

Thyristors

Silicon Controlled Rectifiers

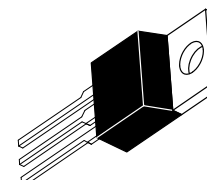
... designed primarily for half-wave ac control applications, such as motor controls, heating controls and power supply crowbar circuits.

- Glass Passivated Junctions with Center Gate Fire for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Constructed for Low Thermal Resistance, High Heat Dissipation and Durability
- Blocking Voltage to 800 Volts
- 300 A Surge Current Capability

2N6504
thru
2N6509*

*Motorola preferred devices

SCRs
25 AMPERES RMS
50 thru 800 VOLTS



CASE 221A-04
(TO-220AB)
STYLE 3

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted.)

Rating	Symbol	Value	Unit
* Peak Forward and Reverse Blocking Voltage ⁽¹⁾ (Gate Open, $T_J = 25$ to 125°C)	V_{DRM} , V_{RRM}	50 100 200 400 600 800	Volts
Forward Current ($T_C = 85^\circ\text{C}$) (180° Conduction Angle)	$I_T(\text{RMS})$ $I_T(\text{AV})$	25 16	Amps
Peak Non-repetitive Surge Current — (1/2 Cycle, Sine Wave)	I_{TSM}	300 350	Amps
Forward Peak Gate Power	P_{GM}	20	Watts
Forward Average Gate Power	$P_{G(\text{AV})}$	0.5	Watt
Forward Peak Gate Current	I_{GM}	2	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	$R_{\theta JC}$	1.5	$^\circ\text{C/W}$

*Indicates JEDEC Registered Data.

1. V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

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

REV 1

2N6504 thru 2N6509

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

Characteristic	Symbol	Min	Typ	Max	Unit
* Peak Forward or Reverse Blocking Current ($V_{AK} = \text{Rated } V_{DRM} \text{ or } V_{RRM}$, Gate Open) $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	I_{DRM}, I_{RRM}	— —	— —	10 2	μA mA
* Forward "On" Voltage(1) ($I_{TM} = 50 \text{ A}$)	V_{TM}	—	—	1.8	Volts
* Gate Trigger Current (Continuous dc) (Anode Voltage = 12 Vdc, $R_L = 100 \text{ Ohms}$) $T_C = 25^\circ\text{C}$ $T_C = -40^\circ\text{C}$	I_{GT}	— —	— 25	40 75	mA
* Gate Trigger Voltage (Continuous dc) (Anode Voltage = 12 Vdc, $R_L = 100 \text{ Ohms}$, $T_C = -40^\circ\text{C}$)	V_{GT}	—	1	1.5	Volts
Gate Non-Trigger Voltage (Anode Voltage = Rated V_{DRM} , $R_L = 100 \text{ Ohms}$, $T_J = 125^\circ\text{C}$)	V_{GD}	0.2	—	—	Volts
* Holding Current (Anode Voltage = 12 Vdc, $T_C = -40^\circ\text{C}$)	I_H	—	35	40	mA
* Turn-On Time ($I_{TM} = 25 \text{ A}$, $I_{GT} = 50 \text{ mAdc}$)	t_{gt}	—	1.5	2	μs
Turn-Off Time ($V_{DRM} = \text{rated voltage}$) ($I_{TM} = 25 \text{ A}$, $I_R = 25 \text{ A}$) ($I_{TM} = 25 \text{ A}$, $I_R = 25 \text{ A}$, $T_J = 125^\circ\text{C}$)	t_q	— —	15 35	— —	μs
Critical Rate of Rise of Off-State Voltage (Gate Open, Rated V_{DRM} , Exponential Waveform)	dv/dt	—	50	—	$\text{V}/\mu\text{s}$

*Indicates JEDEC Registered Data.

1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$.

