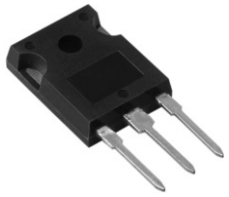
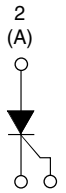
# Phase Control SCR, 35 A



TO-247AC




## DESCRIPTION/FEATURES

Pb-free Available

**RoHS*** COMPLIANT

The 40TPS...APbF High Voltage Series of silicon controlled rectifiers are specifically designed for medium power switching and phase control applications. The glass passivation technology used has reliable operation up to 125 °C junction temperature. Low Igt parts available.

Typical applications are in input rectification (soft start) and these products are designed to be used with Vishay HPP input diodes, switches and output rectifiers which are available in identical package outlines.

This product has been designed and qualified for industrial level and lead (Pb)-free ("PbF" suffix).

| PRODUCT SUMMARY | |
|---|---|
| $V_T$ at 40 A | < 1.45 V |
| $I_{TSM}$ | 500 A |
| $V_{RRM}$ | 800/1200 V |

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|---|---|---|---|
| **PARAMETER** | **TEST CONDITIONS** | **VALUES** | **UNITS** |
| $I_{T(AV)}$ | Sinusoidal waveform | 35 | A |
| $I_{RMS}$ | | 55 | |
| $V_{RRM}/V_{DRM}$ | | 800/1200 | V |
| $I_{TSM}$ | | 500 | A |
| $V_T$ | 40 A, $T_J$ = 25 °C | 1.45 | V |
| dV/dt | | 1000 | V/µs |
| dI/dt | | 100 | A/µs |
| $T_J$ | | - 40 to 125 | °C |

| VOLTAGE RATINGS | | | |
|---|---|---|---|
| **PART NUMBER** | **$V_{RRM}/V_{DRM}$, MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V** | **$V_{RSM}$, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V** | **$I_{RRM}/I_{DRM}$ AT 125 °C mA** |
| 40TPS08APbF | 800 | 900 | 10 |
| 40TPS12APbF | 1200 | 1300 | |
| 40TPS08PbF | 800 | 900 | |
| 40TPS12PbF | 1200 | 1300 | |

* Pb containing terminations are not RoHS compliant, exemptions may apply

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum average on-state current | $I_{T(AV)}$ | $T_C$ = 79 °C, 180° conduction half sine wave | | 35 | A |
| Maximum continuous RMS on-state current as AC switch | $I_{T(RMS)}$ | | | 55 | |
| Maximum peak, one-cycle non-repetitive surge current | $I_{TSM}$ | 10 ms sine pulse, rated $V_{RRM}$ applied | Initial $T_J$ = $T_J$ maximum | 500 | |
| | | 10 ms sine pulse, no voltage reapplied | | 600 | |
| Maximum $I^2t$ for fusing | $I^2t$ | 10 ms sine pulse, rated $V_{RRM}$ applied | | 1250 | $A^2s$ |
| | | 10 ms sine pulse, no voltage reapplied | | 1760 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reapplied | | 12 500 | $A^2\sqrt{s}$ |
| Low level value of threshold voltage | $V_{T(TO)1}$ | $T_J$ = 125 °C | | 1.02 | V |
| High level value of threshold voltage | $V_{T(TO)2}$ | | | 1.23 | |
| Low level value of on-state slope resistance | $r_{t1}$ | | | 9.74 | mΩ |
| High level value of on-state slope resistance | $r_{t2}$ | | | 7.50 | |
| Maximum peak on-state voltage | $V_{TM}$ | 110 A, $T_J$ = 25 °C | | 1.85 | V |
| Maximum rate of rise of turned-on current | dI/dt | $T_J$ = 25 °C | | 100 | A/µs |
| Maximum holding current | $I_H$ | | | 150 | mA |
| Maximum latching current | $I_L$ | | | 300 | |
| Maximum reverse and direct leakage current | $I_{RRM}/I_{DRM}$ | $T_J$ = 25 °C | $V_R$ = Rated $V_{RRM}/V_{DRM}$ | 0.5 | |
| | | $T_J$ = 125 °C | | 10 | |
| Maximum rate of rise of off-state voltage 40TPS08 | dV/dt | $T_J$ = $T_J$ maximum, linear to 80 % $V_{DRM}$, $R_g$-k = Open | | 500 | V/µs |
| Maximum rate of rise of off-state voltage 40TPS12 | | | | 1000 | |

