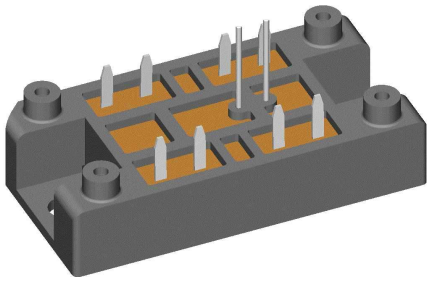
Standard Rectifier Module

3~ Rectifier			Brake Chopper		
V_{RRM}	=	1600 V	V_{CES}	=	1200 V
I_{DAV}	=	75 A	I_{C25}	=	58 A
I_{FSM}	=	600 A	$V_{CE(sat)}$	=	1.85 V

3~ Rectifier Bridge + Brake Unit

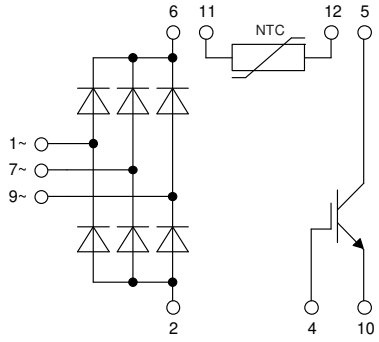
Part number

VUI72-16NOXT



Backside: isolated

E72873



Features / Advantages:

- Package with DCB ceramic base plate
- Improved temperature and power cycling
- Planar passivated chips
- Very low forward voltage drop
- Very low leakage current
- NTC

Applications:

- 3~ Rectifier with brake unit for drive inverters

Package: V1-A-Pack

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 17 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

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.

© 2019 IXYS all rights reserved

Rectifier

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			1700	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			1600	V
I_R	*reverse current*	V_R = 1600 V	T_{VJ} = 25°C			40	µA
		V_R = 1600 V	T_{VJ} = 150°C			1.5	mA
V_F	*forward voltage drop*	I_F = 25 A	T_{VJ} = 25°C			1.10	V
		I_F = 75 A				1.38	V
		I_F = 25 A	T_{VJ} = 125°C			1.01	V
		I_F = 75 A				1.37	V
I_{DAV}	*bridge output current*	T_C = 110°C	T_{VJ} = 150°C			75	A
		rectangular d = ⅓					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			0.79	V
r_F	*slope resistance* }					7.7	mΩ
R_{thJC}	*thermal resistance junction to case*					1.1	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.3		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			110	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			600	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			650	A
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			510	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			550	A
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			1.80	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1.76	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			1.30	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1.26	kA²s
C_J	*junction capacitance*	V_R = 400 V; f = 1 MHz	T_{VJ} = 25°C		19		pF

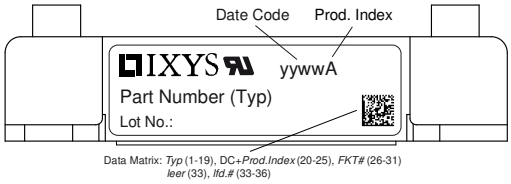
© 2019 IXYS all rights reserved

Brake IGBT + Diode

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°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°C			58	A
I_{C80}			T_C = 80°C			40	A
P_{tot}	*total power dissipation*		T_C = 25°C			195	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 35 A; V_{GE} = 15 V	T_{VJ} = 25°C		1.85	2.15	V
			T_{VJ} = 125°C		2.15		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 2 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5.4	5.9	6.5	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C			0.1	mA
			T_{VJ} = 125°C		0.1		mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V				500	nA
$Q_{G(on)}$	*total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 35 A			110		nC
$t_{d(on)}$	*turn-on delay time*	inductive load V_{CE} = 600 V; I_C = 35 A V_{GE} = ±15 V; R_G = 27 Ω	T_{VJ} = 125°C		70		ns
t_r	*current rise time*				40		ns
$t_{d(off)}$	*turn-off delay time*				250		ns
t_f	*current fall time*				100		ns
E_{on}	*turn-on energy per pulse*				3.8		mJ
E_{off}	*turn-off energy per pulse*				4.1		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 27 Ω	T_{VJ} = 125°C				
I_{CM}		V_{CEK} = 1200 V				105	A
SCSOA	*short circuit safe operating area*	V_{CEK} = 1200 V					
t_{SC}	*short circuit duration*	V_{CE} = 900 V; V_{GE} = ±15	T_{VJ} = 125°C			10	µs
I_{SC}	*short circuit current*	R_G = 27 Ω; non-repetitive			140		A
R_{thJC}	*thermal resistance junction to case*					0.65	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.25		K/W

