Silicon Triac

2N5754

2,5A Triac

100V / 2,5A

DATASHEET

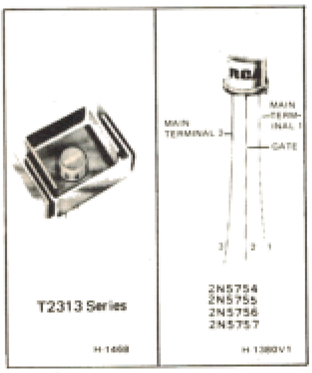
OEM –RCA

Source: RCA Databook 1974

Datasheet Rev. 1.3 – 04/19 – data without warranty / liability

File No. 414

Thyristors 2N5754 2N5756 2N5755 2N5757 T2313 Series



2.5-Ampere Silicon Triacs

For Low-Power Phase-Control and Load-Switching Applications

For Low-Voltage Operation – 2N5754, T2313A (40684)■
For 120-V Line Operation – 2N5755, T2313B (40685)■
For 240-V Line Operation – 2N5756, T2313D (40686)■
For High-Voltage Operation – 2N5757, T2313M (40687)■

■Numbers in parentheses (e.g. 40684) are former RCA type numbers.

Features:

- 25/40 mA I_{GT}
- Shorted Emitter Design
- 3-Lead Package for Printed Circuit Board Applications
- Small Size . . . Suitable for Remote Switching Applications

These RCA triacs are gate-controlled full-wave silicon ac switches that are designed to switch from an off-state to an on-state for either polarity of applied voltage with positive or negative gate triggering voltages.

The gate sensitivity of these triacs permits the use of economical transistorized control circuits and enhances their use in low-power phase control and load-switching applications.

Types 2N5754, 2N5755, 2N5756, 2N5757★ utilize a compact package (similar to JEDEC TO-5) and have an RMS on-state current rating of 2.5 A and repetitive peak off-state voltage ratings of 100, 200, 400, and 600 volts, respectively.

Types T2313A, T2313B, T2313D, T2313M▲ are the same as the 2N5754, 2N5755, 2N5756, 2N5757, respectively but have factory-attached heat-radiators and are intended for printed-circuit board applications.

★ Formerly RCA Dev. types TA7500, TA7501, TA7502, and TA7503, respectively.

▲ Formerly RCA Dev. types TA7579, TA7580, TA7581, and TA7582, respectively.

MAXIMUM RATINGS, *Absolute-Maximum Values;*
For Operation with 50/60-Hz, Sinusoidal Supply Voltage and Resistive or Inductive Load

* REPETITIVE PEAK OFF-STATE VOLTAGE♦	V_{DROM}		
Gate Open, T_J = 65° to 100°C			
2N5754, T2313A		100	V
2N5755, T2313B		200	V
2N5756, T2313D		400	V
2N5757, T2313M		600	V
RMS ON-STATE CURRENT	$I_{T(RMS)}$		
Conduction angle = 360°:			
* Case temperature (T_C) = 70°C 2N5754, 2N5755, 2N5756, 2N5757		2.5	A
Ambient temperature (T_A) = 25°C T2313 series		1.9	A
For other conditions		See Figs. 2,3,4, & 5.	
PEAK SURGE (NON-REPETITIVE) ON-STATE CURRENT	I_{TSM}		
* For one full cycle of applied principal voltage (60-Hz, sinusoidal)		25	A
For one full cycle of applied principal voltage (50-Hz, sinusoidal)		21	A
For more than one full cycle of applied voltage		*See Fig.6.*	
* PEAK GATE-TRIGGER CURRENT	I_{GTM}		
For 1 μs 1 max		1	A
GATE POWER DISSIPATION:			
* PEAK†	P_{GM}		
For 1 μs max		10	W
AVERAGE	$P_{G(AV)}$		
* For case temperature (T_C) = 60°C		0.15	W
* For ambient temperature (T_A) = 25°C		0.05	W
* TEMPERATURE RANGE‡:			
Storage		-65 to 150	°C
Operating (case)		-65 to 100	°C
* LEAD TEMPERATURE:			
During soldering, terminal temperature at a distance ≥ 1/16 in. (1.58 mm) from the case for 10 s		225	°C

♦ For either polarity of main terminal 2 voltage (V_{MT2}) with reference to main terminal 1.

† For either polarity of gate voltage (V_G) with reference to main terminal 1.

‡ For information on the reference point of temperature measurement, see *Dimensional Outlines*.

* In accordance with JEDEC registration data format (JS-14, RDF-2).

