

CR3JM

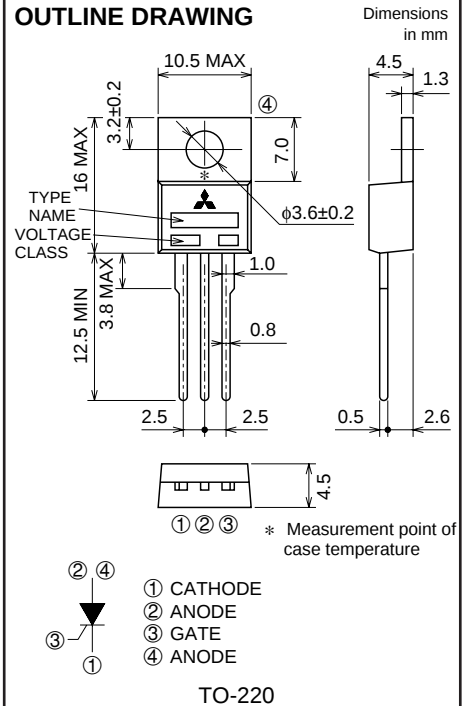
LOW POWER, STROBE USE
NON-INSULATED TYPE, GLASS PASSIVATION TYPE

CR3JM



- $I_T (AV)$ 0.8A
- V_{DRM} 400V
- I_{GT} 50mA

OUTLINE DRAWING



APPLICATION

Automatic strobe flasher

MAXIMUM RATINGS

Symbol	Parameter	Voltage class	Unit
		8	
V_{RRM}	Repetitive peak reverse voltage	400	V
V_{RSM}	Non-repetitive peak reverse voltage	480	V
V_{DRM}	Repetitive peak off-state voltage	400	V
V_{DSM}	Non-repetitive peak off-state voltage	480	V

Symbol	Parameter	Conditions	Ratings	Unit
$I_T (AV)$	Average on-state current	Commercial frequency, sine half wave, 180° conduction, $T_a=37^\circ\text{C}$	0.8	A
I_{TRM}	Repetitive peak on-state current *1	$C_M=1800\mu\text{F}$ with discharge current	240	A
P_{GM}	Peak gate power dissipation		3.0	W
$P_G (AV)$	Average gate power dissipation		0.3	W
V_{FGM}	Peak gate forward voltage		6	V
V_{RGM}	Peak gate reverse voltage		6	V
I_{FGM}	Peak gate forward current		1	A
T_j	Junction temperature		-40 ~ +125	$^\circ\text{C}$
T_{stg}	Storage temperature		-40 ~ +125	$^\circ\text{C}$
—	Weight	Typical value	2.0	g

*1. Refer to sections 1, 2 on STROBE FLASHER APPLICATION.

CR3JM

LOW POWER, STROBE USE

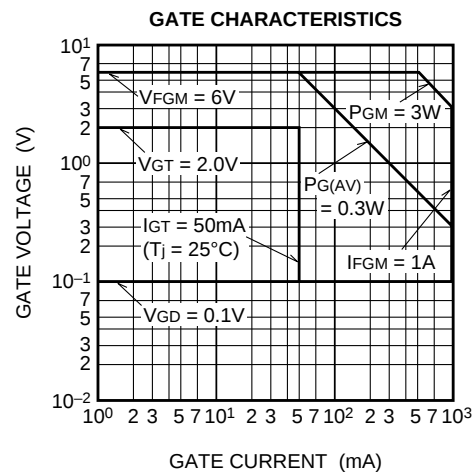
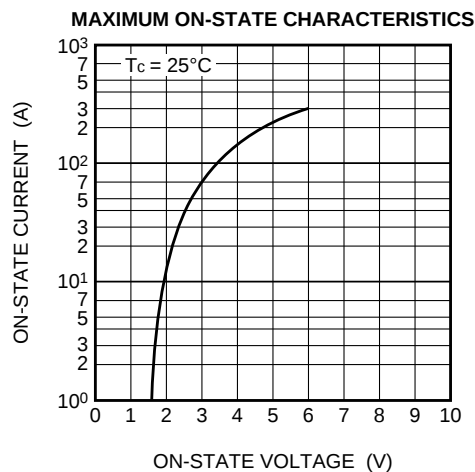
NON-INSULATED TYPE, GLASS PASSIVATION TYPE

ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
IRRM	Repetitive peak reverse current	$T_j=25^{\circ}\text{C}$, V_{RRM} applied	—	—	0.1	mA
IDRM	Repetitive peak off-state current	$T_j=25^{\circ}\text{C}$, V_{DRM} applied	—	—	0.1	mA
V_{TM}	On-state voltage	$T_c=25^{\circ}\text{C}$, $I_{TM}=3\text{A}$, Instantaneous value	—	—	1.8	V
V_{GT}	Gate trigger voltage	$T_j=25^{\circ}\text{C}$, $V_D=6\text{V}$, $R_L=6\Omega$	—	—	2.0	V
V_{GD}	Gate non-trigger voltage	$T_j=125^{\circ}\text{C}$, $V_D=1/2V_{DRM}$	0.1	—	—	V
I_{GT}	Gate trigger current	$T_j=25^{\circ}\text{C}$, $V_D=6\text{V}$, $R_L=6\Omega$	—	—	50	mA
C_c	Commutating capacitor *2	$C_M=1800\mu\text{F}$, $V_{CM}=350\text{V}$, $I_{TM}=240\text{A}$, $L=50\mu\text{H}$, $V_{GK}=-6\text{V}$, $T_a=25^{\circ}\text{C}$	—	—	2.8	μF

*2. Refer to sections 3 on STROBE FLASHER APPLICATION.

PERFORMANCE CURVES



CR3JM

LOW POWER, STROBE USE

NON-INSULATED TYPE, GLASS PASSIVATION TYPE

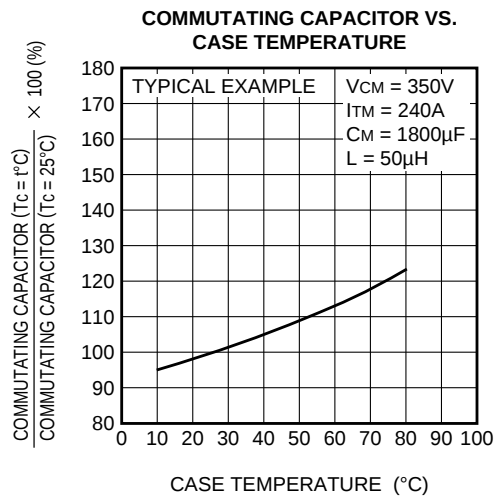
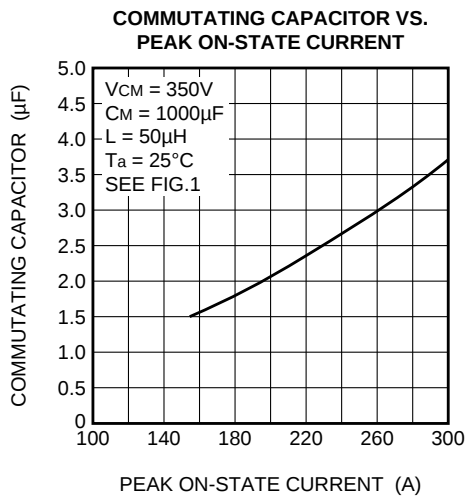
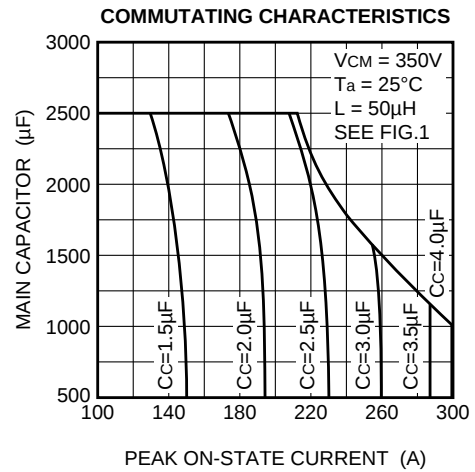
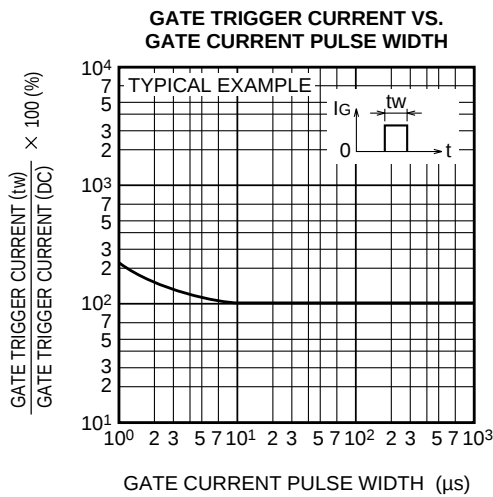
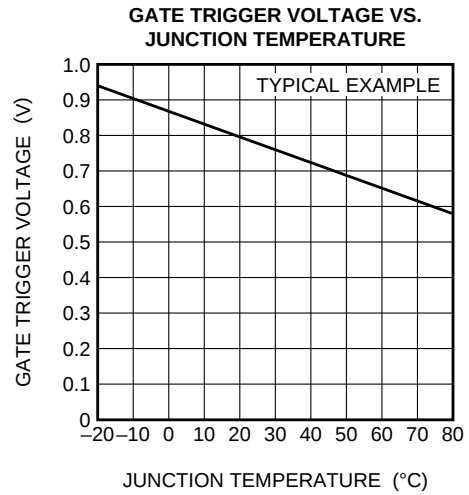
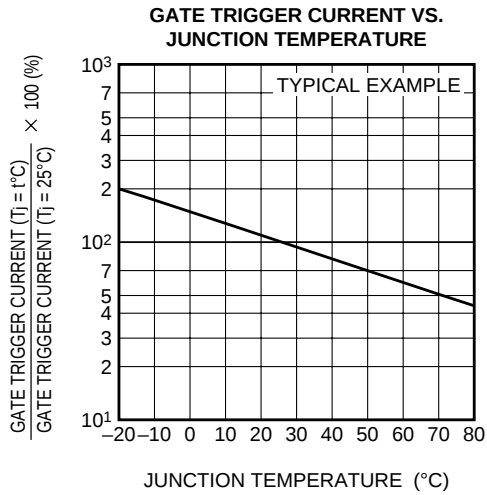
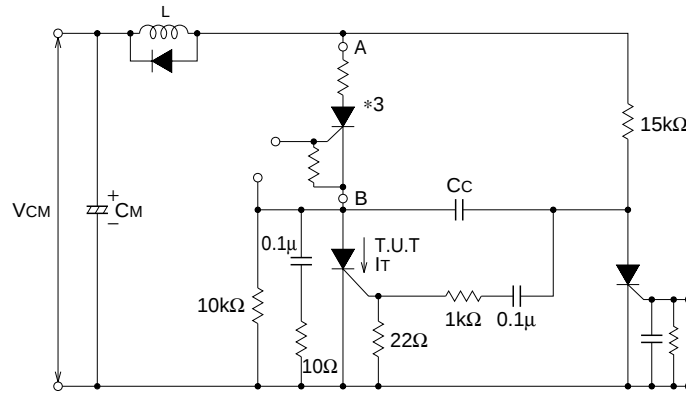