© 2019 IXYS all rights reserved

Package V1-A-Pack				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal				100	A
T_{VJ}	*virtual junction temperature*			-40		150	°C
T_{op}	*operation temperature*			-40		125	°C
T_{stg}	*storage temperature*			-40		125	°C
Weight					37		g
M_D	*mounting torque*			2		2.5	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	6.0			mm
$d_{Spb/Apb}$			*terminal to backside*	12.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	3600			V
		t = 1 minute		3000			V



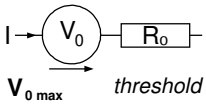
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	VUI72-16NOXT	VUI72-16NOXT	Blister	24	515908

Temperature Sensor NTC

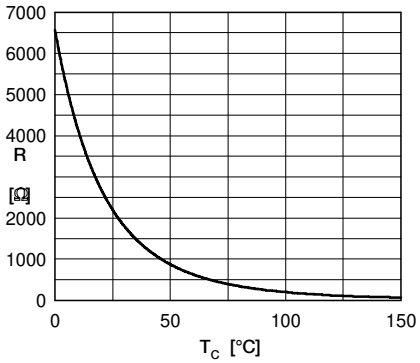
Symbol	Definition	Conditions	min.	typ.	max.	Unit
R_{25}	*resistance*	T_{VJ} = 25°	2.13	2.2	2.27	kΩ
$B_{25/50}$	*temperature coefficient*			3560		K

