Thyristor

V_{RRM}	=	1200 V
I_{TAV}	=	32 A
V_T	=	1.21 V

Single Thyristor

Part number

MCO25-12io1

2   1
3   4

Backside: isolated

E72873

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        |
        ○
        2

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: SOT-227B (minibloc)
- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate: Copper internally DCB isolated
- Advanced power cycling

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Thyristor

Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	T_{VJ} = 25°C				1300	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	T_{VJ} = 25°C				1200	V
$I_{R/D}$	reverse current, drain current	$V_{R/D}$ = 1200 V	T_{VJ} = 25°C			50	µA
		$V_{R/D}$ = 1200 V	T_{VJ} = 125°C			2	mA
V_T	forward voltage drop	I_T = 25 A	T_{VJ} = 25°C			1.23	V
		I_T = 50 A				1.50	V
		I_T = 25 A	T_{VJ} = °C			1.21	V
		I_T = 50 A				1.55	V
I_{TAV}	average forward current	T_C = 80°C	T_{VJ} = 150°C			32	A
$I_{T(RMS)}$	RMS forward current	180° sine				50	A
V_{T0}	threshold voltage	for power loss calculation only	T_{VJ} = 150°C			0.86	V
r_T	slope resistance					13.9	mΩ
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°C				110	W
I_{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			370	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			400	A
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			315	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			340	A
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			685	A²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			665	A²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			495	A²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			480	A²s
C_J	junction capacitance	V_R = 400 V f = 1 MHz	T_{VJ} = 25°C		16		pF
P_{GM}	max. gate power dissipation	t_P = 30 µs	T_C = 150°C			10	W
		t_P = 300 µs				1	W
P_{GAV}	average gate power dissipation					0.5	W
$(di/dt)_{cr}$	critical rate of rise of current	T_{VJ} = 150°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}	T_{VJ} = 150°C			1000	V/µs
		R_{GK} = ∞; method 1 (linear voltage rise)					
V_{GT}	gate trigger voltage	V_D = 6 V	T_{VJ} = 25°C			1.5	V
			T_{VJ} = -40°C			1.6	V
I_{GT}	gate trigger current	V_D = 6 V	T_{VJ} = 25°C			55	mA
			T_{VJ} = -40°C			80	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					5	mA
I_L	latching current	t_p = 10 µs	T_{VJ} = 25°C			150	mA
		I_G = 0.2 A; di_G/dt = 0.2 A/µs					
I_H	holding current	V_D = 6 V R_{GK} = ∞	T_{VJ} = 25°C			100	mA
t_{gd}	gate controlled delay time	V_D = ½ V_{DRM}	T_{VJ} = 25°C			2	µs
		I_G = 0.2 A; di_G/dt = 0.2 A/µs					
t_q	turn-off time	V_R = 100 V; I_T = 30A; V = ⅔ V_{DRM} T_{VJ} = 125 °C di/dt = 10 A/µs dv/dt = 15 V/µs t_p = 200 µs			150		µs

Package	**SOT-227B (minibloc)**				**Ratings**		
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	RMS current	per terminal [1]				150	A
T_{VJ}	virtual junction temperature			-40		150	°C
T_{op}	operation temperature			-40		125	°C
T_{stg}	storage temperature			-40		150	°C
Weight					30		g
M_D	mounting torque			1.1		1.5	Nm
M_T	terminal torque			1.1		1.5	Nm
$d_{Spp/App}$	creepage distance on surface | striking distance through air	terminal to terminal	10.5	3.2			mm
$d_{Spb/Apb}$		terminal to backside	8.6	6.8			mm
V_{ISOL}	isolation voltage	t = 1 second	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	3000			V
		t = 1 minute		2500			V

[1] I_{RMS} is typically limited by the pin-to-chip resistance (1); or by the current capability of the chip (2). In case of (1) and a product with multiple pins for one chip-potential, the current capability can be increased by connecting the pins as one contact.

