DIGITRON™ Semiconductors

High-reliability discrete products and engineering services since 1977

2N3870-2N1850, 2N3896-2N3899, 2N6171-2N6174

SILICON CONTROLLED RECTIFIER

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 or reverse blocking voltage [1] (T_J = -40 to 100°C, ½ sine wave, 50-400 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 ≤ 5ms) 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 [2] (T_C = -40 to 65°C) (T_C = 85°C)	$I_{T(AV)}$	 22 11	Amps
Peak non-repetitive surge current (one cycle, 60Hz) (T_C = 65°C)	I_{TSM}	 350	Amps
Circuit fusing (T_C = -40 to 100°C) (t = 1 to 8.3 ms)	I^2t	 510	A^2s
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.
Thermal resistance, junction to case 2N3870 – 2N3873, 2N3896-2N3899 2N6171-2N6174	$R_{\Theta JC}$	 0.9 1	°C/W

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

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

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		I_{DRM}, I_{RRM}	-	1	2.0	mA
2N3871, 2N3897, 2N6172			-	1	2.5	
2N3872, 2N3898, 2N6173			-	1	3.0	
2N3873, 2N3899, 2N6174			-	1	4.0	
Rated V_{DRM} or V_{RRM}, gate open, T_J = 25°C)						
All devices			-	-	10	µA
Peak on-state voltage		V_{TM}				Volts
(I_{TM} = 69A peak)			-	1.5	1.85	
Gate trigger current (continuous dc)	T_C = -40°C	I_{GT}	-	9	80	mA
V_D = 12V, R_L = 24ohms)	T_C = 25°C		-	4	40	
Gate trigger voltage (continuous dc)		V_{GT}				Volts
V_D = 12V, R_L = 24ohms)	T_C = -40°C		-	0.9	3	
	T_C = 25°C		-	0.69	1.6	
Holding current (gate open)		I_H				mA
V_D = 12V, I_{TM} = 200mA)	T_C = -40°C		-	14	90	
	T_C = 25°C		-	5.2	50	
Gate controlled turn-on time (t_d+t_r)		t_{gt}				µs
(I_{TM} = 41Adc, V_D = rated V_{DRM}, I_{GT} = 40mAdc,			-	-	1.5	
Rise time ≤ 0.05µs, pulse width = 10µs)						
Circuit commutated turn-off time		t_q				µs
(I_{TM} = 10A, I_R = 10A)			-	25	-	
(I_{TM} = 10A, I_R = 10A, T_C = 100°C)			-	35	-	
Forward voltage application rate		dv/dt				V/µs
(T_C = 100°C, V_D = rated V_{DRM})			-	50	-	

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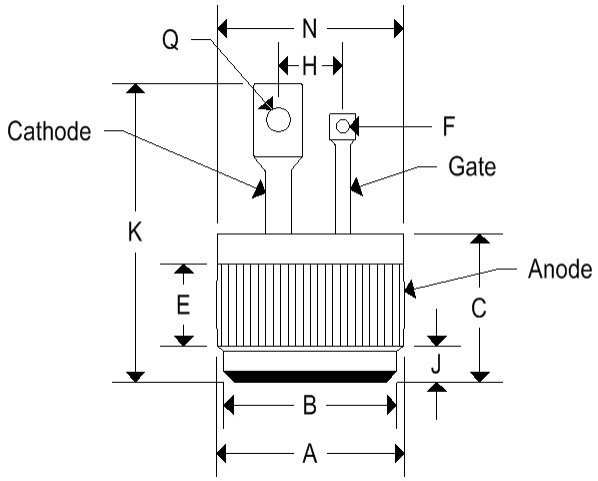
SILICON CONTROLLED RECTIFIER

MECHANICAL CHARACTERISTICS

2N3870-2N3873	
Case	DIGI PF2
Marking	Alpha-numeric
Pin out	See below



	DIGI PF2			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.501	0.505	12.730	12.830
B	0.465	0.475	11.810	12.060
C	0.330	0.380	8.390	9.650
E	0.100	-	2.540	-
F	0.035	0.085	0.890	2.160
H	0.148	0.174	3.750	4.410
J	0.080	0.097	2.040	2.460
K	-	0.800	-	20.320
N	-	0.510	-	12.950
Q	0.065	0.160	1.650	4.060

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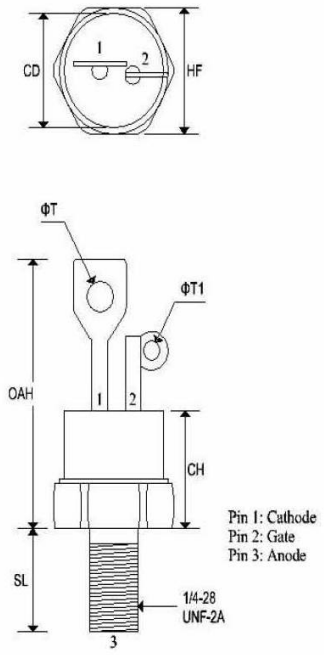
SILICON CONTROLLED RECTIFIER

