

**ELECTRICAL SPECIFICATIONS**

| PARAMETER                                             | SYMBOL         | TEST CONDITIONS                                                                           |                                     | VALUES | UNITS      |  |
|-------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------|-------------------------------------|--------|------------|--|
| Maximum forward voltage drop per leg<br>See fig. 1    | $V_{FM}^{(1)}$ | 15 A                                                                                      | $T_J = 25\text{ }^{\circ}\text{C}$  | 0.86   | V          |  |
|                                                       |                | 30 A                                                                                      |                                     | 1.05   |            |  |
|                                                       |                | 15 A                                                                                      | $T_J = 125\text{ }^{\circ}\text{C}$ | 0.67   |            |  |
|                                                       |                | 30 A                                                                                      |                                     | 0.82   |            |  |
| Maximum reverse leakage current per leg<br>See fig. 2 | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^{\circ}\text{C}$                                                        | $V_R = \text{Rated } V_R$           | 0.55   | mA         |  |
|                                                       |                | $T_J = 125\text{ }^{\circ}\text{C}$                                                       |                                     | 7.0    |            |  |
| Maximum junction capacitance per leg                  | $C_T$          | $V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$ |                                     | 500    | 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/ $\mu$ s |  |

**Note**(1) Pulse width < 300  $\mu$ s, duty cycle < 2 %**THERMAL - MECHANICAL SPECIFICATIONS**

| PARAMETER                                                | SYMBOL         | TEST CONDITIONS                      | VALUES      | UNITS                |
|----------------------------------------------------------|----------------|--------------------------------------|-------------|----------------------|
| Maximum junction and storage temperature range           | $T_J, T_{Stg}$ |                                      | - 55 to 175 | $^{\circ}\text{C}$   |
| Maximum thermal resistance, junction to case per leg     | $R_{thJC}$     | DC operation                         | 3.25        | $^{\circ}\text{C/W}$ |
| Maximum thermal resistance, junction to case per package |                |                                      | 1.63        |                      |
| 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             |
|                                                          | maximum        |                                      | 12 (10)     | (lbf · in)           |
| Marking device                                           |                | Case style TO-220AB                  | 30CTQ080    |                      |
|                                                          |                |                                      | 30CTQ100    |                      |

