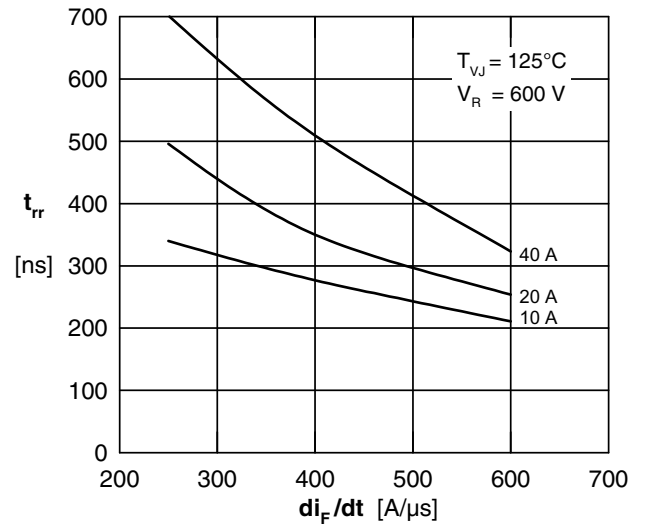
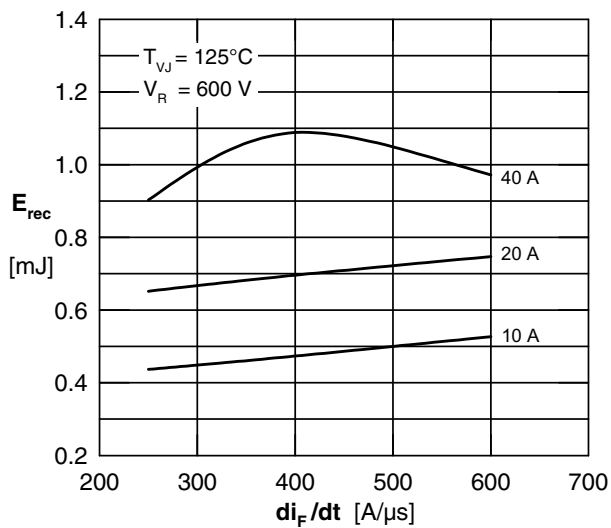
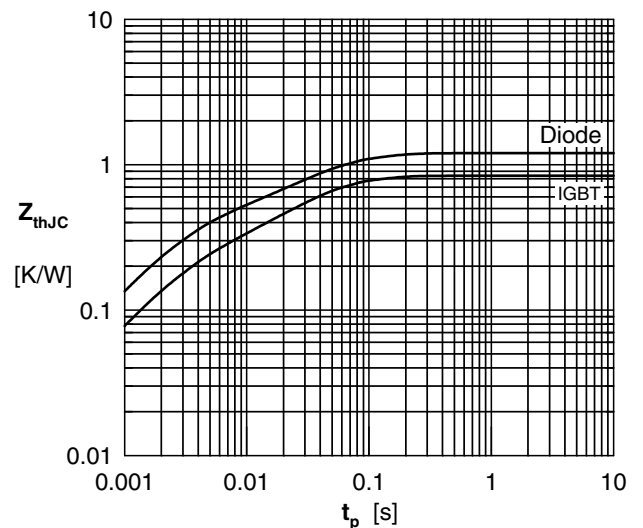

 Fig. 7 Typ. Forward current versus V_F

 Fig. 8 Typ. reverse recov.charge Q_{rr} vs. di/dt

 Fig. 9 Typ. peak reverse current I_{RM} vs. di/dt

 Fig. 10 Typ. recovery time t_{rr} versus di/dt

 Fig. 11 Typ. recovery energy E_{rec} versus di/dt


Fig. 12 Typ. transient thermal impedance



Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.