

VS-40EPS16-M3 Datasheet



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| | |
|------------------------------|--|
| DiGi Electronics Part Number | VS-40EPS16-M3-DG |
| Manufacturer | Vishay General Semiconductor - Diodes Division |
| Manufacturer Product Number | VS-40EPS16-M3 |
| Description | DIODE GP 1.6KV 40A TO247AC |
| Detailed Description | Diode 1600 V 40A Through Hole TO-247AC Modified |

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Manufacturer Product Number:

VS-40EPS16-M3

Series:

-

Technology:

Standard

Current - Average Rectified (Io):

40A

Speed:

Standard Recovery >500ns, > 200mA (Io)

Capacitance @ Vr, F:

-

Package / Case:

TO-247-2

Operating Temperature - Junction:

-40°C ~ 150°C

Manufacturer:

Vishay General Semiconductor - Diodes Division

Product Status:

Active

Voltage - DC Reverse (Vr) (Max):

1600 V

Voltage - Forward (Vf) (Max) @ If:

1.14 V @ 40 A

Current - Reverse Leakage @ Vr:

100 µA @ 1600 V

Mounting Type:

Through Hole

Supplier Device Package:

TO-247AC Modified

Base Product Number:

40EPS16

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.10.0080

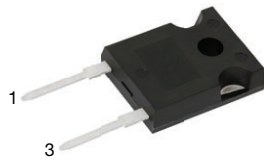
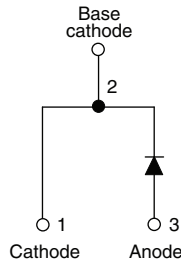
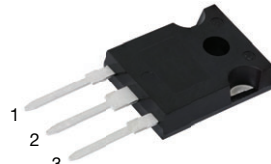
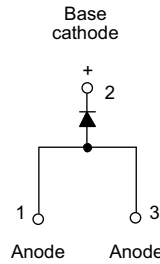
Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

High Voltage, Input Rectifier Diode, 40 A


TO-247AC 2L

VS-40EPS16-M3

TO-247AC 3L

VS-40APS16-M3

FEATURES

- Very low forward voltage drop
- 150 °C max. operating junction temperature
- Glass passivated pellet chip junction
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- Input rectification
- Vishay Semiconductors switches and output rectifiers which are available in identical package outlines

DESCRIPTION

High voltage rectifiers optimized for very low forward voltage drop with moderate leakage.

These devices are intended for use in main rectification (single or three phase bridge).

MECHANICAL DATA

Case: TO-247AC 2L, TO-247AC 3L

Molding compound meets UL 94 V-0 flammability rating

Terminal: matte tin plated leads, solderable per J-STD-002

PRIMARY CHARACTERISTICS

| | |
|-----------------------|--------------------------|
| $I_{F(AV)}$ | 40 A |
| V_R | 1600 V |
| V_F at I_F | 1.14 V |
| I_{FSM} | 475 A |
| T_J max. | 150 °C |
| Package | TO-247AC 2L, TO-247AC 3L |
| Circuit configuration | Single |

LINKS TO ADDITIONAL RESOURCES



MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
|-------------|---------------------|-------------|-------|
| $I_{F(AV)}$ | Sinusoidal waveform | 40 | A |
| V_{RRM} | | 1600 | V |
| I_{FSM} | | 475 | A |
| V_F | 20 A, $T_J = 25$ °C | 1.0 | V |
| T_J | | -40 to +150 | °C |

VOLTAGE RATINGS

| PART NUMBER | V_{RRM} , MAXIMUM PEAK REVERSE VOLTAGE V | V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V | I_{RRM} AT 150 °C mA |
|---------------|---|--|---------------------------|
| VS-40EPS16-M3 | 1600 | 1700 | 1 |
| VS-40APS16-M3 | | | |