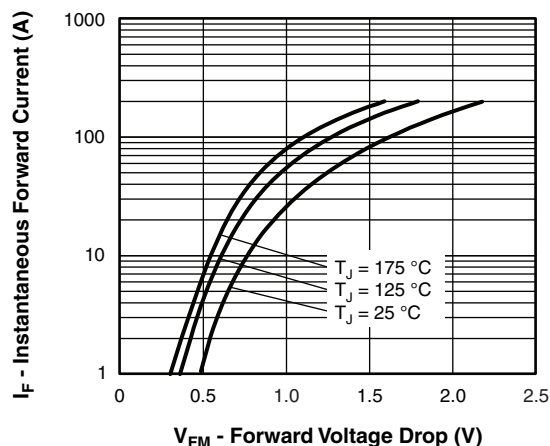


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

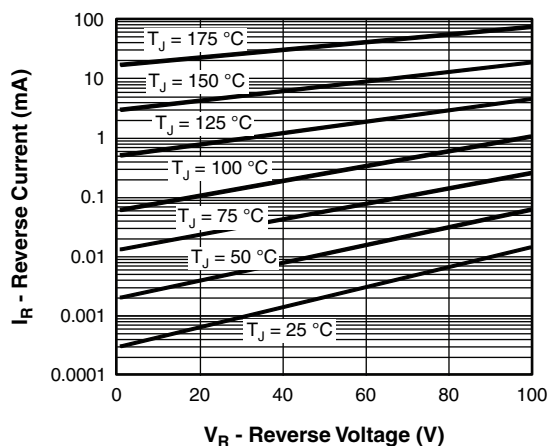


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

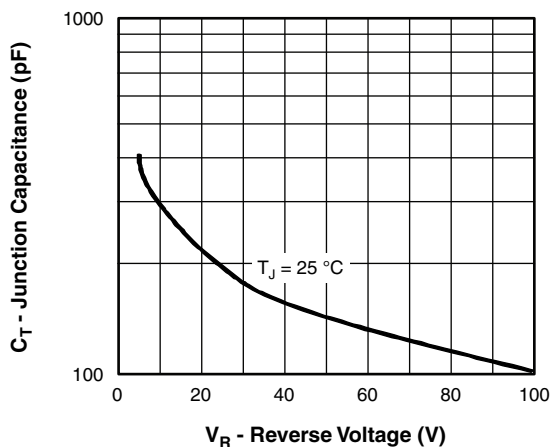


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

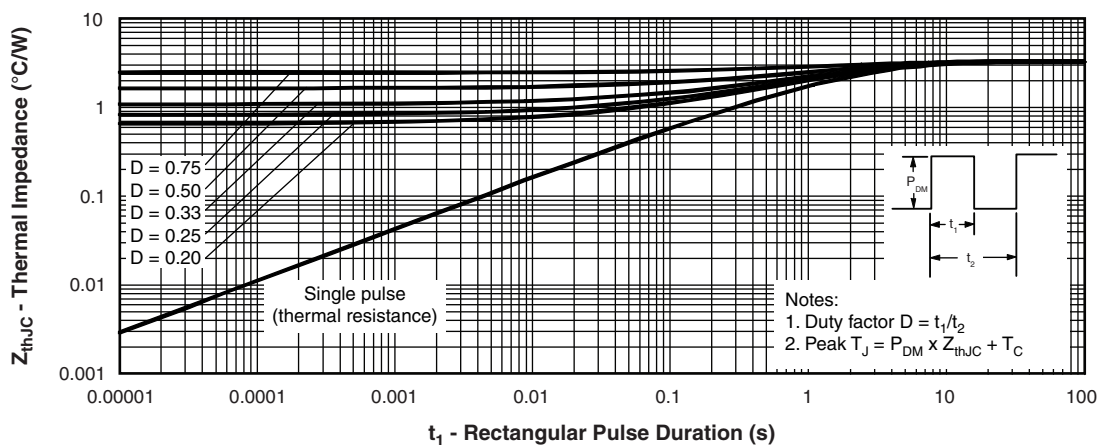


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

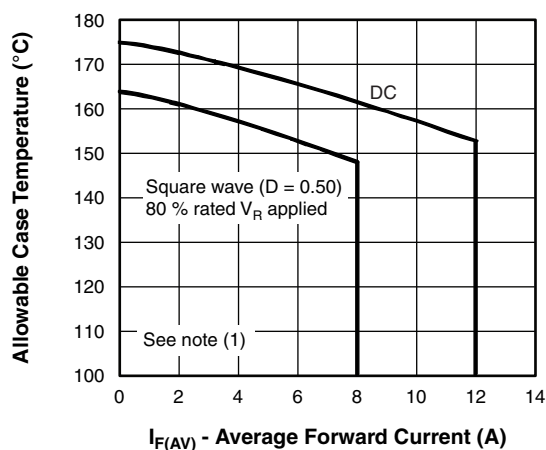


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

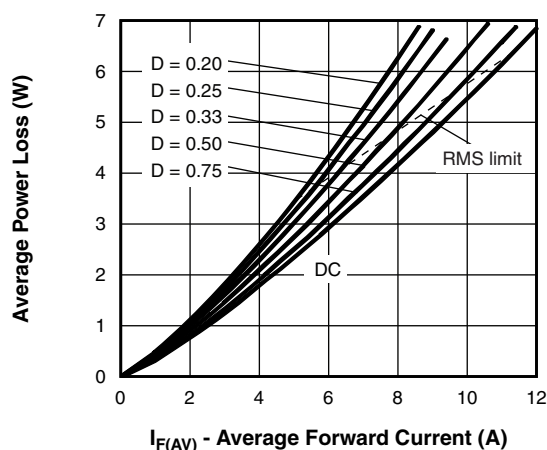


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

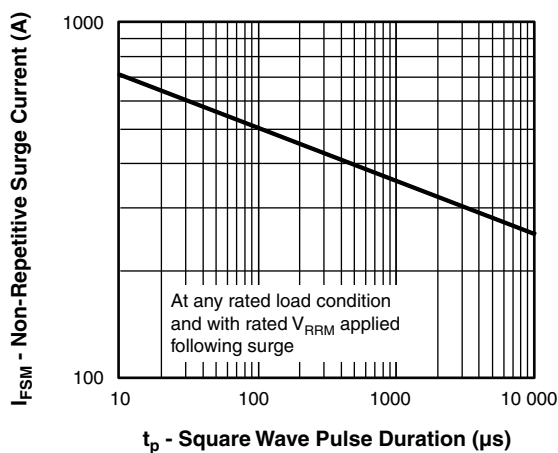


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

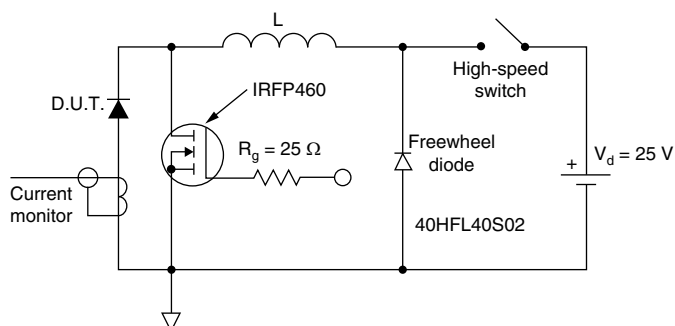


Fig. 8 - Unclamped Inductive Test Circuit

## 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  $V_{R1} = 10\text{ V}$

**ORDERING INFORMATION TABLE**

| Device code | VS-                                                              | 30 | C | T | Q | 100 | PbF |
|-------------|------------------------------------------------------------------|----|---|---|---|-----|-----|
|             | 1                                                                | 2  | 3 | 4 | 5 | 6   | 7   |
