

MOTOROLA

SEMICONDUCTOR TECHNICAL DATA

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by 2N6400/D

Silicon Controlled Rectifiers

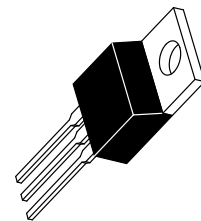
Reverse Blocking Triode Thyristors

... 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 with Center Gate Geometry for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Blocking Voltage to 800 Volts

2N6400 thru 2N6405

SCRs
16 AMPERES RMS
50 thru 800 VOLTS



CASE 221A-07
(TO-220AB)
STYLE 3

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

Rating	Symbol	Value	Unit
Peak Repetitive Forward and Reverse Voltage ⁽¹⁾ (Gate Open, $T_J = 25$ to 125°C) 2N6400 2N6401 2N6402 2N6403 2N6404 2N6405	V_{DRM}, V_{RRM}	50 100 200 400 600 800	Volts
RMS On-State Current ($T_C = 90^\circ\text{C}$)	$I_T(\text{RMS})$	16	Amps
Average On-State Current	$I_T(\text{AV})$	10	Amps
Peak Non-Repetitive Forward Surge Current (1/2 Cycle, Sine Wave, 60 Hz, $T_J = 125^\circ\text{C}$)	I_{TSM}	160	Amps
Circuit Fusing ($t = 8.3$ ms)	I^2t	145	A^2s
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.

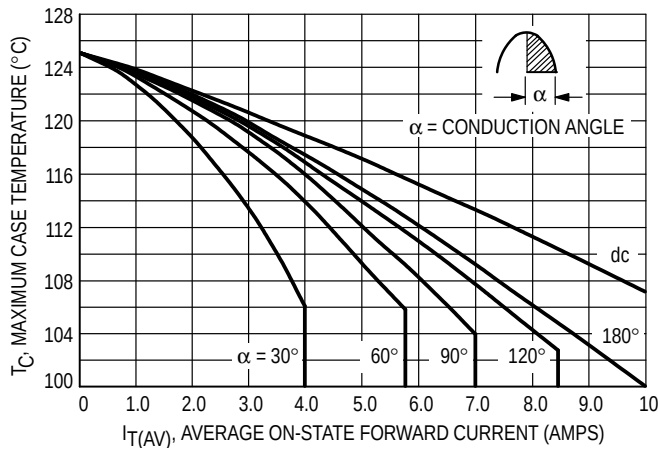
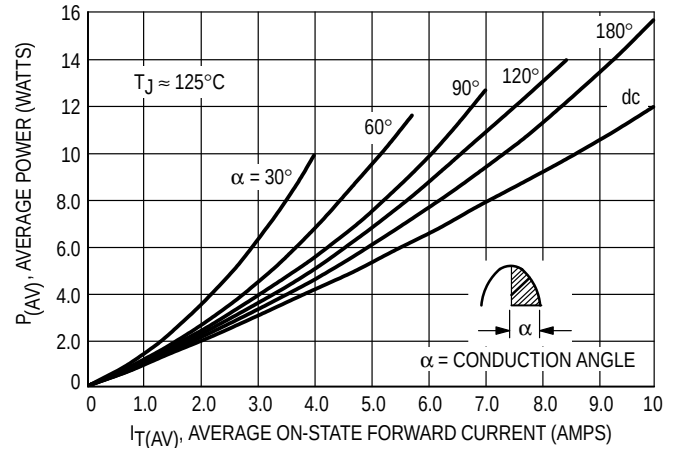
Devices listed in **bold, italic** are Motorola preferred devices. Preferred devices are Motorola recommended choices for future use and best overall value.

