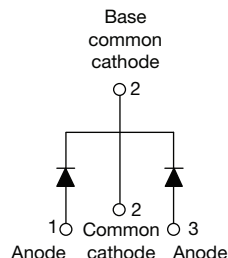
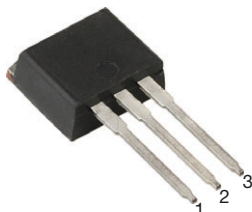
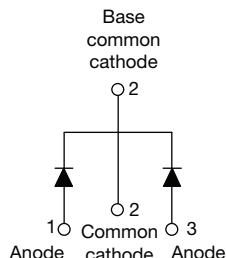


High Performance Schottky Rectifier, 2 x 15 A


D²PAK (TO-263AB)

VS-32CTQ...S-M3

TO-262AA

VS-32CTQ...-1-M3

FEATURES

- 150 °C T_J operation
- Low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified meets JESD 201 class 1A whisker test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

DESCRIPTION

The VS-32CTQ... Schottky rectifier series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

PRIMARY CHARACTERISTICS

| | |
|----------------------------------|-----------------------------------------|
| I _{F(AV)} | 2 x 15 A |
| V _R | 25 V, 30 V |
| V _F at I _F | 0.40 V |
| I _{RM} typ. | 97 mA at 125 °C |
| T _J max. | 150 °C |
| E _{AS} | 13 mJ |
| Package | D ² PAK (TO-263AB), TO-262AA |
| Circuit configuration | Common cathode |

MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
|--------------------|----------------------------------------------|-------------|-------|
| I _{F(AV)} | Rectangular waveform | 30 | A |
| V _{RRM} | | 25, 30 | V |
| I _{FSM} | t _p = 5 μs sine | 900 | A |
| V _F | 15 A _{pk} , T _J = 125 °C | 0.40 | V |
| T _J | Range | -55 to +150 | °C |

VOLTAGE RATINGS

| PARAMETER | SYMBOL | VS-32CTQ025SHM3 VS-32CTQ025-1HM3 | VS-32CTQ030SHM3 VS-32CTQ030-1HM3 | UNITS |
|--------------------------------------|------------------|-------------------------------------|-------------------------------------|-------|
| Maximum DC reverse voltage | V _R | 25 | 30 | V |
| Maximum working peak reverse voltage | V _{RWM} | | | |

**ABSOLUTE MAXIMUM RATINGS**

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|-------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------|--------|-------|
| Maximum average forward current See fig. 5 | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 115\text{ }^{\circ}\text{C}$, rectangular waveform | 30 | A |
| Maximum peak one cycle non-repetitive surge current See fig. 7 | I_{FSM} | 5 μs sine or 3 μs rect. pulse | 900 | |
| | | 10 ms sine or 6 ms rect. pulse | 250 | |
| Non-repetitive avalanche energy | E_{AS} | $T_J = 25\text{ }^{\circ}\text{C}$, $I_{AS} = 1.20\text{ A}$, $L = 11.10\text{ mH}$ | 13 | mJ |
| Repetitive avalanche current | I_{AR} | Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical | 3 | A |

ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|--------------------------------------------|----------------|--------------------------------------------------------------------------------------------|--------|------------------|
| Maximum forward voltage drop See fig. 1 | $V_{FM}^{(1)}$ | 15 A | 0.49 | V |
| | | 30 A | 0.58 | |
| | | 15 A | 0.40 | |
| | | 30 A | 0.53 | |
| Maximum reverse leakage current | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^{\circ}\text{C}$ | 1.75 | mA |
| | | $T_J = 125\text{ }^{\circ}\text{C}$ | 145 | |
| Typical reverse leakage current | $I_{RM}^{(1)}$ | $T_J = 125\text{ }^{\circ}\text{C}$ | 97 | mA |
| Threshold voltage | $V_{F(TO)}$ | $T_J = T_J$ maximum | 0.233 | V |
| Forward slope resistance | r_t | | 9.09 | m Ω |
| Maximum junction capacitance per leg | C_T | $V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$ | 1300 | pF |
| Typical series inductance per leg | L_S | Measured lead to lead 5 mm from package body | 8.0 | nH |
| Maximum voltage rate of change | dV/dt | Rated V_R | 10 000 | V/ μs |

