



Thyristor

$V_{RRM} = 1600\text{ V}$

$I_{TAV} = 30\text{ A}$

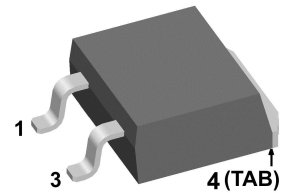
$V_T = 1.96\text{ V}$

SemiFast Single Thyristor

Part number

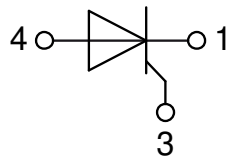
CME30E1600PZ

Marking on Product: CME30E1600PZ



Backside: anode

ESD Level: H3B



Features / Advantages:

- Thyristor for line and moderate frequencies
- Short turn-off time
- Planar passivated chip
- Long-term stability

Applications:

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

Package: TO-263 (D2Pak-HV)

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- High creepage distance between terminals

Disclaimer Notice

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Thyristor			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}C$			1700	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}C$			1600	V
I_{RD}	reverse current, drain current	$V_{R/D} = 1600 V$	$T_{VJ} = 25^{\circ}C$		50	μA
		$V_{R/D} = 1600 V$	$T_{VJ} = 125^{\circ}C$		2	mA
V_T	forward voltage drop	$I_T = 30 A$	$T_{VJ} = 25^{\circ}C$		1.92	V
		$I_T = 60 A$			2.47	V
		$I_T = 30 A$	$T_{VJ} = 125^{\circ}C$		1.96	V
		$I_T = 60 A$			2.68	V
I_{TAV}	average forward current	$T_C = 80^{\circ}C$ 180° sine	$T_{VJ} = 150^{\circ}C$		30	A
V_{T0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^{\circ}C$		1.23	V
r_T	slope resistance				25	m Ω
R_{thJC}	thermal resistance junction to case				0.75	K/W
R_{thCH}	thermal resistance case to heatsink			0.25		K/W
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$		165	W
I_{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$		260	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		280	A
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^{\circ}C$		220	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		240	A
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$		340	A ² s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		325	A ² s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^{\circ}C$		240	A ² s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		240	A ² s
C_J	junction capacitance	$V_R = 400 V$ f = 1 MHz	$T_{VJ} = 25^{\circ}C$		13	pF
P_{GM}	max. gate power dissipation	$t_p = 30 \mu s$	$T_C = 150^{\circ}C$		10	W
		$t_p = 300 \mu s$			5	W
P_{GAV}	average gate power dissipation				0.5	W
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 125^{\circ}C$; f = 50 Hz	repetitive, $I_T = 90 A$		150	A/ μs
		$t_p = 200 \mu s$; $di_G/dt = 0.2 A/\mu s$; $I_G = 0.2 A$; $V = \frac{2}{3} V_{DRM}$	non-repet., $I_T = 30 A$		500	A/ μs
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$ $R_{GK} = \infty$; method 1 (linear voltage rise)	$T_{VJ} = 125^{\circ}C$		500	V/ μs
V_{GT}	gate trigger voltage	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$		1.3	V
			$T_{VJ} = -40^{\circ}C$		1.6	V
I_{GT}	gate trigger current	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$		50	mA
			$T_{VJ} = -40^{\circ}C$		80	mA
V_{GD}	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = 150^{\circ}C$		0.2	V
I_{GD}	gate non-trigger current				1	mA
I_L	latching current	$t_p = 10 \mu s$	$T_{VJ} = 25^{\circ}C$		120	mA
		$I_G = 0.2 A$; $di_G/dt = 0.2 A/\mu s$				
I_H	holding current	$V_D = 6 V$ $R_{GK} = \infty$	$T_{VJ} = 25^{\circ}C$		90	mA
t_{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{VJ} = 25^{\circ}C$		2	μs
		$I_G = 0.5 A$; $di_G/dt = 0.5 A/\mu s$				
t_q	turn-off time	$V_R = 20 V$; $I_T = 30 A$; $V = \frac{2}{3} V_{DRM}$ $di/dt = 10 A/\mu s$ $dv/dt = 1000 V/\mu s$ $t_p = 200 \mu s$	$T_{VJ} = 125^{\circ}C$		120	μs



