

Features

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability
- Direct Copper Bonded Al2O3-ceramic

Applications

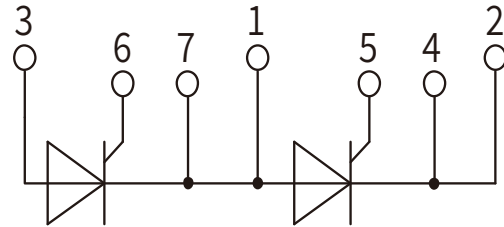
- Line rectifying 50/60 Hz
- Softstart AC motor control
- DC Motor control
- AC power control
- Lighting and temperature control

Package: TO-240AA

- Isolation Voltage: 4800V
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling



Parameter	Value
V_{RRM}	2x 1600V
I_{TAV}	140A
V_T	1, 28V



Thyristor 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
$I_{R/D}$	reverse current, drain current	$V_{R/D} = 1600\text{ V}$ $T_{VJ} = 25^{\circ}\text{C}$			100	μA
		$V_{R/D} = 1600\text{ V}$ $T_{VJ} = 140^{\circ}\text{C}$			10	mA
V_T	forward voltage drop	$I_T = 150\text{ A}$ $T_{VJ} = 25^{\circ}\text{C}$			1, 29	V
		$I_T = 300\text{ A}$ $T_{VJ} = 25^{\circ}\text{C}$			1, 63	V
		$I_T = 150\text{ A}$ $T_{VJ} = 125^{\circ}\text{C}$			1, 28	V
		$I_T = 300\text{ A}$ $T_{VJ} = 125^{\circ}\text{C}$			1, 70	V
I_{TAV}	average forward current	$T_C = 85^{\circ}\text{C}$, $T_{VJ} = 140^{\circ}\text{C}$			140	A
$I_{T(RMS)}$	RMS forward current	180° sine $T_{VJ} = 140^{\circ}\text{C}$			220	A
V_{T0}	threshold voltage	for power loss calculation $T_{VJ} = 140^{\circ}\text{C}$			0, 85	V
r_T	slope resistance	only			2, 8	m Ω
R_{thJC}	thermal resistance junction to case				0, 22	K/W
R_{thCH}	thermal resistance case to heatsink			0, 2		K/W
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$			520	W

