

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	$^\circ\text{C}$
*Storage Temperature Range	T_{stg}	-40 to +150	$^\circ\text{C}$
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	$R_{\theta JC}$	0.9 1	$^\circ\text{C/W}$

*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, $T_J = 100^\circ\text{C}$) 2N3870, 2N3896, 2N6171 2N3871, 2N3897, 2N6172 2N3872, 2N3898, 2N6173 2N3873, 2N3899, 2N6174	I_{DRM}, I_{RRM}	— — — — —	1 1 1 1 —	2 2.5 3 4 10	mA μA
(Rated V_{DRM} or V_{RRM} , gate open, $T_J = 25^\circ\text{C}$) All Devices		—	—	10	μA
*Peak On-State Voltage ($I_{TM} = 69\text{ A Peak}$)	V_{TM}	—	1.5	1.85	Volts
*Gate Trigger Current (Continuous dc) ($V_D = 12\text{ V}$, $R_L = 24\text{ ohms}$)	I_{GT}	— —	9 4	80 40	mA
*Gate Trigger Voltage (Continuous dc) ($V_D = 12\text{ V}$, $R_L = 24\text{ ohms}$)	V_{GT}	— —	0.9 0.69	3 1.6	Volts
*Holding Current (Gate Open) ($V_D = 12\text{ V}$, $I_{TM} = 200\text{ mA}$)	I_H	— —	14 5.2	90 50	mA
*Gate Controlled Turn-On Time ($t_d + t_r$) ($I_{TM} = 41\text{ A dc}$, $V_D = \text{rated } V_{DRM}$, $I_{GT} = 40\text{ mA dc}$, Rise Time $\leq 0.05\text{ }\mu\text{s}$, Pulse Width = $10\text{ }\mu\text{s}$)	t_{gt}	—	—	1.5	μs
Circuit Commutated Turn-Off Time ($I_{TM} = 10\text{ A}$, $I_R = 10\text{ A}$) ($I_{TM} = 10\text{ A}$, $I_R = 10\text{ A}$, $T_C = 100^\circ\text{C}$)	t_q	— —	25 35	— —	μs
Forward Voltage Application Rate ($T_C = 100^\circ\text{C}$, $V_D = \text{Rated } V_{DRM}$)	dv/dt	—	50	—	$\text{V}/\mu\text{s}$

*Indicates JEDEC Registered Data.

