

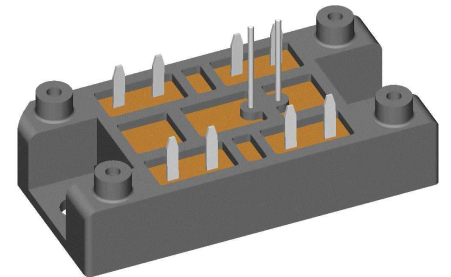
Standard Rectifier Module

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

3~ Rectifier Bridge + Brake Unit

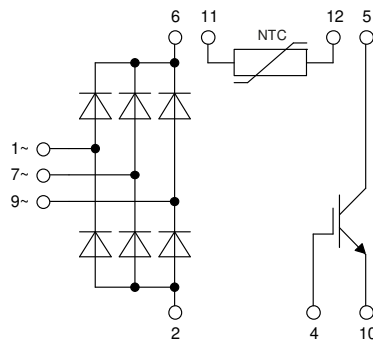
Part number

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

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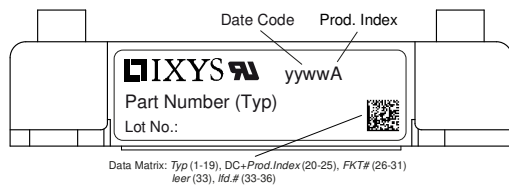
Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage					1700	V
V_{RRM}	max. repetitive reverse blocking voltage					1600	V
I_R	reverse current	$V_R = 1600$ V		$T_{VJ} = 25^\circ\text{C}$		40	μA
		$V_R = 1600$ V		$T_{VJ} = 150^\circ\text{C}$		1.5	mA
V_F	forward voltage drop	$I_F = 25$ A		$T_{VJ} = 25^\circ\text{C}$		1.10	V
		$I_F = 75$ A				1.38	V
		$I_F = 25$ A		$T_{VJ} = 125^\circ\text{C}$		1.01	V
		$I_F = 75$ A				1.37	V
I_{DAV}	bridge output current	$T_C = 110^\circ\text{C}$		$T_{VJ} = 150^\circ\text{C}$		75	A
		rectangular	$d = \frac{1}{3}$				
V_{FO}	threshold voltage			$T_{VJ} = 150^\circ\text{C}$		0.79	V
r_F	slope resistance					7.7	m Ω
						} for power loss calculation only	
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			$T_C = 25^\circ\text{C}$		110	W
I_{FSM}	max. forward surge current	$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		600	A
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		650	A
		$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		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		$T_{VJ} = 45^\circ\text{C}$		1.80	kA ² s
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		1.76	kA ² s
		$t = 10$ ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		1.30	kA ² s
		$t = 8,3$ ms; (60 Hz), sine		$V_R = 0$ V		1.26	kA ² s
C_J	junction capacitance	$V_R = 400$ V; $f = 1$ MHz		$T_{VJ} = 25^\circ\text{C}$		19	pF



Brake IGBT + Diode				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{CES}	collector emitter voltage				1200	V	
V_{GES}	max. DC gate voltage				± 20	V	
V_{GEM}	max. transient gate emitter voltage				± 30	V	
I_{C25}	collector current				58	A	
I_{C80}					40	A	
P_{tot}	total power dissipation				195	W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 35 \text{ A}; V_{GE} = 15 \text{ V}$			1.85	V	
					2.15	V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 2 \text{ mA}; V_{GE} = V_{CE}$	5.4	5.9	6.5	V	
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}$			0.1	mA	
					0.1	mA	
I_{GES}	gate emitter leakage current	$V_{GE} = \pm 20 \text{ V}$			500	nA	
$Q_{G(on)}$	total gate charge	$V_{CE} = 600 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 35 \text{ A}$		110		nC	
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 600 \text{ V}; I_C = 35 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 27 \Omega$			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	$V_{GE} = \pm 15 \text{ V}; R_G = 27 \Omega$					
I_{CM}		$V_{CEK} = 1200 \text{ V}$			105	A	
SCSOA	short circuit safe operating area	$V_{CEK} = 1200 \text{ V}$					
t_{SC}	short circuit duration	$V_{CE} = 900 \text{ V}; V_{GE} = \pm 15$			10	μs	
I_{SC}	short circuit current	$R_G = 27 \Omega$; 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	



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	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