Package TO-263 (D2Pak-HV)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			35	A
T_{VJ}	virtual junction temperature		-40		150	°C
T_{op}	operation temperature		-40		125	°C
T_{stg}	storage temperature		-40		150	°C
Weight				1.5		g
F_C	mounting force with clip		20		60	N
$d_{Spp/ App}$	creepage distance on surface / striking distance through air	terminal to terminal	4.2			mm
$d_{Spb/ Apb}$		terminal to backside	4.7			mm

Product Marking



Part description

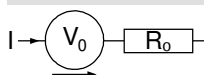
- C = Thyristor (SCR)
- M = Thyristor
- E = Semifast (up to 1800V)
- 30 = Current Rating [A]
- E = Single Thyristor
- 1600 = Reverse Voltage [V]
- PZ = TO-263AB (D2Pak) (2HV)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	CME30E1600PZ-TRL	CME30E1600PZ	Tape & Reel	800	512781
Alternative	CME30E1600PZ-TUB	CME30E1600PZ	Tube	50	523828

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 150\text{ °C}$



Thyristor

$V_{0\ max}$	threshold voltage	1.23	V
$R_{0\ max}$	slope resistance *	22	mΩ

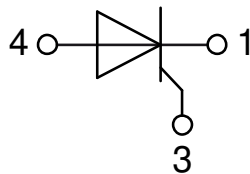


Outlines TO-263 (D2Pak-HV)



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.06	4.83	0.160	0.190
A1	typ. 0.10		typ. 0.004	
A2	2.41		0.095	
b	0.51	0.99	0.020	0.039
b2	1.14	1.40	0.045	0.055
c	0.40	0.74	0.016	0.029
c2	1.14	1.40	0.045	0.055
D	8.38	9.40	0.330	0.370
D1	8.00	8.89	0.315	0.350
D2	2.3		0.091	
E	9.65	10.41	0.380	0.410
E1	6.22	8.50	0.245	0.335
e	2,54 BSC		0,100 BSC	
e1	4.28		0.169	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	1.02	1.68	0.040	0.066
W	typ. 0.02	0.040	typ. 0.0008	0.002

All dimensions conform with and/or within JEDEC standard.



Thyristor

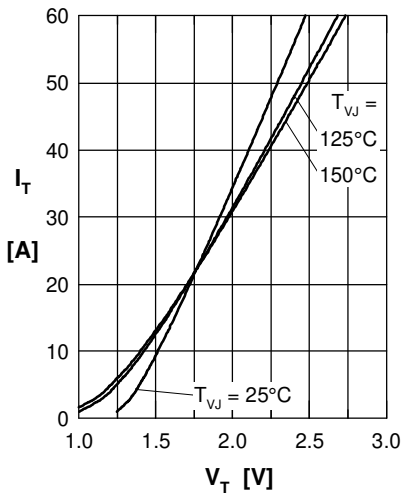


Fig. 1 Forward characteristics

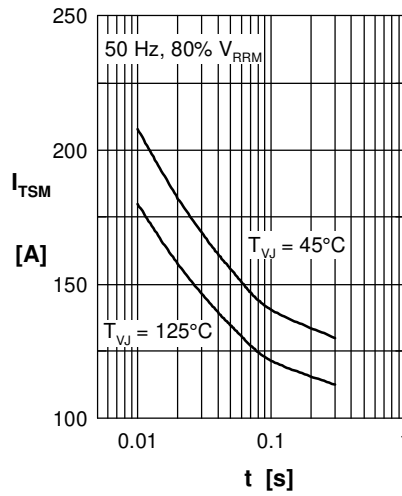


Fig. 2 Surge overload current
 I_{TSM} : crest value, t: duration

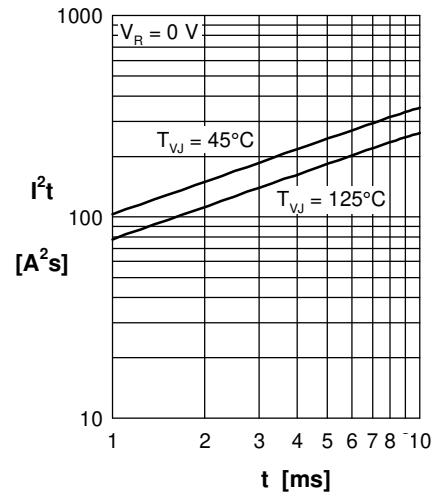


Fig. 3 I^2t versus time (1-10 s)