FIGURE 1 – AVERAGE CURRENT DERATING

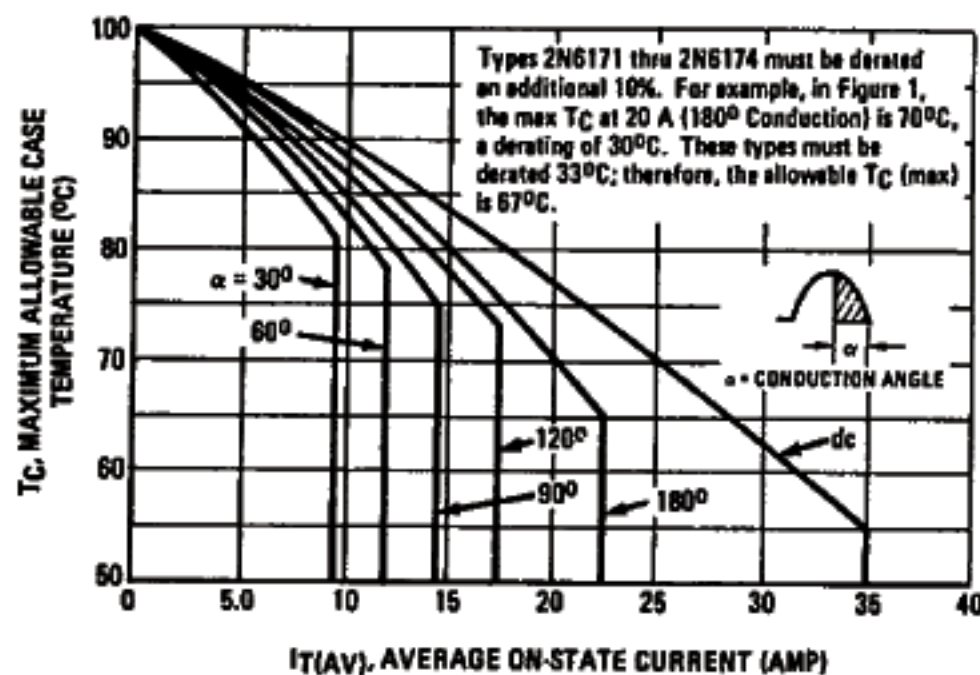


FIGURE 2 – ON-STATE POWER DISSIPATION

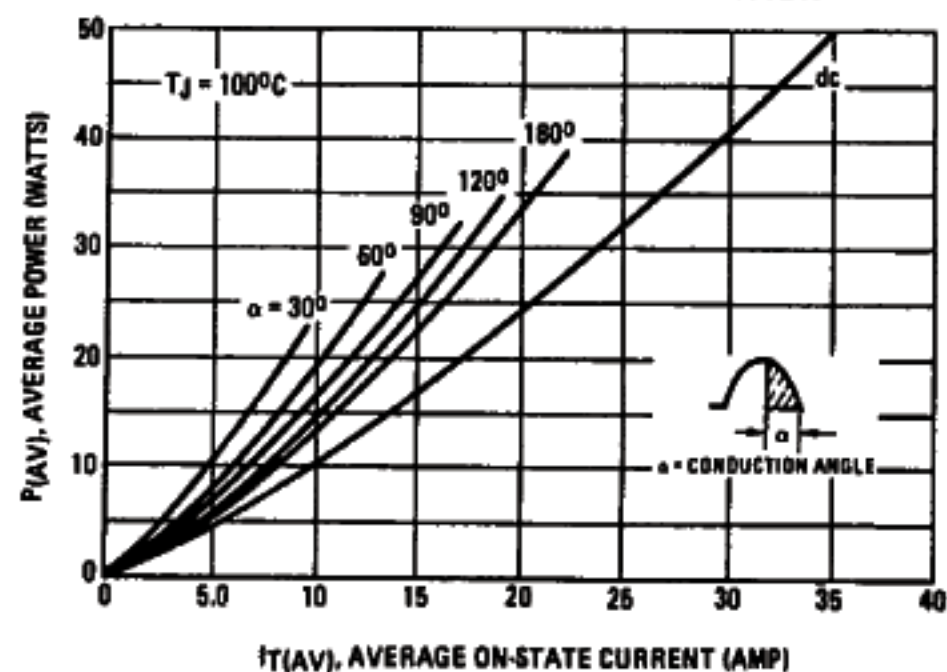


