Thyristor

V_{RRM}	=	1600 V
I_{TAV}	=	30 A
V_T	=	1.42 V

Single Thyristor

Part number

CMA30E1600PZ

1

3   4 (TAB)

Backside: anode

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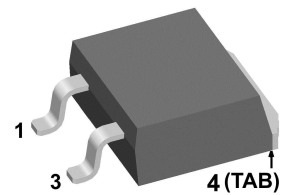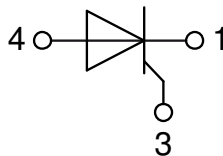
Features / Advantages:
- Thyristor for line frequency
- Planar passivated chip
- Long-term stability

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

Terms _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 the sales office, which is responsible for you.
Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.
Should you intend to use the product in aviation, in health or live 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.

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IXYS

CMA30E1600PZ

Thyristor						Ratings	
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25°C$				1700	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25°C$				1600	V
$I_{R/D}$	reverse current, drain current	$V_{R/D} = 1600$ V	$T_{VJ} = 25°C$			10	µA
		$V_{R/D} = 1600$ V	$T_{VJ} = 125°C$			2	mA
V_T	forward voltage drop	$I_T = 30$ A	$T_{VJ} = 25°C$			1.42	V
		$I_T = 60$ A				1.80	V
		$I_T = 30$ A	$T_{VJ} = 125°C$			1.42	V
		$I_T = 60$ A				1.92	V
I_{TAV}	average forward current	$T_C = 115°C$	$T_{VJ} = 150°C$			30	A
$I_{T(RMS)}$	RMS forward current	180° sine				47	A
V_{T0}	threshold voltage	for power loss calculation only	$T_{VJ} = 150°C$			0.90	V
r_T	slope resistance					17	mΩ
R_{thJC}	thermal resistance junction to case					0.5	K/W
R_{thCH}	thermal resistance case to heatsink				0.25		K/W
P_{tot}	total power dissipation	$T_C = 25°C$				250	W
I_{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45°C$			260	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			280	A
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150°C$			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	$T_{VJ} = 45°C$			340	A²s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			325	A²s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150°C$			240	A²s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			240	A²s
C_J	junction capacitance	$V_R = 400$ V f = 1 MHz	$T_{VJ} = 25°C$		13		pF
P_{GM}	max. gate power dissipation	$t_P = 30$ µs	$T_C = 150°C$			10	W
		$t_P = 300$ µs				5	W
P_{GAV}	average gate power dissipation					0.5	W
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 125°C$; f = 50 Hz repetitive, $I_T = 90$ A; $t_P = 200$ µs; $di_G/dt = 0.2$ A/µs;				150	A/µs
		$I_G = 0.2$ A; V = ⅔ V_{DRM} non-repet., $I_T = 30$ A				500	A/µs
$(dv/dt)_{cr}$	critical rate of rise of voltage	V = ⅔ V_{DRM} $R_{GK} = ∞$; method 1 (linear voltage rise)	$T_{VJ} = 125°C$			500	V/µs
V_{GT}	gate trigger voltage	$V_D = 6$ V	$T_{VJ} = 25°C$			1.3	V
			$T_{VJ} = -40°C$			1.6	V
I_{GT}	gate trigger current	$V_D = 6$ V	$T_{VJ} = 25°C$			28	mA
			$T_{VJ} = -40°C$			50	mA
V_{GD}	gate non-trigger voltage	$V_D = $ ⅔ V_{DRM}	$T_{VJ} = 150°C$			0.2	V
I_{GD}	gate non-trigger current					1	mA
I_L	latching current	$t_p = 10$ µs $I_G = 0.2$ A; $di_G/dt = 0.2$ A/µs	$T_{VJ} = 25°C$			90	mA
I_H	holding current	$V_D = 6$ V $R_{GK} = ∞$	$T_{VJ} = 25°C$			60	mA
t_{gd}	gate controlled delay time	$V_D = $ ½ V_{DRM} $I_G = 0.5$ A; $di_G/dt = 0.5$ A/µs	$T_{VJ} = 25°C$			2	µs
t_q	turn-off time	$V_R = 100$ V; $I_T = 30$ A; V = ⅔ V_{DRM} $T_{VJ} = 125$ °C di/dt = 10 A/µs dv/dt = 20 V/µs $t_p = 200$ µs			150		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 No. → XXXXXXXXX