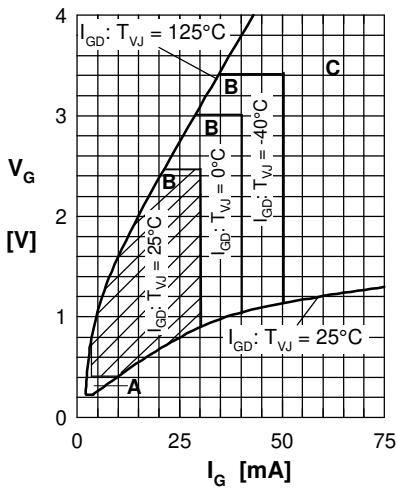


Fig. 4 Gate voltage & gate current
Triggering: A = no; B = possible; C = safe

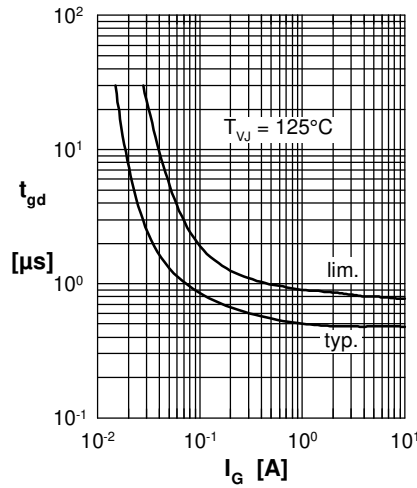


Fig. 5 Gate controlled delay time t_{gd}

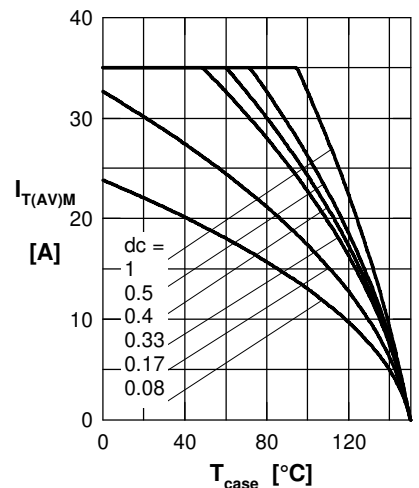


Fig. 6 Max. forward current at case temperature

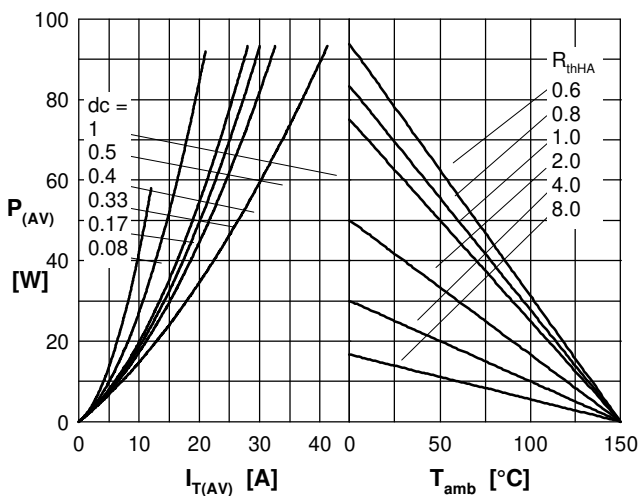


Fig. 7a Power dissipation versus direct output current
Fig. 7b and ambient temperature

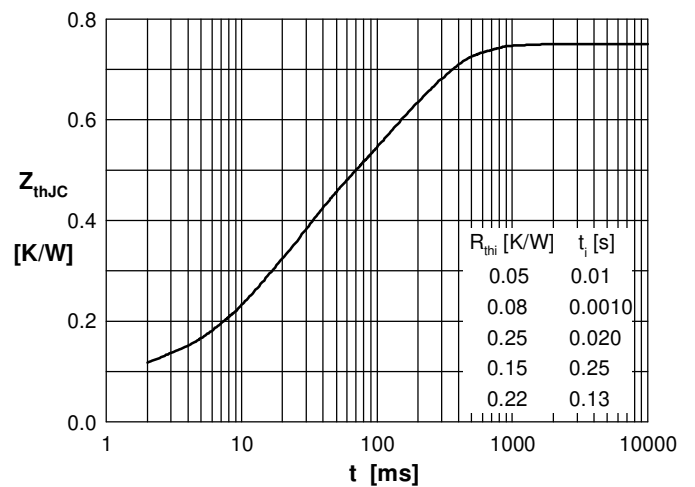


Fig. 7 Transient thermal impedance junction to case