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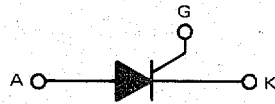
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MOTOROLA
Semiconductors

2N6394 thru 2N6399
MCR220-5 thru MCR220-9

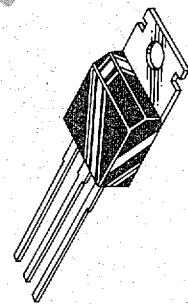


SILICON CONTROLLED RECTIFIERS

... designed primarily for half-wave ac control applications, such as motor controls, heating controls and power supplies; or wherever half-wave silicon gate-controlled, solid-state devices are needed.

- Glass Passivated Junctions and Center Gate Fire for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt[▲] Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Blocking Voltage to 800 Volts

THYRISTORS
12 AMPERES RMS
50-800 VOLTS



***MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Peak Reverse Voltage (1)	V_{RRM}		Volts
2N6394		50	
2N6395		100	
2N6396		200	
MCR220-5		300	
2N6397		400	
MCR220-7		500	
2N6398		600	
MCR220-9		700	
2N6399		800	
Forward Current RMS $T_J = 125^\circ\text{C}$ (All Conduction Angles)	$I_T(\text{RMS})$	12	Amps
Peak Forward Surge Current (1/2 cycle, Sine Wave, 60 Hz, $T_J = 125^\circ\text{C}$)	I_{TSM}	100	Amps
Circuit Fusing Considerations ($T_J = -40$ to $+125^\circ\text{C}$, $t = 1.0$ to 8.3 ms)	I^2t	40	A^2s
Forward Peak Gate Power	P_{GM}	20	Watts
Forward Average Gate Power	$P_{G(AV)}$	0.5	Watt
Forward Peak Gate Current	I_{GM}	2.0	Amps
Operating Junction Temperature Range	T_J	-40 to +125	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-40 to +150	$^\circ\text{C}$

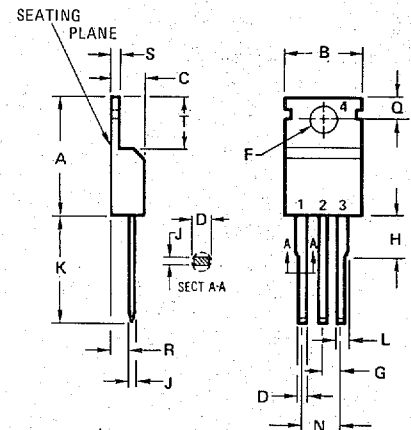
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.0	$^\circ\text{C}/\text{W}$

(1) V_{RRM} for all types can be applied on a continuous dc basis without incurring damage. Ratings apply for zero or negative gate voltage. Devices should not be tested for blocking capability in a manner such that the voltage supplied exceeds the rated blocking voltage.

* Indicates JEDEC Registered Data.

[▲]Trademark of Motorola Inc.



PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

All JEDEC dimensions and notes apply

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.23	15.87	0.560	0.625
B	9.66	10.66	0.380	0.420
C	3.56	4.82	0.140	0.190
D	0.51	1.14	0.020	0.045
F	3.531	3.733	0.139	0.147
G	2.29	2.79	0.090	0.110
H	-	6.35	-	0.250
J	0.31	1.14	0.012	0.045
K	12.70	14.27	0.500	0.562
L	1.14	1.77	0.045	0.070
N	4.83	5.33	0.190	0.210
Q	2.54	3.04	0.100	0.120
R	2.04	2.92	0.080	0.115
S	0.51	1.39	0.020	0.055
T	5.85	6.85	0.230	0.270

