

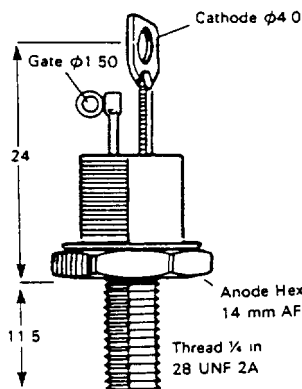
FAST TURN-OFF ASYMMETRICAL THYRISTOR

ACR 22U

$I_T(AV) = 22A$

$t_q = 5.5\mu s$

| VOLTAGE RATINGS | Repetitive peak voltages | | Crest (peak) working voltages | |
|-----------------|--------------------------|-----------|-------------------------------|-----------|
| | Type Number | V_{DRM} | V_{RRM} | V_{DWM} |
| ACR22U04LG | 400 | 10 | 400 | 10 |
| ACR22U06LG | 600 | 10 | 600 | 10 |
| ACR22U08LG | 800 | 10 | 800 | 10 |
| ACR22U10LG | 1000 | 10 | 1000 | 10 |
| ACR22U12LG | 1200 | 10 | 1200 | 10 |



Conforms to SO-28
TO-48
Weight 10.5g
Torque Max 4.0 Nm
Rec. 3.5 Nm

Applications

- High frequency inverters
- Regulated Power Supplies
- Cycloconverters
- Ultrasonic Generators
- Induction Heaters
- Electronic Welding

Features

The ACR22U is a glass passivated asymmetrical thyristor. This device has exceptionally fast turn-off capabilities combined with good turn-on characteristics.

Current Ratings

| Symbol | Description | Conditions | Units |
|-----------|--------------------------------------|--|-------|
| $I_T(AV)$ | Mean on-state current | Half wave resistive load $T_{case} = 70^\circ C$ | 22 A |
| I_T | Continuous (direct) on-state current | $T_{case} = 85^\circ C$ | 22A |
| I_{RMS} | RMS value | Max value | 35A |

Surge Ratings

| | | | |
|-----------|--|---|----------------------|
| I_{TSM} | Surge (non-repetitive) on-state current | $T_J = 125^\circ C$ | 220 A |
| $I^2 t$ | $I^2 t$ for fusing | 10ms half sine | 242 A ² s |
| di/dt | Rate of rise of on-state current | From V_{DRM} to 125A, Gate source 15V, 15Ω, rise time, 50ns | 2000 A/μs |
| dv/dt | Min linear rate of rise of off-state voltage | Gate open circuit $T_{case} = 125^\circ C$ | †500V/μs |

†Available up to 1000V/μs

Gate Ratings

| | | |
|-----------|---------------------------|-------------------------------|
| V_{FGM} | Peak forward gate voltage | 40 V |
| V_{RGM} | Peak reverse gate voltage | 10 V |
| I_{FGM} | Peak forward gate current | 10 A |
| P_{GM} | Peak gate power | 40 W |
| F_G | Mean gate power | Forward = 10W Reverse = 6W |

Averaging time = 10ms max.

Temperature & Frequency Ratings

| | | |
|-----------|------------------------------|--------------|
| T_{vj} | Virtual junction temperature | 125°C |
| T_{stg} | Store temperature range | -55 to 125°C |

Characteristics $T_{case} = 25^\circ C$ unless otherwise stated

| | | | |
|---------------|--------------------------------|---|--------|
| V_{TM} | On-state voltage | $I_T = 100A$ | Fig. 5 |
| I_{DM} | Peak off-state current | $T_{case} = 125^\circ C @ V_{DRM}$ | |
| I_{RM} | Peak reverse current | $T_{case} = 125^\circ C @ V_{RRM}$ | |
| I_L | Latching current | | |
| I_H | Holding current | | |
| I_{GT} | Gate trigger current | $V_{DWM} = 12V, R_L = 30\Omega$ | |
| V_{GT} | Gate trigger voltage | $V_{DWM} = 12V, R_L = 30\Omega$ | Fig. 6 |
| t_d | Delay time | $V_D = 300V, \text{gate source} = 15V, 15\Omega$ | |
| t_q | Circuit computed turn-off time | $I_T = 50A \text{ sq. wave } 50\mu s \text{ pulse, } T_c = 120^\circ C,$ $di/dt = 50A/\mu s, dv/dt = 600V/\mu s \text{ to } V_{DRM}$ | |
| $R_{th(j-h)}$ | Thermal resistance | Gate voltage at turn-off > -1V Mounting torque 3.5 Nm (with mounting grease) | |