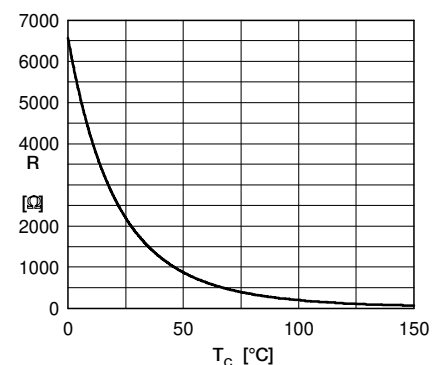
Symbol	Definition	Conditions	min.	typ.	max.	Unit
R_{25}	resistance	$T_{VJ} = 25^\circ$	2.13	2.2	2.27	k Ω
$B_{25/50}$	temperature coefficient			3560		K

Equivalent Circuits for Simulation

* on die level

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

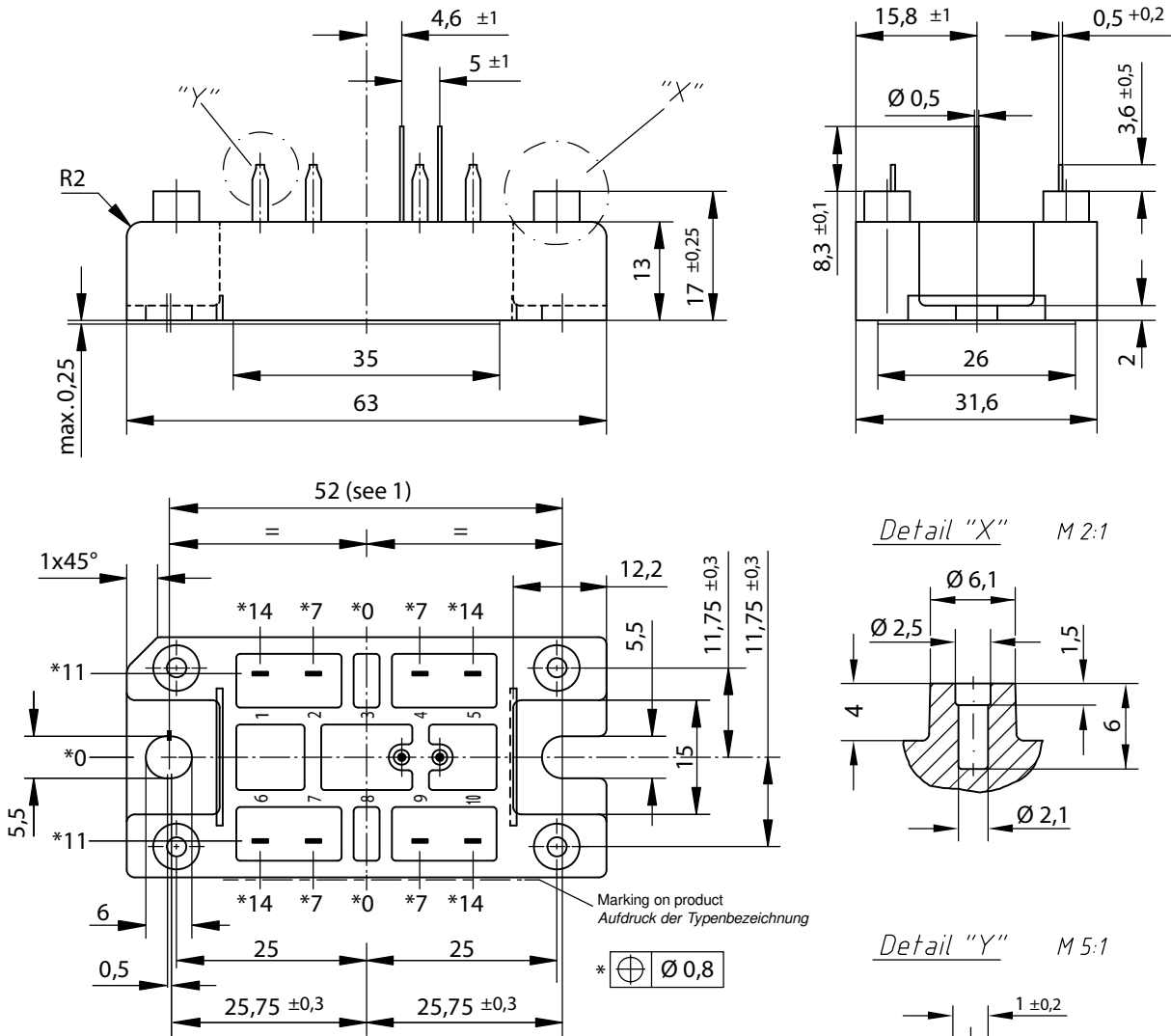
		Rectifier	Brake IGBT +	
V_0	threshold voltage	0.79	1.1	V
R_0	slope resistance *	6.5	40	m Ω



