

NTF3055-100, NVF3055-100

Power MOSFET 3.0 Amps, 60 Volts N-Channel SOT-223

Designed for low voltage, high speed switching applications in power supplies, converters and power motor controls and bridge circuits.

Features

- NVF Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

Applications

- Power Supplies
- Converters
- Power Motor Controls
- Bridge Circuits

MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

| Rating | Symbol | Value | Unit |
|---|---|-------------------|-------------------|
| Drain-to-Source Voltage | V _{DSS} | 60 | Vdc |
| Drain-to-Gate Voltage (R _{GS} = 10 MΩ) | V _{DGR} | 60 | Vdc |
| Gate-to-Source Voltage – Continuous – Non-repetitive (t _p ≤ 10 ms) | V _{GS} | ± 20 ± 30 | Vdc Vpk |
| Drain Current – Continuous @ T _A = 25°C – Continuous @ T _A = 100°C – Single Pulse (t _p ≤ 10 μs) | I _D I _D I _{DM} | 3.0 1.4 9.0 | Adc Adc Apk |
| Total Power Dissipation @ T _A = 25°C (Note 1) | P _D | 2.1 | W |
| Total Power Dissipation @ T _A = 25°C (Note 2) Derate above 25°C | | 1.3 0.014 | W W/°C |
| Operating and Storage Temperature Range | T _J , T _{stg} | –55 to 175 | °C |
| Single Pulse Drain-to-Source Avalanche Energy – Starting T _J = 25°C (V _{DD} = 25 Vdc, V _{GS} = 10 Vdc, I _{L(pk)} = 7.0 Apk, L = 3.0 mH, V _{DS} = 60 Vdc) | E _{AS} | 74 | mJ |
| Thermal Resistance – Junction-to-Ambient (Note 1) – Junction-to-Ambient (Note 2) | R _{θJA} R _{θJA} | 72.3 114 | °C/W |
| Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds | T _L | 260 | °C |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

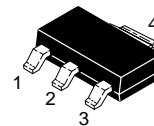
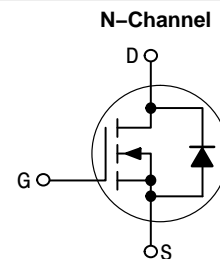
1. When surface mounted to an FR4 board using 1" pad size, 1 oz. (Cu. Area 1.127 sq in).
2. When surface mounted to an FR4 board using minimum recommended pad size, 2–2.4 oz. (Cu. Area 0.272 sq in).



ON Semiconductor®

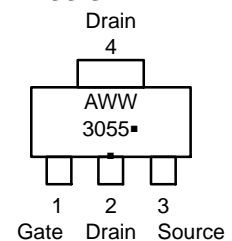
www.onsemi.com

3.0 A, 60 V
R_{DS(on)} = 110 mΩ



**SOT-223
CASE 318E
STYLE 3**

MARKING DIAGRAM & PIN ASSIGNMENT



A = Assembly Location
WW = Work Week
3055 = Specific Device Code
▪ = Pb-Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping† |
|----------------|----------------------|--------------------|
| NTF3055-100T1G | SOT-223 (Pb-Free) | 1000 / Tape & Reel |
| NTF3055-100T3G | SOT-223 (Pb-Free) | 4000 / Tape & Reel |
| NVF3055-100T1G | SOT-223 (Pb-Free) | 1000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

NTF3055-100, NVF3055-100

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|---|----------------------|---------|----------|-----------|--------------|
| Drain-to-Source Breakdown Voltage (Note 3) (V _{GS} = 0 Vdc, I _D = 250 μAdc) Temperature Coefficient (Positive) | V _{(BR)DSS} | 60 - | 68 66 | - - | Vdc mV/°C |
| Zero Gate Voltage Drain Current (V _{DS} = 60 Vdc, V _{GS} = 0 Vdc) (V _{DS} = 60 Vdc, V _{GS} = 0 Vdc, T _J = 150°C) | I _{DSS} | - - | - - | 1.0 10 | μAdc |
| Gate-Body Leakage Current (V _{GS} = ± 20 Vdc, V _{DS} = 0 Vdc) | I _{GSS} | - | - | ± 100 | nAdc |

ON CHARACTERISTICS (Note 3)

| | | | | | |
|---|---------------------|----------|--------------|-----------|--------------|
| Gate Threshold Voltage (Note 3) (V _{DS} = V _{GS} , I _D = 250 μAdc) Threshold Temperature Coefficient (Negative) | V _{GS(th)} | 2.0 - | 3.0 6.6 | 4.0 - | Vdc mV/°C |
| Static Drain-to-Source On-Resistance (Note 3) (V _{GS} = 10 Vdc, I _D = 1.5 Adc) | R _{DS(on)} | - | 88 | 110 | mΩ |
| Static Drain-to-Source On-Resistance (Note 3) (V _{GS} = 10 Vdc, I _D = 3.0 Adc) (V _{GS} = 10 Vdc, I _D = 1.5 Adc, T _J = 150°C) | V _{DS(on)} | - | 0.27 0.24 | 0.40 - | Vdc |
| Forward Transconductance (Note 3) (V _{DS} = 8.0 Vdc, I _D = 1.7 Adc) | g _{fs} | - | 3.2 | - | Mhos |

