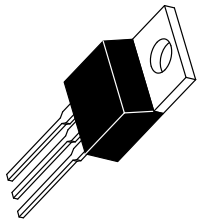
2N6400 thru 2N6405

Silicon Controlled Rectifiers
Reverse Blocking Triode Thyristors

SCRs
16 AMPERES RMS
50 thru 800 VOLTS

. . . 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



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

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

Rating	Symbol	Value	Unit
Peak Repetitive Forward and Reverse Voltage(1) (Gate Open, T_J = 25 to 125°C) ***2N6400***	V_{DRM}, V_{RRM}	50	Volts
2N6401		100	
2N6402		200	
2N6403		400	
2N6404		600	
2N6405		800	
RMS On–State Current (T_C = 90°C)	$I_{T(RMS)}$	16	Amps
Average On–State Current	$I_{T(AV)}$	10	Amps
Peak Non-Repetitive Forward Surge Current (1/2 Cycle, Sine Wave, 60 Hz, T_J = 125°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	$P_{G(AV)}$	0.5	Watt
Forward Peak Gate Current	I_{GM}	2	Amps
Operating Junction Temperature Range	T_J	–40 to +125	°C
Storage Temperature Range	T_{stg}	–40 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.5	°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.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Typ	Max	Unit
*Peak Forward or Reverse Blocking Current (V_{AK} = Rated V_{DRM} or V_{RRM}, Gate Open)	T_J = 25°C T_J = 125°C	I_{DRM}, I_{RRM}	— —	— —	10 2	μA mA
*Peak On–State Voltage (I_{TM} = 32 A Peak, Pulse Width ≤ 1 ms, Duty Cycle ≤ 2%)		V_{TM}	—	—	1.7	Volts
*Gate Trigger Current (Continuous dc) (V_D = 12 Vdc, R_L = 50 Ohms)		I_{GT}	—	5	30	mA
*Gate Trigger Voltage (Continuous dc) (V_D = 12 Vdc, R_L = 50 Ohms) (V_D = Rated V_{DRM}, R_L = 50 Ohms)	 T_C = 25°C T_C = –40°C T_C = +125°C	V_{GT}	 — — 0.2	 0.7 — —	 1.5 2.5 —	Volts
*Holding Current (V_D = 12 Vdc, Gate Open)	T_C = 25°C *T_C = –40°C	I_H	— —	6 —	40 60	mA
Turn-On Time (I_{TM} = 16 A, I_{GT} = 40 mAdc, V_D = Rated V_{DRM})		t_{gt}	—	1	—	μs
Turn-Off Time (I_{TM} = 16 A, I_R = 16 A, V_D = Rated V_{DRM})	 T_C = 25°C T_J = +125°C	t_q	 — —	 15 35	 — —	μs
Critical Rate–of–Rise of Off-State Voltage (V_D = Rated V_{DRM}, Exponential Waveform)	 T_J = +125°C	dv/dt	—	50	—	V/μs

*Indicates JEDEC Registered Data.