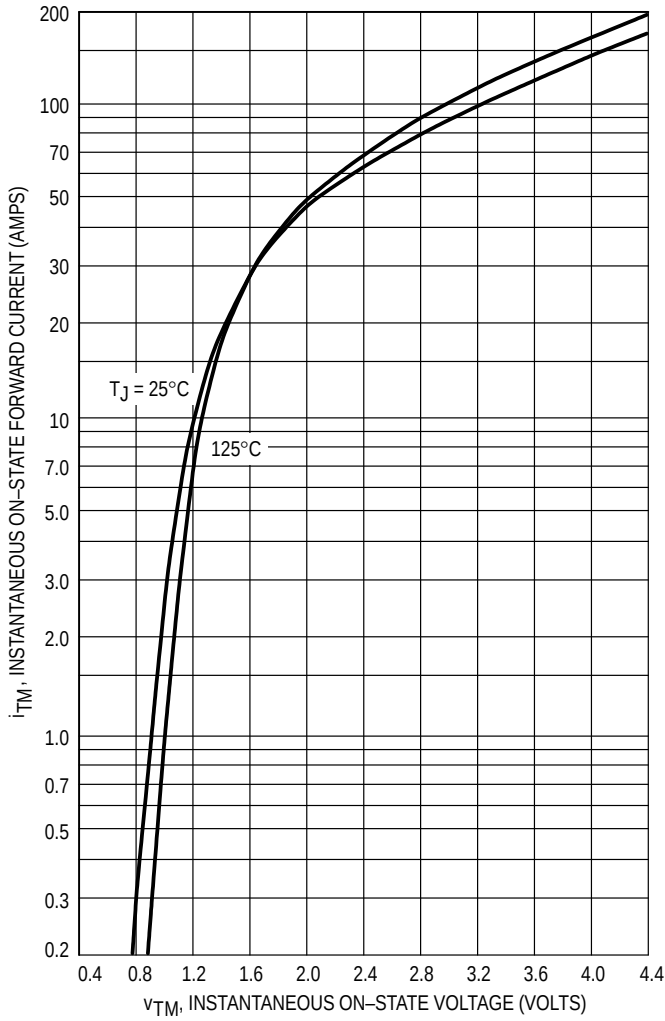
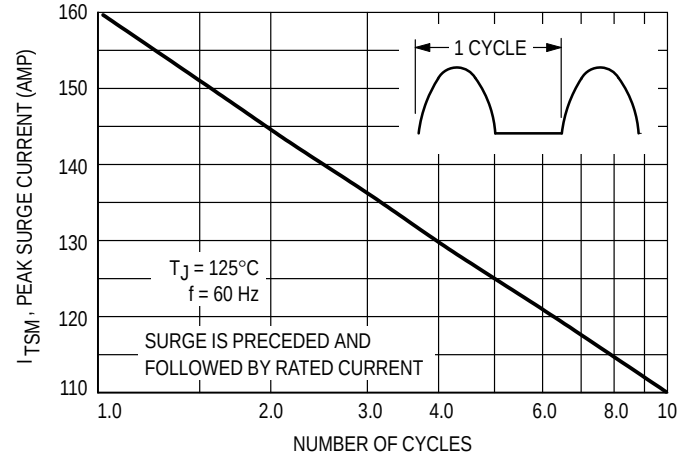
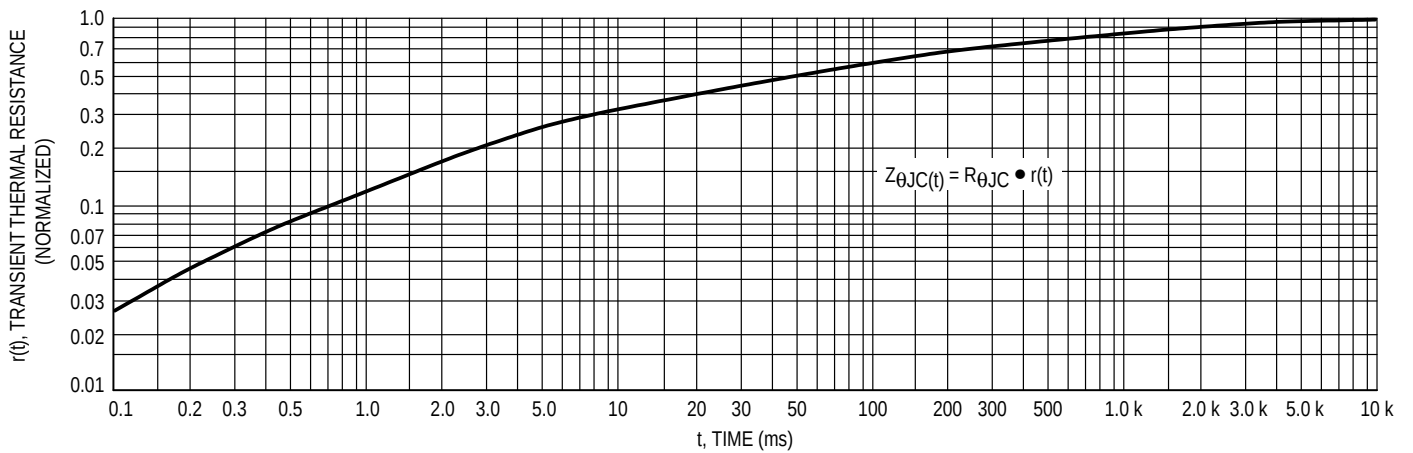


