

Silicon Controlled Rectifiers

Reverse Blocking Triode Thyristors

... designed for industrial and consumer applications such as power supplies; battery chargers; temperature, motor, light and welder controls.

- Economical for a Wide Range of Uses
- High Surge Current — $I_{TSM} = 350$ Amp
- Practical Level Triggering and Holding Characteristics —
4 and 5.2 mA (Typ) @ $T_C = 25^\circ\text{C}$
- Rugged Construction in Either Pressfit, Stud or Isolated Stud Package

**2N3870
thru
2N3873
2N3896
thru
2N3899
2N6171
thru
2N6174**

**SCRs
35 AMPERES RMS
100 thru 800 VOLTS**

MAXIMUM RATINGS ($T_C = 100^\circ\text{C}$ unless otherwise noted.)

Rating	Symbol	Value	Unit
*Peak Repetitive Forward or Reverse Blocking Voltage, Note 1 ($T_J = -40$ to $+100^\circ\text{C}$, 1/2 Sine Wave, 50 to 400 Hz, Gate Open) 2N3870, 2N3896, 2N6171 2N3871, 2N3897, 2N6172 2N3872, 2N3898, 2N6173 2N3873, 2N3899, 2N6174	V_{RRM} or V_{DRM}	100 200 400 600	Volts
*Peak Non-Repetitive Forward or Reverse Blocking Voltage ($t \leq 5$ ms) 2N3870, 2N3896, 2N6171 2N3871, 2N3897, 2N6172 2N3872, 2N3898, 2N6173 2N3873, 2N3899, 2N6174	V_{RSM} or V_{DSM}	150 330 660 700	Volts
*Average On-State Current, Note 2 ($T_C = -40$ to $+65^\circ\text{C}$) ($T_C = +85^\circ\text{C}$)	$I_{T(AV)}$	22 11	Amps
*Peak Non-Repetitive Surge Current (One cycle, 60 Hz) ($T_C = +65^\circ\text{C}$)	I_{TSM}	350	Amps
Circuit Fusing ($T_C = -40$ to $+100^\circ\text{C}$) ($t = 1$ to 8.30 ms)	I^2t	510	A^2s

* Indicates JEDEC Registered Data.

Notes: 1. Ratings apply for zero or negative gate voltage. Devices shall not have a positive bias applied to the gate concurrently with a negative potential on the anode. Devices should not be tested with a constant current source for forward or reverse blocking capability such that the voltage applied exceeds the rated blocking voltage.

2. Isolated stud devices must be derated an additional 10 percent.



**CASE 174-04
(TO-203)
STYLE 1
2N3870 thru 2N3873**



**CASE 175-03
STYLE 1
2N3896 thru 2N3899**



**CASE 311-02
STYLE 1
(Stud Isolated)
2N6171 thru 2N6174**

MAXIMUM RATINGS ($T_C = 100^\circ\text{C}$ unless otherwise noted.)

Rating	Symbol	Value	Unit
*Peak Gate Power	P _{GM}	20	Watts
*Average Gate Power	P _{G(AV)}	0.5	Watt
*Peak Forward Gate Current	I _{GM}	2	Amps
Peak Gate Voltage	V _{GM}	10	Volts
*Operating Junction Temperature Range	T _J	-40 to +100	°C
*Storage Temperature Range	T _{stg}	-40 to +150	°C
Stud Torque	—	30	in. lb.

*Indicates JEDEC Registered Data.

***THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case 2N3870 thru 2N3873, 2N3896 thru 2N3899 2N6171 thru 2N6174	R _{θJC}	0.9 1	°C/W

* Indicates JEDEC Registered Data.

