

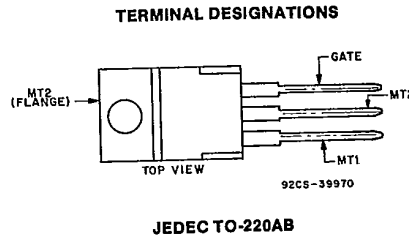
File Number 1314

T2800, T2802 Series

High Voltage, 8-A Silicon Triacs
For Power-Control and Power-Switching Applications

Features:

- 800V, 125 Deg. C T_J Operating
- High dv/dt and di/dt Capability
- Low Switching Losses
- High Pulse Current Capability
- Low Forward and Reverse Leakage
- Sijpos Oxide Glass Multilayer Passivation System
- Advanced Unisurface Construction
- Precise Ion Implanted Diffusion Source



These RCA triacs are gate-controlled full-wave silicon switches utilizing a plastic case with three leads to facilitate mounting on printed-circuit boards. They are intended for the control of ac loads in such applications as motor controls, light dimmers, heating controls, and power-switching systems.

These devices 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 T2802 series triacs are characterized for I⁺, III⁻ gate-triggering modes only and should suit a wide range of applications that employ diac or anode on/off triggering.

All series employ the plastic JEDEC TO-220AB package. The plastic package design provides not only ease of mounting but also low thermal impedance, which allows operation at high case temperatures and permits reduced heat-sink size.

MAXIMUM RATINGS, Absolute-Maximum Values:

| | T2800A | T2800B | T2800C | T2800D | T2800E | T2800M | T2800N | |
|--|-------------|--------|--------|--------|--------|--------|--------|------------------|
| | T2802A | T2802B | T2802C | T2802D | T2802E | T2802M | T2802N | |
| V _{DROM} * (Gate Open, T _J = -65 to 125°C) | 100 | 200 | 300 | 400 | 500 | 600 | 800 | V |
| I _{T(RMS)} : T _C = 105°C | 8 | | | | | | | A |
| I _{TSM} (For one cycle of applied principal voltage): | | | | | | | | A |
| 60 Hz (sinusoidal), T _C = 105°C | 100 | | | | | | | A |
| 50 Hz (sinusoidal), T _C = 105°C | 85 | | | | | | | A |
| For more than one cycle | See Figs. 2 | | | | | | | |
| di/dt: V _D = V _{DROM} , I _G = 200 mA, t _r = 0.1 μs | 70 | | | | | | | A/μs |
| i ² t (At T _C shown for I _{T(RMS)}): | | | | | | | | A ² s |
| t = 20 ms | 55 | | | | | | | A ² s |
| = 2.5 ms | 28 | | | | | | | A ² s |
| = 0.5 ms | 16 | | | | | | | A ² s |
| I _{GTM†} | 4 | | | | | | | A |
| P _{GM} : (for 1 μs max., I _{GTM} ≤ 4 A) | 16 | | | | | | | W |
| P _{G(AV)} | 0.35 | | | | | | | W |
| T _{sig} | -65 to 150 | | | | | | | °C |
| T _C | -65 to 125 | | | | | | | °C |
| T _T During soldering for 10 s max. (terminals and case) ... | 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.