Fig 1. TEST CIRCUIT FOR COMMUTATING CAPACITOR



*3 The circuit between A-B is a substitute for Xenon flash tube.

STROBE FLASHER APPLICATION

Be sure to remember the following points when designing series type automatic strobe flashers using the CR3JM or CR3AMZ.

1. Rated repetitive peak on-state current I_{TRM}

The figure shows a turn-off characteristic test circuit.

When a repetitive discharge current passes to the thyristor (TUT) through the load from the charged main capacitor (CM), the limiting value for the on-state peak current the thyristor can withstand is the rated repetitive peak on-state current.

To ensure the current fed into the thyristor will not exceed this rated value, it is essential to select the appropriate main capacitor charging voltage V_{CM} , the load (Xenon lamp) resistance and the anode reactor L described below.

2. Main capacitor C_M

In addition to its effect on the peak on-state current value, the capacitance of the main capacitor is an important factor determining the temperature rise of the thyristor junction. When the capacitance of the main capacitor becomes large, the discharge-time constant becomes great also, the temperature rise at the thyristor junction will be very serious and the commutating capability of the thyristor will decrease. When the device is turned off, damage may also be caused by the reverse voltage applied to the thyristor resulting in thermal run away.

3. Commutating Capacitor C_c

The capacitance values of the commutating Capacitor (C_c) required for turning the thyristor off can be obtained from the following equation since the electric charge stored in this capacitor and the electric charge released during commutation are the same.

$$C_c \geq \frac{i_T \cdot t_q}{V_{CC}} + \frac{i_T^2 T}{2V_{CC} \cdot (-di_T/dt)_C} + \Delta C_c (\mu F)$$

Where

i_T : On-state current (A) immediately before turning off

t_q : Pulse turn-off time of the thyristor (μs)

V_{CC} : C_c charging voltage (V)

$(-di_T/dt)_C$: Rate of on-state current drop during commutation (A/ μs)

ΔC_c : Loss component due to the impedance of the commutating circuit.

In real conditions, however, the turn-off time will vary considerably depending on the temperature of the junction, and the gate reverse bias conditions during turn-off. It is necessary, therefore, to check the actual C_c value and to adapt the settings (circuit conditions).

The commutating characteristics graph shown in the figure relates to general circuit conditions.

4. Anode reactor L

When the thyristor is turned on, the anode reactor L is used to control the rise of the discharge current from the main capacitor and the commutating circuit current in the commutating mode, respectively. The anode reactor L is suitable for use within the range of 20~100 μH (air core).

With this anode reactor inserted, the voltage during commutation may rise and the thyristor may lead to withstand voltage deterioration so that it is necessary to connect the 1~3A class rectifier diode in anti-parallel for protection, i.e., in the opposite direction to the flow of the discharge current.