CASE 221-02
TO 220 AB

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
*Peak Forward Blocking Voltage ($T_J = 125^\circ\text{C}$)	V_{DRM}				Volts
2N6394		50	—	—	
2N6395		100	—	—	
2N6396		200	—	—	
MCR220-5		300	—	—	
2N6397		400	—	—	
MCR220-7		500	—	—	
2N6398		600	—	—	
MCR220-9		700	—	—	
2N6399		800	—	—	
* Peak Forward Blocking Current (Rated V_{DRM} @ $T_J = 125^\circ\text{C}$)	I_{DRM}	—	—	2.0	mA
* Peak Reverse Blocking Current (Rated V_{RRM} @ $T_J = 125^\circ\text{C}$)	I_{RRM}	—	—	2.0	mA
* Forward "On" Voltage ($I_{TM} = 24$ A Peak)	V_{TM}	—	1.7	2.2	Volts
* Gate Trigger Current (Continuous dc) (Anode Voltage = 12 Vdc, $R_L = 100$ Ohms)	I_{GT}	—	5.0	30	mA
* Gate Trigger Voltage (Continuous dc) (Anode Voltage = 12 Vdc, $R_L = 100$ Ohms)	V_{GT}	—	0.7	1.5	Volts
* Gate Non-Trigger Voltage (Anode Voltage = Rated V_{DRM} , $R_L = 100$ Ohms, $T_J = 125^\circ\text{C}$)	V_{GD}	0.2	—	—	Volts
* Holding Current (Anode Voltage = 12 Vdc)	I_H	—	6.0	40	mA
Turn-On Time ($I_{TM} = 12$ A, $I_{GT} = 40$ mA dc)	t_{gt}	—	1.0	2.0	μs
Turn-Off Time ($V_{DRM} =$ rated voltage) ($I_{TM} = 12$ A, $I_R = 12$ A) ($I_{TM} = 12$ A, $I_R = 12$ A, $T_J = 125^\circ\text{C}$)	t_q	—	15 35	—	μs
Forward Voltage Application Rate ($T_J = 125^\circ\text{C}$)	dv/dt	—	50	—	V/ μs

*Indicates JEDEC Registered Data.