Triacs

T2800, T2802 Series

ELECTRICAL CHARACTERISTICS

At Maximum Ratings Unless Otherwise Specified, and at Indicated Temperature

| CHARACTERISTIC | SYMBOL | LIMITS | | | UNITS | |
|---|-------------------|--|------------------|----------------|-------|------|
| | | For All Types Unless Otherwise Specified | | | | |
| | | Min. | Typ. | Max. | | |
| Peak Off-State Current: [*] Gate open, T _J = 125°C, V _{DROM} = Max. rated value | I _{DROM} | — | 0.1 | 2 | mA | |
| Maximum On-State Voltage: [*] (See Fig. 4) For I _T = 30 A (peak), T _C = 25°C | V _{TM} | — | 1.7 | 2 | V | |
| DC Holding Current: [*] Gate open, Initial principal current = 150 mA (dc), V _D = 12 V, T _C = 25°C, T2800 series T2802 series | I _{HO} | — | 15 | 30 | mA | |
| For other case temperatures | | | 20 | 60 | | |
| | | See Fig. 5 | | | | |
| Critical Rate-of-Rise of Commutation Voltage: [†] For V _D = V _{DROM} , I _{T(RMS)} = 8 A, commutating di/dt = 4.3 A/ms, gate unenergized, T _C = 105°C | dv/dt | 4 | 10 | — | V/μs | |
| Critical Rate-of-Rise of Off-State Voltage: [*] For V _D = V _{DROM} , exponential voltage rise, and gate open, T _C = 125°C | dv/dt | T2800B, T2802B | 100 | 300 | — | V/μs |
| | | T2800C, T2802C | 85 | 275 | — | |
| | | T2800D, T2802D | 75 | 250 | — | |
| | | T2800E, T2802E | 65 | 225 | — | |
| | | T2800M, T2802M | 60 | 200 | — | |
| | | T2800N, T2802N | 40 | 100 | — | |
| | | | | | | |
| DC Gate-Trigger Current: ^{* ‡} For V _D = 12 V (dc), R _L = 30 Ω, T _C = 25°C | I _{GT} | Mode | V _{MT2} | V _G | | |
| I+ positive positive T2800 series | | — | 10 | 25 | mA | |
| T2802 series | | — | 25 | 50 | | |
| III- negative negative T2800 series | | — | 15 | 25 | | |
| T2802 series | | — | 25 | 50 | | |
| I- positive negative T2800 series only | — | 20 | 60 | | | |
| IIi+ negative positive T2800 series only | — | 30 | 60 | | | |
| For other case temperatures | See Figs. 6 & 7 | | | | | |
| DC Gate-Trigger Voltage: ^{* ‡} For V _D = 12 V (dc), R _L = 30 Ω, T _C = 25°C | V _{GT} | — | 1.25 | 2.5 | V | |
| For other case temperatures | | See Fig. 8 & 9 | | | | |
| For V _D = V _{DROM} , R _L = 125 Ω, T _C = 125°C | | 0.2 | — | — | | |
| Gate-Controlled Turn-On Time: For V _D = V _{DROM} , I _{GT} = 80 mA, t _r = 0.1 μs, I _T = 10 A (peak), T _C = 25°C | t _{gt} | — | 1.6 | 2.5 | μs | |
| Thermal Resistance: | R _{θJC} | — | — | 2.2 | °C/W | |
| Junction-to-Case | R _{θJA} | — | — | 60 | | |
| Junction-to-Ambient | | | | | | |

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

[†]Variants of these devices having dv/dt characteristics selected specifically for inductive loads are available on special order; for additional information, contact your RCA Representative or your RCA Distributor.

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

T2800, T2802 Series

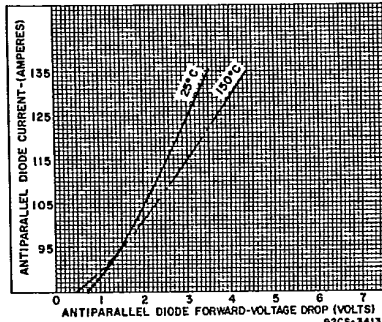


Fig. 1 — Maximum allowable case temperature vs. on-state current.

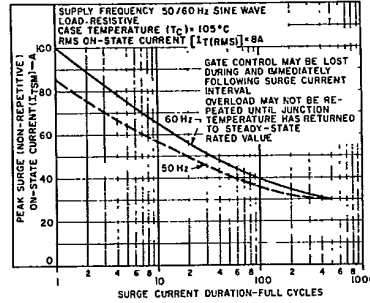


Fig. 2 — Peak surge on-state current vs. surge current duration for T2800, T2802 series.

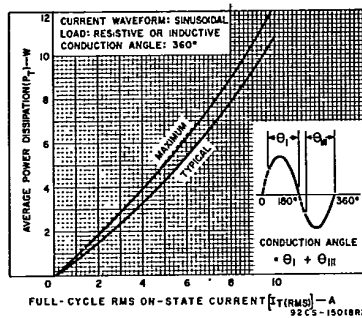


Fig. 3 — Power dissipation vs. on-state current for T2800, T2802 series.

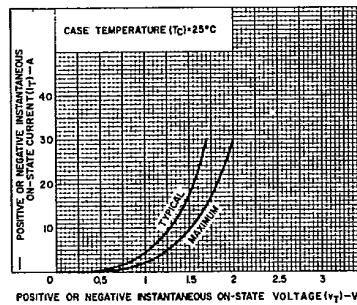


Fig. 4 — On-state current vs. on-state voltage for T2800, T2802 series.

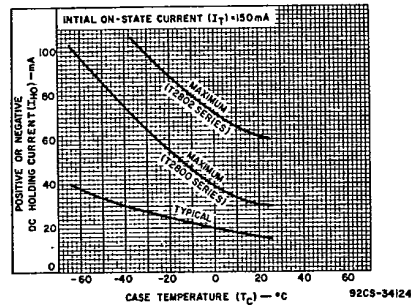


Fig. 5 — DC holding current vs. case temperature for T2800, T2802.