Equivalent Circuits for Simulation

** on die level* T_{VJ} = 150°C



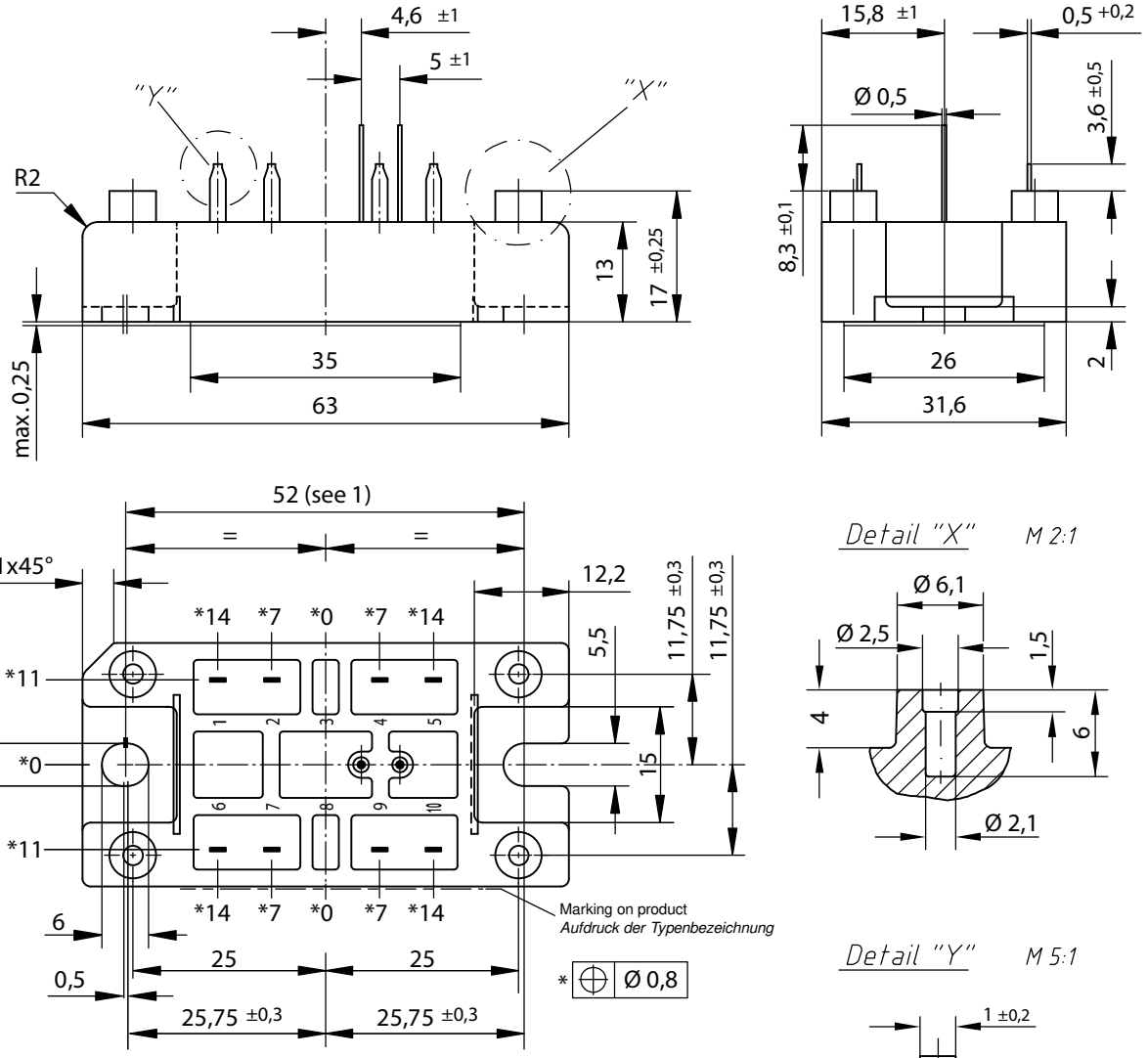
		Rectifier	Brake IGBT +	
$V_{0\ max}$	*threshold voltage*	0.79	1.1	V
$R_{0\ max}$	*slope resistance **	6.5	40	mΩ



Typ. NTC resistance vs. temperature

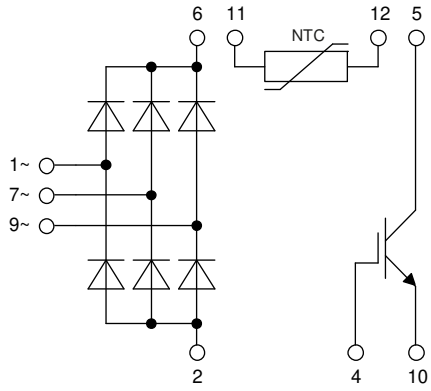
© 2019 IXYS all rights reserved

Outlines V1-A-Pack



Remarks / ***Bemerkungen:***

1. Nominal distance mounting screws on heat sink: 52 mm / *Nennabstand Befestigungsschrauben auf Kühlkörper: 52 mm*
2. General tolerance / *Allgemeintoleranz*: DIN ISO 2768 -T1-c
3. Surface treatment of pins: tin plated (Sn) in hot dip / *Oberflächenbehandlung der Pins: verzinnt (Sn) im Tauchbad*
4. *Detail X:*
   EJOT PT® self-tapping screws (dimension K25) to be recommended for mounting on PCB
   selbstschneidende Schraube (Größe K25) empfohlen für die PCB-Montage
   Take care on the maximum screw length according to board thickness and the maximum hole depth of 6 mm
   Bei der Wahl der Schraubenlänge die PCB-Dicke und die maximale Lochtiefe von 6mm beachten
   Recommended mounting torque: 1.5 Nm / *Empfohlenes Drehmoment: 1.5 Nm*