| ABSOLUTE MAXIMUM RATINGS | | | | |
|---|---------------|--|--------|---------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum average forward current | $I_{F(AV)}$ | $T_C = 105\text{ }^\circ\text{C}$, 180° conduction half sine wave | 40 | A |
| Maximum peak one cycle non-repetitive surge current | I_{FSM} | 10 ms sine pulse, rated V_{RRM} applied | 400 | |
| | | 10 ms sine pulse, no voltage reapplied | 475 | |
| Maximum I^2t for fusing | I^2t | 10 ms sine pulse, rated V_{RRM} applied | 800 | A^2s |
| | | 10 ms sine pulse, no voltage reapplied | 1131 | |
| Maximum $I^2\sqrt{t}$ for fusing | $I^2\sqrt{t}$ | $t = 0.1\text{ ms to } 10\text{ ms}$, no voltage reapplied | 11 310 | $A^2\sqrt{s}$ |

| ELECTRICAL SPECIFICATIONS | | | | | |
|---------------------------------|-------------|--|-----------------------------------|-----------|----|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS | |
| Maximum forward voltage drop | V_{FM} | 40 A, $T_J = 25\text{ }^\circ\text{C}$ | 1.14 | V | |
| Forward slope resistance | r_t | $T_J = 150\text{ }^\circ\text{C}$ | 7.6 | $m\Omega$ | |
| Threshold voltage | $V_{F(TO)}$ | | 0.72 | V | |
| Maximum reverse leakage current | I_{RM} | $V_R = \text{Rated } V_{RRM}$ | $T_J = 25\text{ }^\circ\text{C}$ | 0.1 | mA |
| | | | $T_J = 150\text{ }^\circ\text{C}$ | 1.0 | |

| THERMAL - MECHANICAL SPECIFICATIONS | | | | |
|---|----------------|---|--------------------|------------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
| Maximum junction and storage temperature range | T_J, T_{Stg} | | -40 to +150 | $^\circ\text{C}$ |
| Maximum thermal resistance, junction to case | R_{thJC} | DC operation | 0.6 | $^\circ\text{C/W}$ |
| Maximum thermal resistance, junction to ambient | R_{thJA} | | 40 | |
| Typical thermal resistance, case to heatsink | R_{thCS} | Mounting surface, flat, smooth, and greased | 0.2 | |
| Approximate weight | | | 6 | g |
| Mounting torque | minimum | | 6 (5) | kgf · cm (lbf · in) |
| | maximum | | 12 (10) | |
| Marking device | | Case style TO-247AC 2L, TO-247AC 3L | 40EPS16 40APS16 | |