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

Characteristic	Symbol	Min	Typ	Max *	Unit
*Peak Forward or Reverse Blocking Current (Rated V _{DRM} or V _{RRM} , gate open, T _J = 100°C) 2N3870, 2N3896, 2N6171 2N3871, 2N3897, 2N6172 2N3872, 2N3898, 2N6173 2N3873, 2N3899, 2N6174 (Rated V _{DRM} or V _{RRM} , gate open, T _J = 25°C) All Devices	I _{DRM} , I _{RRM}	— — — — —	1 1 1 1 —	2 2.5 3 4 10	mA μA
*Peak On-State Voltage (I _{TM} = 69 A Peak)	V _{TM}	—	1.5	1.85	Volts
*Gate Trigger Current (Continuous dc) (V _D = 12 V, R _L = 24 ohms)	I _{GT}	— —	9 4	80 40	mA
*Gate Trigger Voltage (Continuous dc) (V _D = 12 V, R _L = 24 ohms)	V _{GT}	— —	0.9 0.69	3 1.6	Volts
*Holding Current (Gate Open) (V _D = 12 V, I _{TM} = 200 mA)	I _H	— —	14 5.2	90 50	mA
*Gate Controlled Turn-On Time (t _d + t _r) (I _{TM} = 41 Adc, V _D = rated V _{DRM} , I _{GT} = 40 mA dc, Rise Time ≤ 0.05 μs, Pulse Width = 10 μs)	t _{gt}	—	—	1.5	μs
Circuit Commutated Turn-Off Time (I _{TM} = 10 A, I _R = 10 A) (I _{TM} = 10 A, I _R = 10 A, T _C = 100°C)	t _q	— —	25 35	— —	μs
Forward Voltage Application Rate (T _C = 100°C, V _D = Rated V _{DRM})	dv/dt	—	50	—	V/μs

*Indicates JEDEC Registered Data.

