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.

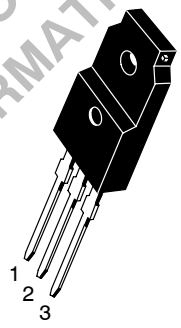
(1) V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

(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

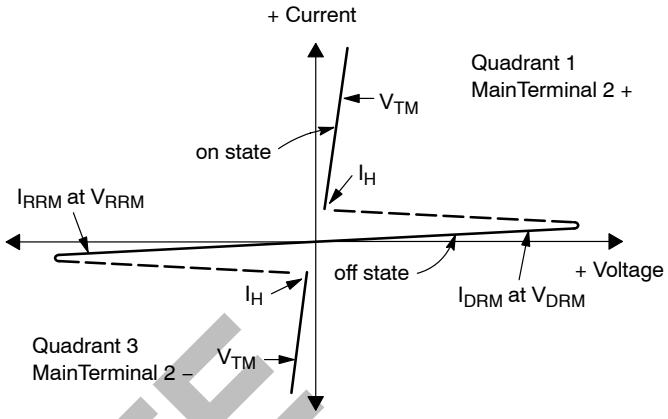
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.2	°C/W
Thermal Resistance, Case to Sink	$R_{\theta CS}$	2.2	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8″ from Case for 10 Seconds	T_L	260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

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

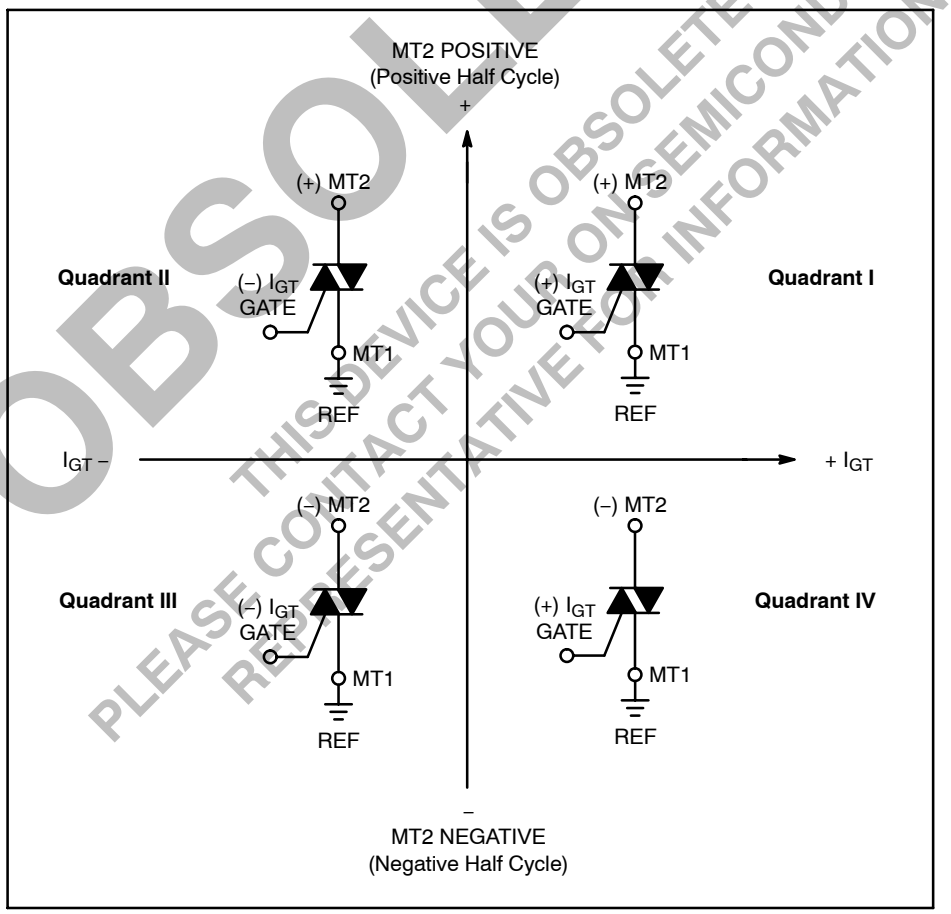
Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Peak Repetitive Blocking Current (V_D = Rated V_{DRM}, V_{RRM}; Gate Open)	T_J = 25°C T_J = 125°C	I_{DRM}, I_{RRM}	— —	— —	10 2.0	μA mA
ON CHARACTERISTICS						
Peak On-State Voltage (I_{TM} = ±35 A Peak, Pulse Width ≤ 2 ms; Duty Cycle ≤ 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.