Logo → IXYS Zyyww

Assembly Line
Date Code → 000000
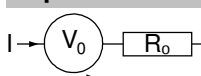Assembly Code
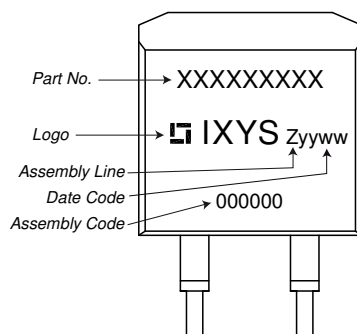
Part description

C = Thyristor (SCR)
M = Thyristor
A = (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	CMA30E1600PZ	CMA30E1600PZ	Tape & Reel	800	513695

Similar Part	Package	Voltage class
CMA30E1600PB	TO-220AB (3)	1600
CMA30E1600PN	TO-220ABFP (3)	1600
CLA30E1200PC	TO-263AB (D2Pak) (2)	1200
CLA30E1200PB	TO-220AB (3)	1200
CS22-12io1M	TO-220ABFP (3)	1200
CLA30E1200HB	TO-247AD (3)	1200
CS22-08io1M	TO-220ABFP (3)	800

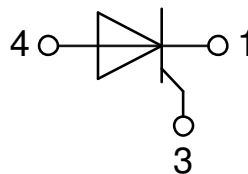## Equivalent Circuits for Simulation   *on die level* $T_{VJ} = 150\,°C$

I → V_0 — R_0 →   **Thyristor**

$V_{0\,max}$	threshold voltage	0.9	V
$R_{0\,max}$	slope resistance *	14	mΩ

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Outlines   TO-263 (D2Pak-HV)
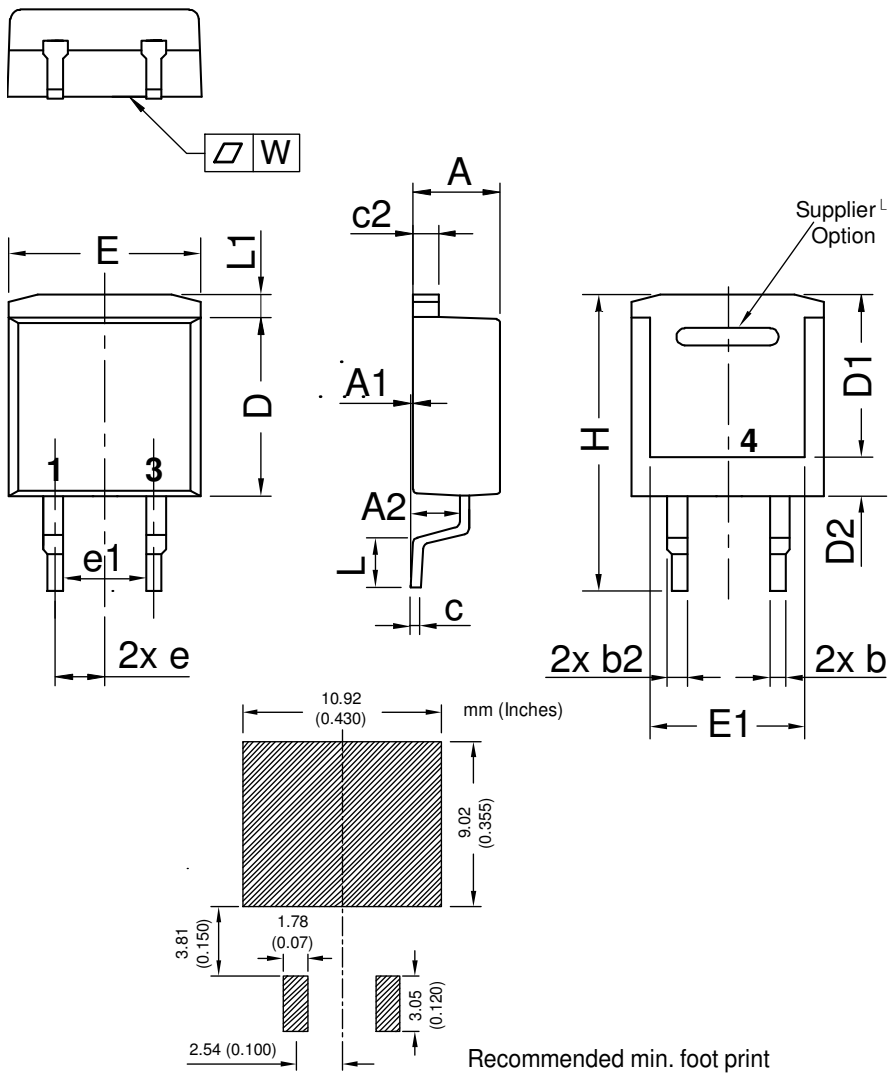
Dim.	Millimeter		Inches	
	min	max	min	max
A	4.06	4.83	0.160	0.190
A1	typ. 0.10		typ. 0.004	
A2	2.41		0.095	
b	0.51	0.99	0.020	0.039
b2	1.14	1.40	0.045	0.055
c	0.40	0.74	0.016	0.029
c2	1.14	1.40	0.045	0.055
D	8.38	9.40	0.330	0.370
D1	8.00	8.89	0.315	0.350
D2	2.3		0.091	
E	9.65	10.41	0.380	0.410
E1	6.22	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.