FIGURE 3 – ON-STATE CHARACTERISTICS

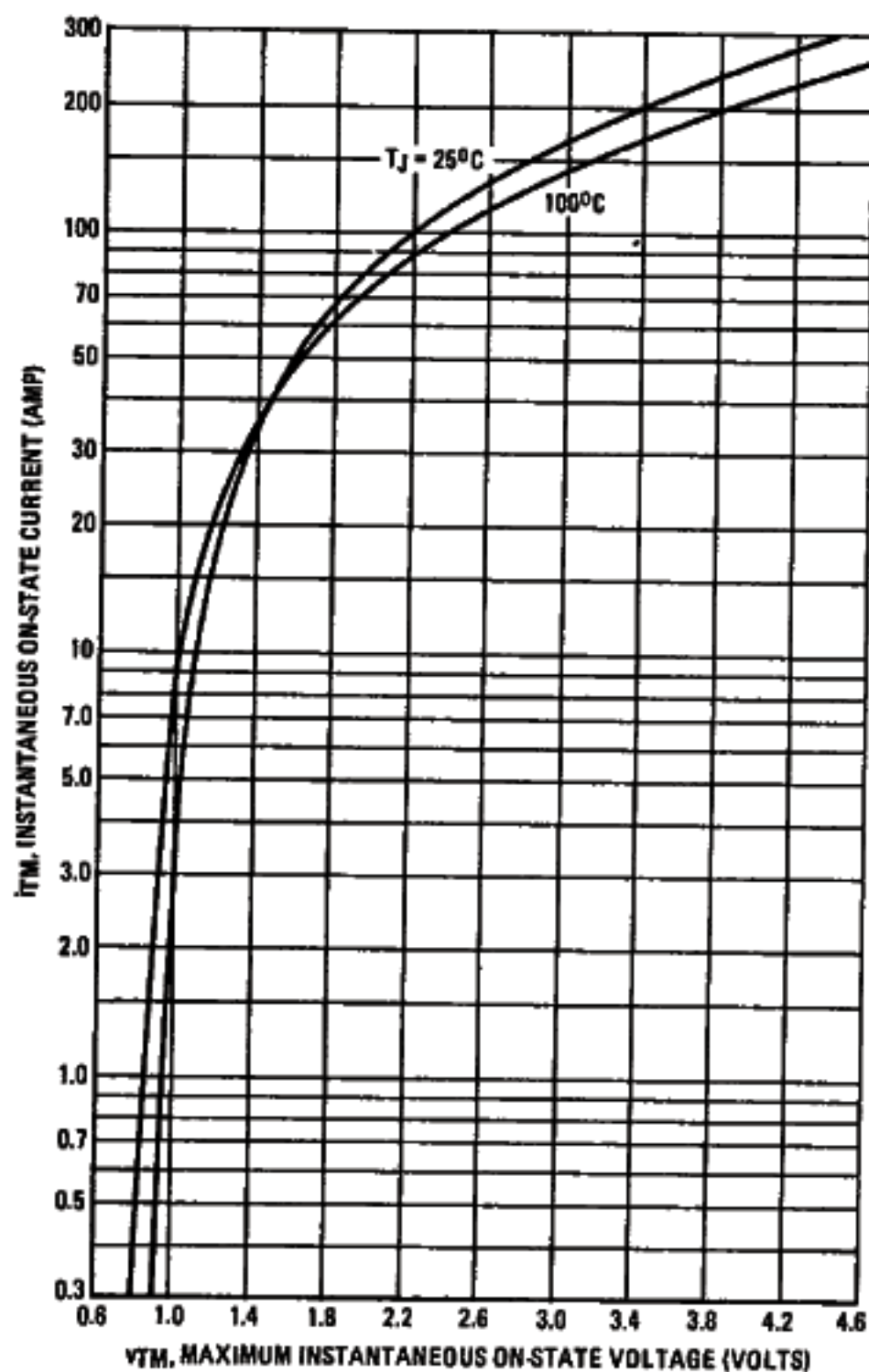


FIGURE 4 – MAXIMUM NON-REPETITIVE SURGE CURRENT

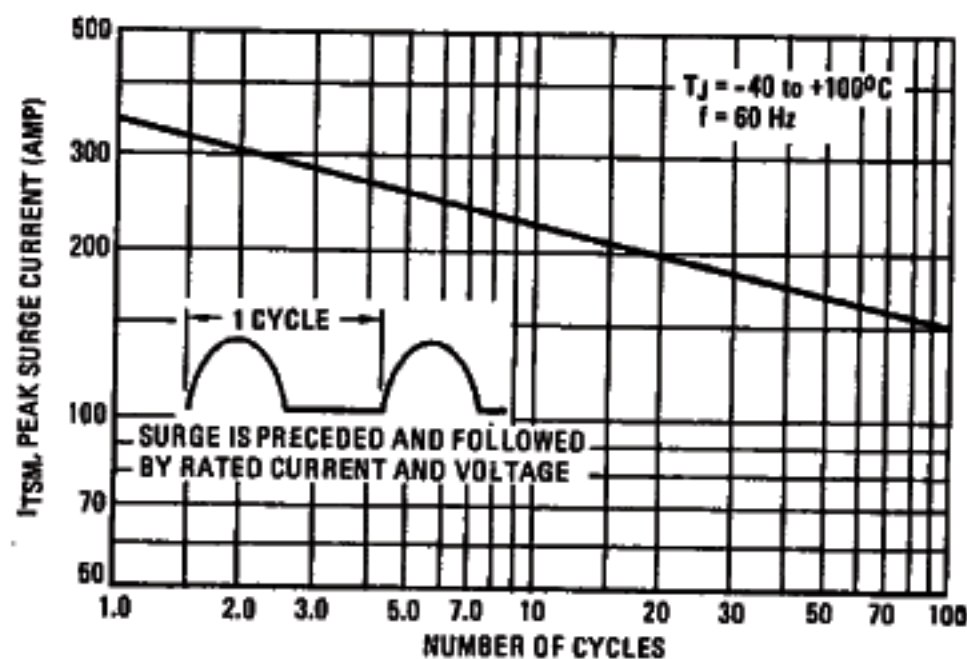


