

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak repetitive forward and reverse blocking voltage ⁽¹⁾⁽²⁾ 2N5164, 2N5168 2N5165, 2N5169 2N5166, 2N5170 2N5167, 2N5171	V_{RRM}, V_{DRM}	50 200 400 600	Volts
Non repetitive peak reverse blocking voltage 2N5164, 2N5168 2N5165, 2N5169 2N5166, 2N5170 2N5167, 2N5171	V_{RSM}	75 300 500 700	Volts
Forward current RMS	$I_{T(RMS)}$	20	Amps
Average on state current, $T_c = 67^\circ\text{C}$	$I_{T(AV)}$	13	Amps
Circuit fusing considerations, $T_j = -40$ to $+100^\circ\text{C}$; $t = 8.3\text{ms}$	I^2t	235	A^2s
Peak non-repetitive surge current ($T_j = -40$ to $+100^\circ\text{C}$) (1 cycle, 60Hz preceded and followed by rated current and voltage)	I_{TSM}	240	Amps
Peak gate power (maximum pulse width = $10\mu\text{s}$)	P_{GM}	5	Watts
Average gate power	$P_{G(AV)}$	0.5	Watts
Forward peak gate current (maximum pulse width = $10\mu\text{s}$)	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	$^\circ\text{C}$
Mounting torque (2N5168-2N5171)	-	30	In. lb.

Note 1: V_{DRM} for all types can be applied on a continuous basis without incurring damage. 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.

Note 2: Devices should not be operated with a positive bias applied to the gate concurrent with a negative potential applied to the anode.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Typical	Maximum	Unit
Thermal resistance, junction to case 2N5164, 2N5165, 2N5166, 2N5167 2N5168, 2N5169, 2N5170, 2N5171	$R_{\theta JC}$	1 1.1	1.5 1.6	$^\circ\text{C/W}$

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Characteristic	Symbol	Min.	Max.	Unit
Peak forward blocking current (Rated V_{DRM} or V_{RRM} , gate open) $T_J = 25^\circ\text{C}$ $T_J = 100^\circ\text{C}$	I_{DRM} or I_{RRM}	- -	10 5	μA mA
Gate trigger current (continuous dc)⁽¹⁾ ($V_D = 7\text{ Vdc}$, $R_L = 100\ \Omega$) ($V_D = 7\text{ Vdc}$, $R_L = 100\ \Omega$, $T_C = -40^\circ\text{C}$)	I_{GT}	- -	40 75	mA
Gate trigger voltage (continuous dc) ($V_D = 7\text{ Vdc}$, gate open) ($V_D = 7\text{ Vdc}$, $R_L = 100\ \Omega$, $T_C = -40^\circ\text{C}$) ($V_D = \text{Rated } V_{DRM}$, $R_L = 100\ \Omega$, $T_J = 100^\circ\text{C}$)	V_{GT}	- - 0.2	1.5 2.5 -	volts
Peak on state voltage (pulse width = 1ms max., duty cycle $\leq 1\%$) ($I_{TM} = 20\text{A}$) ($I_{TM} = 41\text{A}$)	V_{TM}	- 8	1.5 1.7	Volts
Holding current ($V_D = 7\text{Vdc}$, gate open) ($V_D = 7\text{Vdc}$, gate open, $T_C = -40^\circ\text{C}$)	I_H	- -	50 90	mA
Gate controlled turn-on time ($I_{TM} = 20\text{A}$, $I_{GT} = 40\text{mA}$, $V_D = \text{rated } V_{DRM}$)	t_{gt}	Typical		μs
		1		
Circuit commutated turn-off time ($I_{TM} = 10\text{A}$, $I_R = 10\text{A}$) ($I_{TM} = 10\text{A}$, $I_R = 10\text{A}$, $T_J = 100^\circ\text{C}$) ($V_D = V_{DRM} = \text{rated voltage}$) ($dv/dt = 30\text{V}/\mu\text{s}$)	t_q	20 30		μs
Critical rate of rise of off-state voltage ($V_D = \text{rated } V_{DRM}$, exponential waveform, $T_J = 100^\circ\text{C}$, gate open)	dv/dt	50		$\text{V}/\mu\text{s}$

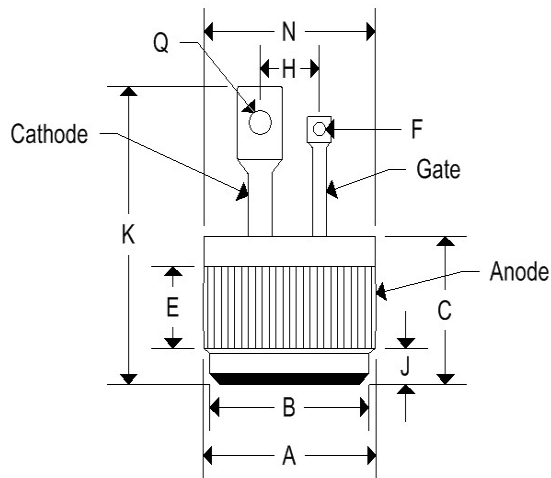
Note 1: Devices should not be operated with a positive bias applied to the gate concurrent with a negative potential applied to the anode.