| 1           | - Vishay Semiconductors product                                  |    |   |   |   |     |     |
| 2           | - Current rating (30 = 30 A)                                     |    |   |   |   |     |     |
| 3           | - Circuit configuration:<br>C = Common cathode                   |    |   |   |   |     |     |
| 4           | - Package:<br>T = TO-220                                         |    |   |   |   |     |     |
| 5           | - Schottky "Q" series                                            |    |   |   |   |     |     |
| 6           | - Voltage ratings                                                |    |   |   |   |     |     |
| 7           | - Environmental digit                                            |    |   |   |   |     |     |
|             | • PbF = Lead (Pb)-free and RoHS compliant                        |    |   |   |   |     |     |
|             | • -N3 = Halogen-free, RoHS compliant, and totally lead (Pb)-free |    |   |   |   |     |     |

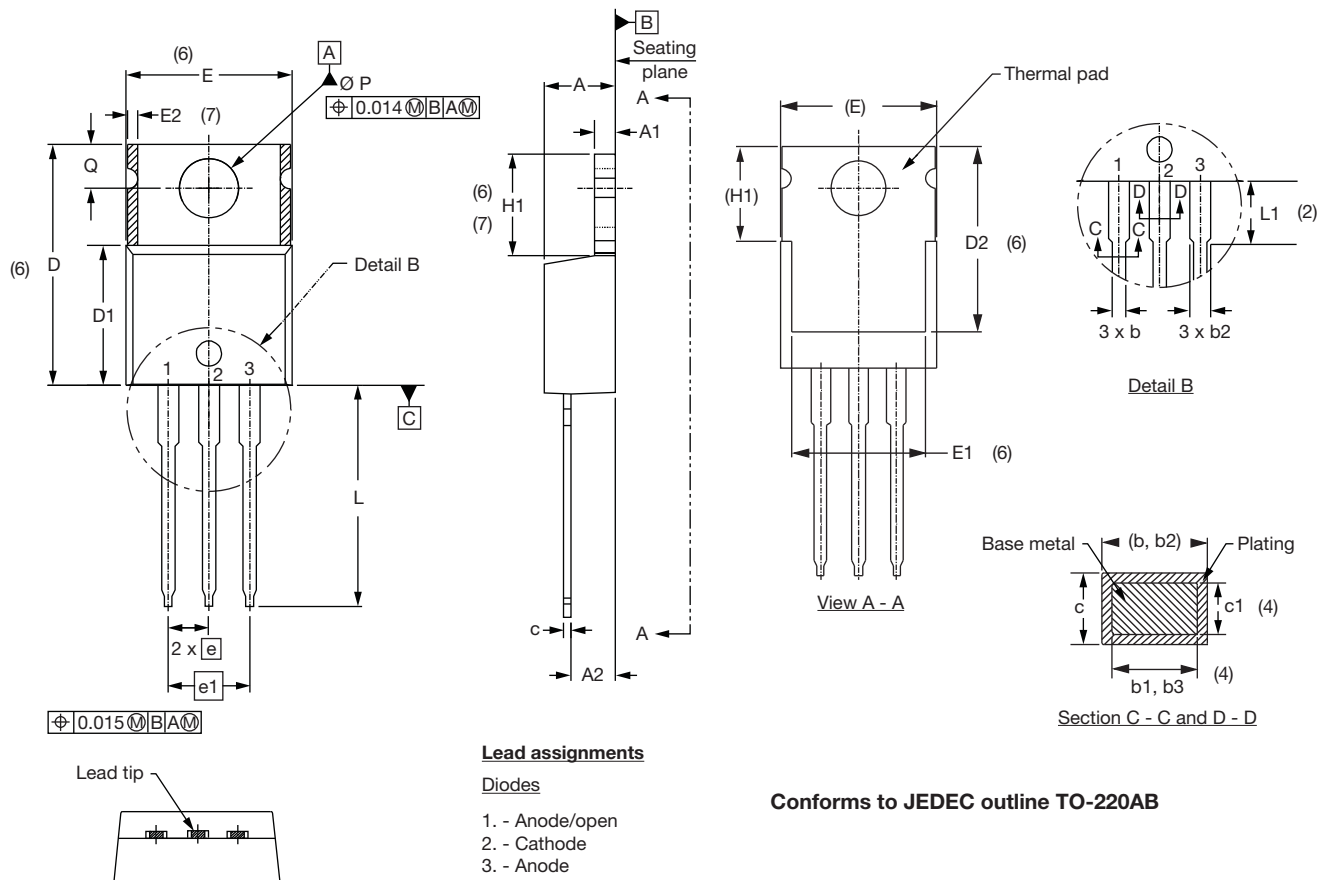
|             |
|-------------|
| 080 = 80 V  |
| 100 = 100 V |