| LIMIT | | | |
|-------|------|------|-------|
| Min | Typ. | Max | Units |
| - | - | 2.7 | V |
| - | - | 10 | mA |
| - | - | 10 | mA |
| - | 45 | - | mA |
| - | 35 | - | mA |
| - | 60 | 200* | mA |
| - | 0.9 | 3 | V |
| - | - | 250 | ns |
| - | - | 5.5 | μs |
| - | - | 1.05 | °C/W |

*Recommended gate source is 15V, 15Ω with 50ns rise time or minimum gate current 500mA

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Fig. 5.
ON-STATE CHARACTERISTICS

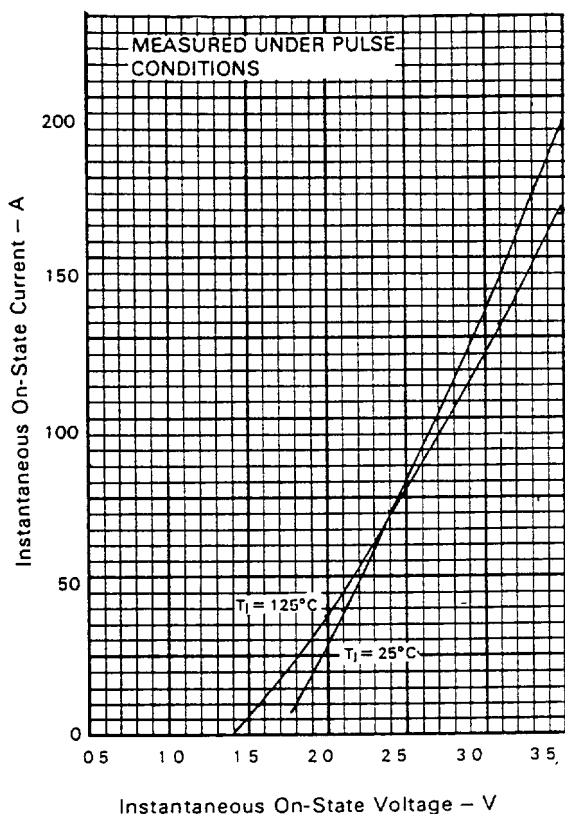