Typ. NTC resistance vs. temperature

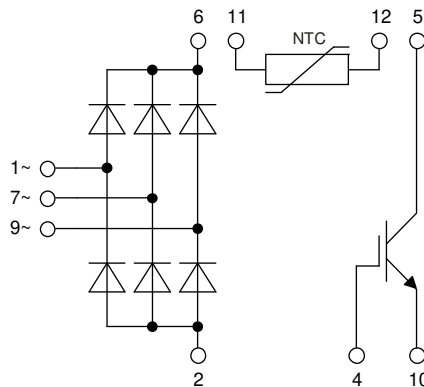


Outlines V1-A-Pack



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: verzinkt (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⁻¹
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





Rectifier

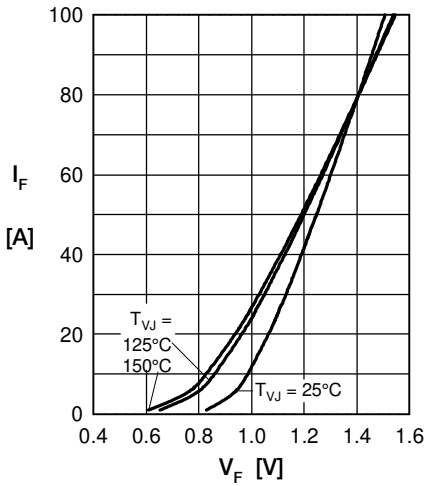


Fig. 1 Forward current vs. voltage drop per diode

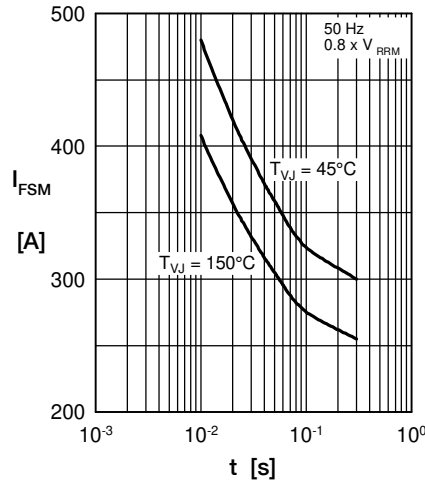


Fig. 2 Surge overload current vs. time per diode

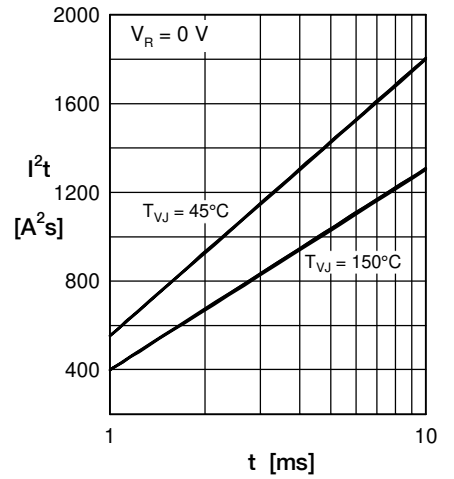


