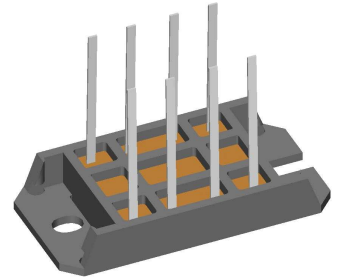


Thyristor Module

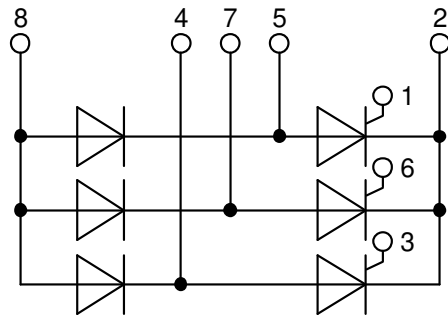
3~ Rectifier	
V_{RRM}	= 1600 V
I_{DAV}	= 45 A
I_{FSM}	= 320 A

3~ Rectifier Bridge, half-controlled (high-side)

Part number
VVZ40-16io1


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

Applications:

- Line rectifying 50/60 Hz
- Drives
- SMPS
- UPS

Package: V1-B-Pack

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 10 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

Terms and Conditions of Usage

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office.

Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

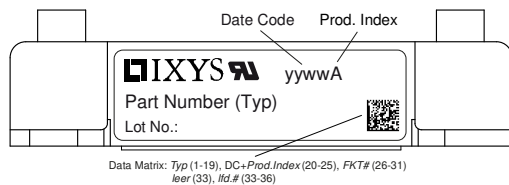
- to perform joint risk and quality assessments;

- the conclusion of quality agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

Rectifier				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$			1700	V	
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$			1600	V	
I_{RD}	reverse current, drain current	$V_{R/D} = 1600\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$		300	μA	
		$V_{R/D} = 1600\text{ V}$	$T_{VJ} = 125^{\circ}\text{C}$		5	mA	
V_T	forward voltage drop	$I_T = 15\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$		1.12	V	
		$I_T = 45\text{ A}$			1.47	V	
		$I_T = 15\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$		1.07	V	
		$I_T = 45\text{ A}$			1.52	V	
I_{DAV}	bridge output current	$T_C = 100^{\circ}\text{C}$ rectangular $d = 1/3$	$T_{VJ} = 125^{\circ}\text{C}$		45	A	
V_{T0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 125^{\circ}\text{C}$		0.85	V	
r_T	slope resistance				15	m Ω	
R_{thJC}	thermal resistance junction to case				1	K/W	
R_{thCH}	thermal resistance case to heatsink			0.60		K/W	
P_{tot}	total power dissipation		$T_C = 25^{\circ}\text{C}$		100	W	
I_{TSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$		320	A	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		345	A	
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 125^{\circ}\text{C}$		270	A	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		295	A	
I^2t	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$		510	A ² s	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		495	A ² s	
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 125^{\circ}\text{C}$		365	A ² s	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		360	A ² s	
C_J	junction capacitance	$V_R = 400\text{ V}$ $f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		16	pF	
P_{GM}	max. gate power dissipation	$t_p = 30\text{ }\mu\text{s}$	$T_C = 125^{\circ}\text{C}$		10	W	
		$t_p = 300\text{ }\mu\text{s}$			1	W	
P_{GAV}	average gate power dissipation				0.5	W	
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 125^{\circ}\text{C}; f = 50\text{ Hz}$ repetitive, $I_T = 45\text{ A}$			150	A/ μs	
		$t_p = 200\text{ }\mu\text{s}; di_G/dt = 0.3\text{ A}/\mu\text{s};$ $I_G = 0.3\text{ A}; V = 2/3 V_{DRM}$ non-repet., $I_T = 15\text{ A}$			500	A/ μs	
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V = 2/3 V_{DRM}$ $R_{GK} = \infty$; method 1 (linear voltage rise)	$T_{VJ} = 125^{\circ}\text{C}$		1000	V/ μs	
V_{GT}	gate trigger voltage	$V_D = 6\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$		1	V	
			$T_{VJ} = -40^{\circ}\text{C}$		1.2	V	
I_{GT}	gate trigger current	$V_D = 6\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$		65	mA	
			$T_{VJ} = -40^{\circ}\text{C}$		80	mA	
V_{GD}	gate non-trigger voltage	$V_D = 2/3 V_{DRM}$	$T_{VJ} = 125^{\circ}\text{C}$		0.2	V	
I_{GD}	gate non-trigger current				5	mA	
I_L	latching current	$t_p = 30\text{ }\mu\text{s}$	$T_{VJ} = 25^{\circ}\text{C}$		150	mA	
		$I_G = 0.3\text{ A}; di_G/dt = 0.3\text{ A}/\mu\text{s}$					
I_H	holding current	$V_D = 6\text{ V}$ $R_{GK} = \infty$	$T_{VJ} = 25^{\circ}\text{C}$		100	mA	
t_{gd}	gate controlled delay time	$V_D = 1/2 V_{DRM}$	$T_{VJ} = 25^{\circ}\text{C}$		2	μs	
		$I_G = 0.3\text{ A}; di_G/dt = 0.3\text{ A}/\mu\text{s}$					
t_q	turn-off time	$V_R = 100\text{ V}; I_T = 15\text{ A}; V = 2/3 V_{DRM}$ $di/dt = 10\text{ A}/\mu\text{s}$ $dv/dt = 20\text{ V}/\mu\text{s}$ $t_p = 300\text{ }\mu\text{s}$	$T_{VJ} = 100^{\circ}\text{C}$		150	μs	