## TRIGGERING

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum peak gate power | $P_{GM}$ | | | 10 | W |
| Maximum average gate power | $P_{G(AV)}$ | | | 2.5 | |
| Maximum peak gate current | $I_{GM}$ | | | 2.5 | A |
| Maximum peak negative gate voltage | - $V_{GM}$ | | | 10 | V |
| Maximum required DC gate voltage to trigger | $V_{GT}$ | $T_J$ = - 40 °C | Anode supply = 6 V resistive load | 4.0 | V |
| | | $T_J$ = 25 °C | | 2.5 | |
| | | $T_J$ = 125 °C | | 1.7 | |
| Maximum required DC gate current to trigger | $I_{GT}$ | $T_J$ = - 40 °C | | 270 | mA |
| | | $T_J$ = 25 °C | | 150 | |
| | | $T_J$ = 125 °C | | 80 | |
| | | $T_J$ = 25 °C, for 40TPS08APbF and 40TPS12APbF | | 40 | |
| Maximum DC gate voltage not to trigger | $V_{GD}$ | $T_J$ = 125 °C, $V_{DRM}$ = Rated value | | 0.25 | V |
| Maximum DC gate current not to trigger | $I_{GD}$ | | | 6 | mA |

| THERMAL AND MECHANICAL SPECIFICATIONS | | | | | |
|---|---|---|---|---|---|
| **PARAMETER** | | **SYMBOL** | **TEST CONDITIONS** | **VALUES** | **UNITS** |
| Maximum junction and storage temperature range | | $T_J$, $T_{Stg}$ | | - 40 to 125 | °C |
| Maximum thermal resistance, junction to case | | $R_{thJC}$ | DC operation | 0.6 | °C/W |
| Maximum thermal resistance, junction to ambient | | $R_{thJA}$ | | 40 | |
| Maximum thermal resistance, case to heatsink | | $R_{thCS}$ | Mounting surface, smooth and greased | 0.2 | |
| Approximate weight | | | | 6 | g |
| | | | | 0.21 | oz. |
| Mounting torque | minimum | | | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | | 12 (10) | |
| Marking device | | | Case style TO-247AC | 40TPS08A | |
| | | | | 40TPS12A | |
| | | | | 40TPS08 | |
| | | | | 40TPS12 | |