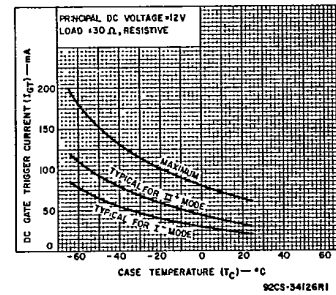


Fig. 6 — DC gate-trigger current (for I+ and III+ triggering modes) vs. case temperature for T2800, T2802 series.

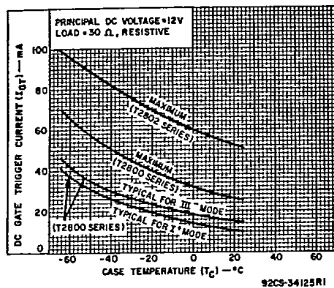


Fig. 7 — DC gate-trigger current (for I+ and III+ triggering modes) vs. case temperature for T2800, T2802 series.

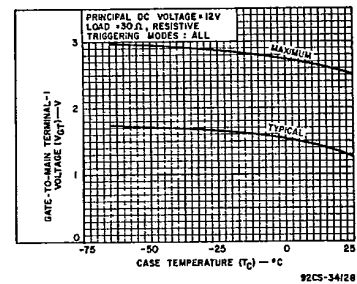


Fig. 8 — DC gate-trigger voltage vs. case temperature for T2800, T2802 series.

Triacs

T2800, T2802 Series

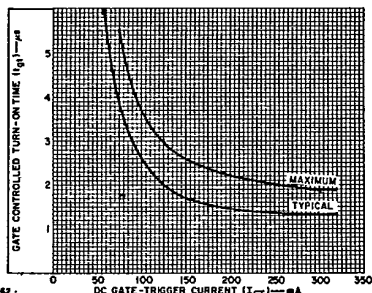


Fig. 9 — Turn-on time vs. gate-trigger current for T2800, T2802 series.

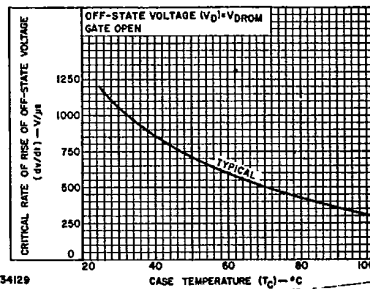


Fig. 10 — Typical critical rate-of-rise of off-state voltage vs. case temperature for all series.

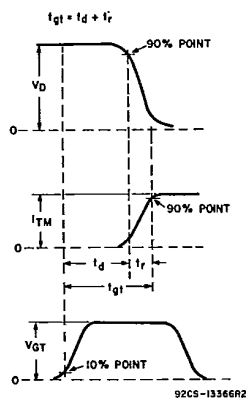


Fig. 11 — Relationship between off-state voltage, on-state current, and gate-trigger voltage showing reference points for definition of turn-on time (t_{gt}).

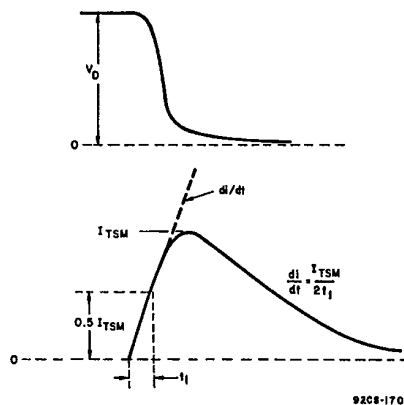


Fig. 12 — Rate-of-change of on-state current with time (defining dI/dt).

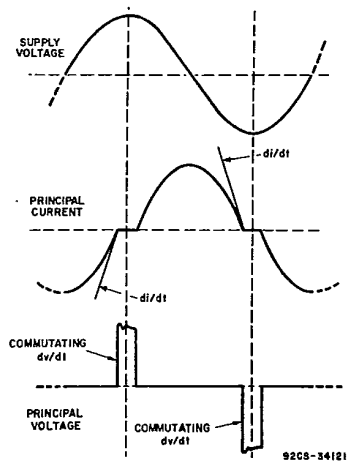


Fig. 13 — Relationship between supply voltage and principal current (inductive load) showing reference points for definition of commutating voltage (dV/dt).

NOTES

1. Curve defines temperature rise of either junction above case temperature for equal-amplitude symmetrical sine wave current at 50 and 80 Hz.
2. Curve considers junction temperature measured immediately after the final cycle of current.
3. Gate will regain control if temperature is maintained below rated value and load current is reduced or maintained at RMS value.
4. For more than 100 cycles of current the case temperature rise must be observed and used in calculating the total junction temperature.
5. Junction temperature rise above case is defined as apparent transient thermal impedance times average conduction power dissipated during full cycle conduction.
6. Apparent steady-state value is not the same as JEDEC value listed as steady-state in characteristics table.