MAC223A6FP, MAC223A8FP, MAC223A10FP

Preferred Device

Triacs

Silicon Bidirectional Thyristors

Designed primarily for full-wave ac control applications, such as lighting systems, heater controls, motor controls and power supplies; or wherever full–wave silicon–gate–controlled devices are needed.

- Off–State Voltages to 800 Volts
- All Diffused and Glass Passivated Junctions for Parameter Uniformity and Stability
- Small, Rugged Thermowatt Construction for Thermal Resistance and High Heat Dissipation
- Gate Triggering Guaranteed in Four Modes
- Ⓤ Indicates UL Registered — File #E69369
- Device Marking: Logo, Device Type, e.g., MAC223A6FP, Date Code

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off–State Voltage(1) (T_J = –40 to +125°C, Sine Wave 50 to 60 Hz, Gate Open) MAC223A6FP MAC223A8FP MAC223A10FP	V_{DRM}, V_{RRM}	 400 600 800	Volts
On-State RMS Current (T_C = +80°C)(2) Full Cycle Sine Wave 50 to 60 Hz	$I_{T(RMS)}$	25	Amps
Peak Non–repetitive Surge Current (One Full Cycle, 60 Hz, T_C = 80°C) Preceded and followed by rated current	I_{TSM}	250	Amps
Circuit Fusing (t = 8.3 ms)	I^2t	260	A^2s
Peak Gate Power ($t \leq 2$ μsec; T_C = +80°C)	P_{GM}	20	Watts
Average Gate Power (t = 8.3 ms; T_C = +80°C)	$P_{G(AV)}$	0.5	Watt
Peak Gate Current ($t \leq 2$ μsec; T_C = +80°C)	I_{GM}	2.0	Amps
Peak Gate Voltage ($t \leq 2$ μsec; T_C = +80°C)	V_{GM}	±10	Volts
RMS Isolation Voltage (T_A = 25°C, Relative Humidity ≤ 20%) Ⓤ	$V_{(ISO)}$	1500	Volts
Operating Junction Temperature	T_J	–40 to +125	°C
Storage Temperature Range	T_{stg}	–40 to +150	°C
Mounting Torque	—	8.0	in. lb.

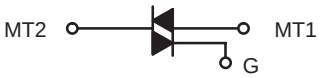
(1) V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

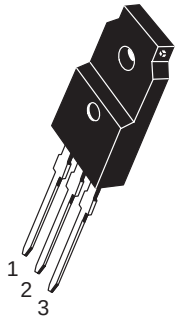
(2) The case temperature reference point for all T_C measurements is a point on the center lead of the package as close as possible to the plastic body.

ON Semiconductor

http://onsemi.com

ISOLATED TRIAC (Ⓤ)
25 AMPERES RMS
400 thru 800 VOLTS





ISOLATED TO–220 Full Pack
CASE 221C
STYLE 3

PIN ASSIGNMENT	
1	Main Terminal 1
2	Main Terminal 2
3	Gate

ORDERING INFORMATION

Device	Package	Shipping
MAC223A6FP	ISOLATED TO220FP	500/Box
MAC223A8FP	ISOLATED TO220FP	500/Box
MAC223A10FP	ISOLATED TO220FP	500/Box

Preferred devices are recommended choices for future use and best overall value.

THERMAL CHARACTERISTICS

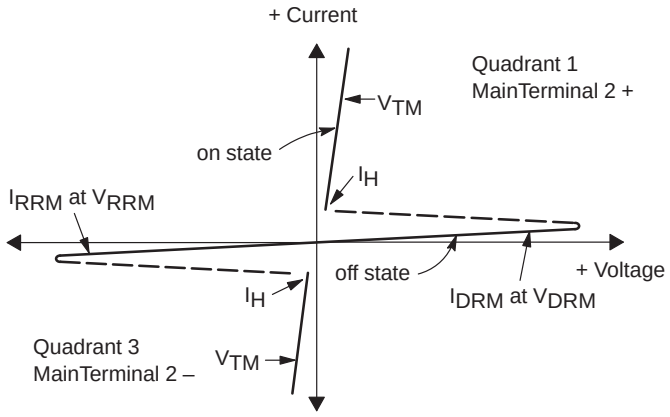
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.2	°C/W
Thermal Resistance, Case to Sink	$R_{\theta CS}$	2.2	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8″ from Case for 10 Seconds	T_L	260	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted; Electricals apply in both directions)