FIGURE 5 — TYPICAL THERMAL RESPONSE

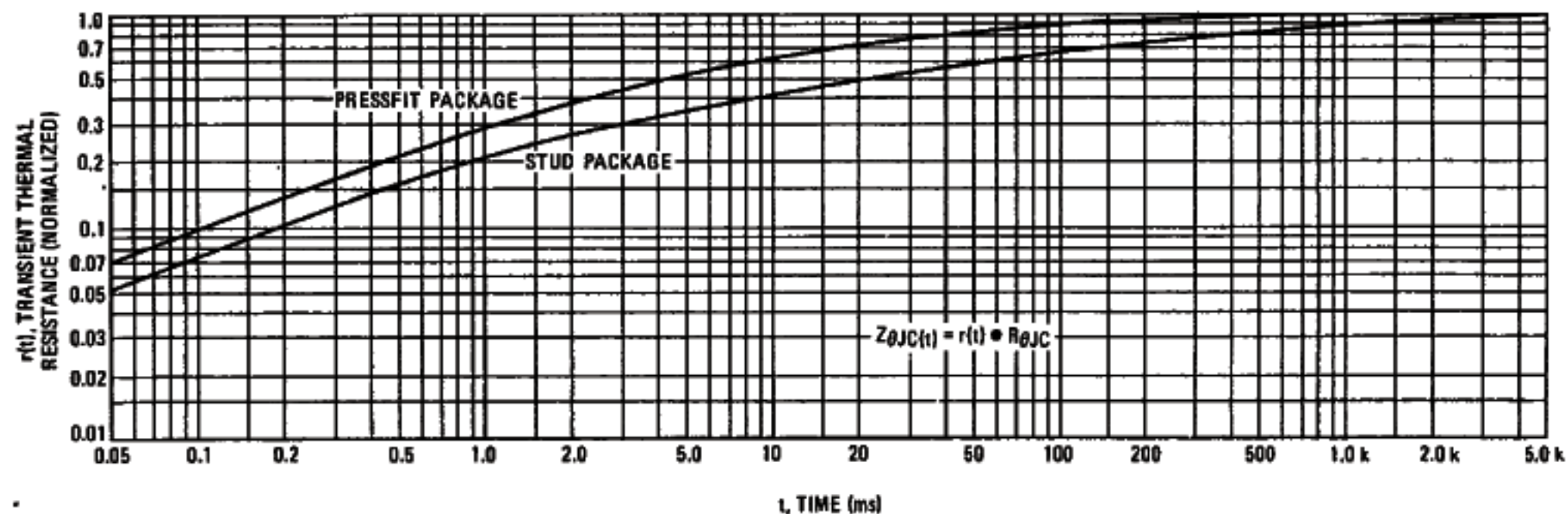


FIGURE 6 — PULSE TRIGGER CURRENT

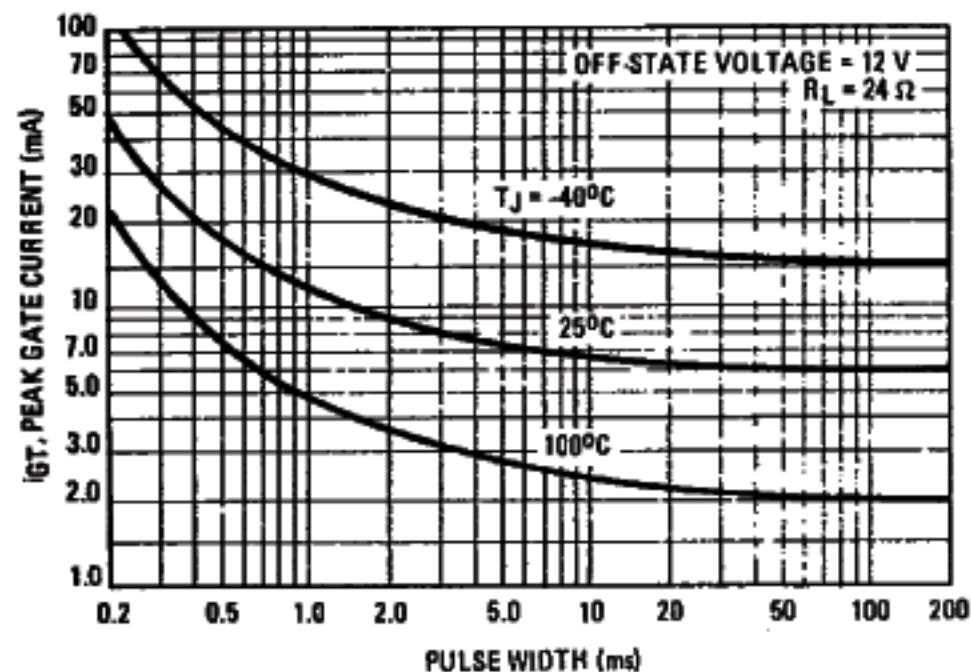