2N5164-2N5171

SILICON CONTROLLED RECTIFIER

MECHANICAL CHARACTERISTICS

Case	Digi PF1 (2N5164-2N5167)
Marking	Body painted, alpha-numeric



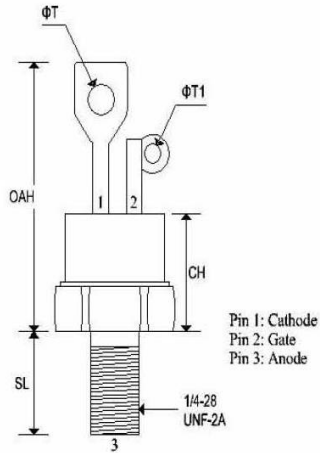
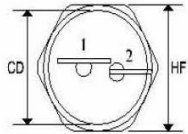
	DIGI PF1			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.501	0.505	12.730	12.830
F	-	0.160	-	4.060
G	0.085	0.095	2.160	2.410
H	0.060	0.070	1.520	1.780
J	0.300	0.350	7.620	8.890
K	-	1.050	-	26.670
L	-	0.670	-	17.020
Q	0.055	0.085	1.400	2.160

2N5164-2N5171

SILICON CONTROLLED RECTIFIER

MECHANICAL CHARACTERISTICS

Case	TO-48 (2N5168-2N5171)
Marking	Body painted, alpha-numeric
Polarity	Anode is stud



	TO-48			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	-	0.543	-	13.793
CH	-	0.550	-	13.970
HF	0.544	0.563	13.817	14.301
OAH	-	1.193	-	30.303
SL	0.422	0.453	10.718	11.507
ΦT	0.125	0.165	3.175	4.191
ΦT1	0.060	0.075	1.524	1.905

EFFECT OF TEMPERATURE UPON TYPICAL TRIGGER CHARACTERISTICS

FIGURE 1 – GATE TRIGGER CURRENT

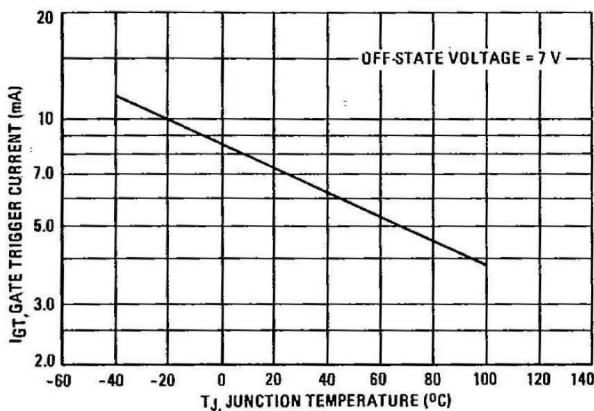
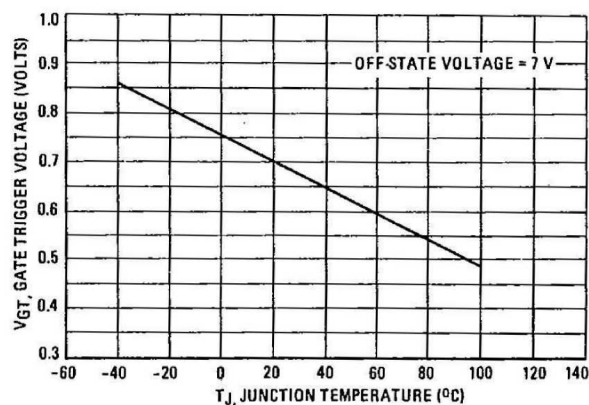