ELECTRICAL CHARACTERISTICS

At Maximum Ratings and at Indicated Case Temperature (T_C) Unless Otherwise Specified

CHARACTERISTIC	Mode	V_{MT2}	V_G	SYMBOL	LIMITS ALL TYPES Min.	Typ.	Max.	UNITS
* **Peak Off-State Current:** ♠ Gate Open, T_J = 100°C and V_{DROM} = Max. rated value				I_{DROM}	-	0.2	0.75	mA
Maximum On-State Voltage: ♠				V_{TM}				V
For i_T = 10 A (peak) and T_C = 25°C					-	2.2	2.6	
* For i_T = 3.5 A (peak) and T_C = 25°C					-	-	1.8	
DC Holding Current: ♠ Gate Open, Initial principal current = 150 mA (DC), V_D = 12 V				I_{HO}				mA
At T_C = 25°C					-	6	35	
At T_C = -65°C					-	20	82*	
For other case temperatures					← See Fig.8. →			
* **Critical Rate-of-Rise of Off-State Voltage:** ♠ For V_D = V_{DROM}, exponential voltage rise, and gate open, T_C = 100°C				dv/dt	10	100	-	V/µs
DC Gate-Trigger Current: ♠ † For V_D = 12 V (DC), R_L = 30Ω, and T_C = 25°C	I^+	positive	positive	I_{GT}	-	5	25	mA
	III^-	negative	negative		-	5	25	
	I^-	positive	negative		-	10	40	
	III^+	negative	positive		-	10	40	
T_C = -65°C	I^+	positive	positive		-	30	60*	
	III^-	negative	negative		-	30	60*	
	I^-	positive	negative		-	40	100*	
	III^+	negative	positive		-	40	100*	
For other case temperatures					← See Fig.11. →			
DC Gate-Trigger Voltage: ♠ † For V_D = 12 V (DC) and R_L = 30 Ω				V_{GT}				V
At T_C = 25°C					-	0.9	2.2	
At T_C = -65°C					-	1.5	3*	
For other case temperatures					← See Fig.12. →			
* For v_D = V_{DROM} and R_L = 125Ω At T_C = 100°C					0.2	-	-	
* **Thermal Resistance, Junction-to-Case:** Steady-State				θ_{J-C}	-	-	8.5	°C/W

♠ For either polarity of main terminal 2 voltage (V_{MT2}) with reference to main terminal 1.

† For either polarity of gate voltage (V_G) with reference to main terminal 1.

* In accordance with JEDEC registration data format (JS-14, RDF-2).

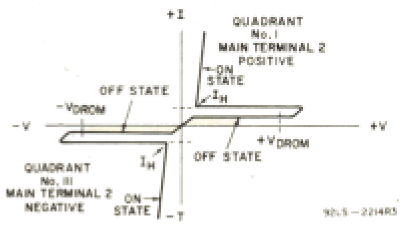


Fig. 1 – Principal voltage-current characteristic.

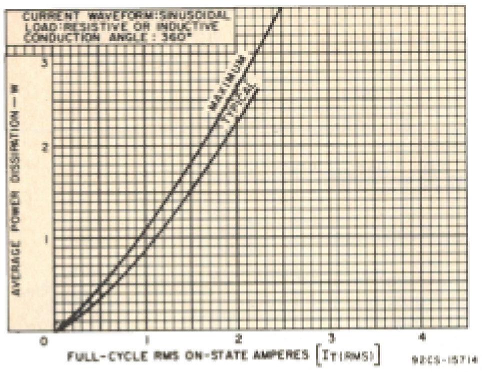


Fig. 2 — Power dissipation vs. on-state current.

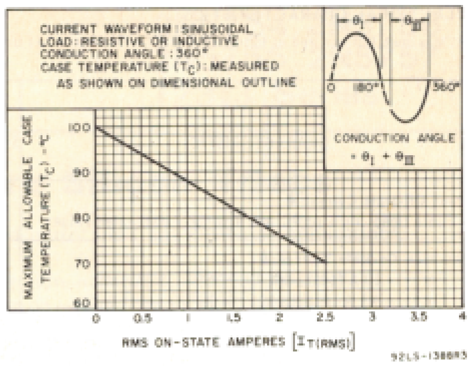


Fig. 3 — Maximum allowable case temperature vs. on-state current.

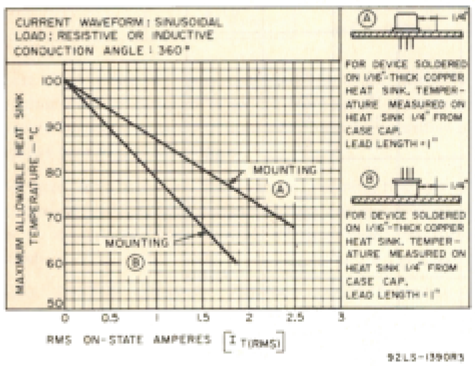


Fig. 4 — Maximum allowable heat-sink temperature vs. on-state current.