FIGURE 7 — GATE TRIGGER CURRENT

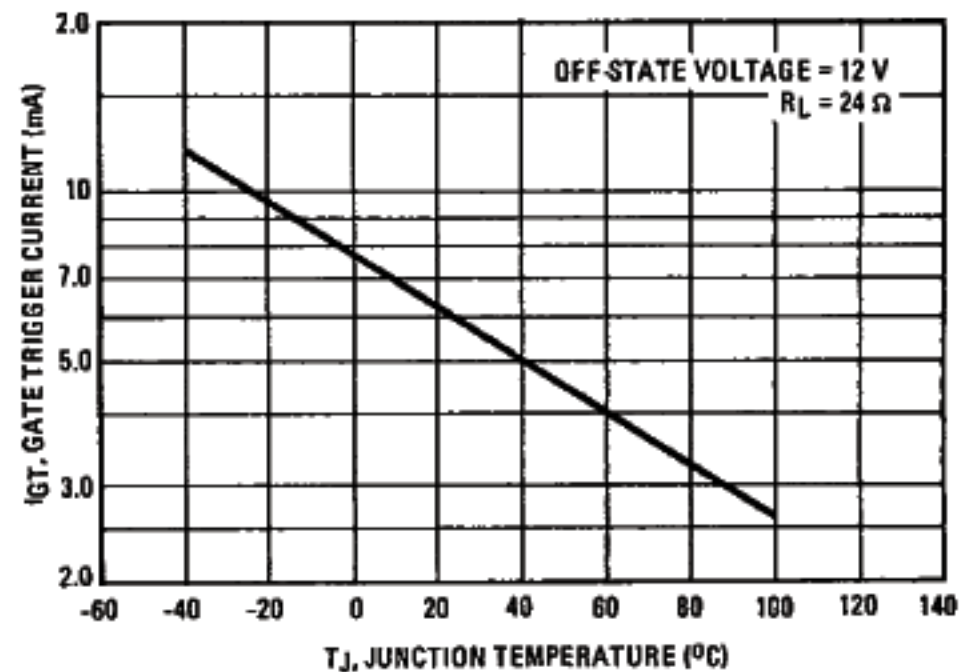


FIGURE 8 — GATE TRIGGER VOLTAGE

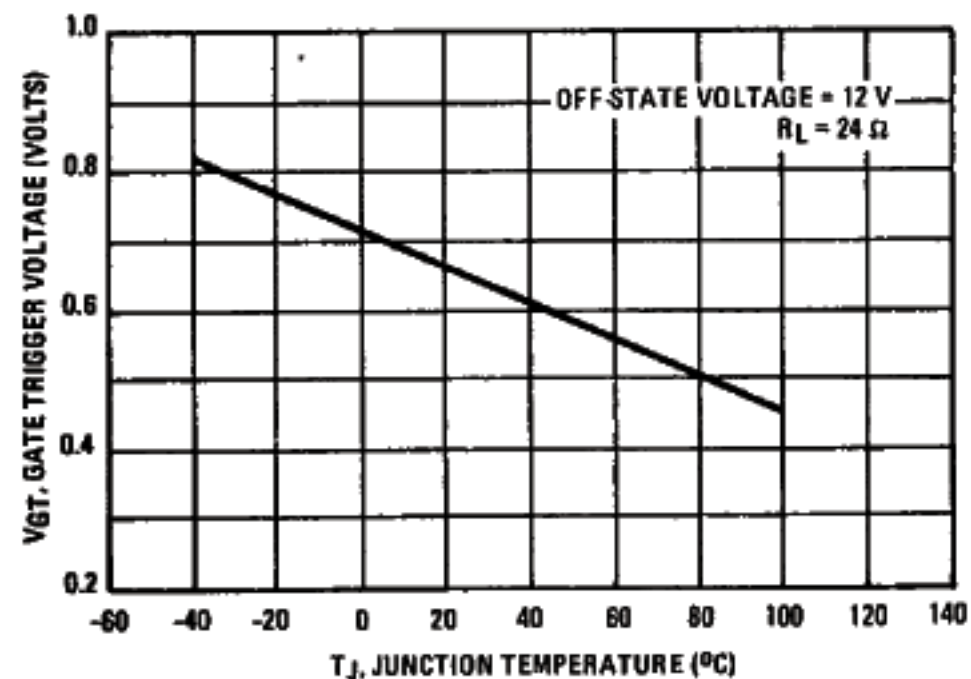


FIGURE 9 — HOLDING CURRENT