FIGURE 1 — AVERAGE CURRENT DERATING

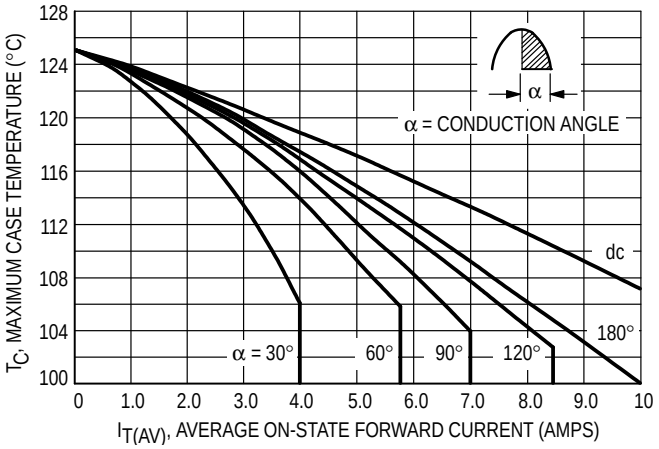


FIGURE 2 — MAXIMUM ON-STATE POWER DISSIPATION

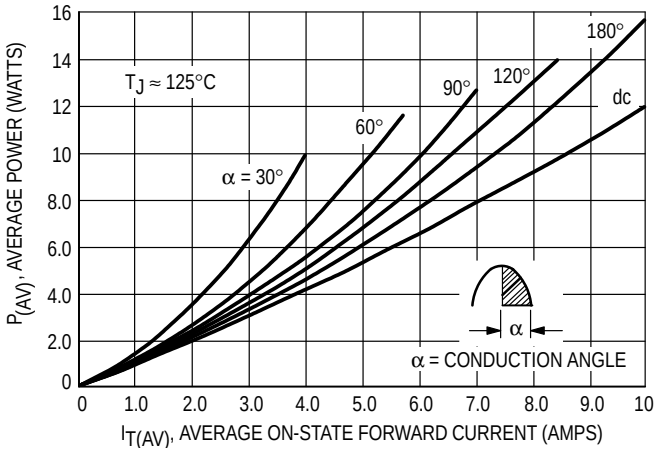


FIGURE 3 — ON–STATE CHARACTERISTICS