© 2019 IXYS all rights reserved

Rectifier

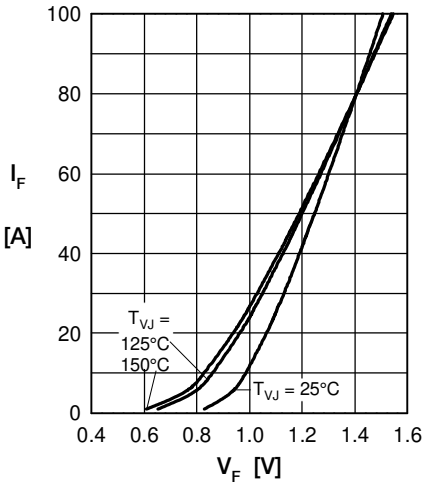


Fig. 1 Forward current vs. voltage drop per diode

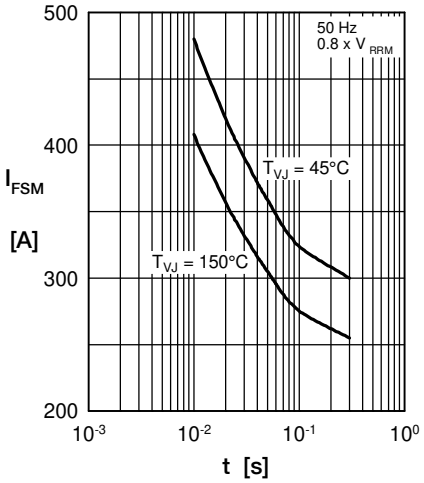


Fig. 2 Surge overload current vs. time per diode

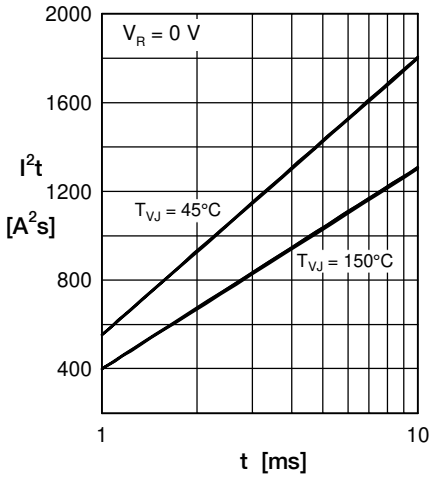


Fig. 3 I^2t vs. time per diode

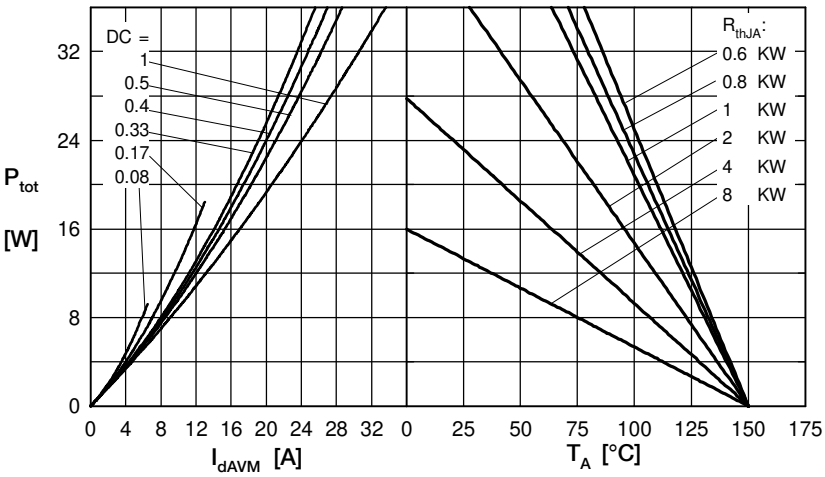