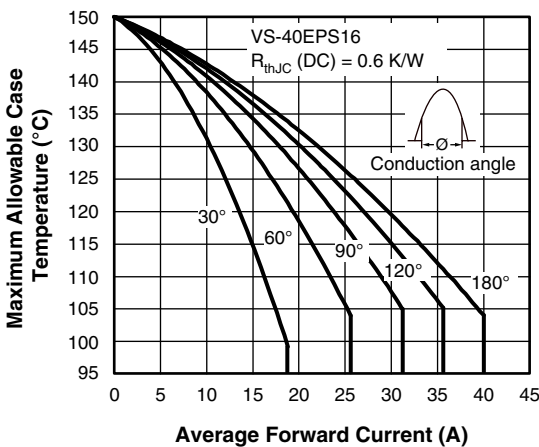


Fig. 1 - Current Rating Characteristics

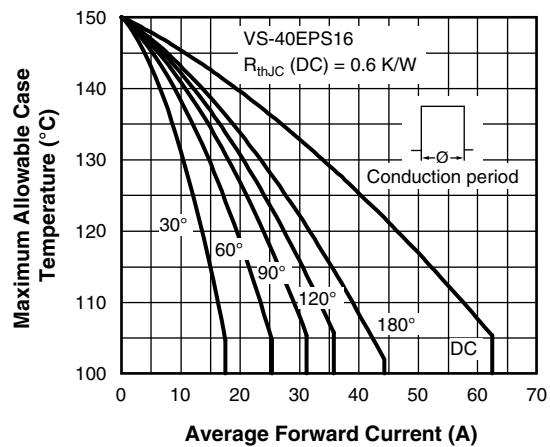


Fig. 2 - Current Rating Characteristics

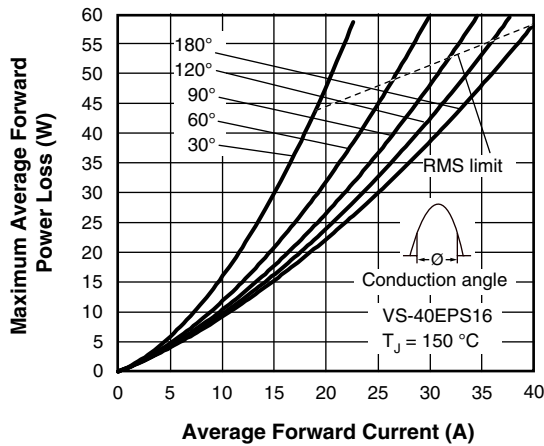


Fig. 3 - Forward Power Loss Characteristics

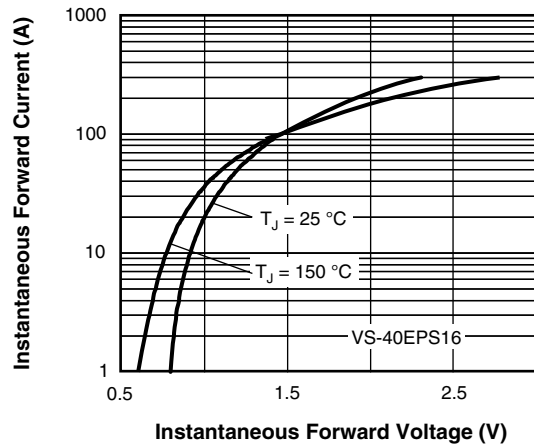


Fig. 5 - Forward Voltage Drop Characteristics

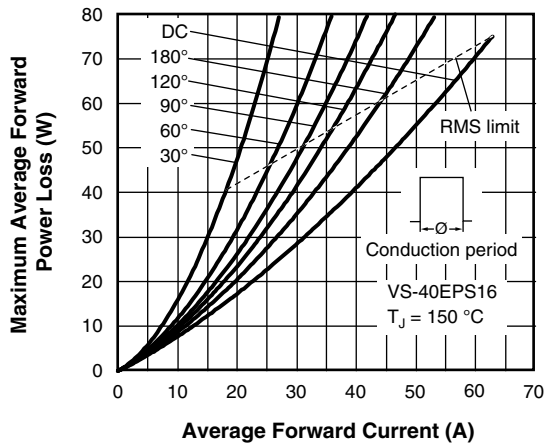


Fig. 4 - Forward Power Loss Characteristics

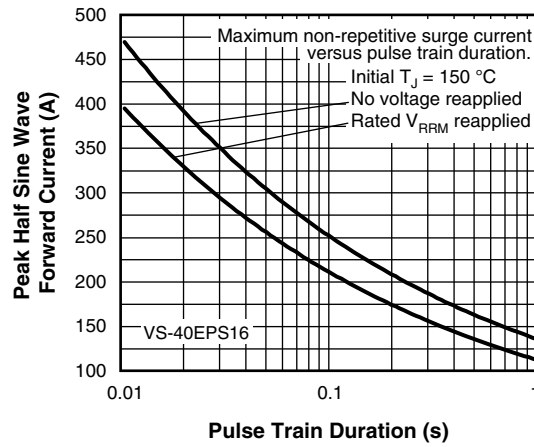


Fig. 6 - Maximum Non-Repetitive Surge Current

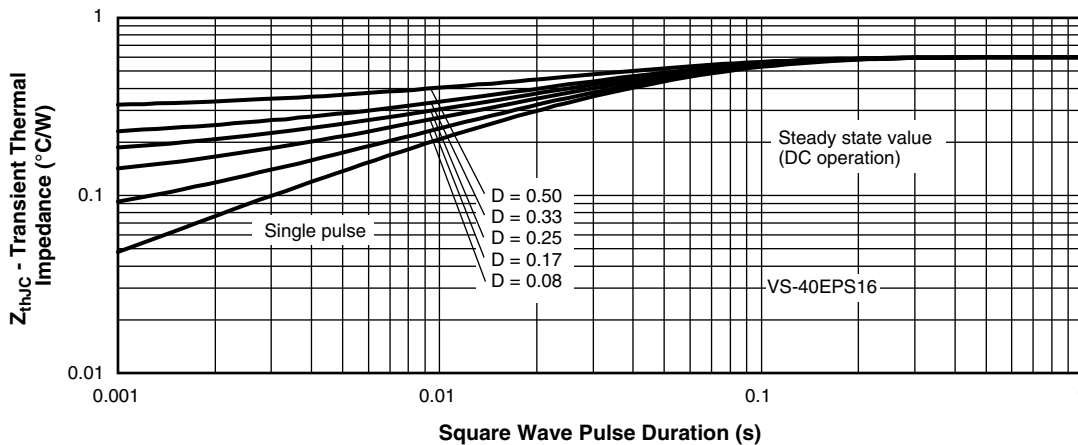
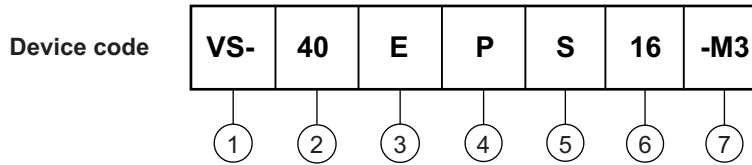


Fig. 7 - Thermal Impedance Z_{thJC} Characteristics