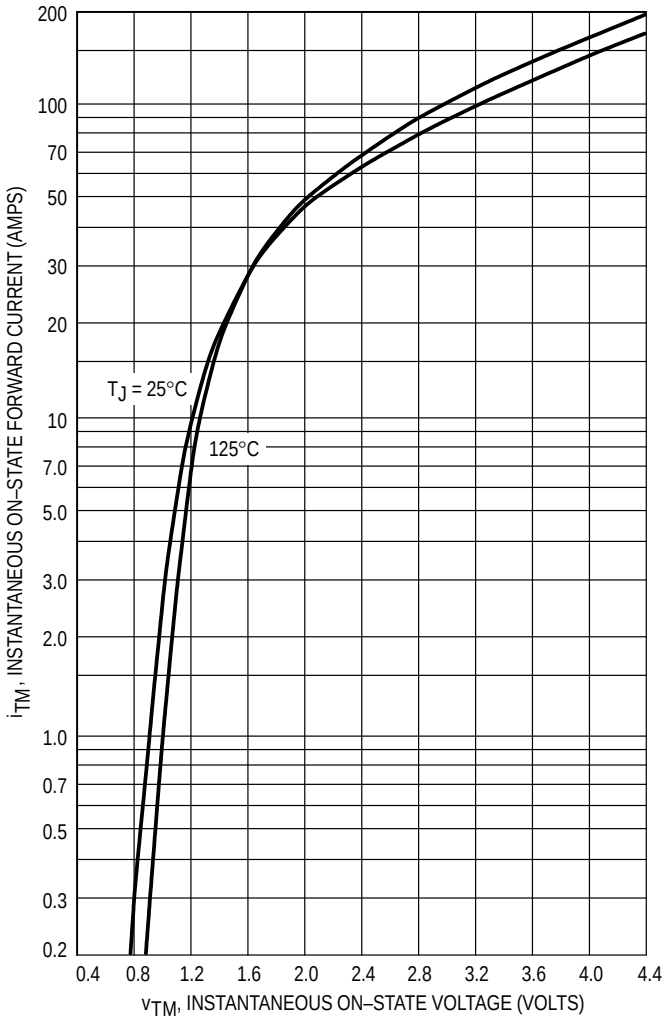


FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

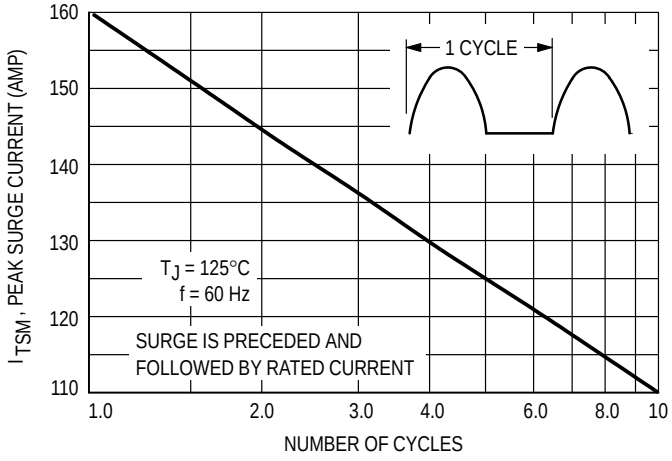
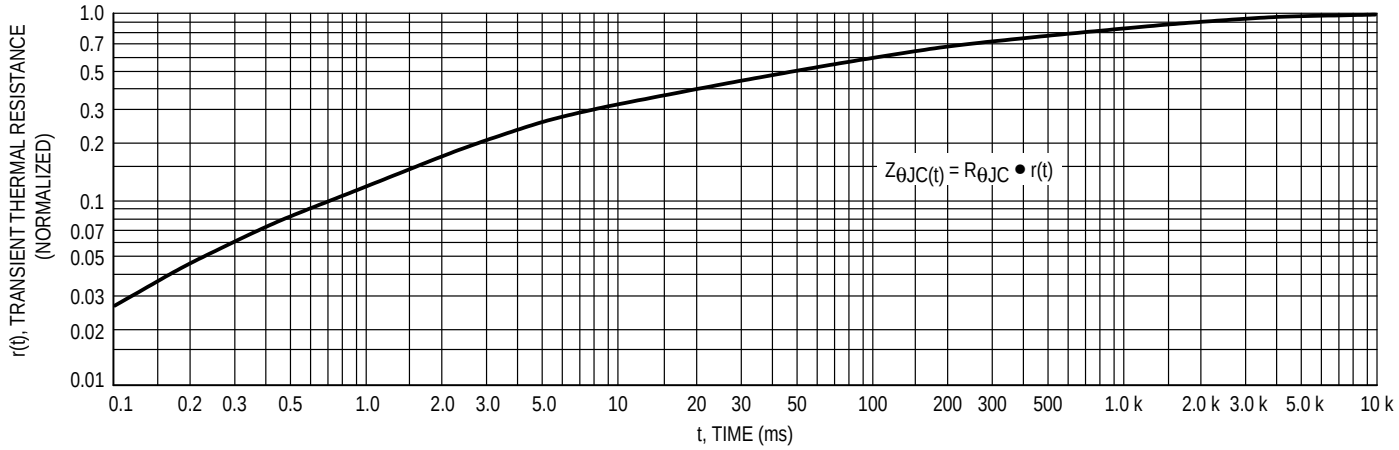