Fig. 6. TYPICAL CIRCUIT COMMUTATED TURN-OFF TIME VS. GATE VOLTAGE AT TURN-OFF

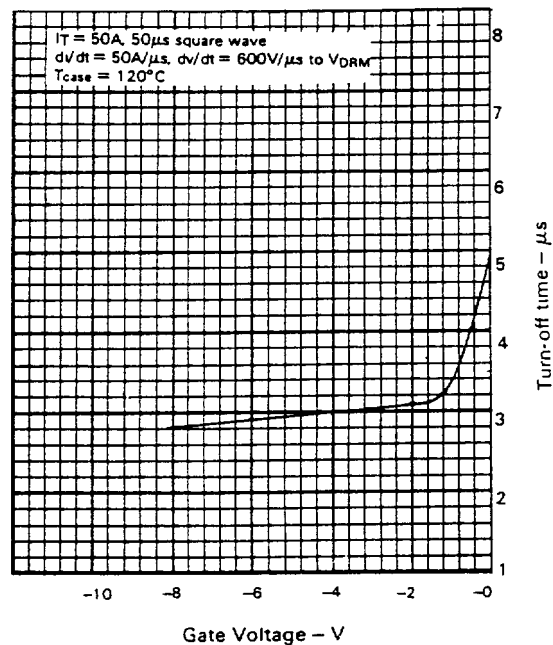
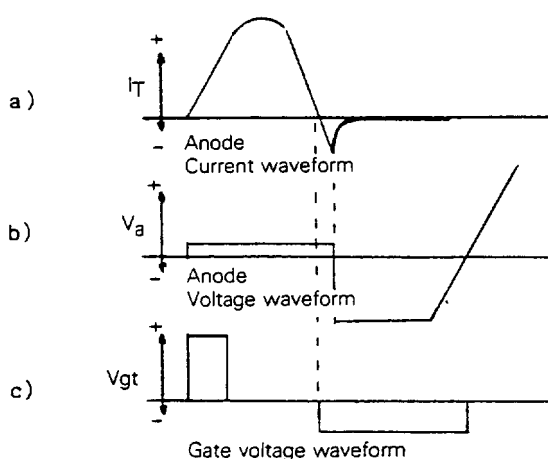
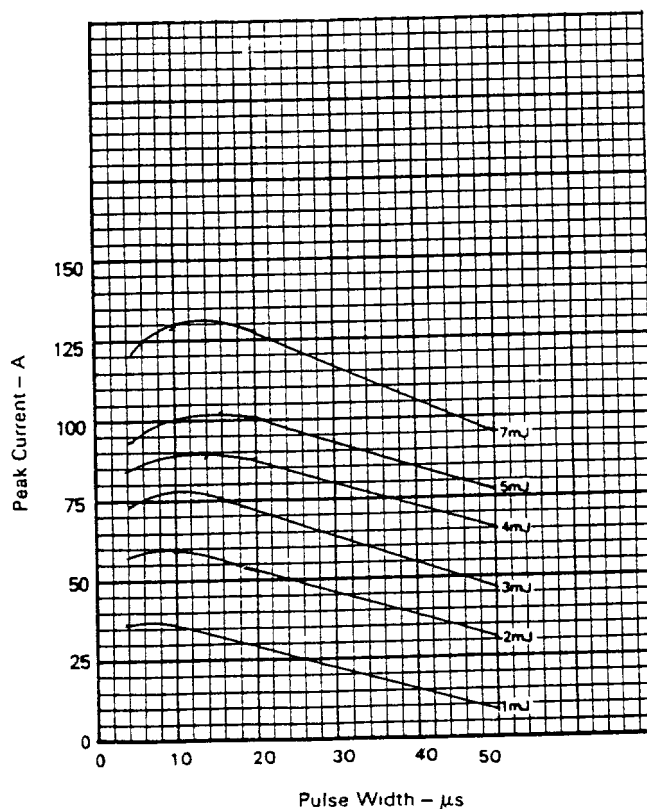


Fig. 7 MAXIMUM ENERGY LOSS/PULSE WHEN SWITCHING A HALF SINUSOIDAL PULSE FROM 600V



WAVEFORM OF GATE VOLTAGE AT TURN-OFF



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Fig. 1 MINIMUM LINEAR CRITICAL RATE OF RISE OF OFF-STATE VOLTAGE VS GATE VOLTAGE