MECHANICAL CHARACTERISTICS

2N3896-2N3899	
Case	TO-48
Marking	Alpha-numeric
Polarity	Cathode



	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
ΦT_1	0.060	0.075	1.524	1.905

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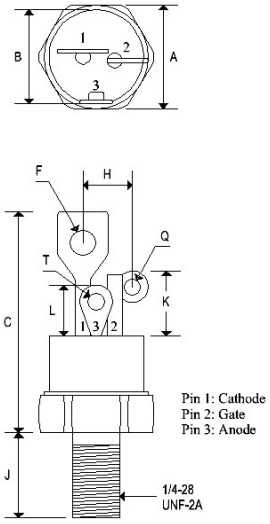
MECHANICAL CHARACTERISTICS

2N6171-2N6174	
Case	TO-48
Marking	Alpha-numeric
Polarity	Cathode



	TO-48 ISO			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.551	0.559	14.000	14.200
B	0.501	0.505	12.730	12.830
C	-	1.280	-	32.510
F	-	0.160	-	4.060
H	-	0.265	-	6.730
J	0.420	0.455	10.670	11.560
K	0.300	0.350	7.620	8.890
L	0.255	0.275	6.480	6.990
Q	0.055	0.085	1.400	2.160
T	0.135	0.150	3.430	3.810

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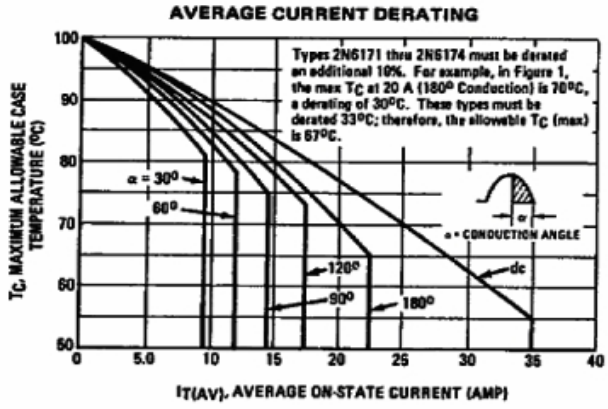