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (40 = 40 A)
- 3** - Circuit configuration:
A = single diode, 3 pins
E = single diode, 2 pins
- 4** - Package:
P = TO-247AC 2L / TO-247AC 3L
- 5** - Type of silicon:
S = standard recovery rectifier
- 6** - Voltage rating (16 = 1600 V)
- 7** - Environmental digit:
-M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

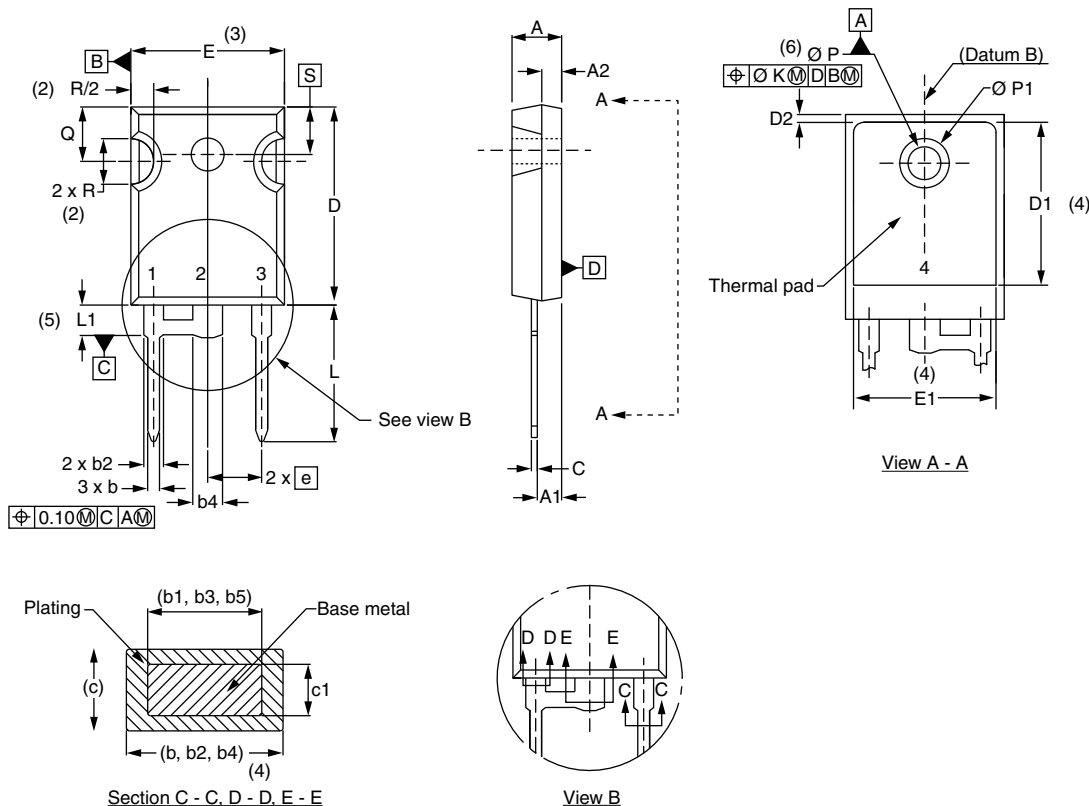
| ORDERING INFORMATION (Example) | | | |
|--------------------------------|------------------|------------------------|--------------------------|
| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-40EPS16-M3 | 25 | 500 | Antistatic plastic tubes |
| VS-40APS16-M3 | 25 | 500 | Antistatic plastic tubes |