FIGURE 1 – AVERAGE CURRENT DERATING

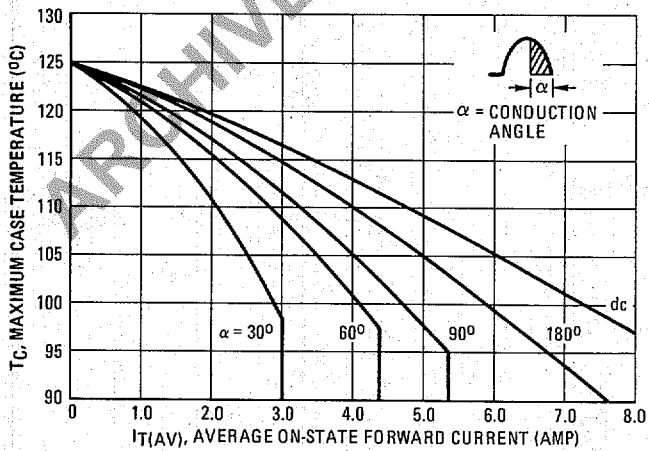


FIGURE 2 – MAXIMUM ON-STATE POWER DISSIPATION

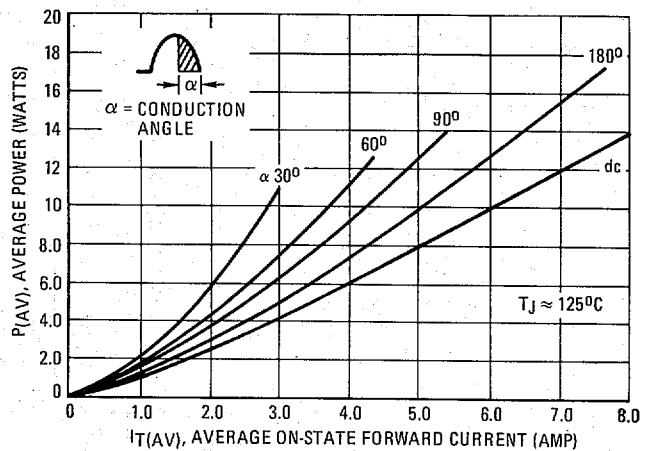


FIGURE 3 – ON-STATE CHARACTERISTICS

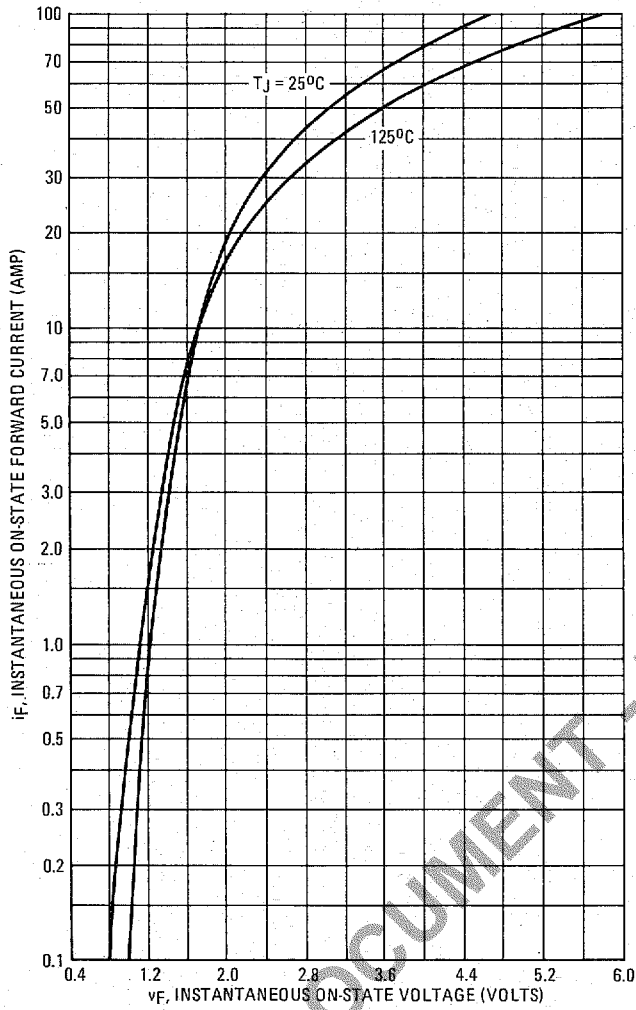