Note(1) Pulse width < 300 μs , duty cycle < 2 %**THERMAL - MECHANICAL SPECIFICATIONS**

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|------------------------------------------------------|----------------|------------------------------------------|-------------|------------------------|
| Maximum junction and storage temperature range | T_J, T_{Stg} | | -55 to +150 | $^{\circ}\text{C}$ |
| Maximum thermal resistance, junction to case per leg | R_{thJC} | DC operation See fig. 4 | 3.25 | $^{\circ}\text{C/W}$ |
| Typical thermal resistance, case to heatsink | R_{thCS} | Mounting surface, smooth and greased | 0.50 | |
| Approximate weight | | | 2 | g |
| | | | 0.07 | oz. |
| Mounting torque | minimum | | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | 12 (10) | |
| Marking device | | Case style D ² PAK (TO-263AB) | 32CTQ025SH | |
| | | | 32CTQ030SH | |
| | | Case style TO-262AA | 32CTQ025-1H | |
| | | | 32CTQ030-1H | |

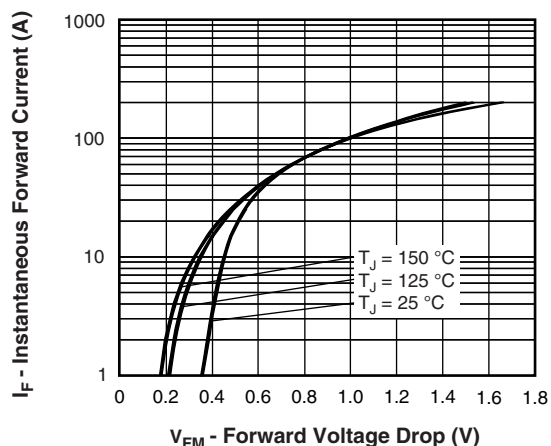


Fig. 1 - Maximum Forward Voltage Drop Characteristics

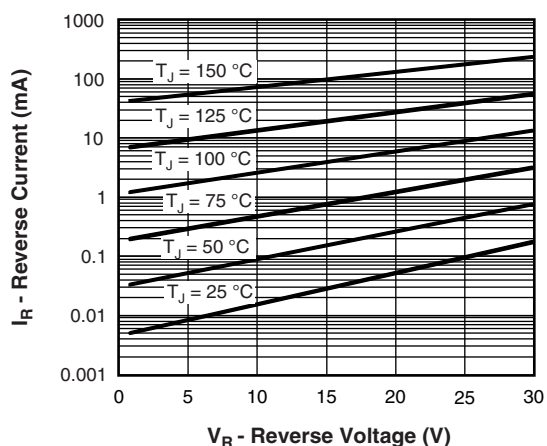


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

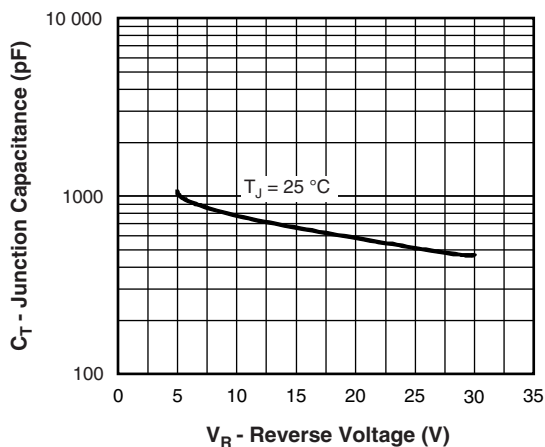
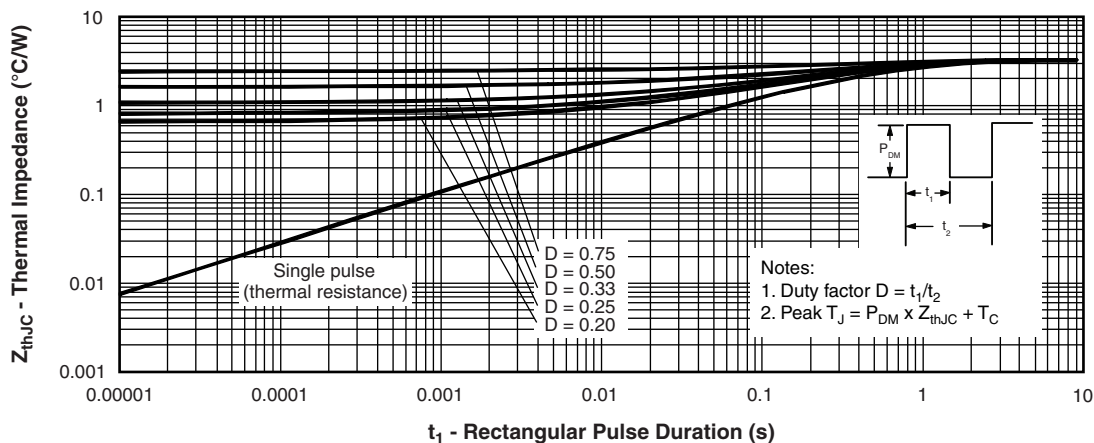