| LINKS TO RELATED DOCUMENTS | | |
|----------------------------|-------------|--|
| Dimensions | TO-247AC 2L | www.vishay.com/doc?96144 |
| | TO-247AC 3L | www.vishay.com/doc?96138 |
| Part marking information | TO-247AC 2L | www.vishay.com/doc?95648 |
| | TO-247AC 3L | www.vishay.com/doc?95007 |
| SPICE model | | www.vishay.com/doc?96047 |



TO-247AC modified - 50 mils L/F

DIMENSIONS in millimeters and inches



| SYMBOL | MILLIMETERS | | INCHES | | NOTES | SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|--------|-------|-------|---------------|-------------|-------|-----------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | | | MIN. | MAX. | MIN. | MAX. | |
| A | 4.65 | 5.31 | 0.183 | 0.209 | | D2 | 0.51 | 1.35 | 0.020 | 0.053 | |
| A1 | 2.21 | 2.59 | 0.087 | 0.102 | | E | 15.29 | 15.87 | 0.602 | 0.625 | 3 |
| A2 | 1.17 | 1.37 | 0.046 | 0.054 | | E1 | 13.46 | - | 0.53 | - | |
| b | 0.99 | 1.40 | 0.039 | 0.055 | | e | 5.46 BSC | | 0.215 BSC | | |
| b1 | 0.99 | 1.35 | 0.039 | 0.053 | | Ø K | 0.254 | | 0.010 | | |
| b2 | 1.65 | 2.39 | 0.065 | 0.094 | | L | 14.20 | 16.10 | 0.559 | 0.634 | |
| b3 | 1.65 | 2.34 | 0.065 | 0.092 | | L1 | 3.71 | 4.29 | 0.146 | 0.169 | |
| b4 | 2.59 | 3.43 | 0.102 | 0.135 | | Ø P | 3.56 | 3.66 | 0.14 | 0.144 | |
| b5 | 2.59 | 3.38 | 0.102 | 0.133 | | Ø P1 | - | 7.39 | - | 0.291 | |
| c | 0.38 | 0.89 | 0.015 | 0.035 | | Q | 5.31 | 5.69 | 0.209 | 0.224 | |
| c1 | 0.38 | 0.84 | 0.015 | 0.033 | | R | 4.52 | 5.49 | 0.178 | 0.216 | |
| D | 19.71 | 20.70 | 0.776 | 0.815 | 3 | S | 5.51 BSC | | 0.217 BSC | | |
| D1 | 13.08 | - | 0.515 | - | 4 | | | | | | |