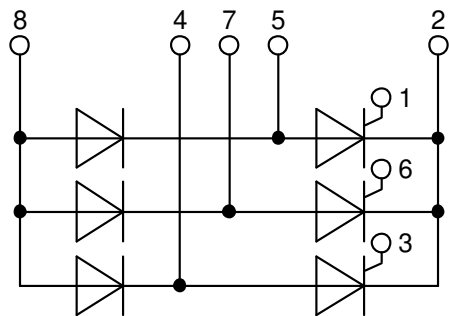
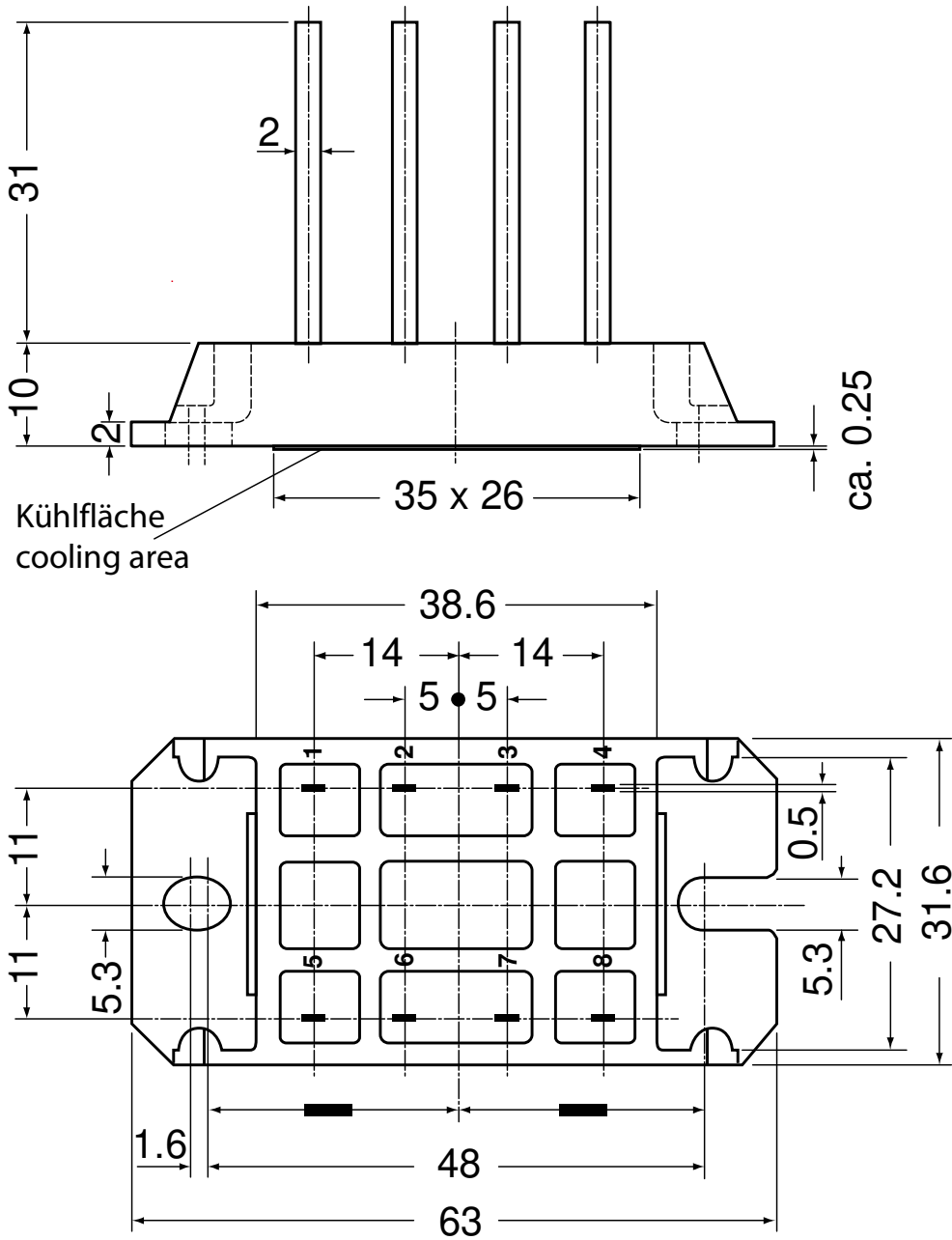
Package V1-B-Pack				Ratings		
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			100	A
T_{VJ}	virtual junction temperature		-40		125	°C
T_{op}	operation temperature		-40		100	°C
T_{stg}	storage temperature		-40		125	°C
Weight				30		g
M_D	mounting torque		2		2.5	Nm
$d_{Spp/App}$	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	VVZ40-16io1	VVZ40-16io1	Box	5	466379