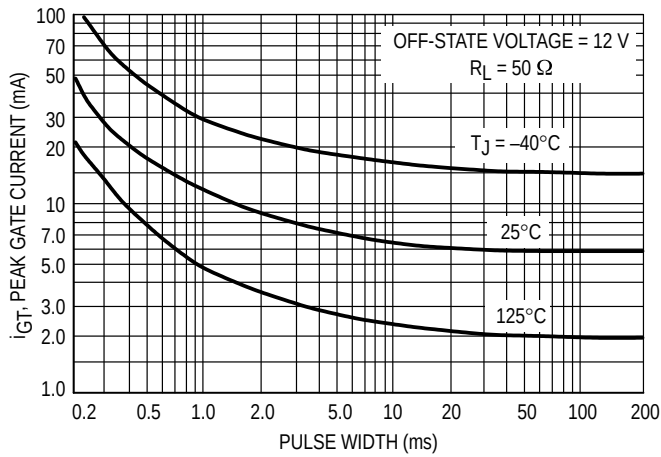
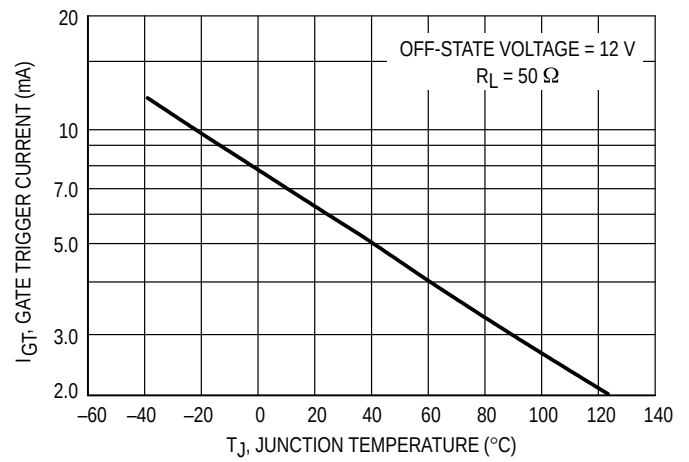
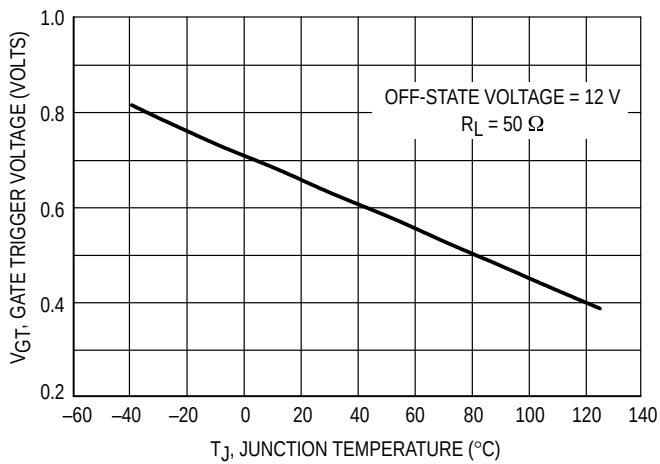
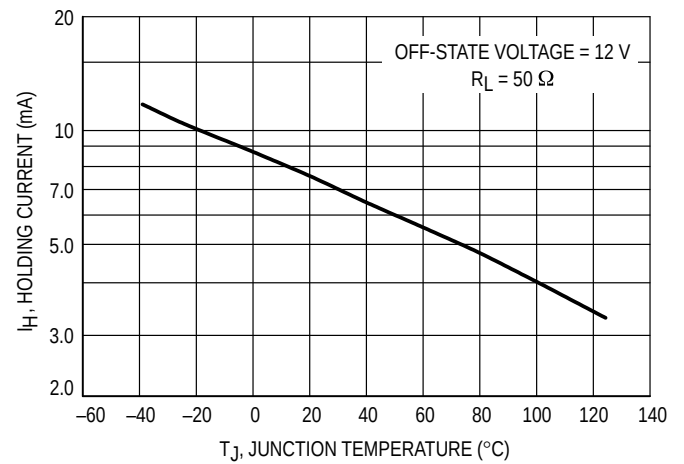
2N6400 thru 2N6405**ELECTRICAL CHARACTERISTICS** ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