Supplier Option

E L1 c2 A

D A1 A2 L c

1 3 e1 2x e

H 4 D1 D2 2x b2 2x b E1

10.92 (0.430) mm (Inches)

9.02 (0.355)

3.81 (0.150) 1.78 (0.07) 3.05 (0.120)

2.54 (0.100) Recommended min. foot print

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        ◦
        3

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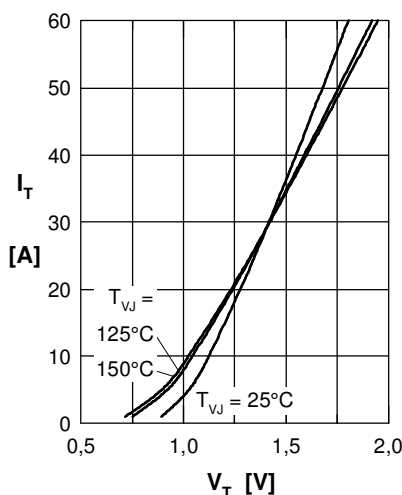
Thyristor

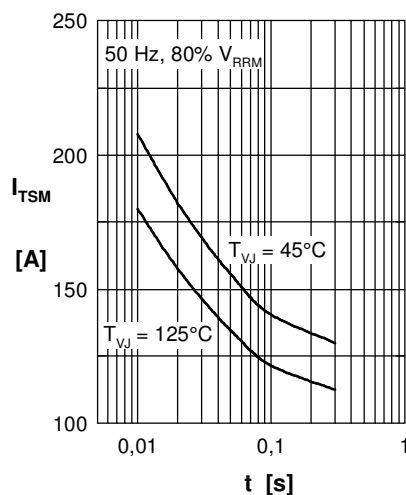Fig. 1 Forward characteristics

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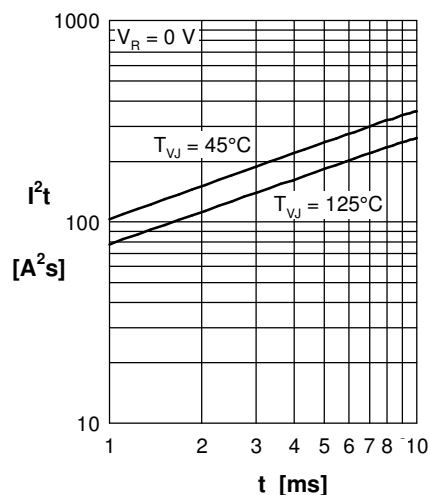I_{TSM}: crest value, t: duration

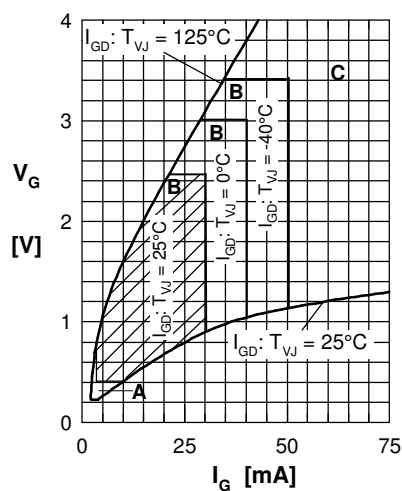Fig. 3 I^2t versus time (1-10 s)