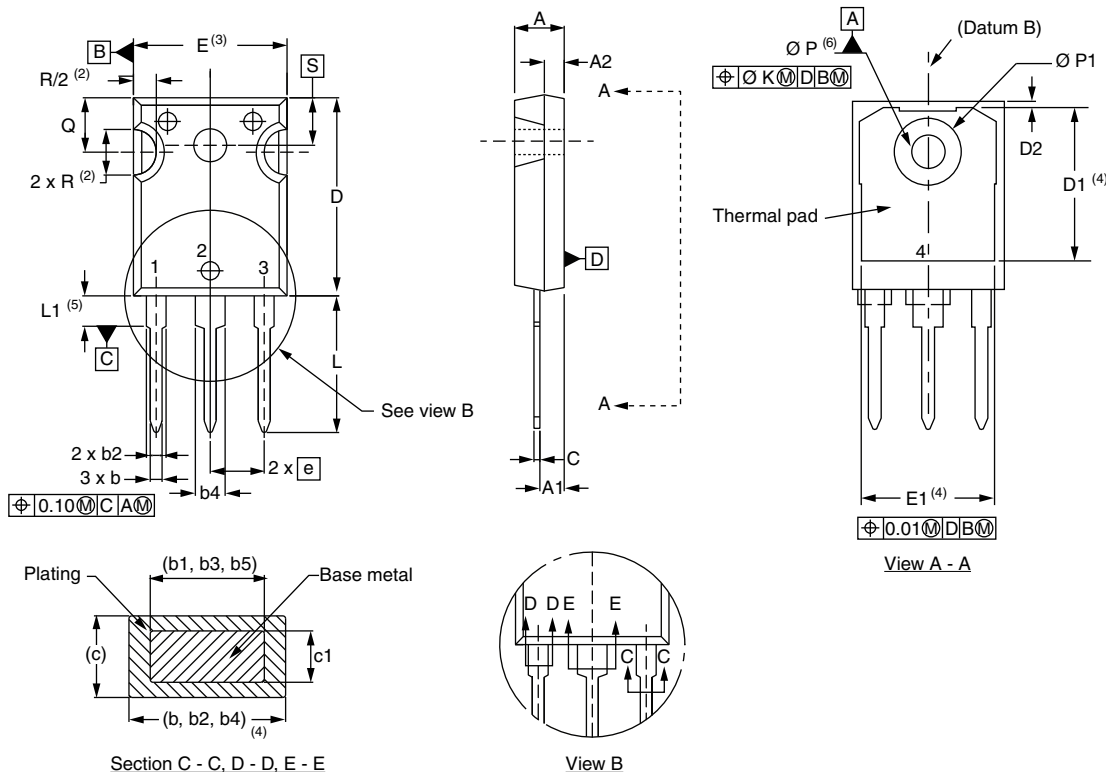
Notes

- (1) Dimensioning and tolerance per ASME Y14.5M-1994
- (2) Contour of slot optional
- (3) 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 outermost extremes of the plastic body
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC® outline TO-247 with exception of dimension c and Q



TO-247AC 3L

DIMENSIONS in millimeters and inches



| SYMBOL | MILLIMETERS | | INCHES | | NOTES | SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|--------|-------|-------|--------|-------------|-------|-----------|-------|-------|
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| A2 | 1.17 | 1.37 | 0.046 | 0.054 | | E1 | 13.46 | - | 0.53 | - | |
| b | 0.99 | 1.40 | 0.039 | 0.055 | | e | 5.46 BSC | | 0.215 BSC | | |
| b1 | 0.99 | 1.35 | 0.039 | 0.053 | | Ø K | 0.254 | | 0.010 | | |
| b2 | 1.65 | 2.39 | 0.065 | 0.094 | | L | 14.20 | 16.10 | 0.559 | 0.634 | |
| b3 | 1.65 | 2.34 | 0.065 | 0.092 | | L1 | 3.71 | 4.29 | 0.146 | 0.169 | |
| b4 | 2.59 | 3.43 | 0.102 | 0.135 | | Ø P | 3.56 | 3.66 | 0.14 | 0.144 | |
| b5 | 2.59 | 3.38 | 0.102 | 0.133 | | Ø P1 | - | 7.39 | - | 0.291 | |
| c | 0.38 | 0.89 | 0.015 | 0.035 | | Q | 5.31 | 5.69 | 0.209 | 0.224 | |
| c1 | 0.38 | 0.84 | 0.015 | 0.033 | | R | 4.52 | 5.49 | 0.178 | 0.216 | |
| D | 19.71 | 20.70 | 0.776 | 0.815 | 3 | S | 5.51 BSC | | 0.217 BSC | | |
| D1 | 13.08 | - | 0.515 | - | 4 | | | | | | |