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

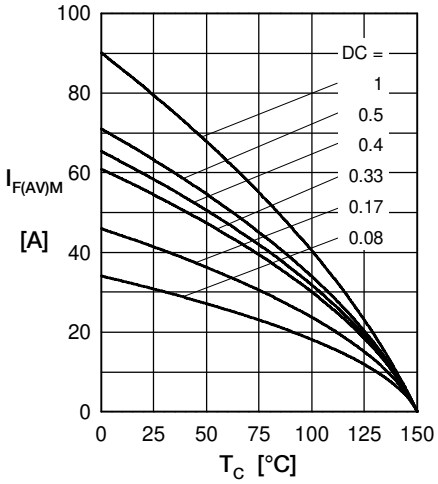


Fig. 5 Max. forward current vs. case temperature per diode

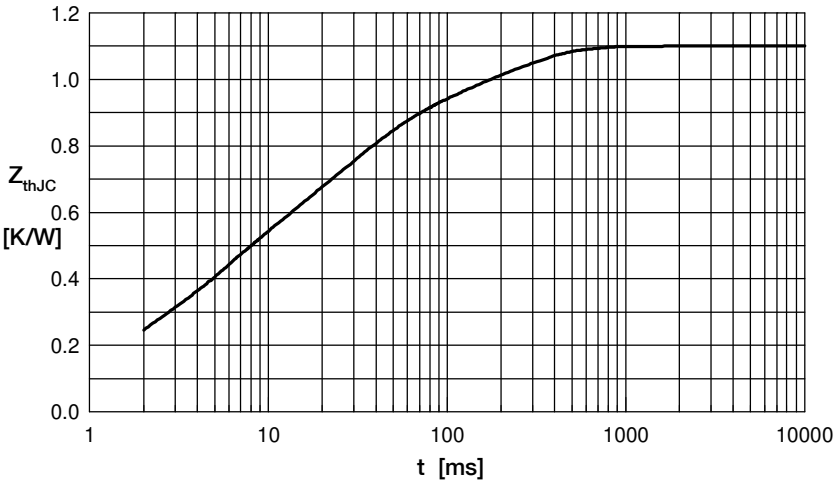


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for Z_{thJC} calculation:

i	R_{th} (K/W)	t_i (s)
1	0.0607	0.0004
2	0.1230	0.00256
3	0.2305	0.0045
4	0.4230	0.0242
5	0.2628	0.1800