FIGURE 1 – AVERAGE CURRENT DERATING

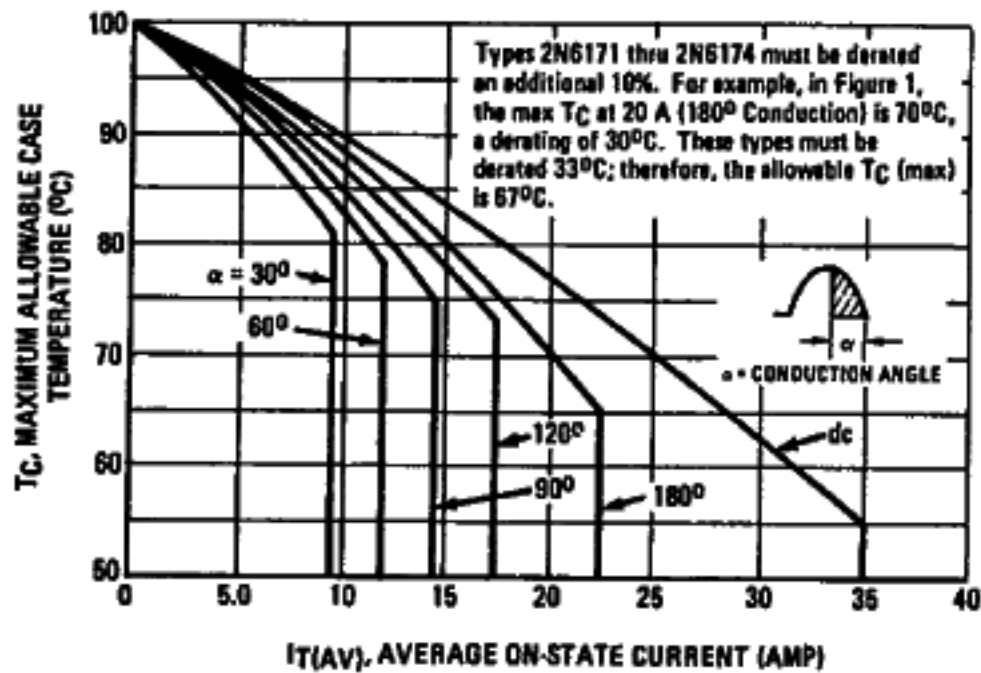


FIGURE 2 – ON-STATE POWER DISSIPATION

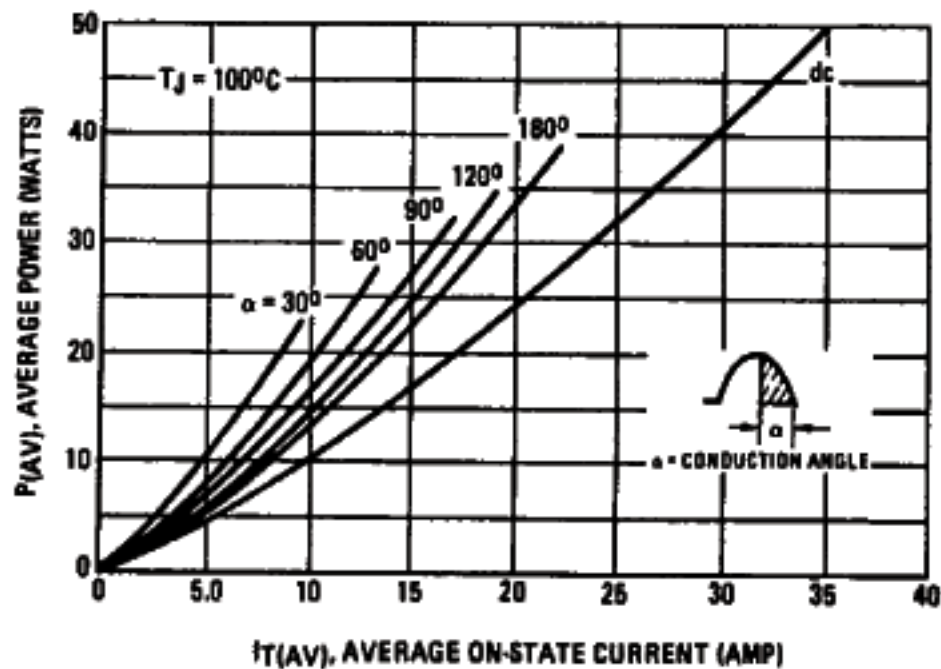