Product Marking

Logo →
Part Number
UL
Date Code
Location
Lot#
IXYS XXXXX ®⦿
yywwZ   1234

Ordering	**Ordering Number**	**Marking on Product**	**Delivery Mode**	**Quantity**	**Code No.**
Standard	MCO25-12io1	MCO25-12io1	Tube	10	500534

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

Thyristor

$V_{0\,max}$	threshold voltage	0.86	V
$R_{0\,max}$	slope resistance *	12	mΩ

Outlines SOT-227B (minibloc)

Dim.	Millimeter		Inches	
	min	max	min	max
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.23	1.488	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.74	0.84	0.029	0.033
M	12.50	13.10	0.492	0.516
N	25.15	25.42	0.990	1.001
O	1.95	2.13	0.077	0.084
P	4.95	6.20	0.195	0.244
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.167
S	4.55	4.85	0.179	0.191
T	24.59	25.25	0.968	0.994
U	-0.05	0.10	-0.002	0.004
V	3.20	5.50	0.126	0.217
W	19.81	21.08	0.780	0.830
Z	2.50	2.70	0.098	0.106

Nut M4 DIN 934
Lens Head
Screw M4x8
DIN 7985

* Center of each nut pocket

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Thyristor
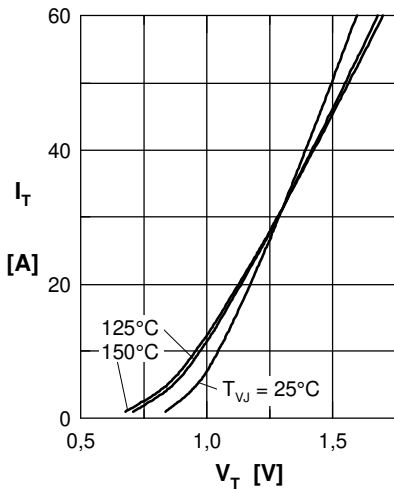
Fig. 1 Forward characteristics
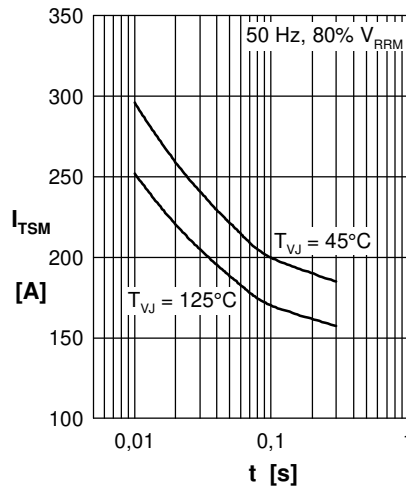
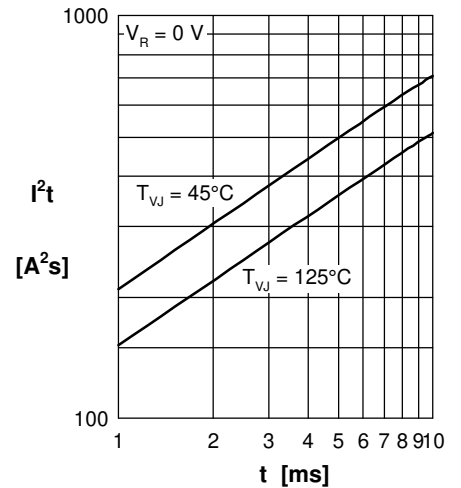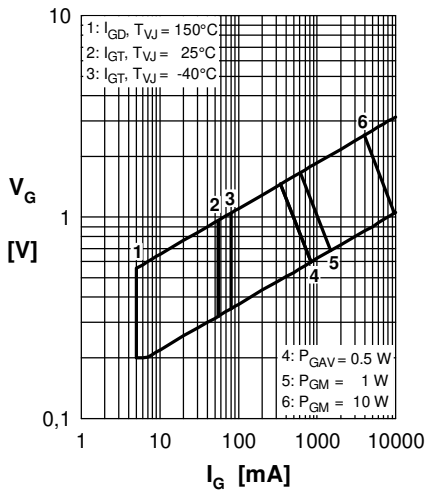Fig. 2 Surge overload current