Equivalent Circuits for Simulation		* on die level		$T_{VJ} = 125\text{ °C}$
	Thyristor			
$V_{0\ max}$	threshold voltage	0.85		V
$R_{0\ max}$	slope resistance *	12.5		mΩ

Outlines V1-B-Pack



Thyristor

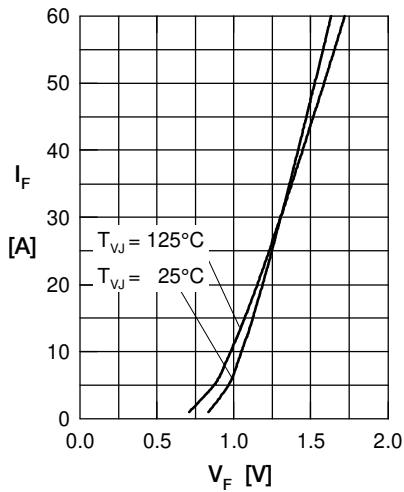


Fig. 1 Forward current vs. voltage drop per thyristor

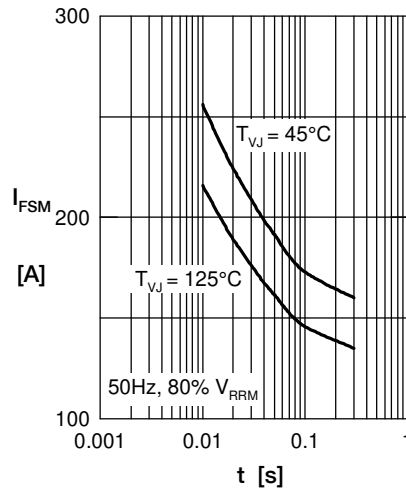


Fig. 2 Surge overload current vs. time per thyristor

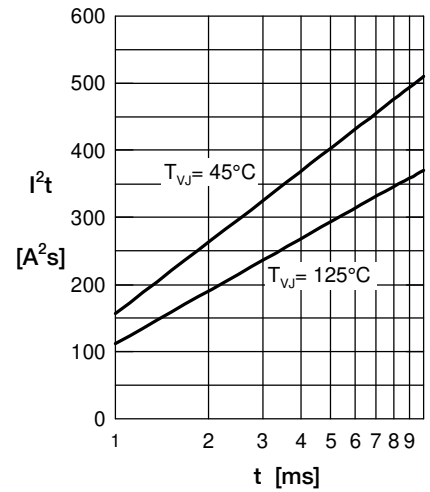


Fig. 3 I^2t vs. time per thyristor