FIGURE 3 – ON-STATE CHARACTERISTICS

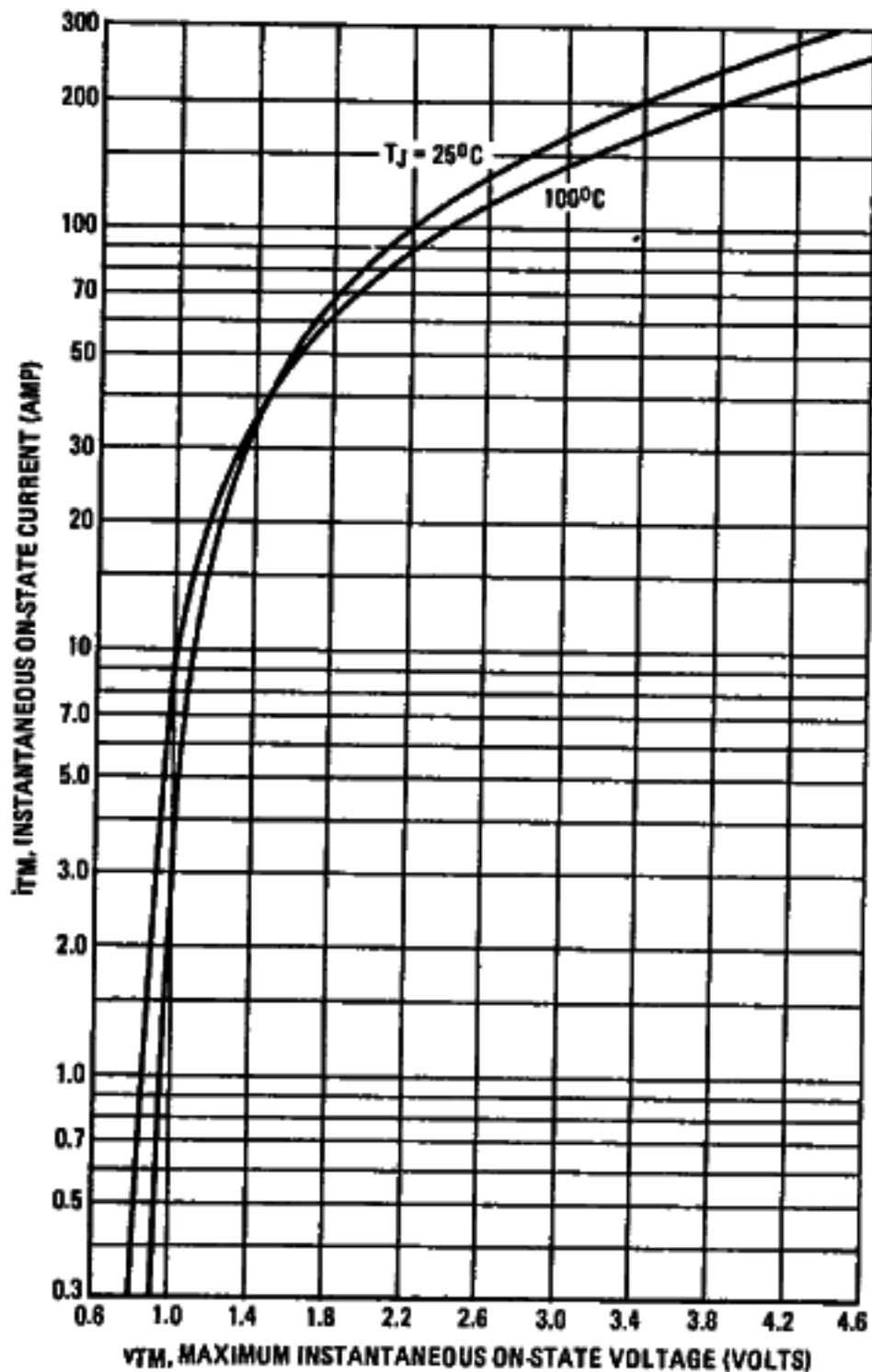


FIGURE 4 – MAXIMUM NON-REPETITIVE SURGE CURRENT

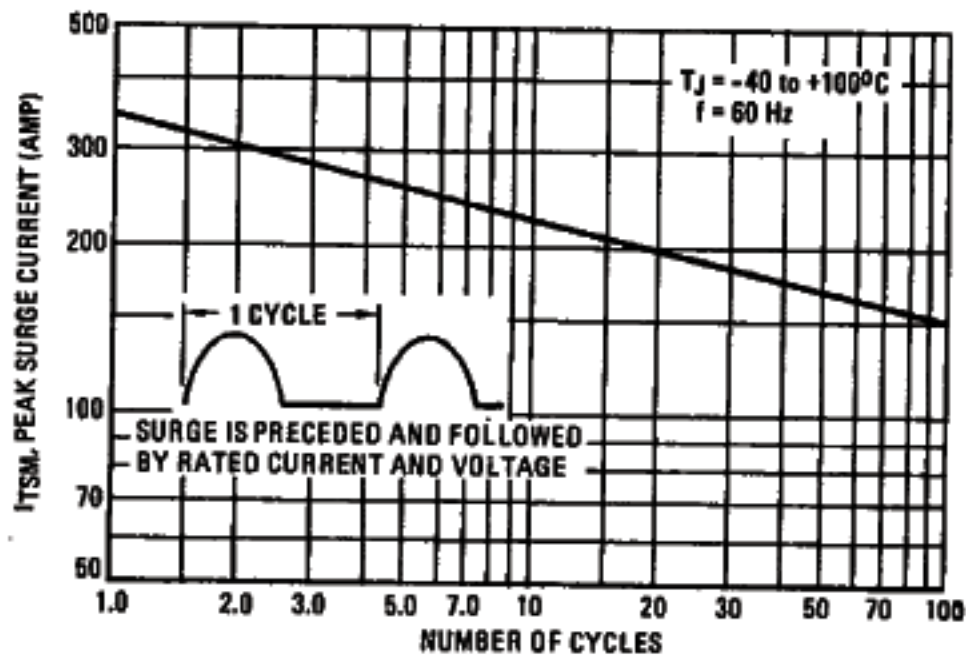