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

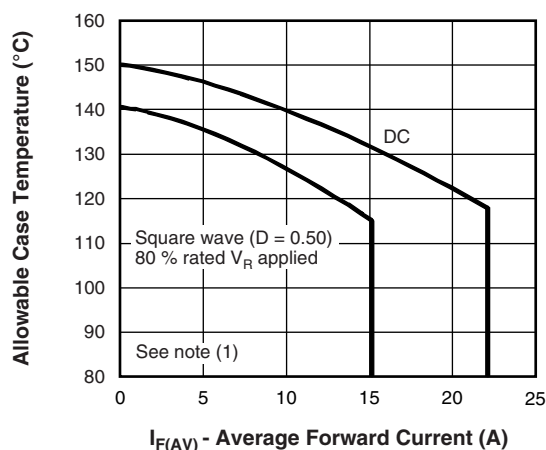


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

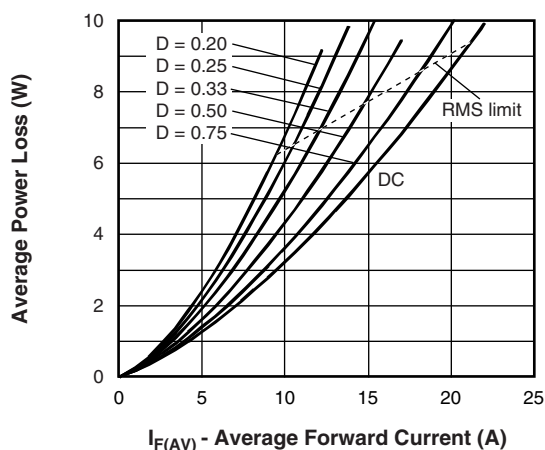


Fig. 6 - Forward Power Loss Characteristics

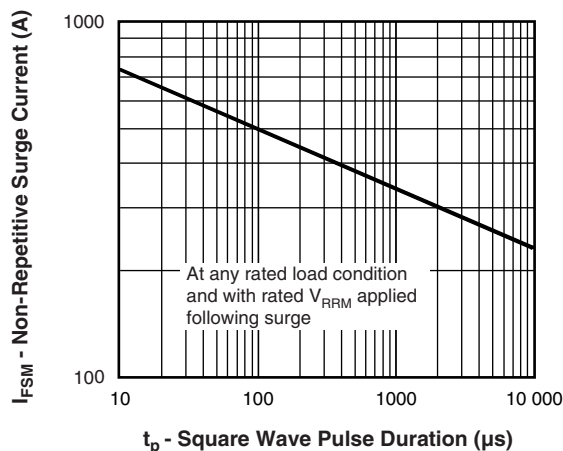


Fig. 7 - Maximum Non-Repetitive Surge Current

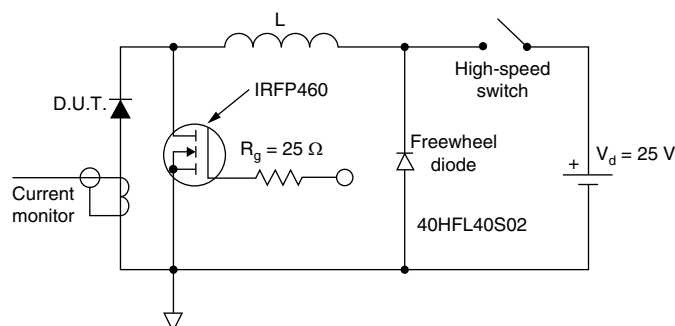


Fig. 8 - Unclamped Inductive Test Circuit

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 P_{dREV} = inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at $V_{R1} = 80\%$ rated V_R



ORDERING INFORMATION TABLE

| Device code | VS- | 32 | C | T | Q | 030 | S | TRL | H | M3 |
|-------------|-----|----|---|---|---|-----|---|-----|---|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

- | | | |
|-----------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | - | Vishay Semiconductors product |
| 2 | - | Current rating (30 A) |
| 3 | - | Circuit configuration: C = common cathode |
| 4 | - | T = TO-220 |
| 5 | - | Schottky "Q" series |
| 6 | - | Voltage ratings ——— <div style="border: 1px solid black; padding: 2px; display: inline-block;">025 = 25 V 030 = 30 V</div> |
| 7 | - | • S = D ² PAK • -1 = TO-262 |