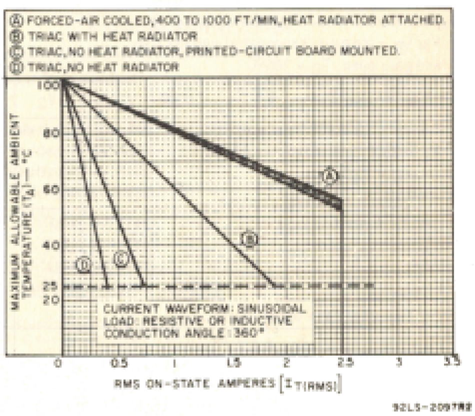


Fig. 5 — Maximum allowable ambient temperature vs. on-state current.

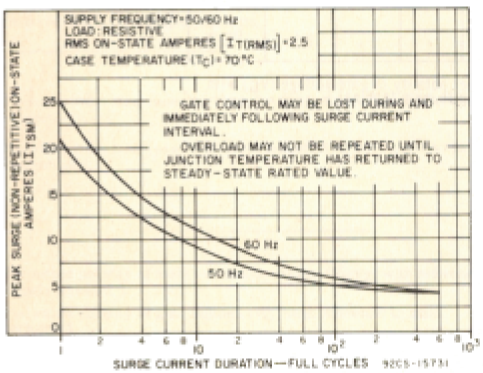


Fig. 6 — Peak surge on-state current vs. surge-current duration.

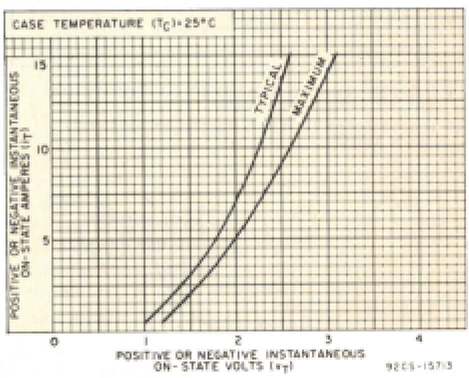


Fig. 7 — On-state current vs. on-state voltage.

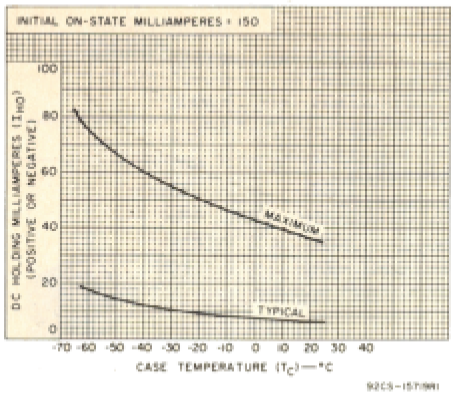


Fig. 8 – DC holding current (positive or negative) vs. case temperature.

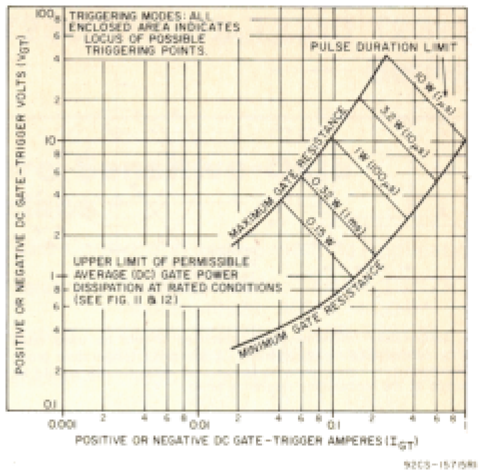
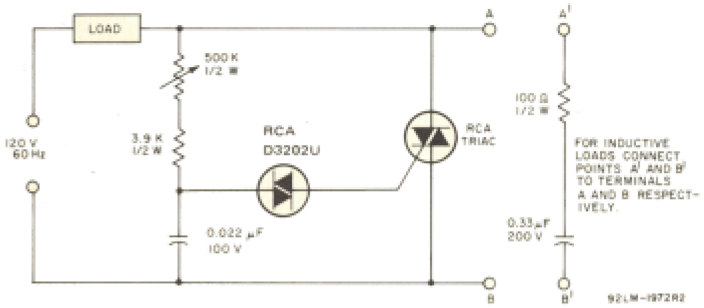


Fig. 9 – Gate trigger characteristics and limiting conditions for determination of permissible gate trigger pulses.



NOTE: For incandescent lamp loads which produce burnout current surges with I^2t values greater than 2.5 ampere^2 seconds, connect a 10-ohm resistor of appropriate power rating in series with the load. This rating can be determined as follows:

Power Rating of 10-ohm Resistor = 10(rms load current)^2

Fig. 10 – Typical phase-control circuit.