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
* Peak On-State Voltage ($I_{TM} = 32 \text{ A Peak}$, Pulse Width $\leq 1 \text{ ms}$, Duty Cycle $\leq 2\%$)	V_{TM}	—	—	1.7	Volts
* Gate Trigger Current (Continuous dc) ($V_D = 12 \text{ Vdc}$, $R_L = 50 \text{ Ohms}$)	I_{GT}	—	5	30	mA
* Gate Trigger Voltage (Continuous dc) ($V_D = 12 \text{ Vdc}$, $R_L = 50 \text{ Ohms}$) $T_C = 25^\circ\text{C}$ $T_C = -40^\circ\text{C}$ ($V_D = \text{Rated } V_{DRM}$, $R_L = 50 \text{ Ohms}$) $T_C = +125^\circ\text{C}$	V_{GT}	— — 0.2	0.7 — —	1.5 2.5 —	Volts
* Holding Current ($V_D = 12 \text{ Vdc}$, Gate Open) $T_C = 25^\circ\text{C}$ $*T_C = -40^\circ\text{C}$	I_H	— —	6 —	40 60	mA
Turn-On Time ($I_{TM} = 16 \text{ A}$, $I_{GT} = 40 \text{ mAdc}$, $V_D = \text{Rated } V_{DRM}$)	t_{gt}	—	1	—	μs
Turn-Off Time ($I_{TM} = 16 \text{ A}$, $I_R = 16 \text{ A}$, $V_D = \text{Rated } V_{DRM}$) $T_C = 25^\circ\text{C}$ $T_J = +125^\circ\text{C}$	t_q	— —	15 35	— —	μs
Critical Rate-of-Rise of Off-State Voltage ($V_D = \text{Rated } V_{DRM}$, Exponential Waveform) $T_J = +125^\circ\text{C}$	dv/dt	—	50	—	$\text{V}/\mu\text{s}$

*Indicates JEDEC Registered Data.

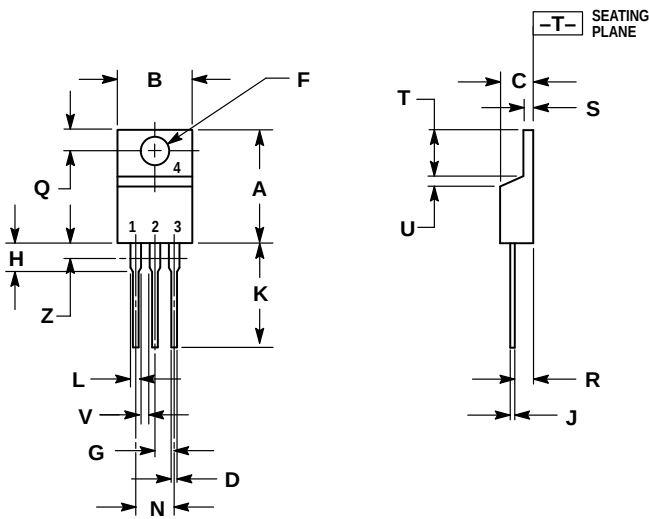
FIGURE 1 — AVERAGE CURRENT DERATING**FIGURE 2 — MAXIMUM ON-STATE POWER DISSIPATION**

2N6400 thru 2N6405**FIGURE 3 — ON-STATE CHARACTERISTICS****FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT****FIGURE 5 — THERMAL RESPONSE**

2N6400 thru 2N6405**TYPICAL CHARACTERISTICS****FIGURE 6 — PULSE TRIGGER CURRENT****FIGURE 7 — GATE TRIGGER CURRENT****FIGURE 8 — GATE TRIGGER VOLTAGE****FIGURE 9 — HOLDING CURRENT**

2N6400 thru 2N6405

PACKAGE DIMENSIONS



- 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	0.060	1.15	1.52
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

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

CASE 221A-07
ISSUE Z

2N6400 thru 2N6405

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2N6400/D