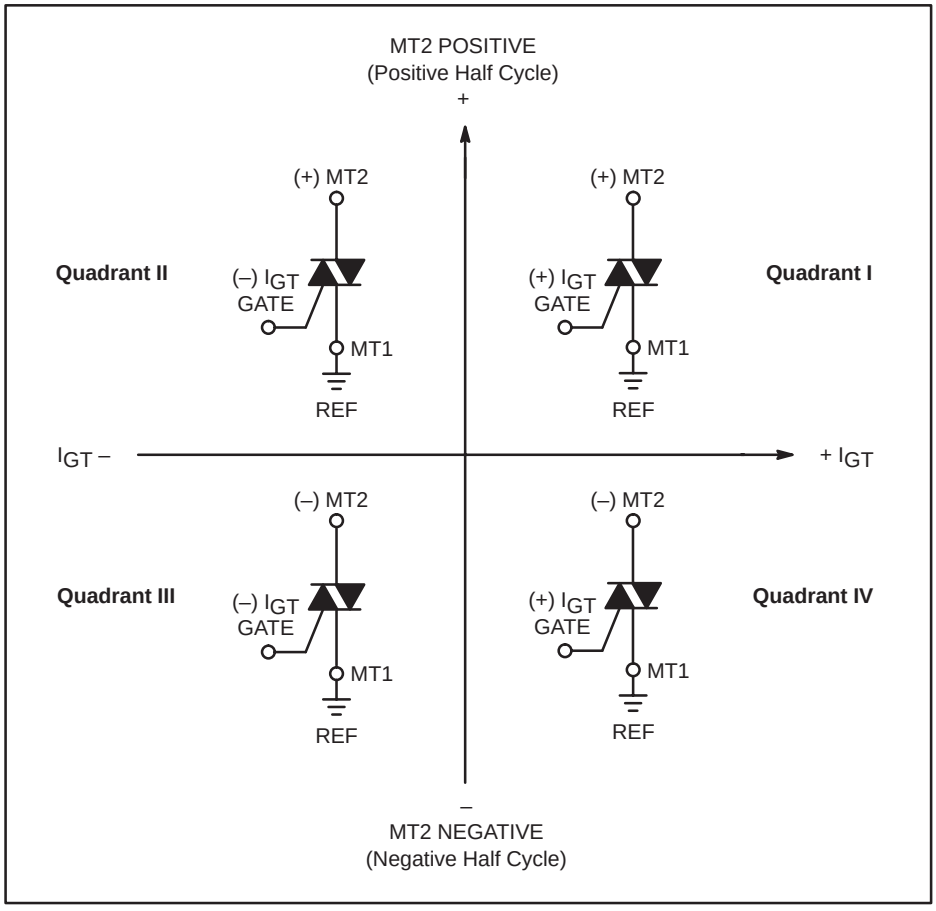
Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Peak Repetitive Blocking Current (V_D = Rated V_{DRM}, V_{RRM}; Gate Open)	T_J = 25°C T_J = 125°C	I_{DRM}, I_{RRM}	— —	— —	10 2.0	μA mA
ON CHARACTERISTICS						
Peak On-State Voltage (I_{TM} = ±35 A Peak, Pulse Width ≤ 2 ms; Duty Cycle ≤ 2%)		V_{TM}	—	1.4	1.85	Volts
Gate Trigger Current (Continuous dc) (V_D = 12 V, R_L = 100 Ω) MT2(+), G(+); MT2(–), G(–); MT2(+), G(–) MT2(–), G(+)		I_{GT}	 — —	 20 30	 50 75	mA
Gate Trigger Voltage (Continuous dc) (V_D = 12 V, R_L = 100 Ω) MT2(+), G(+); MT2(–), G(–); MT2(+), G(–) MT2(–), G(+)		V_{GT}	 — —	 1.1 1.3	 2.0 2.5	Volts
Gate Non–trigger Voltage (V_D = 12 V, T_J = 125°C, R_L = 100 Ω) All Quadrants		V_{GD}	 0.2	 0.4	 —	Volts
Holding Current (V_D = 12 Vdc, Gate Open, Initiating Current = ±200 mA)		I_H	—	10	50	mA
Gate Controlled Turn–On Time (V_D = Rated V_{DRM}, I_{TM} = 35 A Peak, I_G = 200 mA)		t_{gt}	—	1.5	—	μs
DYNAMIC CHARACTERISTICS						
Critical Rate of Rise of Off–State Voltage (V_D = Rated V_{DRM}, Exponential Waveform, T_C = 125°C)		dv/dt	—	40	—	V/μs
Critical Rate of Rise of Commutation Voltage (V_D = Rated V_{DRM}, I_{TM} = 35 A Peak, Commutating di/dt = 12.6 A/ms, Gate Unenergized, T_C = 80°C)		dv/dt(c)	—	5.0	—	V/μs

Voltage Current Characteristic of Triacs (Bidirectional Device)

Symbol	Parameter
V_{DRM}	Peak Repetitive Forward Off State Voltage
I_{DRM}	Peak Forward Blocking Current
V_{RRM}	Peak Repetitive Reverse Off State Voltage
I_{RRM}	Peak Reverse Blocking Current
V_{TM}	Maximum On State Voltage
I_H	Holding Current



Quadrant Definitions for a Triac



All polarities are referenced to MT1.
With in–phase signals (using standard AC lines) quadrants I and III are used.