Fig. 3 I^2t vs. time per diode

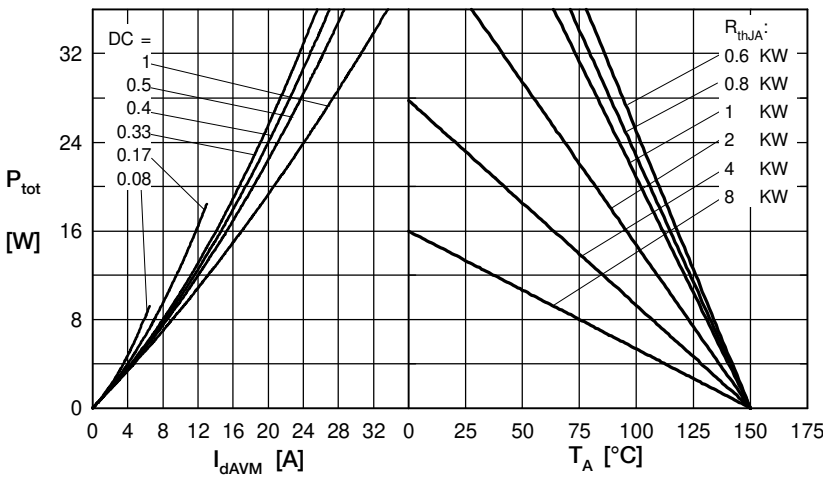


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

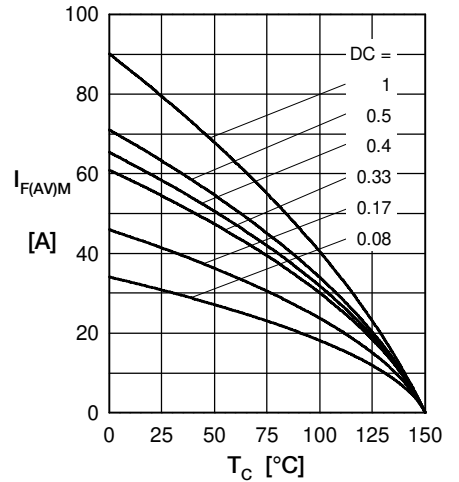


Fig. 5 Max. forward current vs. case temperature per diode

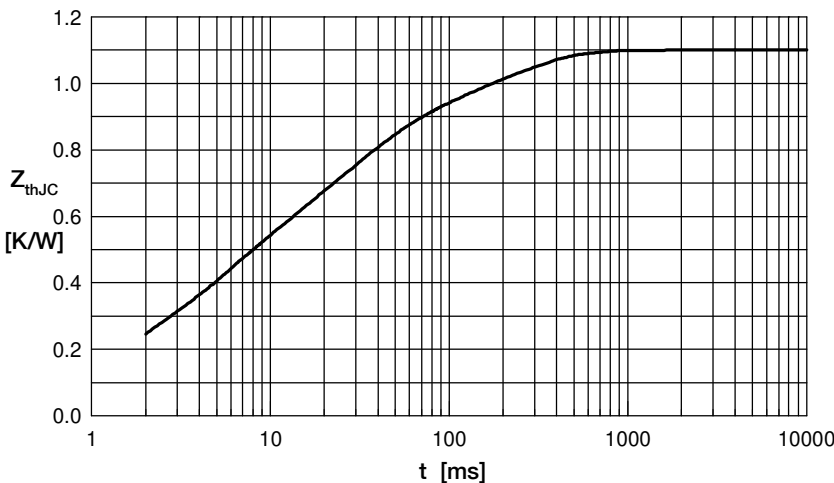


Fig. 6 Transient thermal impedance junction to case vs. time per diode

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



Brake IGBT + Diode

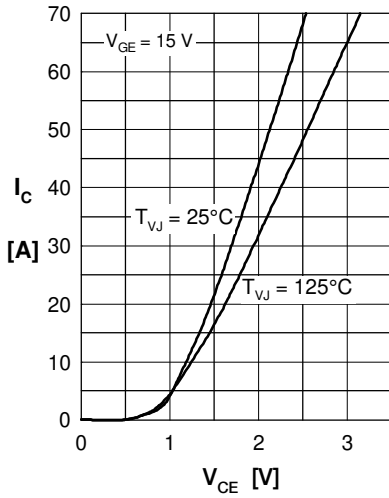


Fig. 1 Typ. output characteristics

