

## TOSHIBA POWER MODULE

**MP7002**

## 1. MAXIMUM RATINGS (Ta = 25°C)

## DIODE

CHARACTERISTIC	SYMBOL	RATING	UNIT
Repetitive Peak Reverse Voltage	VRRM	600	V
Peak One Cycle Surge Forward Current (D1, D2, D3, D4) (50 Hz, Non-Repetitive)	IFSM	220	A
Forward Current	IF	25	A
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature Range	T <sub>stg</sub>	-40~125	°C

## IGBT

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Emitter Voltage	V <sub>CES</sub>	600	V
Gate-Emitter Voltage	V <sub>GES</sub>	±20	V
Collector Current	DC	I <sub>C</sub>	40
	1 ms	I <sub>CP</sub>	80
Collector Power Dissipation (Tc = 25°C)	P <sub>C</sub>	37	W
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature Range	T <sub>stg</sub>	-40~125	°C

## ALL SYSTEM

CHARACTERISTIC	SYMBOL	CONDITION	RATING	UNIT
Isolation Voltage	V <sub>ISO</sub>	AC 1 minute	2500	V

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2. ELECTRICAL CHARACTERISTICS (Ta = 25°C)

DIODE

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Peak Forward Voltage (1)	V <sub>FM</sub> (1)	I <sub>F</sub> = 12.5 A	—	1.0	1.2	V
Peak Forward Voltage (2)	V <sub>FM</sub> (2)	I <sub>F</sub> = 30 A	—	1.20	1.55	V
Repetitive Peak Reverse Current	I <sub>RRM</sub>	V <sub>RRM</sub> = 600 V			10	μA
Peak Reverse Current (D1, D2, D3, D4)	I <sub>rr</sub>	I <sub>F</sub> = 30 A			100	A
Thermal Resistance	R <sub>th(j-c)</sub>		—	—	3.5	°C/W

IGBT

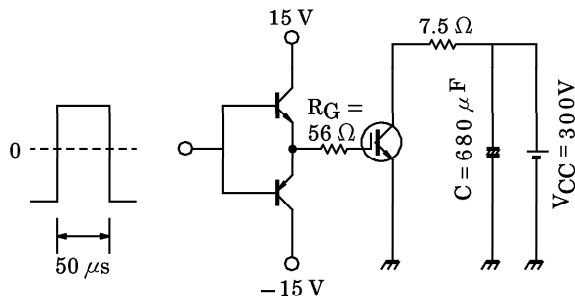
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current	I <sub>GES</sub>	V <sub>GE</sub> = ±20 V, V <sub>CE</sub> = 0	—	—	±500	nA
Collector Cut-off Current	I <sub>CES</sub>	V <sub>CE</sub> = 600 V, V <sub>GE</sub> = 0	—	—	1.0	mA
Gate-Emitter Cut-off Voltage	V <sub>GE</sub> (OFF)	I <sub>C</sub> = 40 mA, V <sub>CE</sub> = 5 V	3.0	—	6.0	V
Collector-Emitter Saturation Voltage	V <sub>CE</sub> (sat)	I <sub>C</sub> = 40 A, V <sub>GE</sub> = 15 V	—	1.9	2.7	V
Input Capacitance	C <sub>ies</sub>	V <sub>CE</sub> = 10 V, V <sub>GE</sub> = 0, f = 1 MHz	—	2900	—	pF
Switching Time	Rise Time	Load Resistance V <sub>CC</sub> = 300 V, I <sub>C</sub> = 40 A V <sub>GE</sub> = ±15 V, (R <sub>G</sub> = 56 Ω) (Note 1)	—	0.4	—	μs
	Turn-on Time		—	0.7	—	
	Fall Time		—	0.3	0.42	
	Turn-off Time		—	0.7	—	
Thermal Resistance	R <sub>th(j-c)</sub>		—	—	3.3	°C/W

3. Mechanical Rating

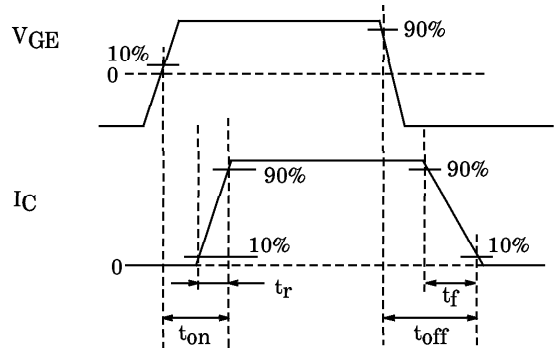
CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT
Fastening Torque	—	—	1.5	Nm