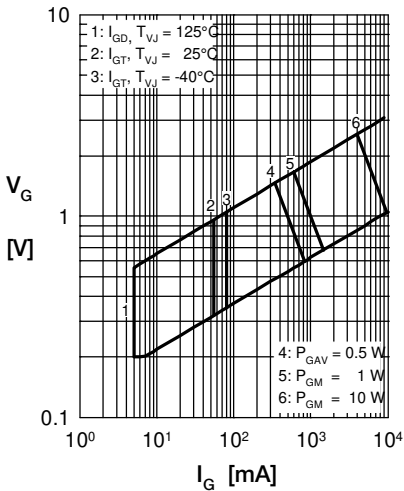


Fig. 4 Gate trigger characteristics

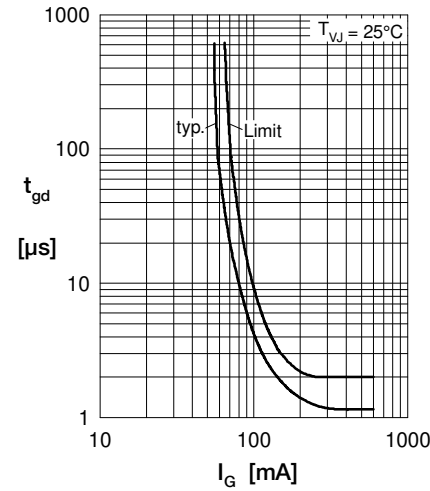


Fig. 5 Gate trigger delay time

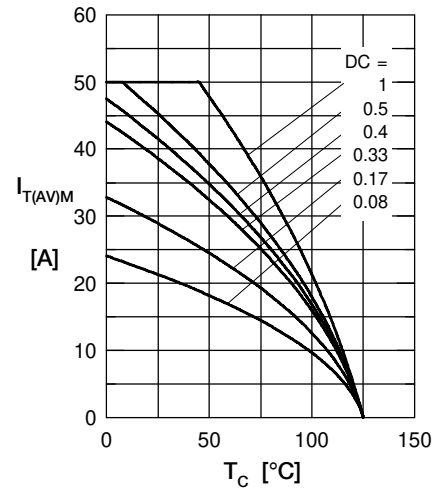


Fig. 5 Max. forward current vs. case temperature per thyristor

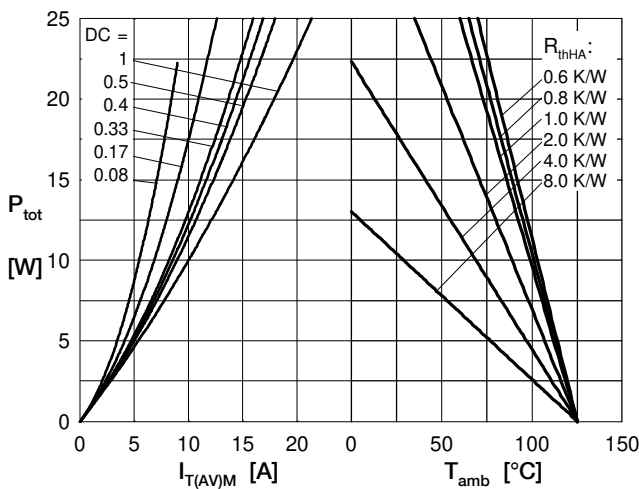


Fig. 4 Power dissipation vs. forward current and ambient temperature per thyristor

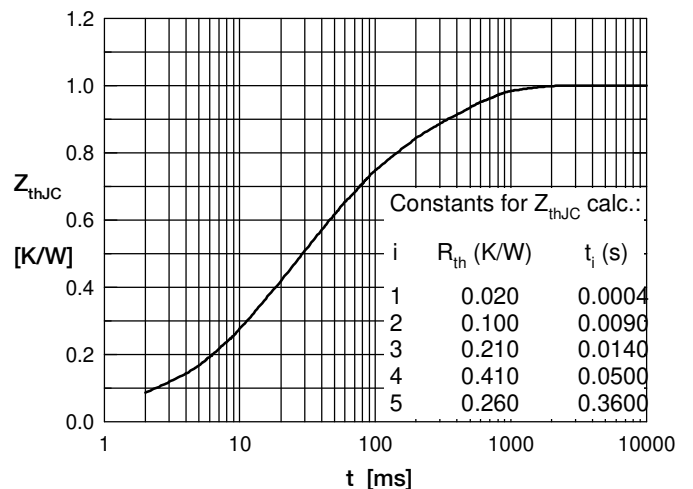


Fig. 6 Transient thermal impedance junction to case vs. time per thyristor