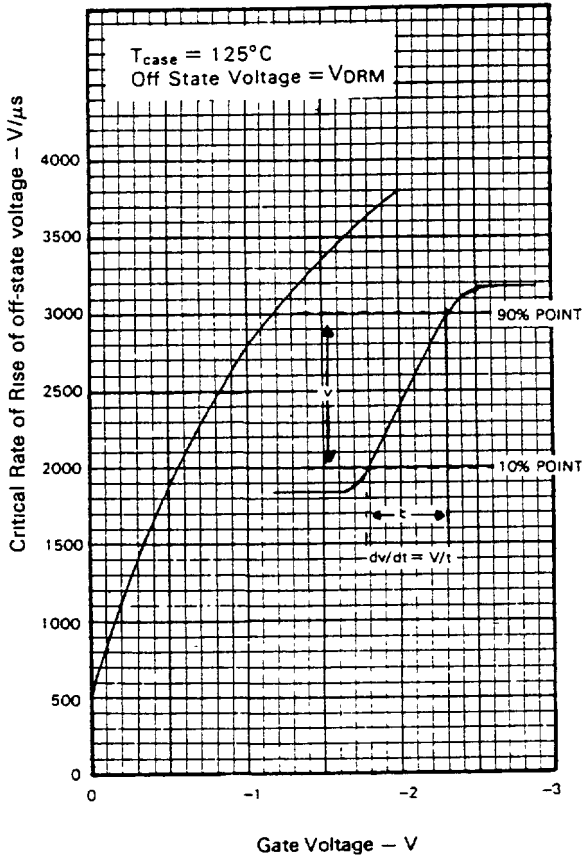


Fig. 3 REVERSE GATE CHARACTERISTICS

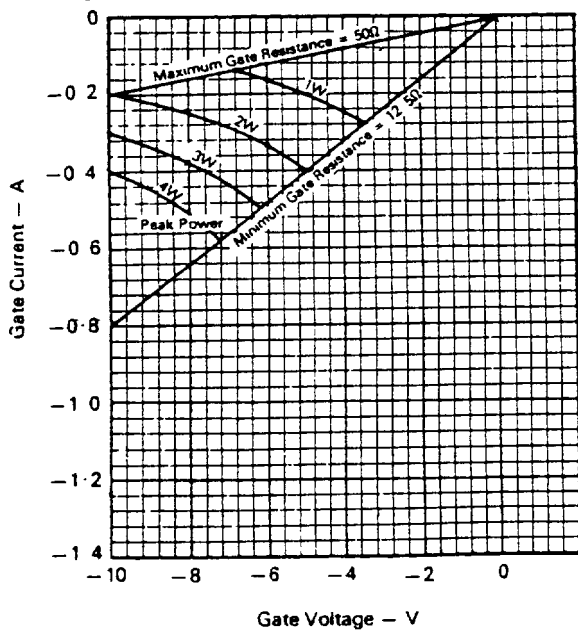


Fig. 2. GATE CHARACTERISTICS

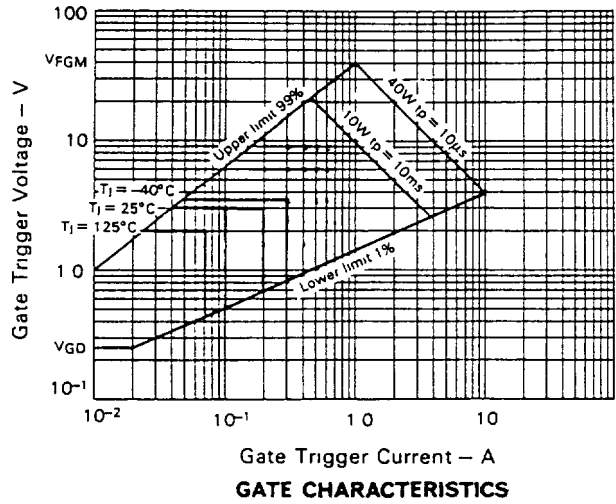
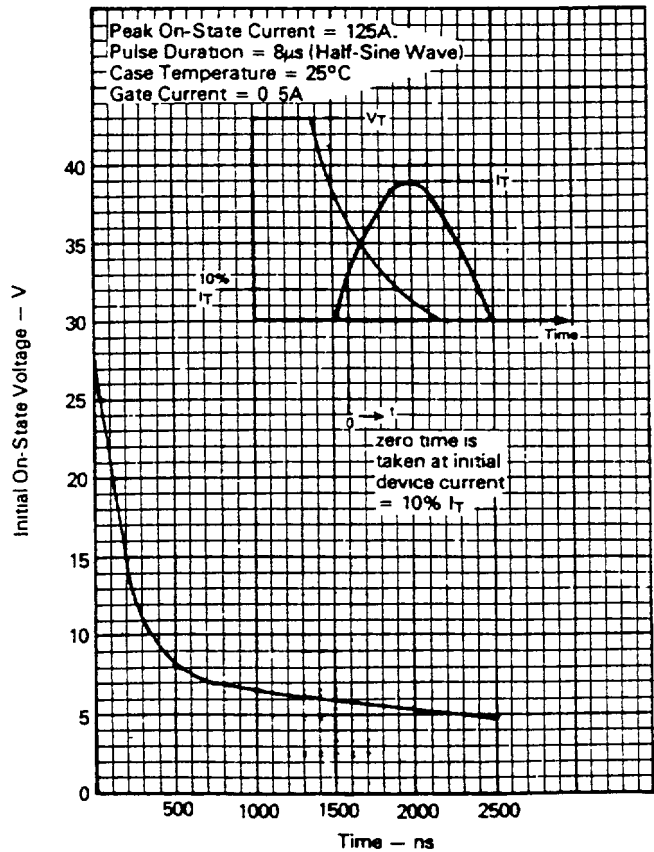


Fig. 4. TYPICAL INITIAL ON-STATE VOLTAGE VS TIME



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