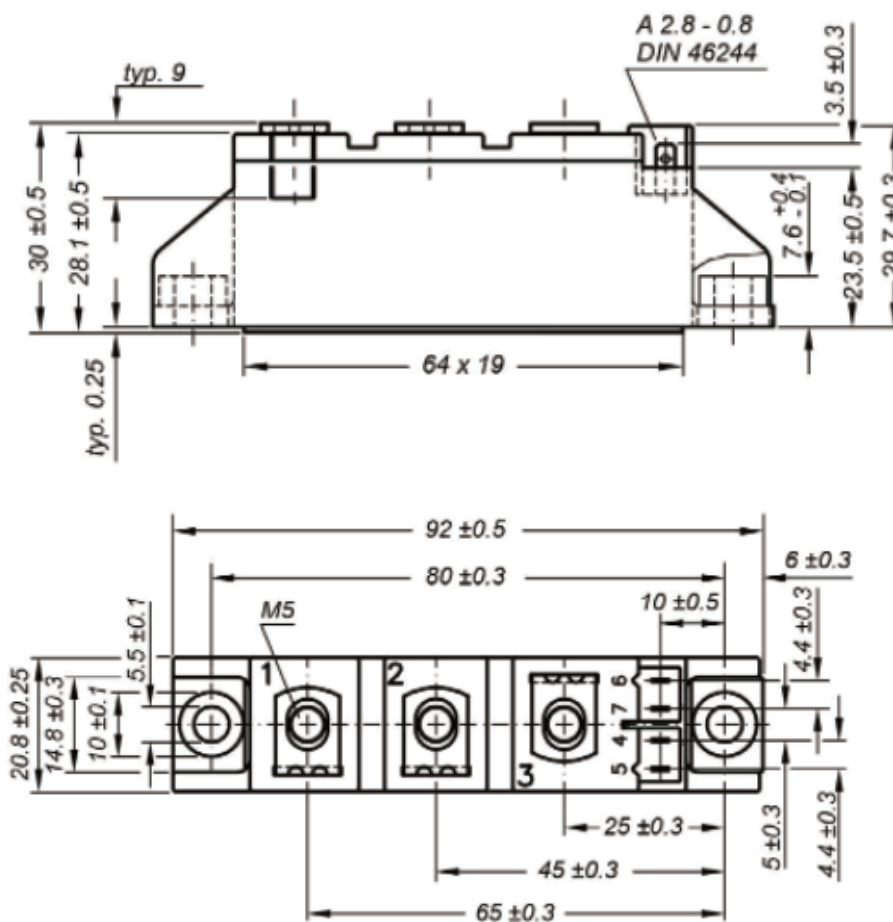
I_{TSM}	max, forward surge current	$t = 10 \text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}\text{C}$			2, 40	kA
		$t = 8, 3 \text{ ms; (60 Hz), sine}$	$V_R = 0V$			2, 59	kA
		$t = 10 \text{ ms; (50 Hz), sine}$	$T_{VJ} = 140^{\circ}\text{C}$			2, 04	kA
		$t = 8, 3 \text{ ms; (60 Hz), sine}$	$V_R = 0V$			2, 21	kA
I^2t	value for fusing	$t = 10 \text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}\text{C}$			28, 8	kA^2s
		$t = 8, 3 \text{ ms; (60 Hz), sine}$	$V_R = 0V$			27, 9	kA^2s
		$t = 10 \text{ ms; (50 Hz), sine}$	$T_{VJ} = 140^{\circ}\text{C}$			20, 8	kA^2s
		$t = 8, 3 \text{ ms; (60 Hz), sine}$	$V_R = 0V$			20, 2	kA^2s
C_J	junction capacitance	$V_R = 400 \text{ V, } f = 1 \text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		119		pF
P_{GM}	max. gate power dissipation	$t_p = 30 \mu\text{s}$	$T_C = 140^{\circ}\text{C}$			10	W
		$t_p = 300 \mu\text{s}$				5	W
P_{GAV}	average gate power dissipation					0, 5	W
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 140^{\circ}\text{C; } f = 50 \text{ Hz}$ $t_p = 200 \mu\text{s; } di_G/dt = 0,45 \text{ A}/\mu\text{s;}$ $I_G = 0,45 \text{ A; } V_D = \frac{2}{3}V_{DRM}$	repetitive, $I_T = 450\text{A}$			150	$\text{A}/\mu\text{s}$
			non-repet., $I_T = 150\text{A}$			500	$\text{A}/\mu\text{s}$
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V_D = \frac{2}{3}V_{DRM}$ $R_{GK} = \infty$; method 1 (linear voltage rise)	$T_{VJ} = 140^{\circ}\text{C}$			1000	$\text{V}/\mu\text{s}$
V_{GT}	gate trigger voltage	$V_D = 6 \text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			1,5	V
			$T_{VJ} = -40^{\circ}\text{C}$			1,6	V
I_{GT}	gate trigger current	$V_D = 6 \text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			150	mA
			$T_{VJ} = -40^{\circ}\text{C}$			200	mA
V_{GD}	gate non-trigger voltage	$V_D = \frac{2}{3}V_{DRM}$	$T_{VJ} = 140^{\circ}\text{C}$			0,2	V
I_{GD}	gate non-trigger current					10	mA
I_L	latching current	$t_p = 10 \mu\text{s}$ $I_G = 0,45 \text{ A; } di_G/dt = 0,45 \text{ A}/\mu\text{s}$	$T_{VJ} = 25^{\circ}\text{C}$			200	mA
I_H	holding current	$V_D = 6 \text{ V, } R_{GK} = \infty$	$T_{VJ} = 25^{\circ}\text{C}$			200	mA
t_{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$ $I_G = 0,45 \text{ A; } di_G/dt = 0,45 \text{ A}/\mu\text{s}$	$T_{VJ} = 25^{\circ}\text{C}$			2	μs
t_q	turn-off time	$V_R = 100 \text{ V; } I_T = 150 \text{ A;}$ $V_D = \frac{2}{3}V_{DRM}; di/dt = 10 \text{ A}/\mu\text{s;}$ $dv/dt = 20 \text{ V}/\mu\text{s; } t_p = 200 \mu\text{s}$	$T_{VJ} = 125^{\circ}\text{C}$		185		μs