FIGURE 4 – MAXIMUM NON-REPETITIVE SURGE CURRENT

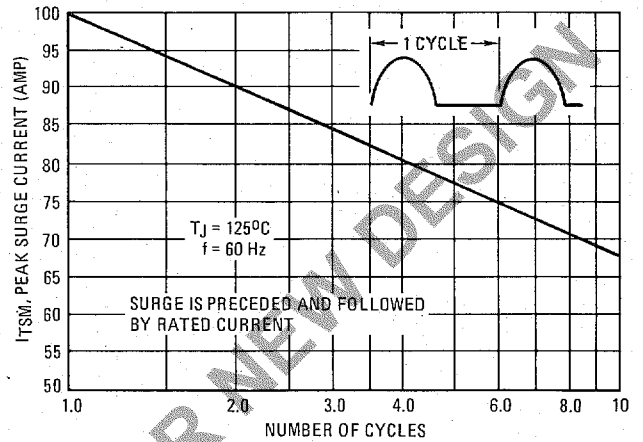


FIGURE 5 – CHARACTERISTICS AND SYMBOLS

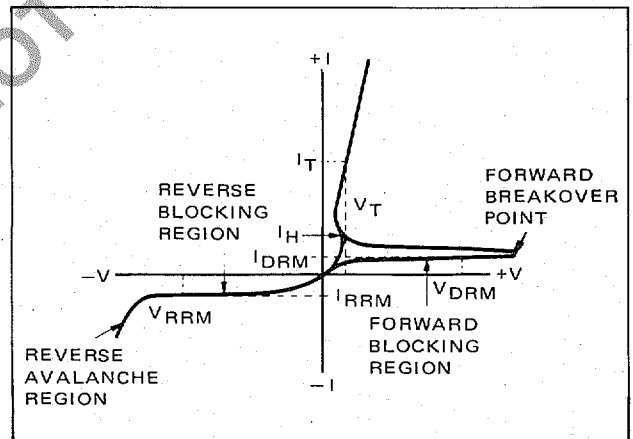
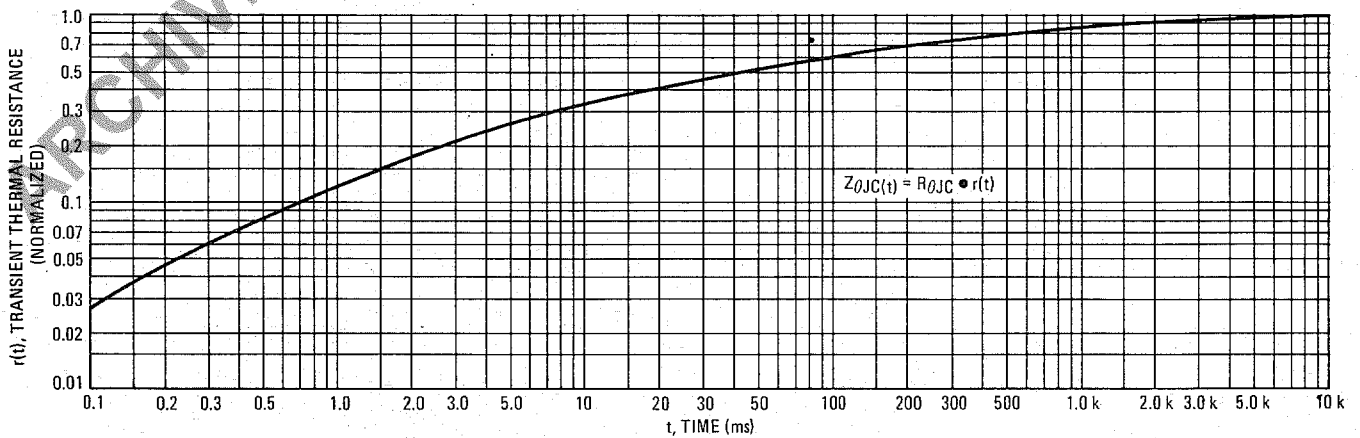