FIGURE 1 — AVERAGE CURRENT DERATING

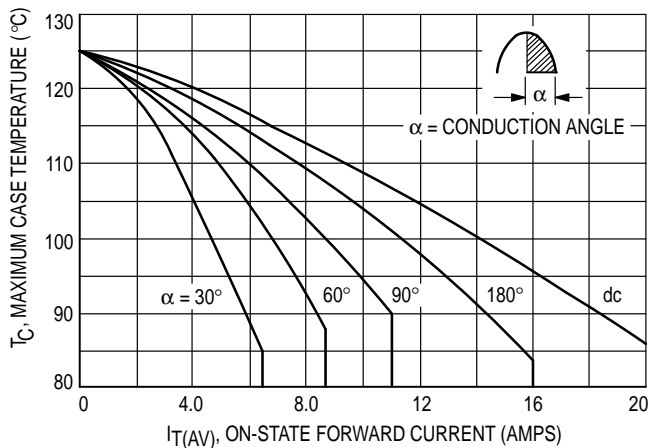


FIGURE 2 — MAXIMUM ON-STATE POWER DISSIPATION

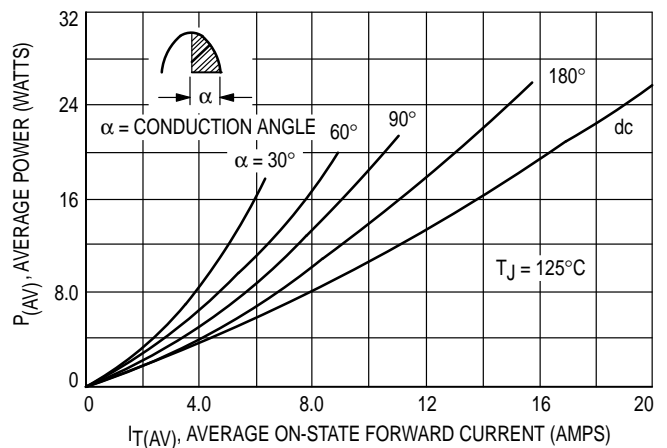


FIGURE 3 — MAXIMUM FORWARD VOLTAGE

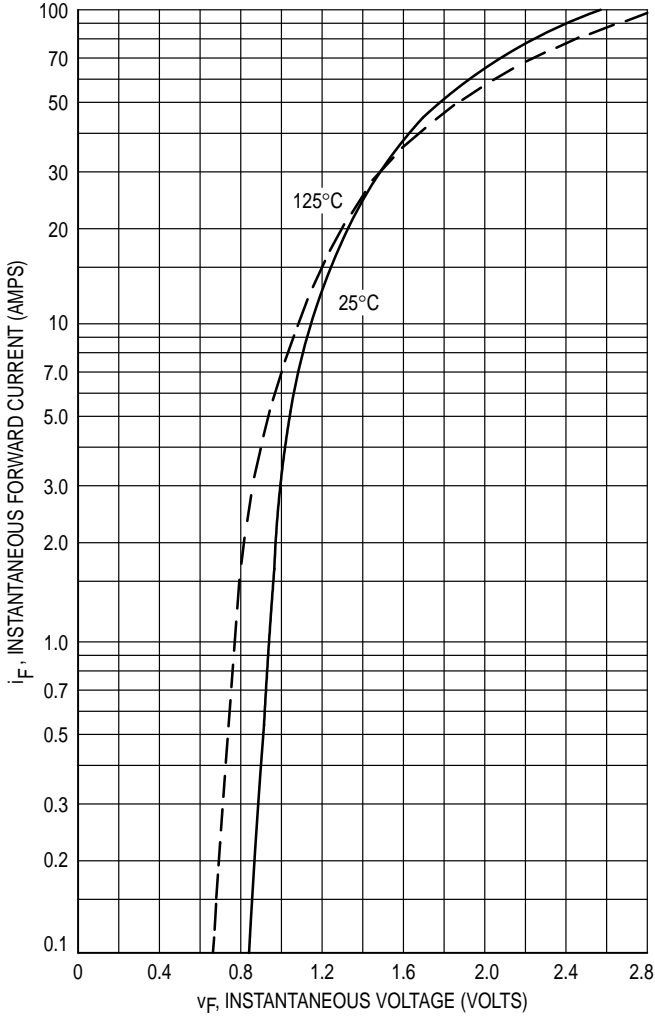


FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

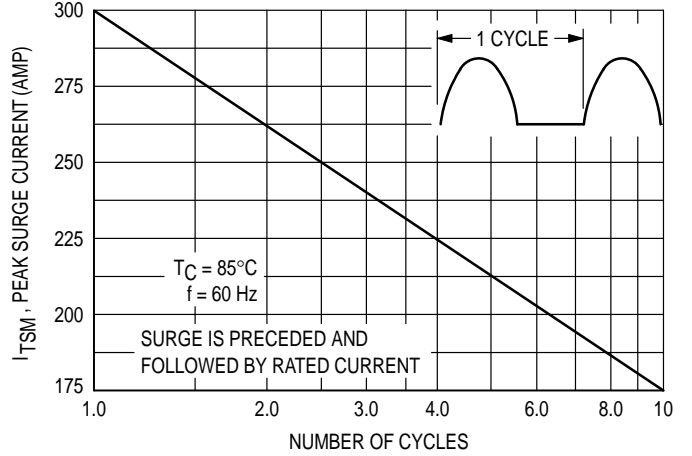


FIGURE 5 — CHARACTERISTICS AND SYMBOLS

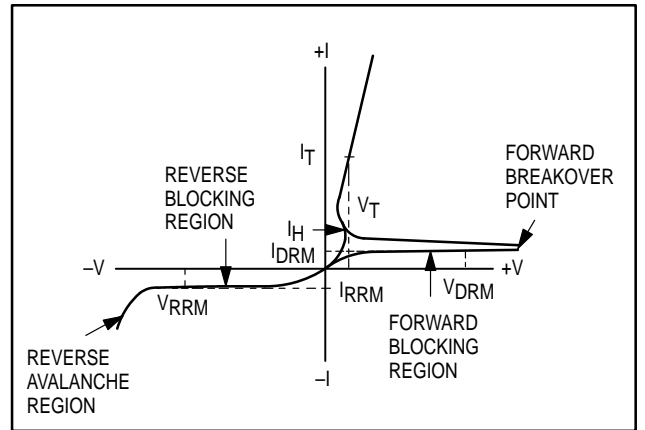
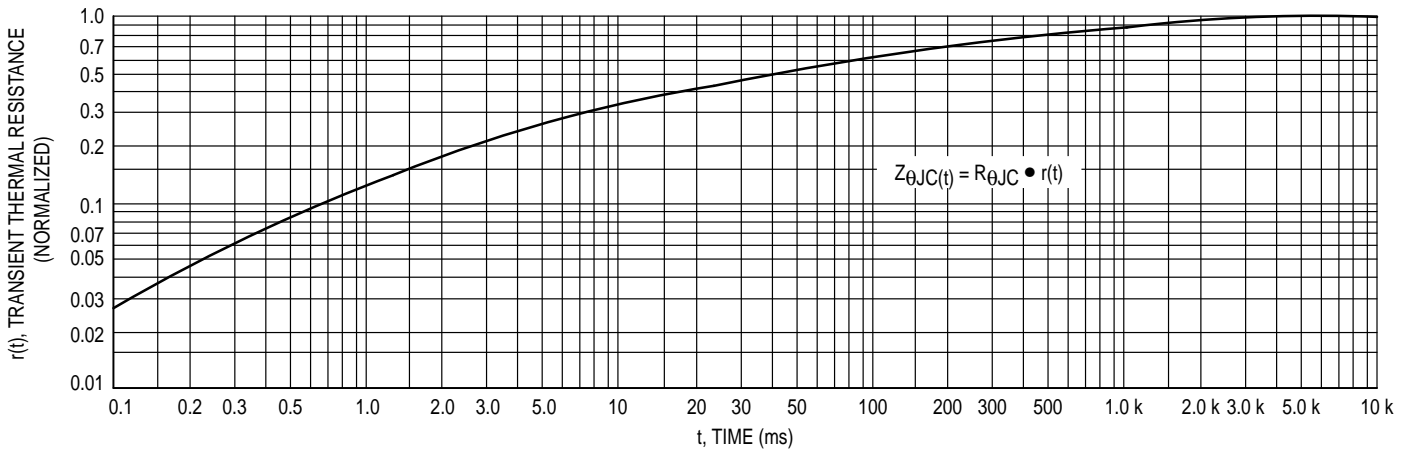