© 2019 IXYS all rights reserved

Brake IGBT + Diode

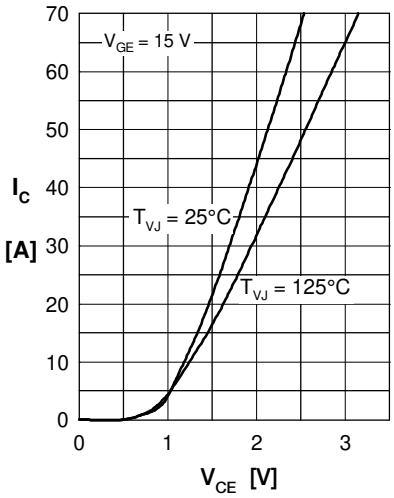


Fig. 1 Typ. output characteristics

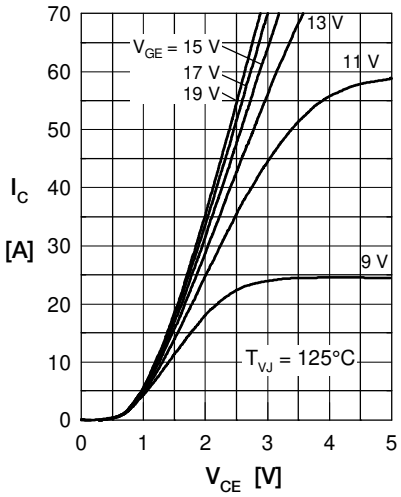


Fig. 2 Typ. output characteristics

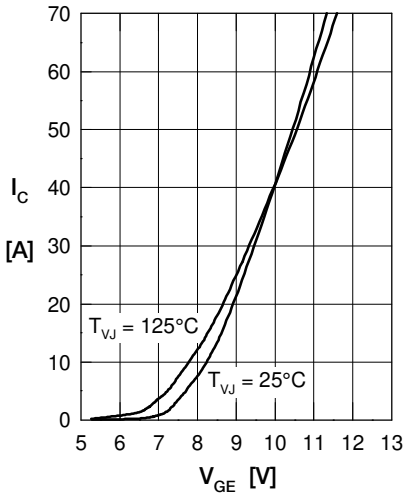


Fig. 3 Typ. tranfer characteristics

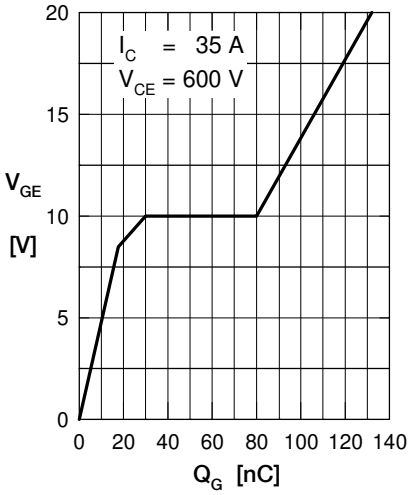


Fig. 4 Typ. turn-on gate charge

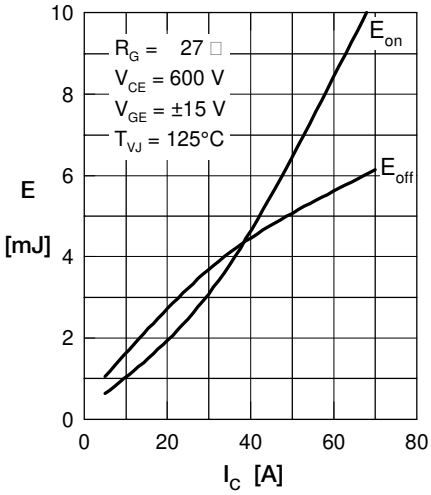


Fig. 5 Typ. switching energy versus collector current

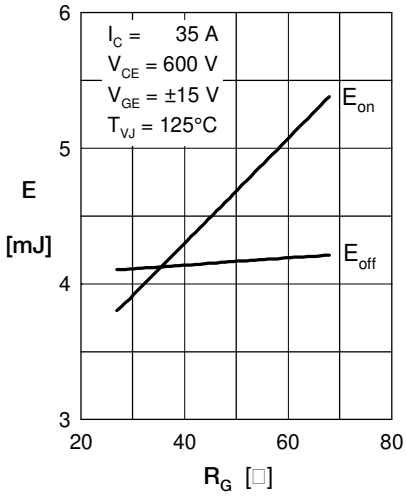


Fig. 6 Typ. switching energy versus gate resistance

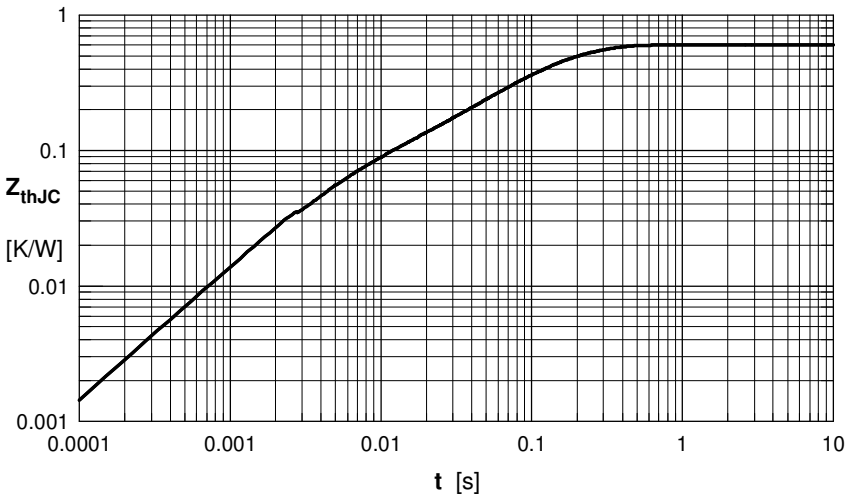


Fig. 7 Typ. transient thermal impedance

© 2019 IXYS all rights reserved