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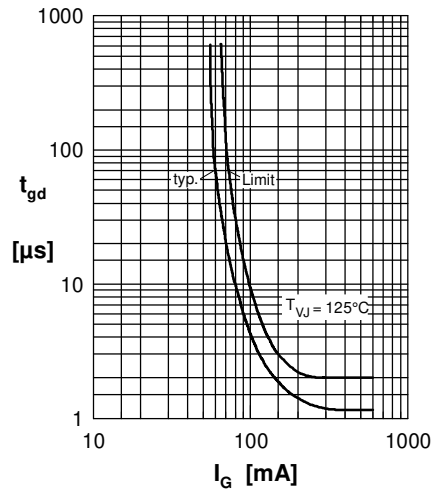

Fig. 4 Gate trigger characteristics

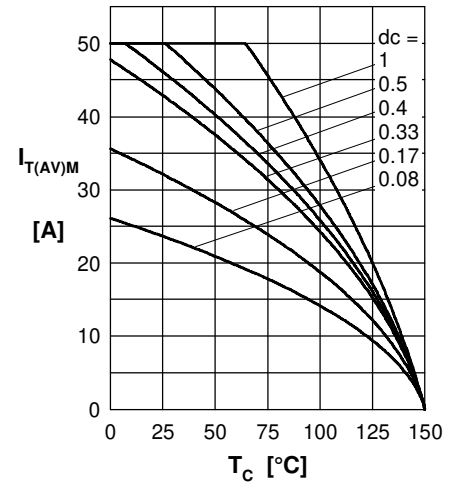Fig. 5 Gate controlled delay time

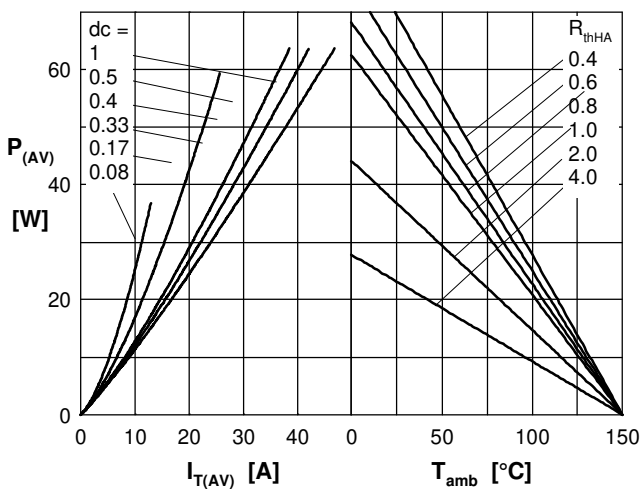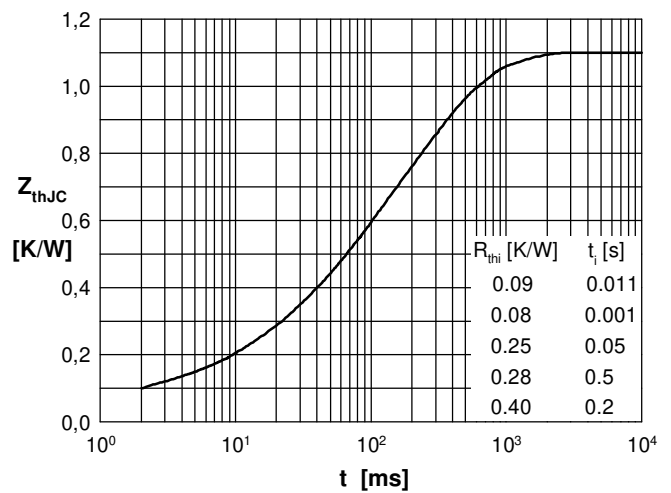Fig. 6 Max. forward current
at case temperature

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

Fig. 8 Transient thermal impedance junction to case

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