(Note 1) Switching Time Test Circuit & Timing Chart

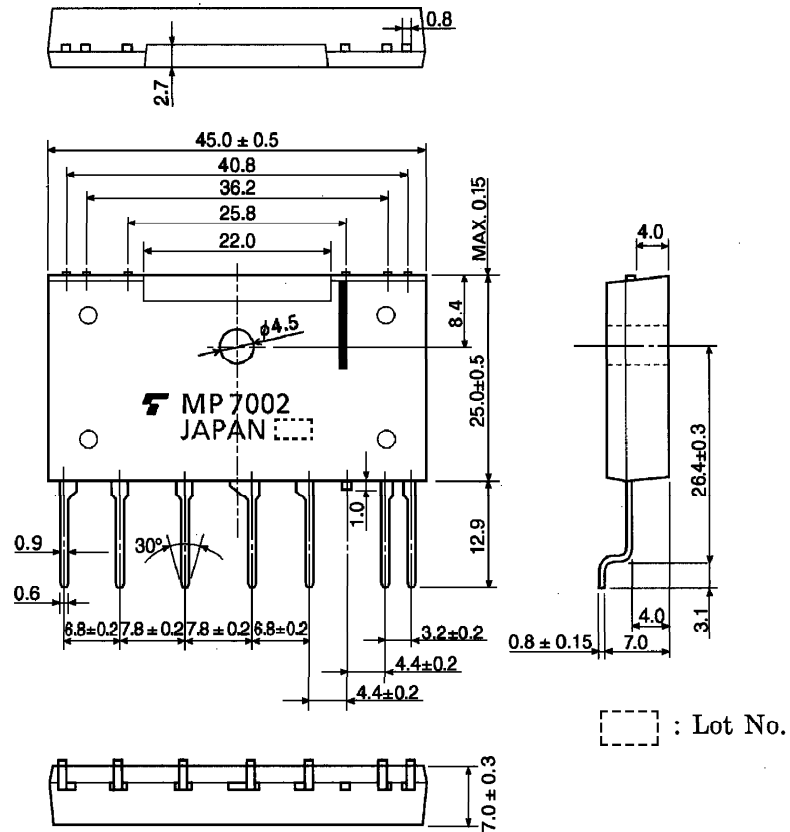
Load Resistance Test Circuit



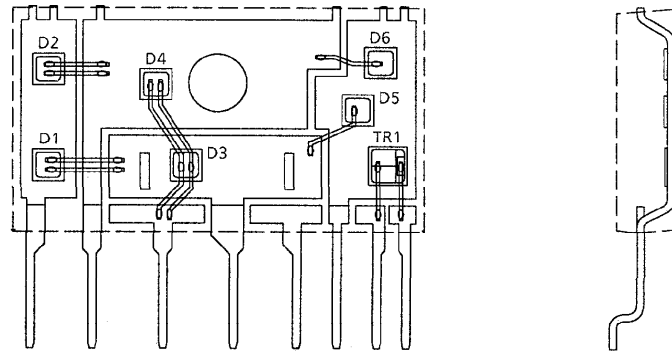
Waveform



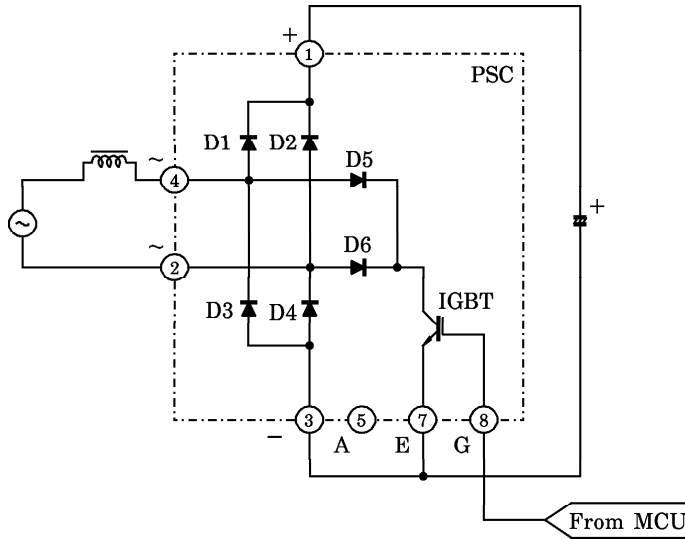
4. Package Dimension



5. Image of Chips Mounting



6. PSC Equivalent Circuit Diagram (including application circuit)



## 7. Pin Assignment