FIGURE 6 — THERMAL RESPONSE



TYPICAL TRIGGER CHARACTERISTICS

FIGURE 7 — GATE TRIGGER CURRENT

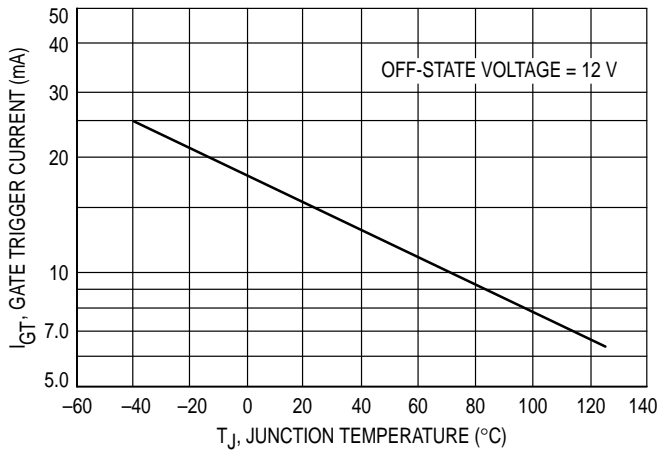


FIGURE 8 — GATE TRIGGER VOLTAGE

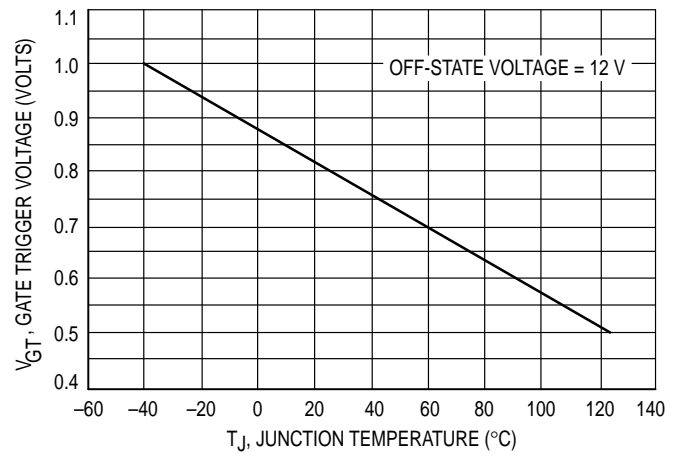
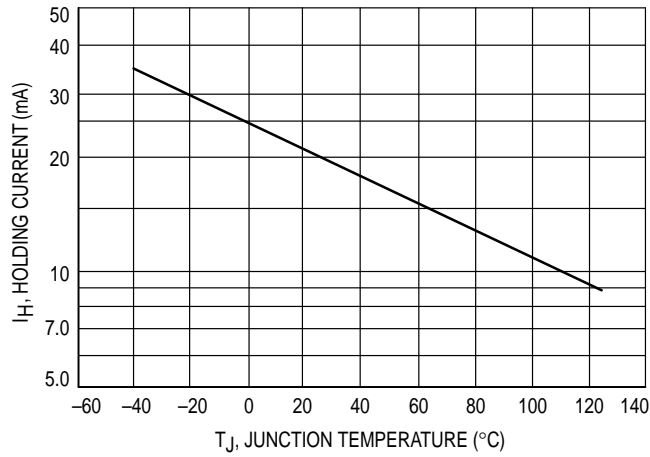
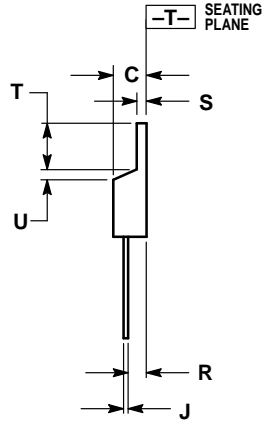
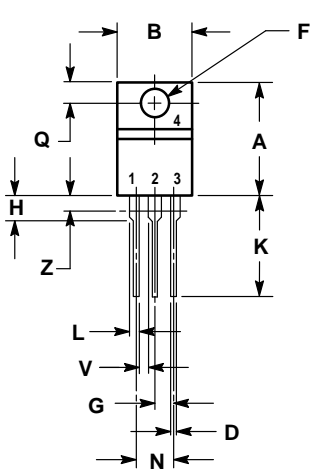


FIGURE 9 — HOLDING CURRENT



PACKAGE DIMENSIONS



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

- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.014	0.022	0.36	0.55
K	0.500	0.562	12.70	14.27
L	0.045	0.055	1.15	1.39
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	—	1.15	—
Z	—	0.080	—	2.04

CASE 221A-04
 (TO-220AB)

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