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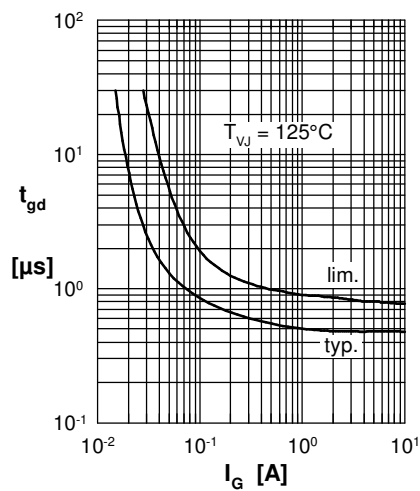Triggering: A = no; B = possible; C = safe
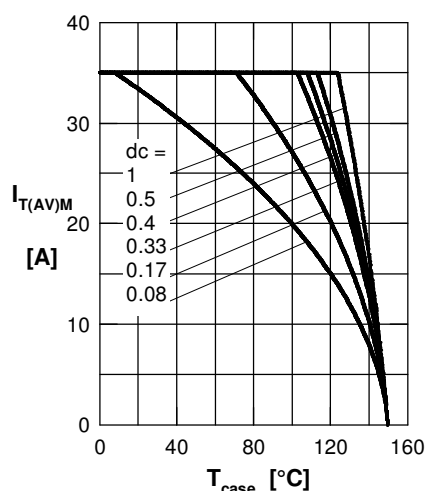

Fig. 5 Gate controlled delay time t_{gd}

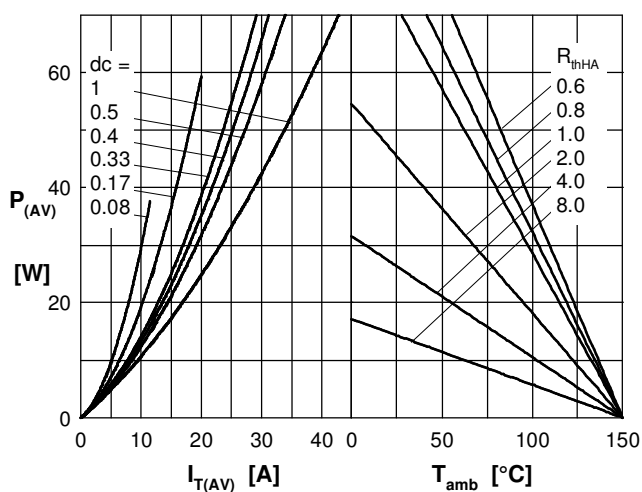Fig. 6 Max. forward current at
case temperature

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

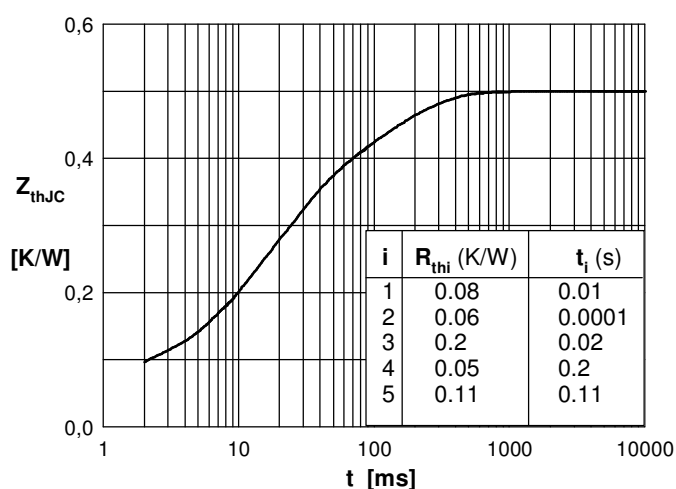| i	R_{thi} (K/W)	t_i (s)
1	0.08	0.01
2	0.06	0.0001
3	0.2	0.02
4	0.05	0.2
5	0.11	0.11

Fig. 7 Transient thermal impedance junction to case

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