FIGURE 2 – GATE TRIGGER VOLTAGE



MAXIMUM ALLOWABLE NON-REPETITIVE SURGE CURRENT

FIGURE 3 – 60 Hz SURGES

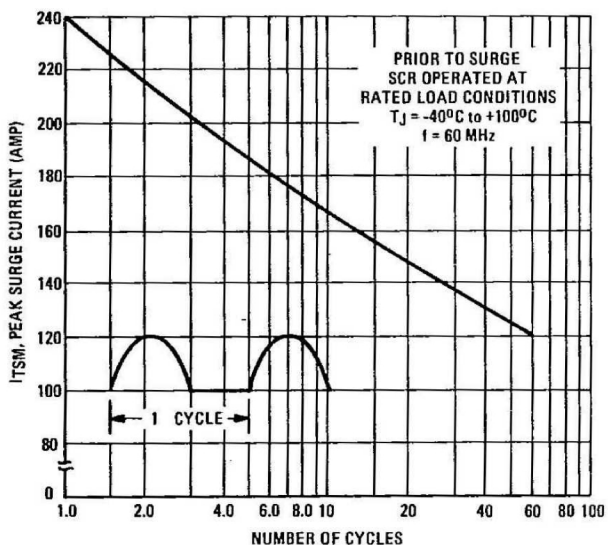


FIGURE 4 – SUB-CYCLE SURGES

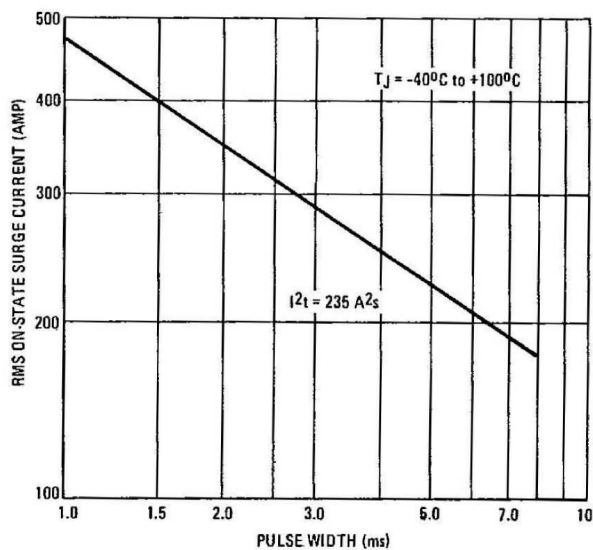


FIGURE 5 – GATE TRIGGER CHARACTERISTICS

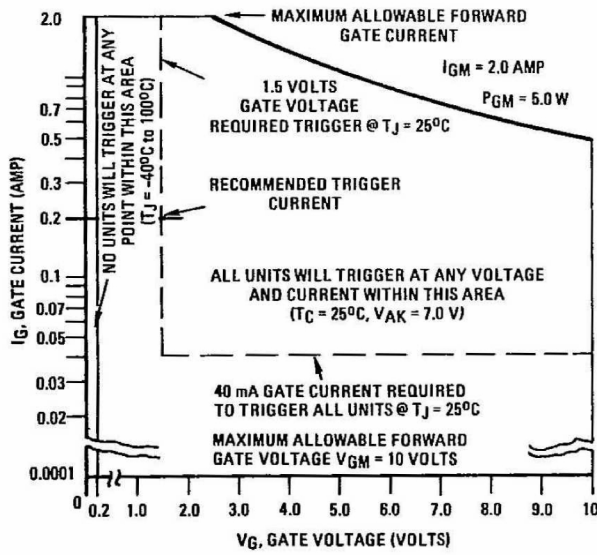
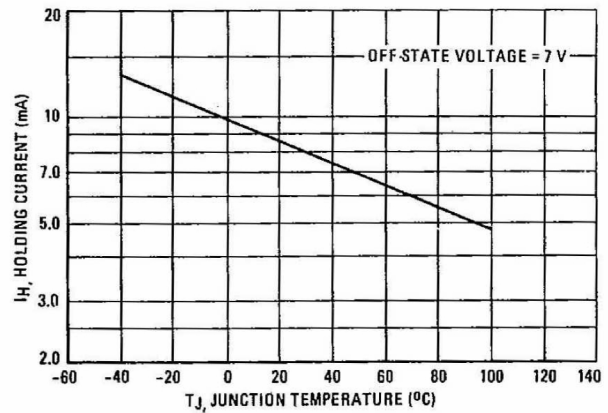


FIGURE 6 – EFFECT OF TEMPERATURE ON TYPICAL HOLDING CURRENT



DERATING AND DISSIPATION FOR RESISTIVE AND INDUCTIVE LOADS ($f = 60$ to 400 Hz, SINE WAVE)