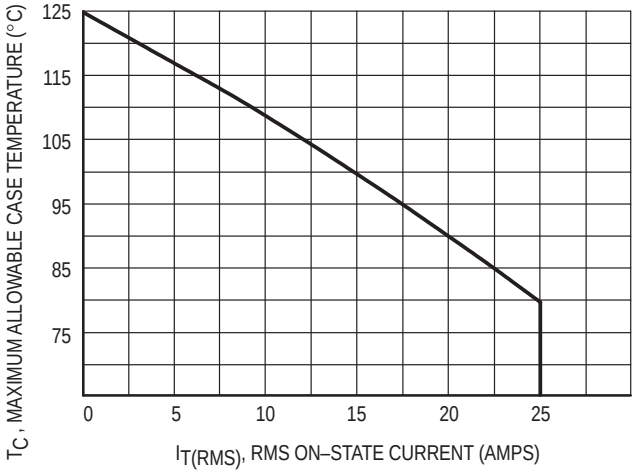


Figure 1. RMS Current Derating

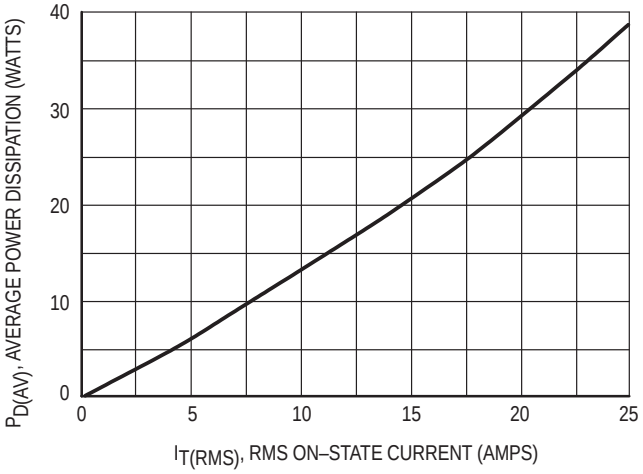


Figure 2. On–State Power Dissipation

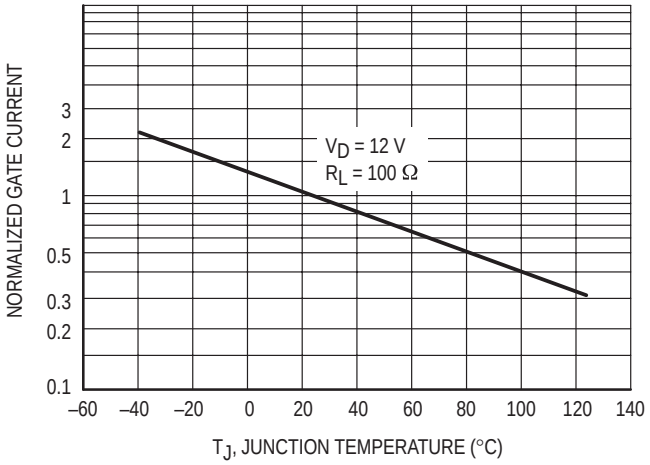


Figure 3. Typical Gate Trigger Current

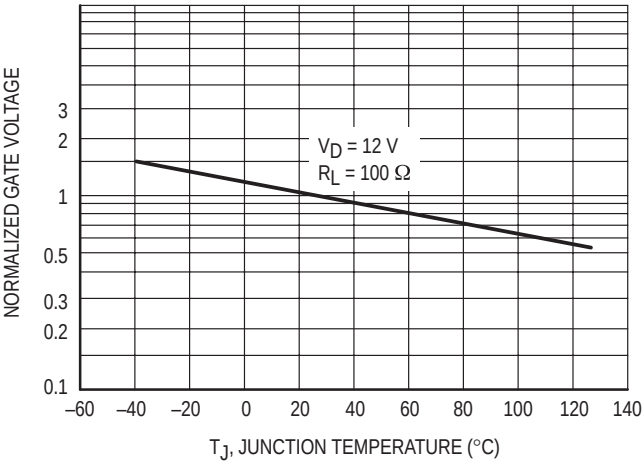


Figure 4. Typical Gate Trigger Voltage

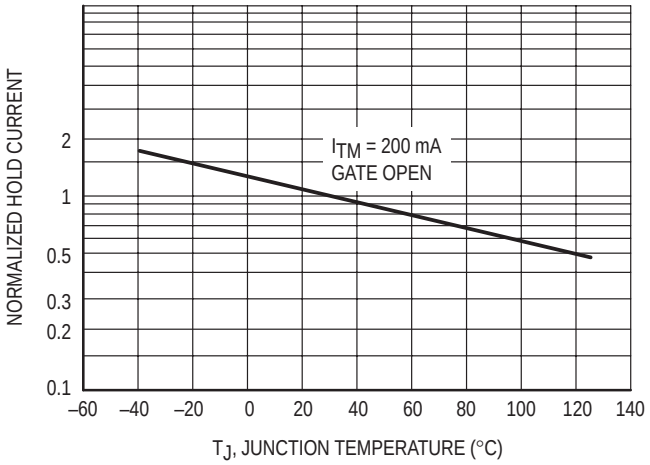


Figure 5. Typical Hold Current

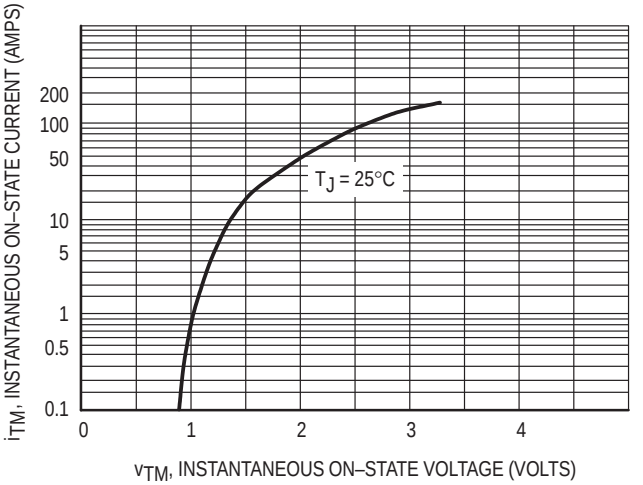
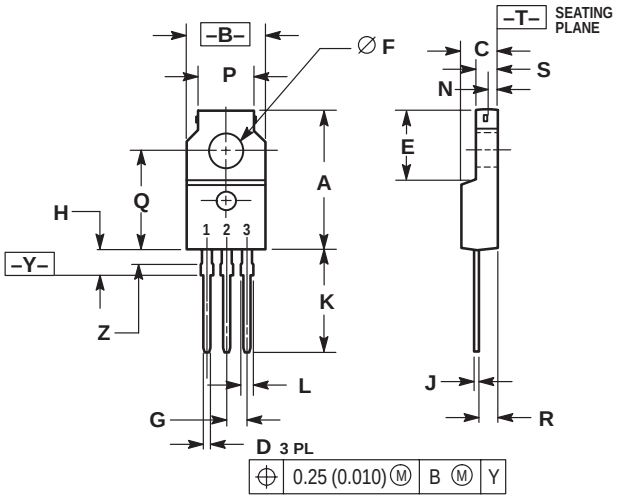


Figure 6. Typical On–State Characteristics

PACKAGE DIMENSIONS

ISOLATED TO–220 Full Pack
CASE 221C–02
ISSUE C



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. LEAD DIMENSIONS UNCONTROLLED WITHIN DIMENSION Z.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.680	0.700	17.28	17.78
B	0.388	0.408	9.86	10.36
C	0.175	0.195	4.45	4.95
D	0.025	0.040	0.64	1.01
E	0.340	0.355	8.64	9.01
F	0.140	0.150	3.56	3.81
G	0.100 BSC		2.54 BSC	
H	0.110	0.155	2.80	3.93
J	0.018	0.028	0.46	0.71
K	0.500	0.550	12.70	13.97
L	0.045	0.070	1.15	1.77
N	0.049	—	1.25	—
P	0.270	0.290	6.86	7.36
Q	0.480	0.500	12.20	12.70
R	0.090	0.120	2.29	3.04
S	0.105	0.115	2.67	2.92
Z	0.070	0.090	1.78	2.28

STYLE 3:
PIN 1. MT 1
2. MT 2
3. GATE

Notes

Notes

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