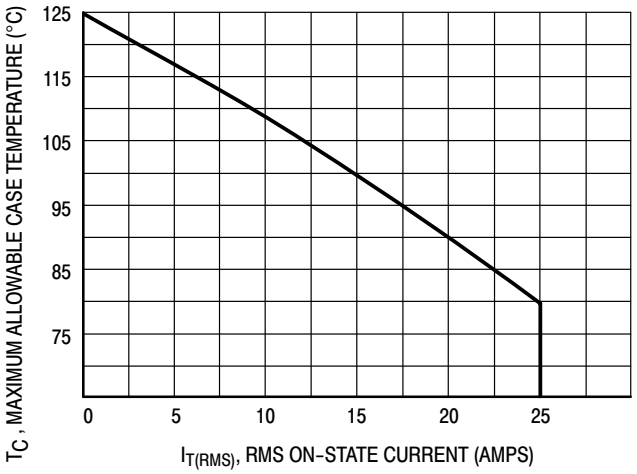


Figure 1. RMS Current Derating

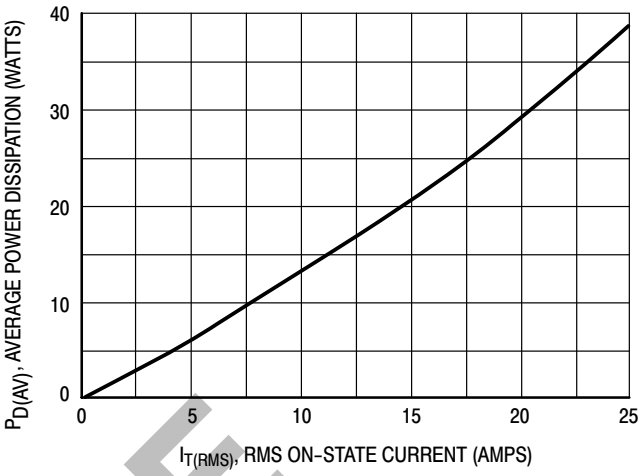


Figure 2. On−State Power Dissipation

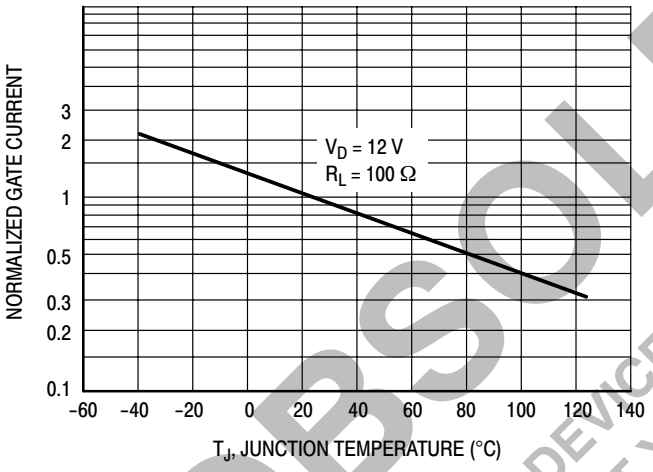


Figure 3. Typical Gate Trigger Current

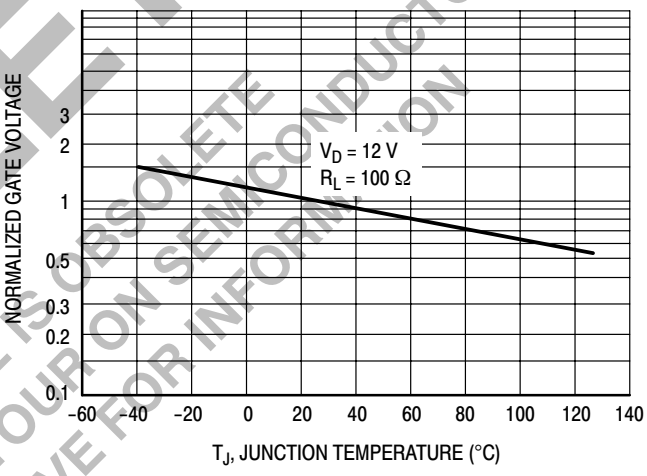


Figure 4. Typical Gate Trigger Voltage