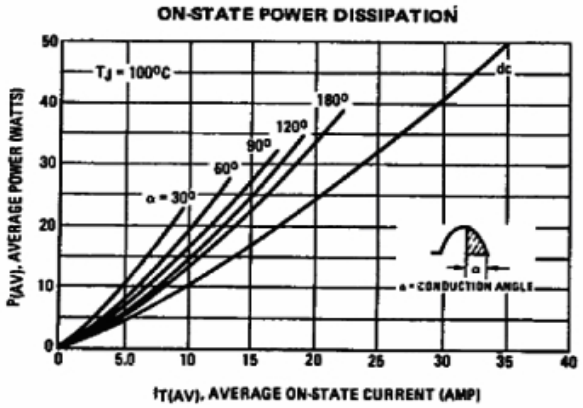

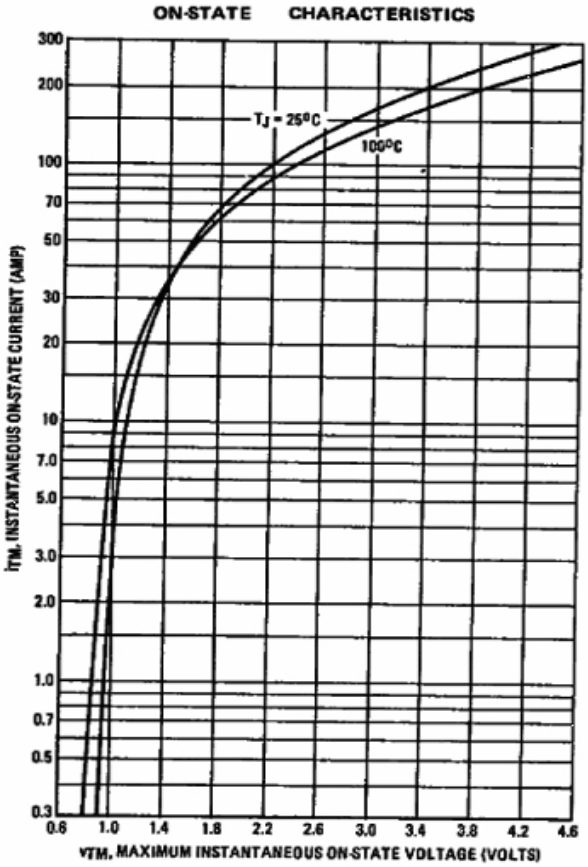

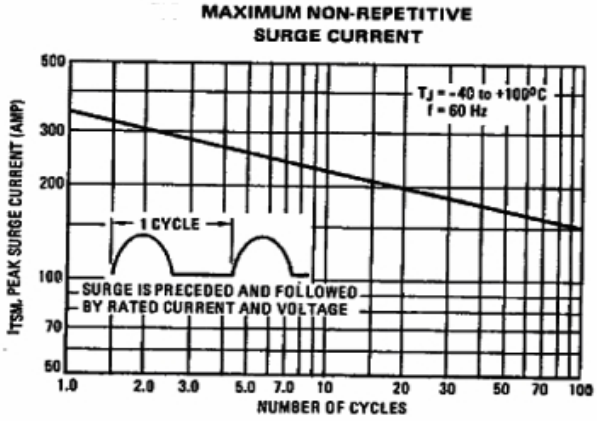

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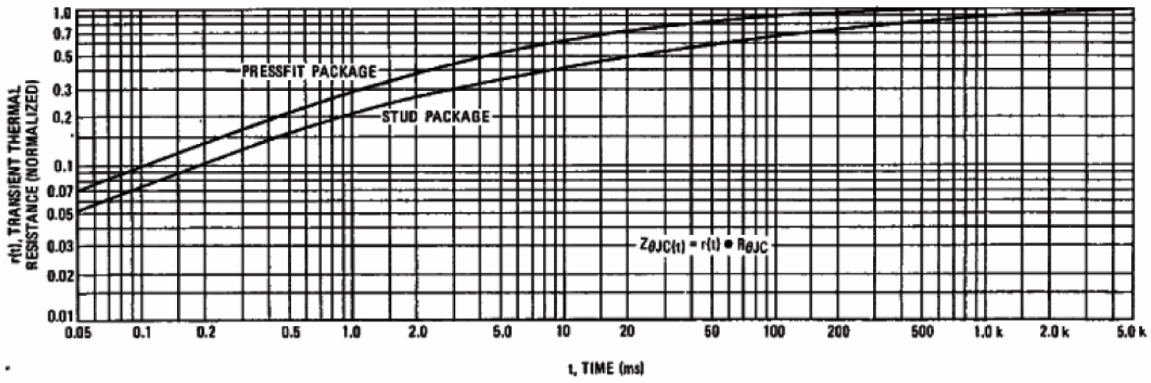
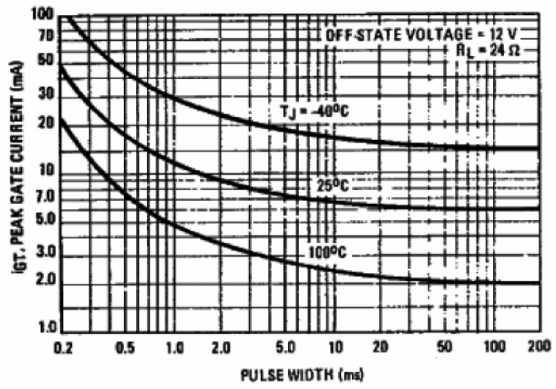
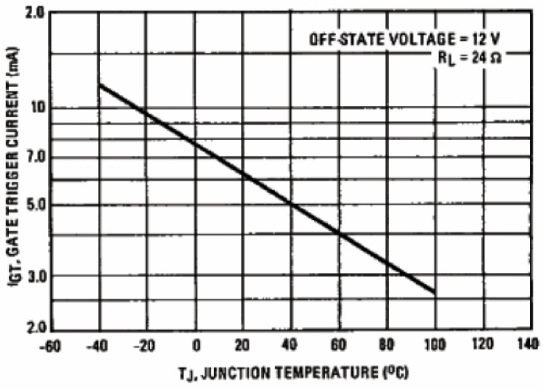
TYPICAL THERMAL RESPONSE



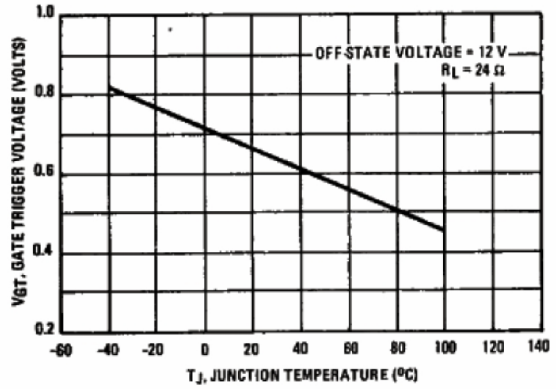
PULSE TRIGGER CURRENT



GATE TRIGGER CURRENT



GATE TRIGGER VOLTAGE



HOLDING CURRENT