FIGURE 5 -- TYPICAL THERMAL RESPONSE

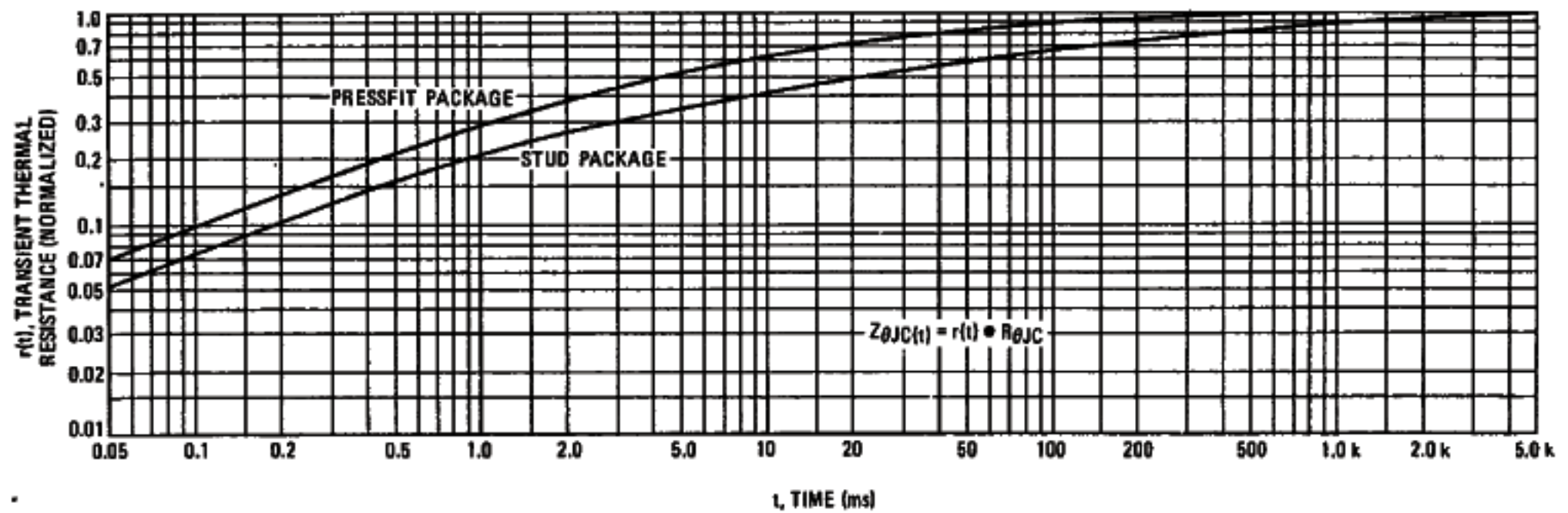


FIGURE 6 -- PULSE TRIGGER CURRENT

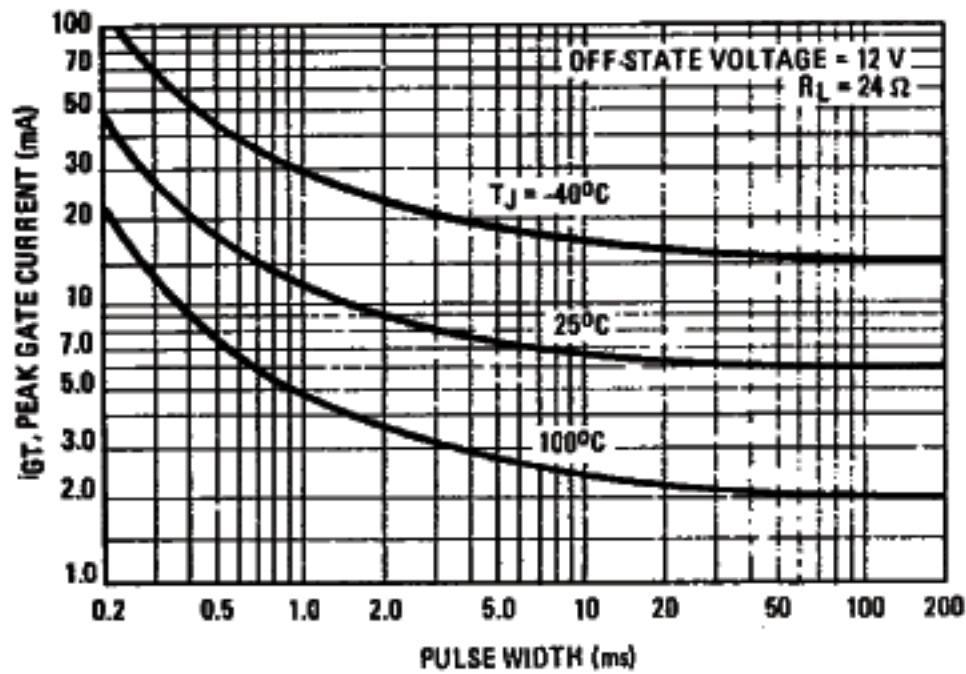