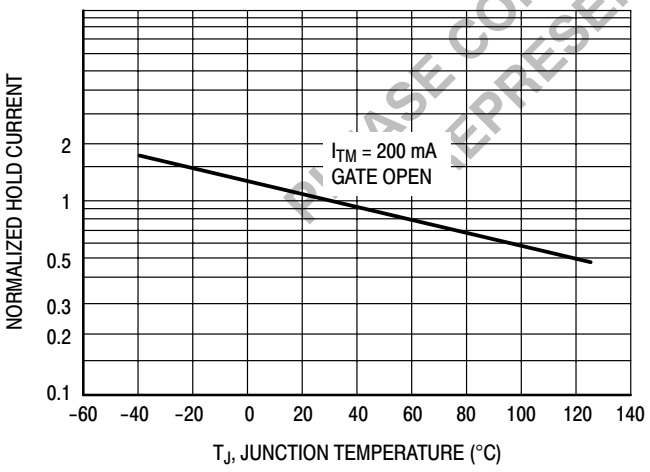


Figure 5. Typical Hold Current

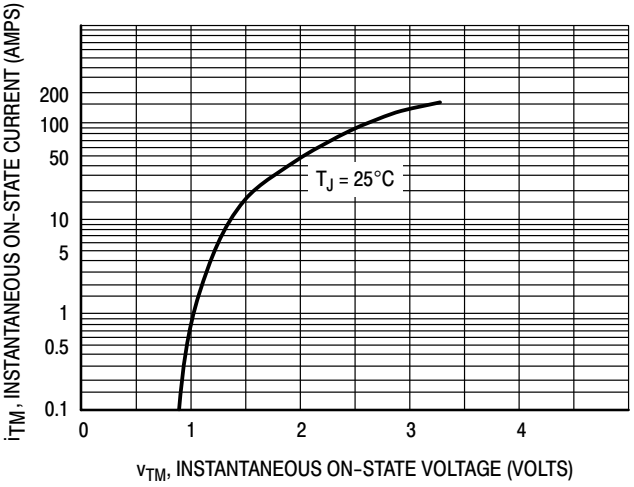
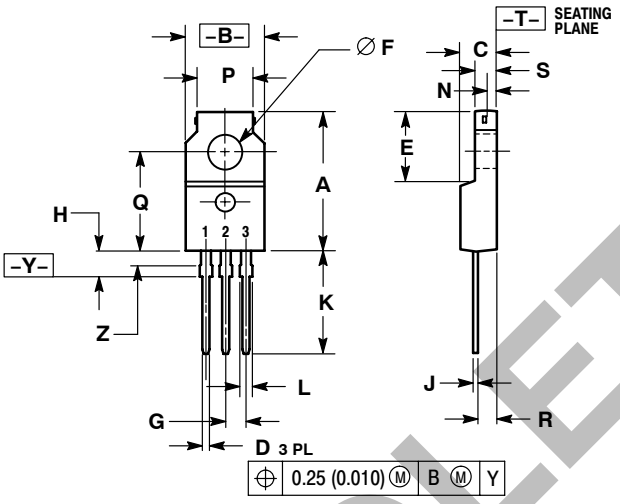


Figure 6. Typical On−State Characteristics

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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
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