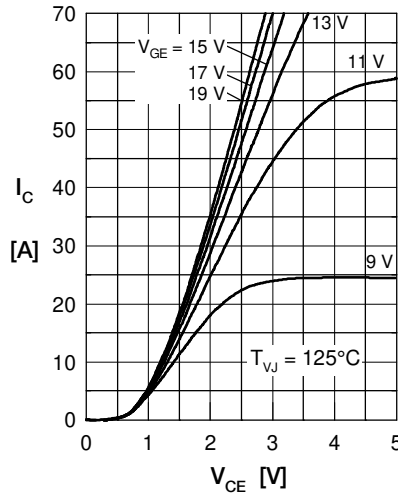


Fig. 2 Typ. output characteristics

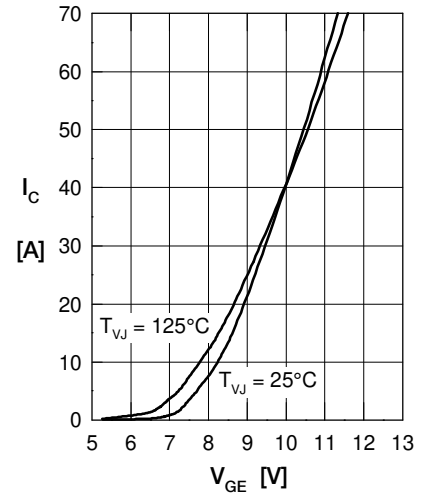


Fig. 3 Typ. transfer characteristics

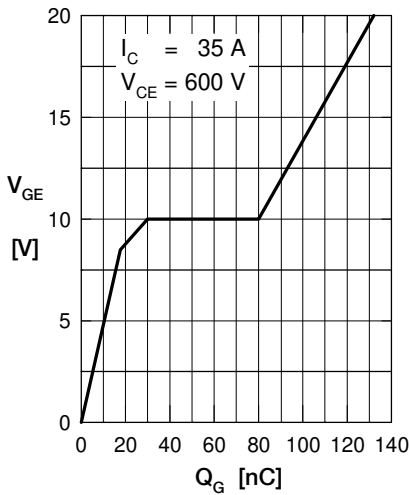


Fig. 4 Typ. turn-on gate charge

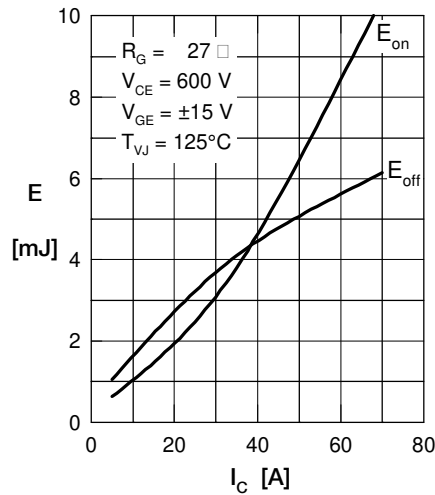


Fig. 5 Typ. switching energy versus collector current

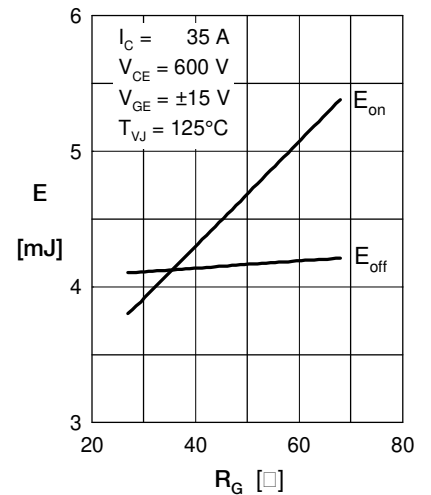


Fig. 6 Typ. switching energy versus gate resistance

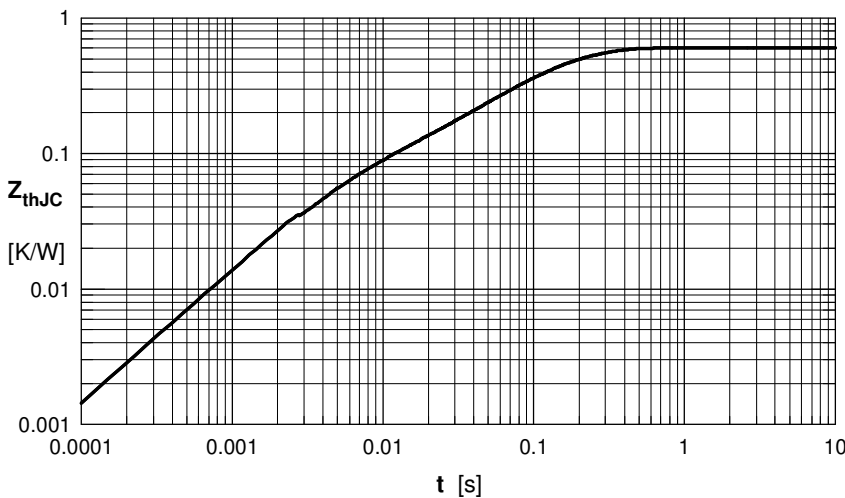


Fig. 7 Typ. transient thermal impedance