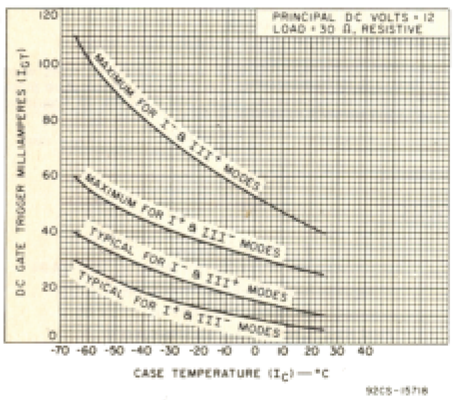


Fig. 11 – DC gate-trigger current vs. case temperature.

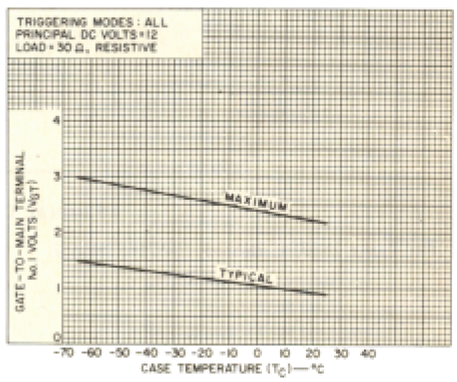
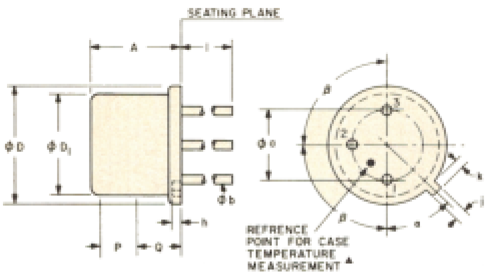


Fig. 12 – DC gate-trigger voltage vs. case temperature.

DIMENSIONAL OUTLINE FOR TYPES 2N5754, 2N 5755, 2N5756, 2N5757



▲The temperature reference point specified should be used when making temperature measurements. A low-mass temperature probe or thermocouple having wire no larger than AWG No. 36 should be attached at the temperature reference point.

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
φa	.190	.210	4.83	5.33	
A	.240	.260	6.10	6.60	
φb	.017	.021	.44	.53	
φD	.335	.366	8.51	9.30	
φD_1		.330	8.13	8.38	
h	.015	.035	.38	.89	
i	.028	.035	.71	.89	
k	.029	.045	.74	1.14	
l	.975	1.025	24.76	26.03	
P	.100	-	2.54	-	
Q	-	-	-	-	1
α	45° NOMINAL				
β	50° NOMINAL				

Note 1: Details of outline in this zone optional.

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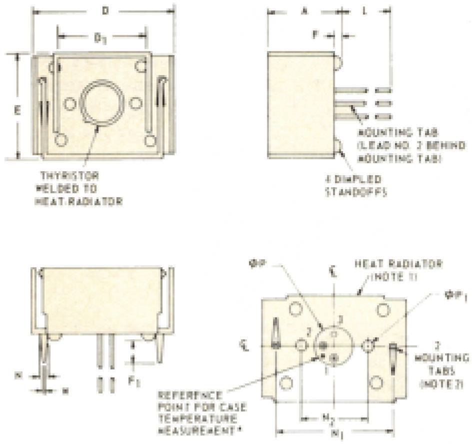
DIMENSIONAL OUTLINE FOR T2313 SERIES



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	–	.630	–	16.00	
D	1.205	1.235	30.61	31.37	
D_1	.745	.755	18.923	19.177	
E	.875	.905	22.22	22.99	
F	.040	.055	1.02	1.40	
F_1	.170	.225	4.32	5.72	
L	.920	–	23.37	–	
ΦP	.295	.305	7.493	7.747	
ΦP_1	.093	.095	2.362	2.413	
N	.048	.062	1.21	1.57	
N_1	.998	1.002	25.349	25.450	3
N_2	.687	.689	17.45	17.50	3
W	.048	.052	1.219	1.320	

NOTES:

1. 0.035 C.R.S., finish: electroless nickel plate
2. Recommended hole size for printed-circuit board is 0.070 in. (1.78 mm) dia.
3. Measured at bottom of heat radiator

▲The specified temperature-reference point should be used when making temperature measurements. A low-mass temperature probe or thermocouple having wire no larger than AWG No. 26 should be attached at the temperature reference point.

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TERMINAL CONNECTIONS

For Types 2N5754, 2N5755, 2N5756, 2N5657

Lead No. 1 – Main terminal 1
Lead No. 2 – Gate
Case, Lead No. 3 – Main terminal 2

For T2313 Series

Lead No. 1 – Main terminal 1
Lead No. 2 – Gate
Heat Rad., Lead No. 3 – Main terminal 2