FIGURE 5 — THERMAL RESPONSE



TYPICAL CHARACTERISTICS

FIGURE 6 — PULSE TRIGGER CURRENT

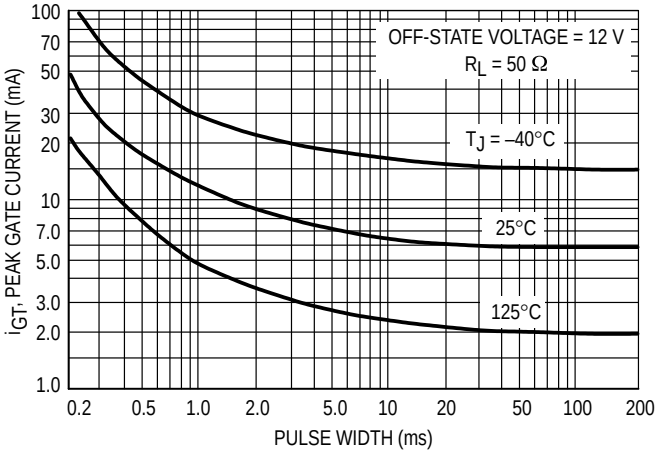


FIGURE 7 — GATE TRIGGER CURRENT

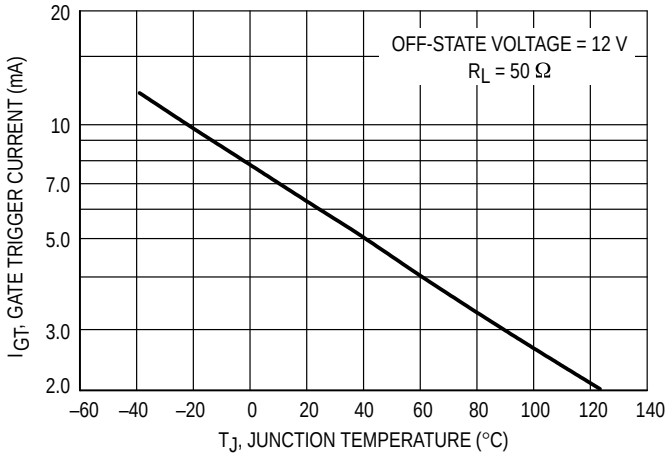


FIGURE 8 — GATE TRIGGER VOLTAGE

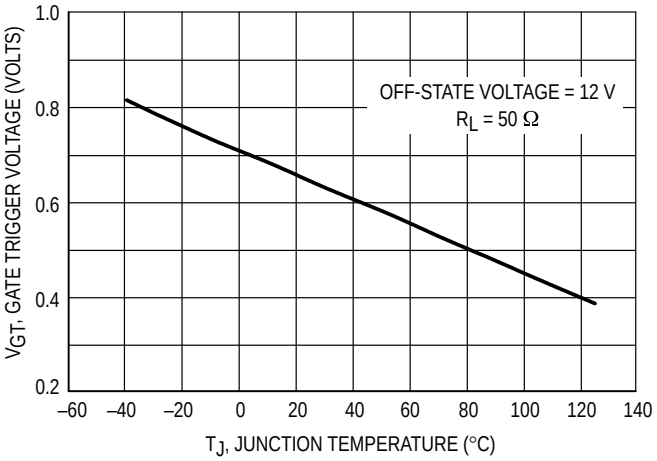
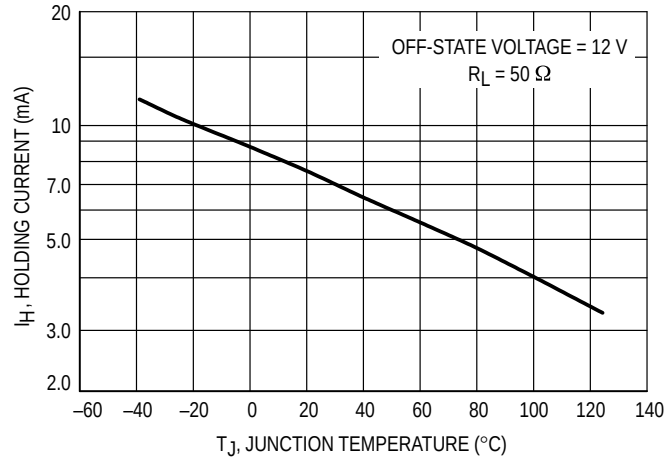
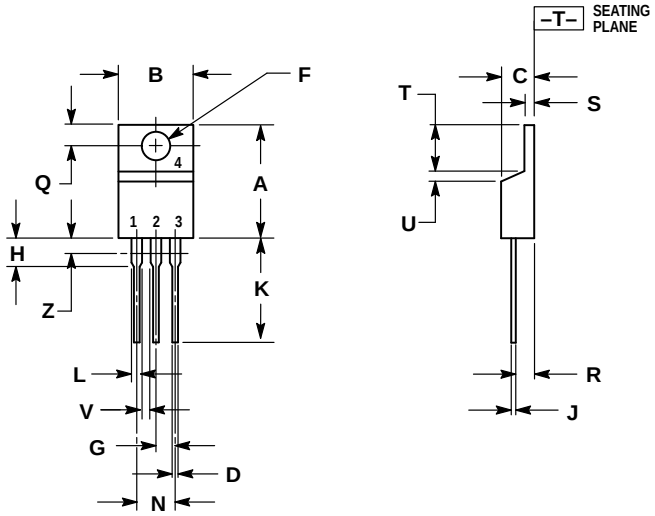


FIGURE 9 — HOLDING CURRENT



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.

	INCHES		MILLIMETERS	
DIM	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

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