FIGURE 7 – AVERAGE CURRENT DERATING

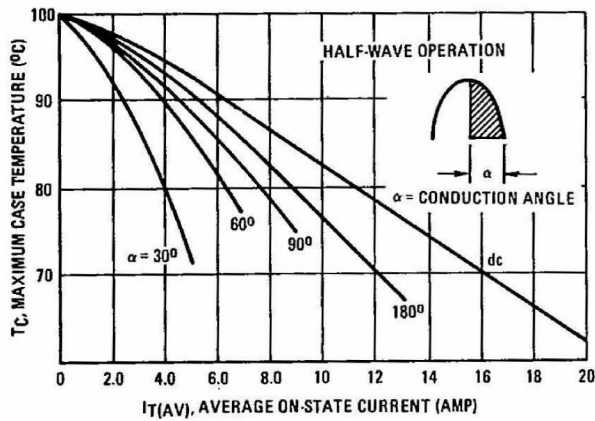


FIGURE 8 – ON-STATE POWER DISSIPATION

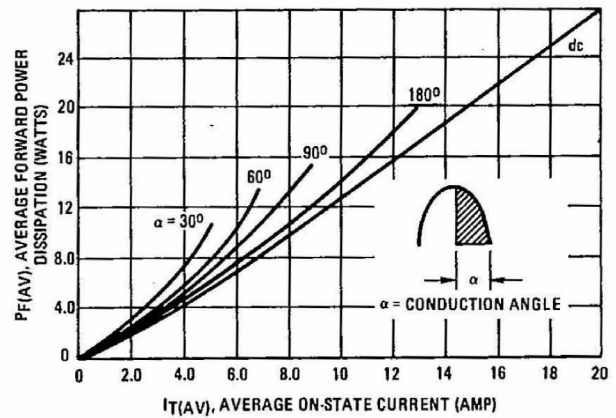


FIGURE 9 – ON-STATE CHARACTERISTICS

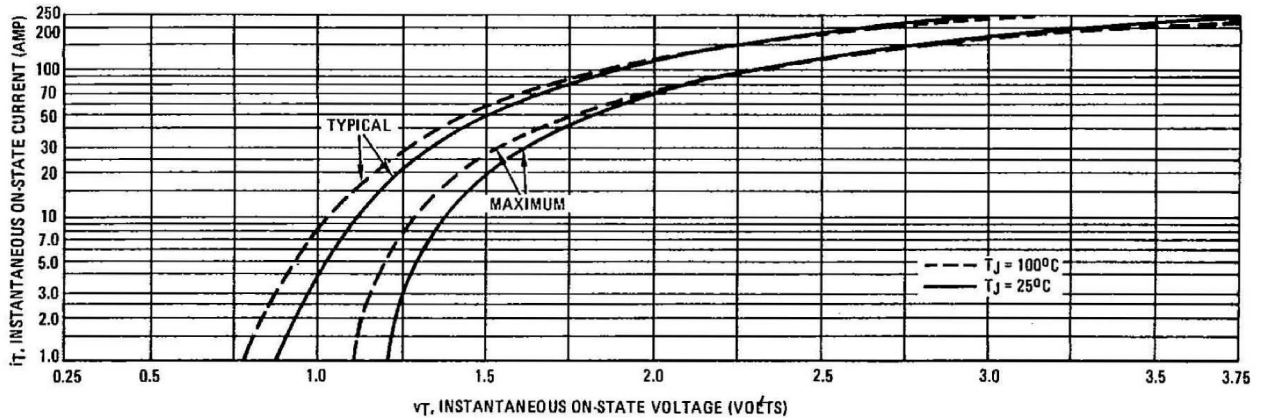


FIGURE 10 – TYPICAL THERMAL RESISTANCE OF PLATES

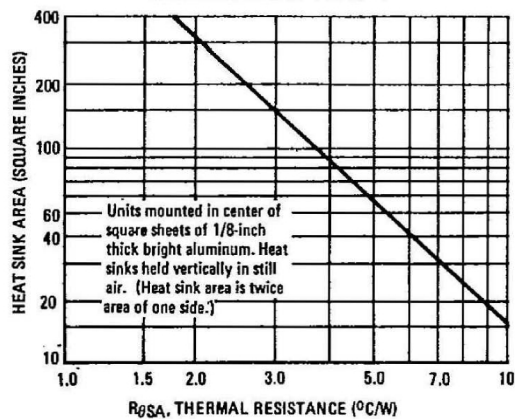


FIGURE 11 – MOUNTING DETAILS FOR PRESSFIT THYRISTORS