Package TO-240AA

03

Symbol	Definition	Conditions			min.	typ.	max.	Unit
I _{RMS}	RMS current	per terminal					200	A
T _{VJ}	virtual junction temperature				-40		140	°C
T _{op}	operation temperature				-40		125	°C
T _{stg}	storage temperature				-40		125	°C
Weight						81		g
M _D	mounting torque				2,5		4	Nm
M _T	terminal torque				2,5		4	Nm
d _{Spp/App}	creepage distance on surface striking		terminal to terminal	13,0	9,7			mm
d _{Spb/Appb}	distance through air		terminal to backside	16,0	16,0			mm
V _{ISOL}	isolation voltage	t = 1 second	50/60 Hz, RMS; I _{ISOL} ≤ 1 mA		4800			V
		t = 1 minute			4000			V

Outlines



Thyristor

04

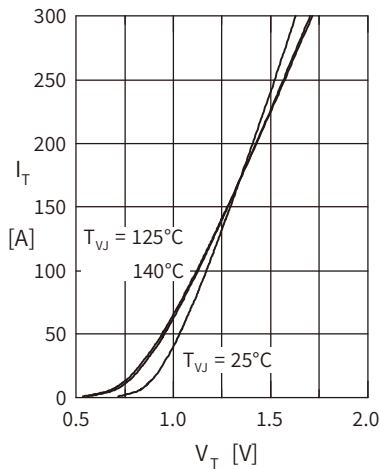


Fig. 1 Forward characteristics

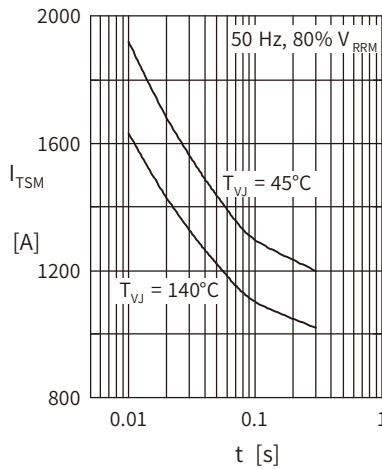


Fig. 2 Surge overload current
 I_{TSM} : crest value, t : duration

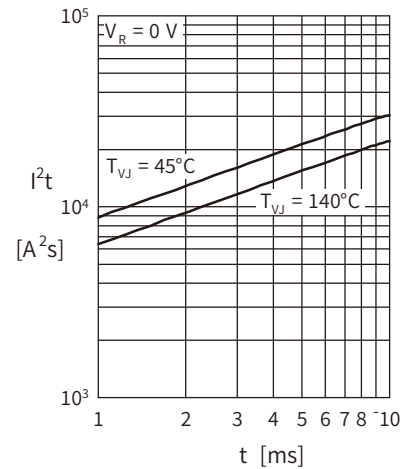


Fig. 3 I^2t versus time (1-10 s)