| ORDERING INFORMATION (Example) |                  |                        |                         |
|--------------------------------|------------------|------------------------|-------------------------|
| PREFERRED P/N                  | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION   |
| VS-30CTQ080PbF                 | 50               | 1000                   | Antistatic plastic tube |
| VS-30CTQ080-N3                 | 50               | 1000                   | Antistatic plastic tube |
| VS-30CTQ100-N3                 | 50               | 1000                   | Antistatic plastic tube |
| VS-30CTQ100-N3                 | 50               | 1000                   | Antistatic plastic tube |

| LINKS TO RELATED DOCUMENTS |                                                                                     |
|----------------------------|-------------------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95222">www.vishay.com/doc?95222</a>              |
| Part marking information   | TO-220AB PbF <a href="http://www.vishay.com/doc?95225">www.vishay.com/doc?95225</a> |
|                            | TO-220AB -N3 <a href="http://www.vishay.com/doc?95028">www.vishay.com/doc?95028</a> |

## TO-220AB

**DIMENSIONS** in millimeters and inches



| SYMBOL | MILLIMETERS |       | INCHES |       | NOTES |
|--------|-------------|-------|--------|-------|-------|
|        | MIN.        | MAX.  | MIN.   | MAX.  |       |
| A      | 4.25        | 4.65  | 0.167  | 0.183 |       |
| A1     | 1.14        | 1.40  | 0.045  | 0.055 |       |
| A2     | 2.56        | 2.92  | 0.101  | 0.115 |       |
| b      | 0.69        | 1.01  | 0.027  | 0.040 |       |
| b1     | 0.38        | 0.97  | 0.015  | 0.038 | 4     |
| b2     | 1.20        | 1.73  | 0.047  | 0.068 |       |
| b3     | 1.14        | 1.73  | 0.045  | 0.068 | 4     |
| c      | 0.36        | 0.61  | 0.014  | 0.024 |       |
| c1     | 0.36        | 0.56  | 0.014  | 0.022 | 4     |
| D      | 14.85       | 15.25 | 0.585  | 0.600 | 3     |
| D1     | 8.38        | 9.02  | 0.330  | 0.355 |       |
| D2     | 11.68       | 12.88 | 0.460  | 0.507 | 6     |

| SYMBOL | MILLIMETERS |       | INCHES     |       | NOTES |
|--------|-------------|-------|------------|-------|-------|
|        | MIN.        | MAX.  | MIN.       | MAX.  |       |
| E      | 10.11       | 10.51 | 0.398      | 0.414 | 3, 6  |
| E1     | 6.86        | 8.89  | 0.270      | 0.350 | 6     |
| E2     | -           | 0.76  | -          | 0.030 | 7     |
| e      | 2.41        | 2.67  | 0.095      | 0.105 |       |
| e1     | 4.88        | 5.28  | 0.192      | 0.208 |       |
| H1     | 6.09        | 6.48  | 0.240      | 0.255 | 6, 7  |
| L      | 13.52       | 14.02 | 0.532      | 0.552 |       |
| L1     | 3.32        | 3.82  | 0.131      | 0.150 | 2     |
| Ø P    | 3.54        | 3.73  | 0.139      | 0.147 |       |
| Q      | 2.60        | 3.00  | 0.102      | 0.118 |       |
| θ      | 90° to 93°  |       | 90° to 93° |       |       |

### Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension and finish uncontrolled in L1
- (3) Dimension D, D1 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 outermost extremes of the plastic body
- (4) Dimension b1, b3 and c1 apply to base metal only
- (5) Controlling dimensions: inches
- (6) Thermal pad contour optional within dimensions E, H1, D2 and E1
- (7) Dimensions E2 x H1 define a zone where stamping and singulation irregularities are allowed
- (8) Outline conforms to JEDEC TO-220, except A2 (maximum) and D2 (minimum) where dimensions are derived from the actual package outline



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