FIGURE 6 – THERMAL RESPONSE



TYPICAL CHARACTERISTICS

FIGURE 7 – PULSE TRIGGER CURRENT

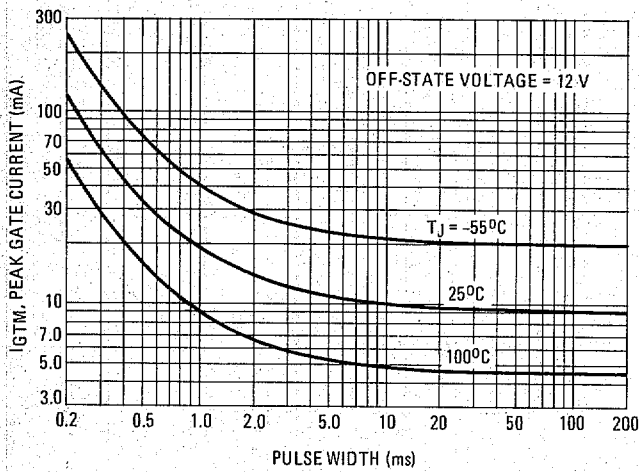


FIGURE 8 – GATE TRIGGER CURRENT

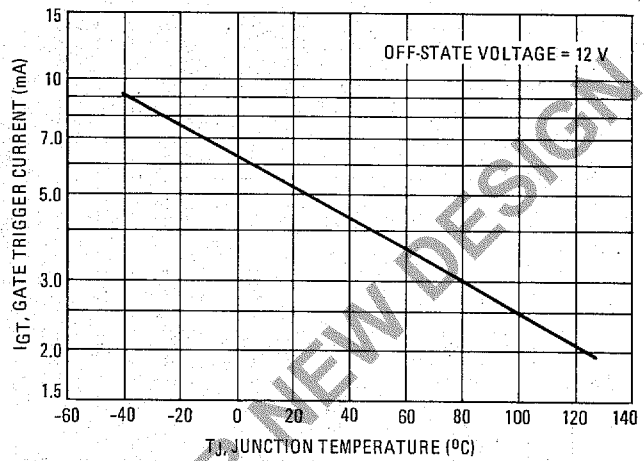


FIGURE 9 – GATE TRIGGER VOLTAGE

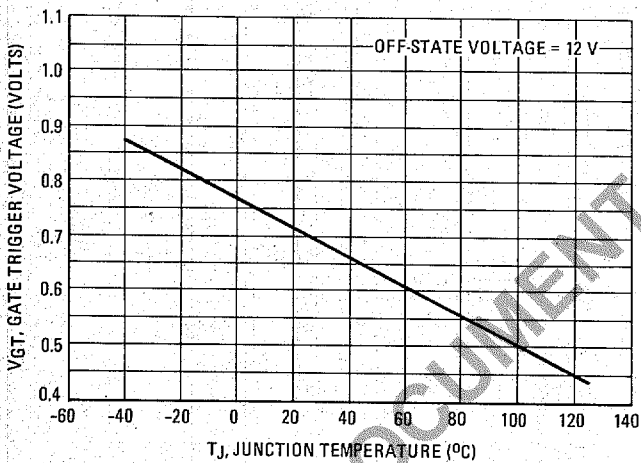
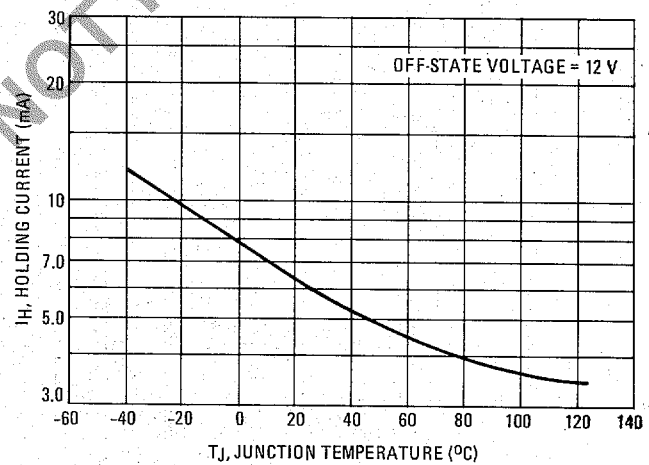


FIGURE 10 – HOLDING CURRENT



THYRISTOR APPLICATION NOTES

- AN-189 Solid-State Pulse Width Modulation DC Motor Control
- AN-240 SCR Power Control Fundamentals
- AN-295 Suppressing RFI in Thyristor Circuits
- AN-413 Unijunction Trigger Circuits for Gated Thyristors
- AN-443 Directional and Speed Control for Series, Universal and Shunt Motors
- AN-453 Zero Point Switching Techniques
- AN-482 Electronic Speed Control of Appliance Motors
- AN-526 Theory, Characteristics and Applications of Silicon Unilateral and Bilateral Switches

- AN-527 Theory, Characteristics and Applications of the Programmable Unijunction Transistor
- AN-568 A Fuse-Thyristor Coordinator Primer
- AN-725 A Low-Cost 80-V-1.5 A Color TV Power Supply
- AN-734 SCR Controller for a Series Field dc Motor

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