| 8 | - | • None = tube • TRL = tape and reel (left oriented - for D ² PAK only) • TRR = tape and reel (right oriented - for D ² PAK only) |
| 9 | - | H = AEC-Q101 qualified |
| 10 | - | M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free |

ORDERING INFORMATION

| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
|-------------------|------------------|------------------------|--------------------------|
| VS-32CTQ025SHM3 | 50 | 1000 | Antistatic plastic tubes |
| VS-32CTQ025STRRH3 | 800 | 800 | 13" diameter reel |
| VS-32CTQ025STRLH3 | 800 | 800 | 13" diameter reel |
| VS-32CTQ025-1HM3 | 50 | 1000 | Antistatic plastic tubes |
| VS-32CTQ030SHM3 | 50 | 1000 | Antistatic plastic tubes |
| VS-32CTQ030STRRH3 | 800 | 800 | 13" diameter reel |
| VS-32CTQ030STRLH3 | 800 | 800 | 13" diameter reel |
| VS-32CTQ030-1HM3 | 50 | 1000 | Antistatic plastic tubes |

LINKS TO RELATED DOCUMENTS

| | | |
|--------------------------|-------------------------------|------------------------------------------------------------------------|
| Dimensions | D ² PAK (TO-263AB) | www.vishay.com/doc?95046 |
| | TO-262AA | www.vishay.com/doc?95419 |
| Part marking information | D ² PAK (TO-263AB) | www.vishay.com/doc?95444 |
| | TO-262AA | www.vishay.com/doc?95443 |
| Packaging information | | www.vishay.com/doc?95032 |