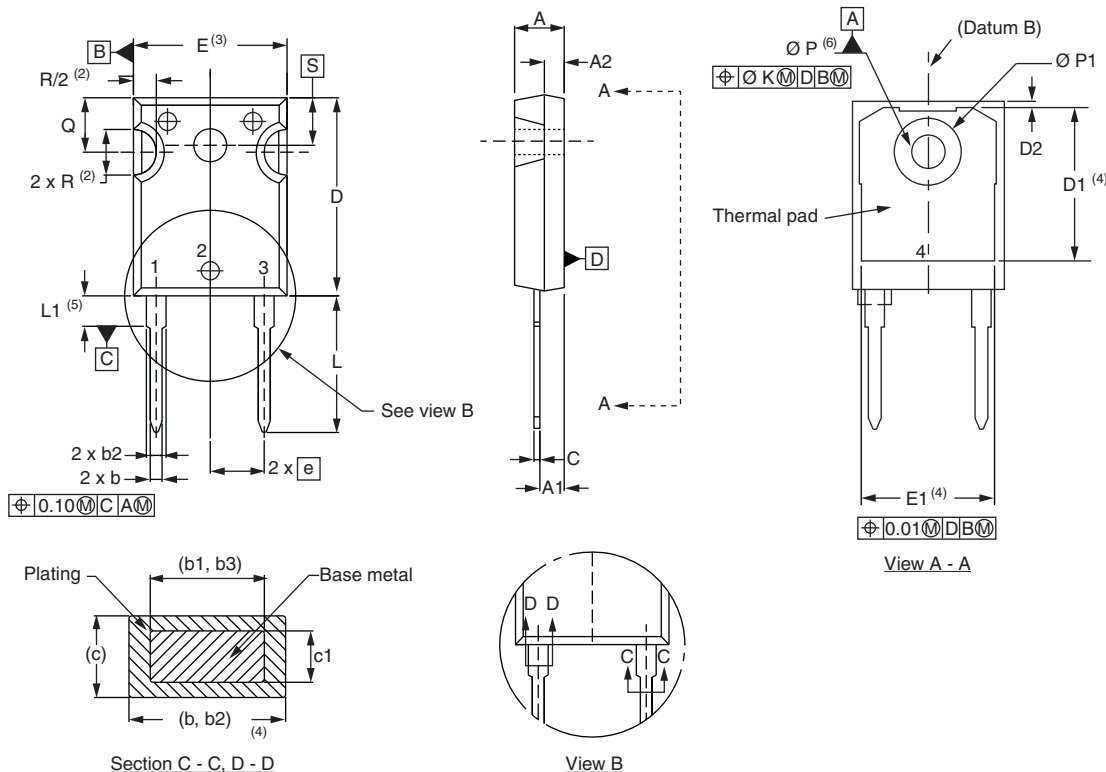
Notes

- (1) Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Contour of slot optional
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- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC® outline TO-247 with exception of dimension Q



TO-247AC 2L

DIMENSIONS in millimeters and inches



| SYMBOL | MILLIMETERS | | INCHES | | NOTES | SYMBOL | MILLIMETERS | | INCHES | | NOTES |
|--------|-------------|-------|--------|-------|-------|------------------|-------------|-------|-----------|-------|-------|
| | MIN. | MAX. | MIN. | MAX. | | | MIN. | MAX. | MIN. | MAX. | |
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| A1 | 2.21 | 2.59 | 0.087 | 0.102 | | E1 | 13.46 | - | 0.53 | - | |
| A2 | 1.17 | 1.37 | 0.046 | 0.054 | | e | 5.46 BSC | | 0.215 BSC | | |
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| b3 | 1.65 | 2.34 | 0.065 | 0.092 | | $\varnothing P$ | 3.56 | 3.66 | 0.14 | 0.144 | |
| c | 0.38 | 0.89 | 0.015 | 0.035 | | $\varnothing P1$ | - | 7.39 | - | 0.291 | |
| c1 | 0.38 | 0.84 | 0.015 | 0.033 | | Q | 5.31 | 5.69 | 0.209 | 0.224 | |
| D | 19.71 | 20.70 | 0.776 | 0.815 | 3 | R | 4.52 | 5.49 | 0.178 | 0.216 | |
| D1 | 13.08 | - | 0.515 | - | 4 | S | 5.51 BSC | | 0.217 BSC | | |
| D2 | 0.51 | 1.35 | 0.020 | 0.053 | | | | | | | |

Notes

- (1) Dimensioning and tolerancing per ASME Y14.5M-1994
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