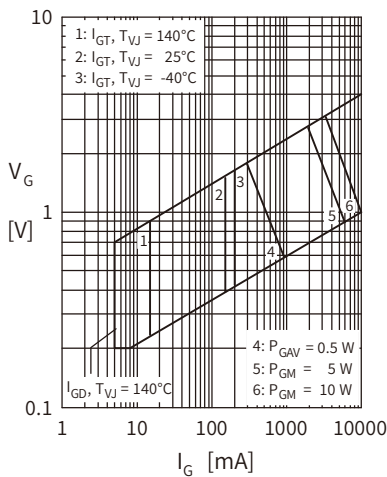


Fig. 4 Gate voltage & gate current

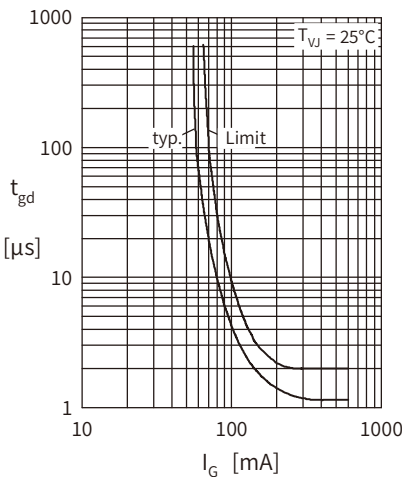


Fig. 5 Gate controlled delay time t_{gd}

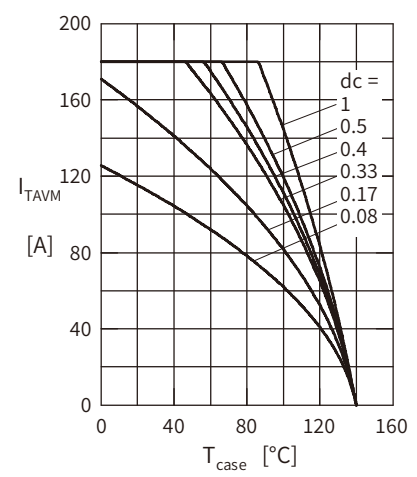


Fig. 6 Max. forward current at case temperature

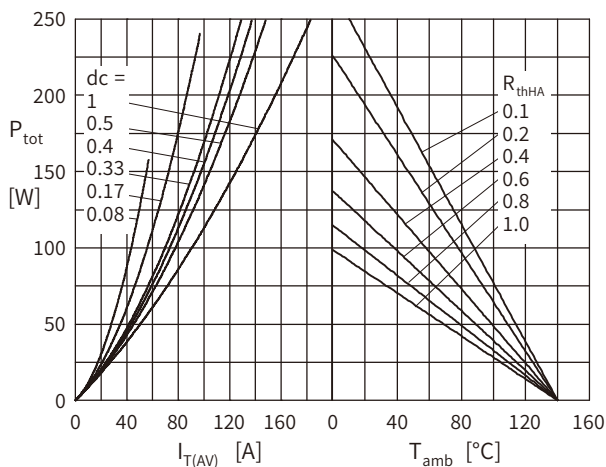


Fig. 7a Power dissipation versus direct output current
Fig. 7b and ambient temperature

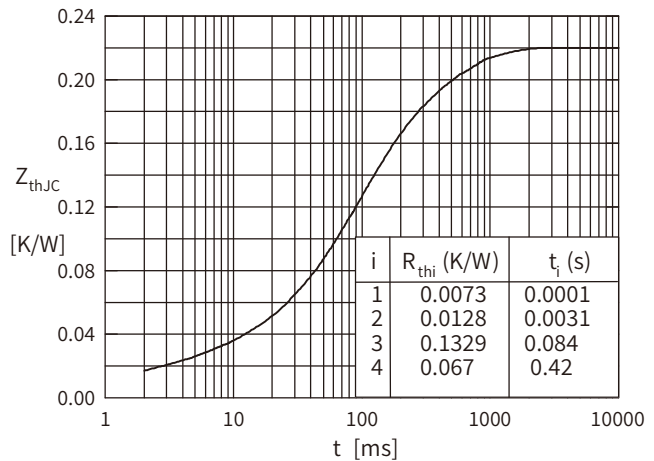


Fig. 8 Transient thermal impedance junction to case