D²PAK

DIMENSIONS in millimeters and inches

Conforms to JEDEC® outline D²PAK (SMD-220)



| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|--------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | |
| A | 4.06 | 4.83 | 0.160 | 0.190 | |
| A1 | 0.00 | 0.254 | 0.000 | 0.010 | |
| b | 0.51 | 0.99 | 0.020 | 0.039 | |
| b1 | 0.51 | 0.89 | 0.020 | 0.035 | 4 |
| b2 | 1.14 | 1.78 | 0.045 | 0.070 | |
| b3 | 1.14 | 1.73 | 0.045 | 0.068 | 4 |
| c | 0.38 | 0.74 | 0.015 | 0.029 | |
| c1 | 0.38 | 0.58 | 0.015 | 0.023 | 4 |
| c2 | 1.14 | 1.65 | 0.045 | 0.065 | |
| D | 8.51 | 9.65 | 0.335 | 0.380 | 2 |

| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|-----------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | |
| D1 | 6.86 | 8.00 | 0.270 | 0.315 | 3 |
| E | 9.65 | 10.67 | 0.380 | 0.420 | 2, 3 |
| E1 | 7.90 | 8.80 | 0.311 | 0.346 | 3 |
| e | 2.54 BSC | | 0.100 BSC | | |
| H | 14.61 | 15.88 | 0.575 | 0.625 | |
| L | 1.78 | 2.79 | 0.070 | 0.110 | |
| L1 | - | 1.65 | - | 0.066 | 3 |
| L2 | 1.27 | 1.78 | 0.050 | 0.070 | |
| L3 | 0.25 BSC | | 0.010 BSC | | |
| L4 | 4.78 | 5.28 | 0.188 | 0.208 | |

Notes

- (1) Dimensioning and tolerancing per ASME Y14.5 M-1994
- (2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Datum A and B to be determined at datum plane H
- (6) Controlling dimension: inch
- (7) Outline conforms to JEDEC® outline TO-263AB

TO-262

DIMENSIONS in millimeters and inches

Modified JEDEC® outline TO-262

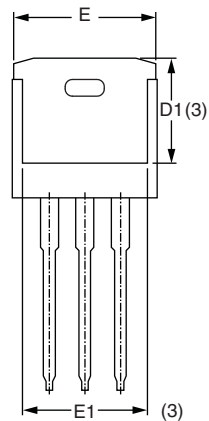
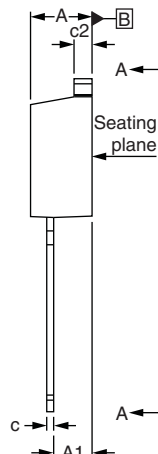


⌀ 0.010 (M) (B)



Lead assignments

- Diodes**
 1. - Anode (two die)/open (one die)
 2., 4. - Cathode
 3. - Anode



Section A - A



Section B - B and C - C
 Scale: None

| SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|-----------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | |
| A | 4.06 | 4.83 | 0.160 | 0.190 | |
| A1 | 2.03 | 3.02 | 0.080 | 0.119 | |
| b | 0.51 | 0.99 | 0.020 | 0.039 | |
| b1 | 0.51 | 0.89 | 0.020 | 0.035 | 4 |
| b2 | 1.14 | 1.78 | 0.045 | 0.070 | |
| b3 | 1.14 | 1.73 | 0.045 | 0.068 | 4 |
| c | 0.38 | 0.74 | 0.015 | 0.029 | |
| c1 | 0.38 | 0.58 | 0.015 | 0.023 | 4 |
| c2 | 1.14 | 1.65 | 0.045 | 0.065 | |
| D | 8.51 | 9.65 | 0.335 | 0.380 | 2 |
| D1 | 6.86 | 8.00 | 0.270 | 0.315 | 3 |
| E | 9.65 | 10.67 | 0.380 | 0.420 | 2, 3 |
| E1 | 7.90 | 8.80 | 0.311 | 0.346 | 3 |
| e | 2.54 BSC | | 0.100 BSC | | |
| L | 13.46 | 14.10 | 0.530 | 0.555 | |
| L1 | - | 1.65 | - | 0.065 | 3 |
| L2 | 3.36 | 3.71 | 0.132 | 0.146 | |

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and E1
- (4) Dimension b1 and c1 apply to base metal only
- (5) Controlling dimension: inches
- (6) Outline conform to JEDEC TO-262 except A1 (maximum), b (minimum), D1 (minimum) and L2 where dimensions derived the actual package outline



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