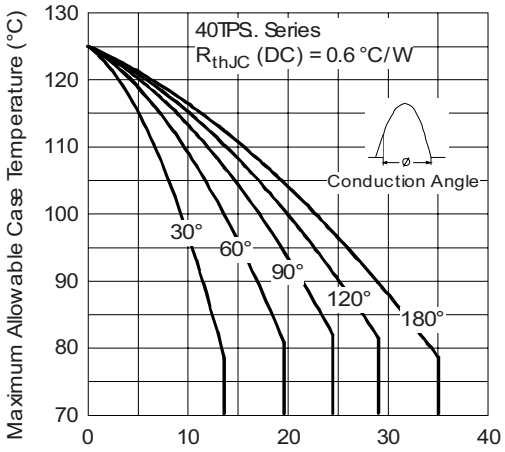



Fig. 1 - Current Rating Characteristics

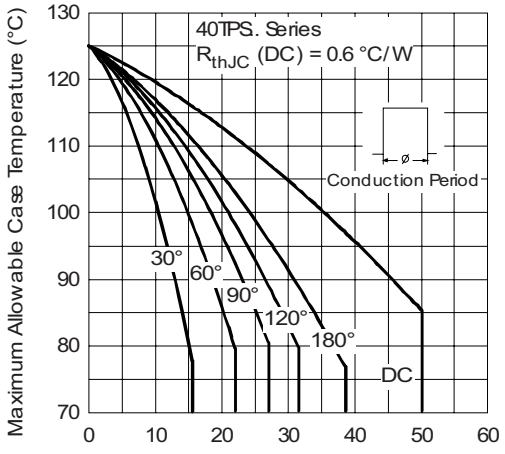



Fig. 2 - Current Rating Characteristics

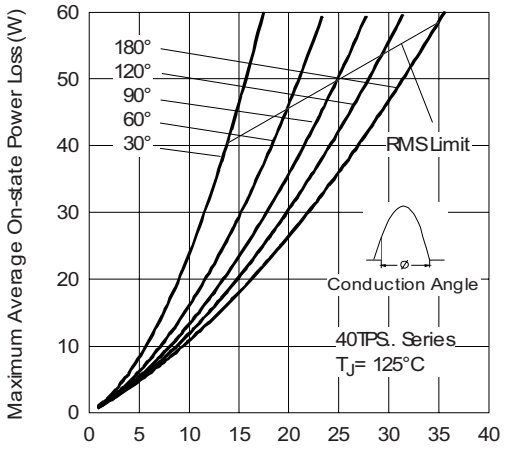



Fig. 3 - On-State Power Loss Characteristics

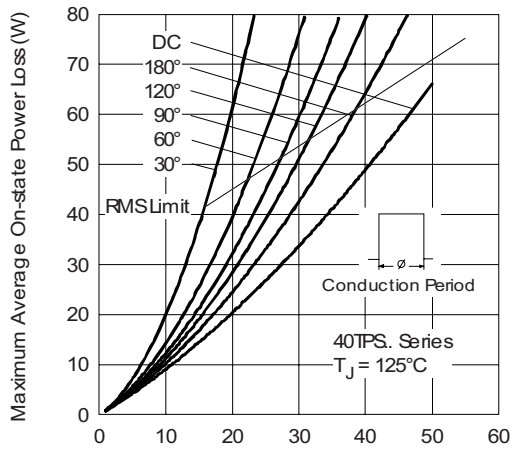



Fig. 4 - On-State Power Loss Characteristics

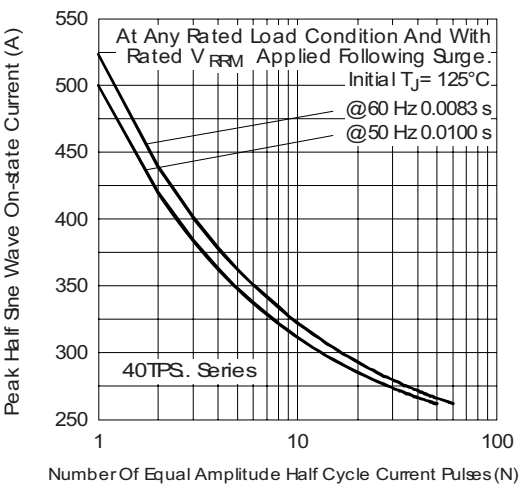



Fig. 5 - Maximum Non-Repetitive Surge Current

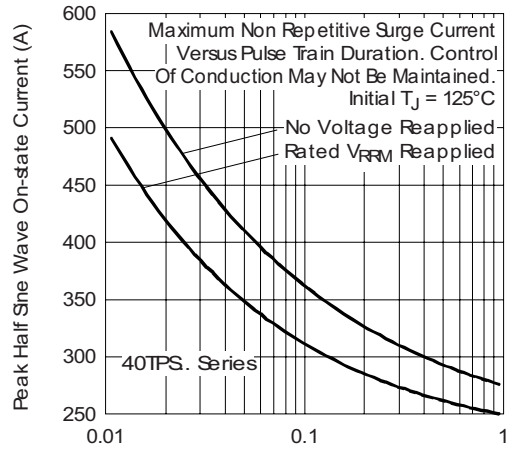



Fig. 6 - Maximum Non-Repetitive Surge Current

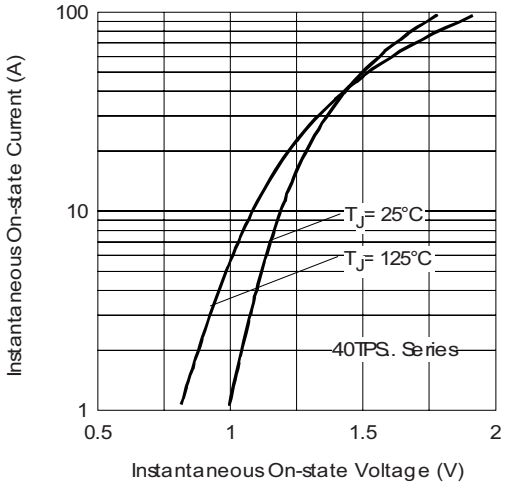



Fig. 7 - On-State Voltage Drop Characteristics

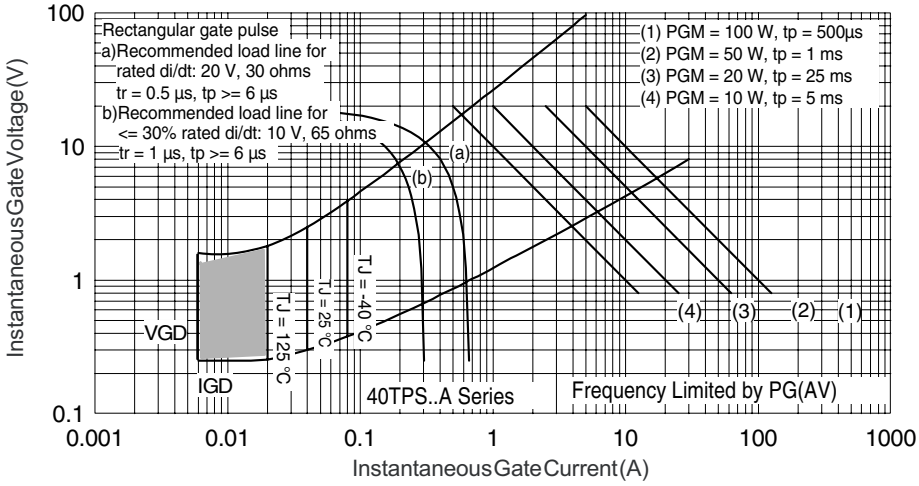



Fig. 8 - Gate Characteristics

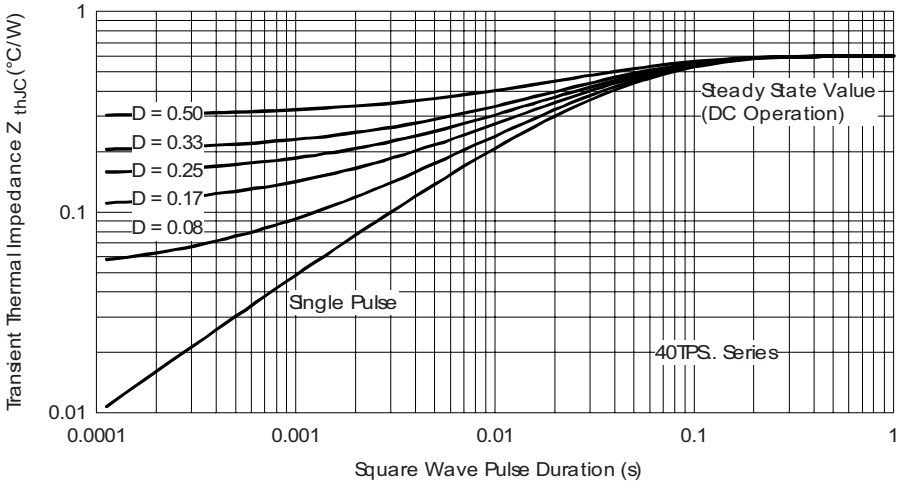



Fig. 9 - Thermal Impedance $Z_{thJC}$ Characteristics

## ORDERING INFORMATION TABLE

**Device code**

| 40 | T | P | S | 12 | A | PbF |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- 1 - Current rating (40 = 40 A)
- 2 - Circuit configuration:
  T = Thyristor
- 3 - Package:
  P = TO-247
- 4 - Type of silicon:
  S = Standard recovery rectifier
- 5 - Voltage ratings
  - 08 = 800 V
  - 12 = 1200 V
- 6 - • A = Low Igt selection 40 mA maximum
  • None = Standard Igt selection
- 7 - • None = Standard production
  • PbF = Lead (Pb)-free

| LINKS TO RELATED DOCUMENTS | |
|---|---|
| Dimensions | http://www.vishay.com/doc?95223 |
| Part marking information | http://www.vishay.com/doc?95226 |

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