FIGURE 7 -- GATE TRIGGER CURRENT

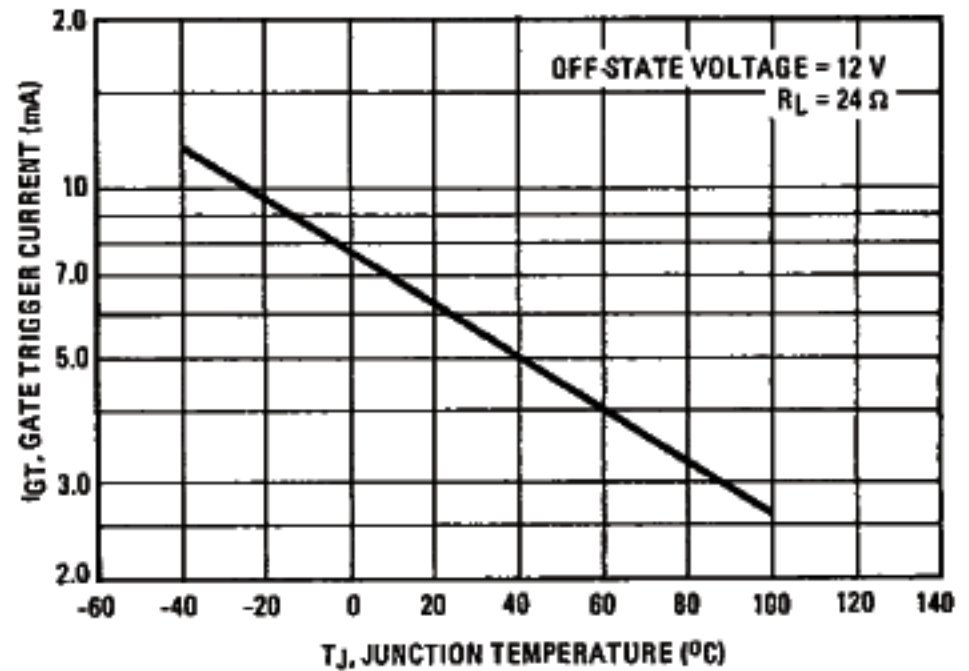


FIGURE 8 -- GATE TRIGGER VOLTAGE

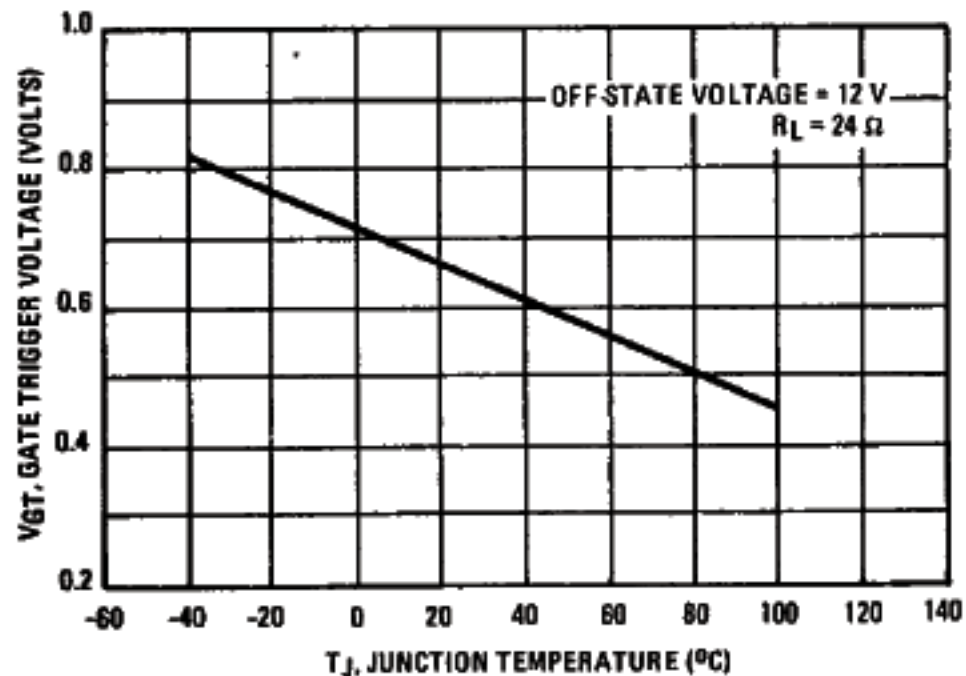


FIGURE 9 -- HOLDING CURRENT