DYNAMIC CHARACTERISTICS

| | | | | | | |
|----------------------|---|------------------|---|-----|-----|----|
| Input Capacitance | (V _{DS} = 25 Vdc, V _{GS} = 0 V, f = 1.0 MHz) | C _{iss} | - | 324 | 455 | pF |
| Output Capacitance | | C _{oss} | - | 35 | 50 | |
| Transfer Capacitance | | C _{rss} | - | 110 | 155 | |

SWITCHING CHARACTERISTICS (Note 4)

| | | | | | | |
|---------------------|---|---------------------|---|------|----|----|
| Turn-On Delay Time | (V _{DD} = 30 Vdc, I _D = 3.0 Adc, V _{GS} = 10 Vdc, R _G = 9.1 Ω) (Note 3) | t _{d(on)} | - | 9.4 | 20 | ns |
| Rise Time | | t _r | - | 14 | 30 | |
| Turn-Off Delay Time | | t _{d(off)} | - | 21 | 45 | |
| Fall Time | | t _f | - | 13 | 30 | |
| Gate Charge | (V _{DS} = 48 Vdc, I _D = 3.0 Adc, V _{GS} = 10 Vdc) (Note 3) | Q _T | - | 10.6 | 22 | nC |
| | | Q ₁ | - | 1.9 | - | |
| | | Q ₂ | - | 4.2 | - | |

SOURCE-DRAIN DIODE CHARACTERISTICS

| | | | | | | |
|--------------------------------|--|-----------------|--------|--------------|----------|-----|
| Forward On-Voltage | (I _S = 3.0 Adc, V _{GS} = 0 Vdc) (I _S = 3.0 Adc, V _{GS} = 0 Vdc, T _J = 150°C) (Note 3) | V _{SD} | - - | 0.89 0.74 | 1.0 - | Vdc |
| Reverse Recovery Time | (I _S = 3.0 Adc, V _{GS} = 0 Vdc, di _S /dt = 100 A/μs) (Note 3) | t _{rr} | - | 30 | - | ns |
| | | t _a | - | 22 | - | |
| | | t _b | - | 8.6 | - | |
| Reverse Recovery Stored Charge | | Q _{RR} | - | 0.04 | - | μC |

3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

4. Switching characteristics are independent of operating junction temperatures.

NTF3055-100, NVF3055-100

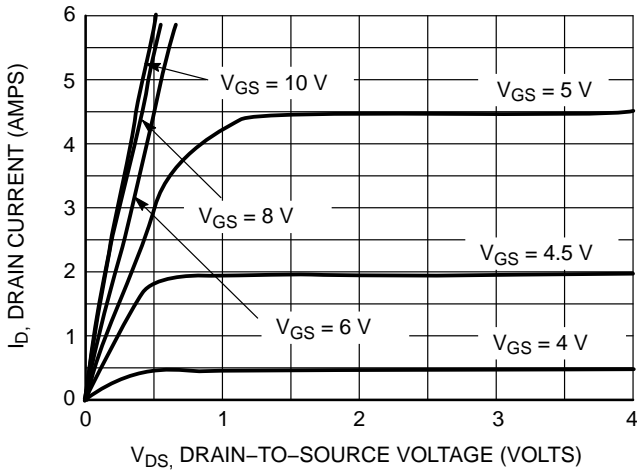


Figure 1. On-Region Characteristics

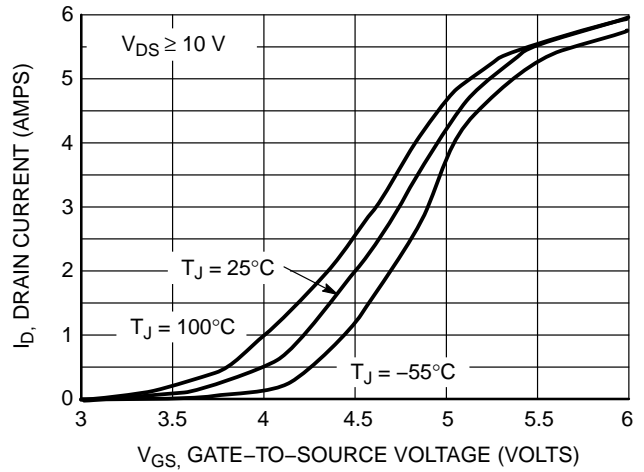


Figure 2. Transfer Characteristics

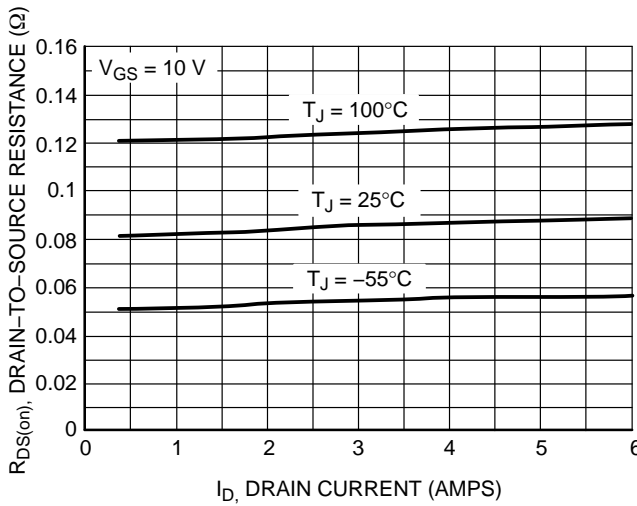


Figure 3. On-Resistance versus Gate-to-Source Voltage

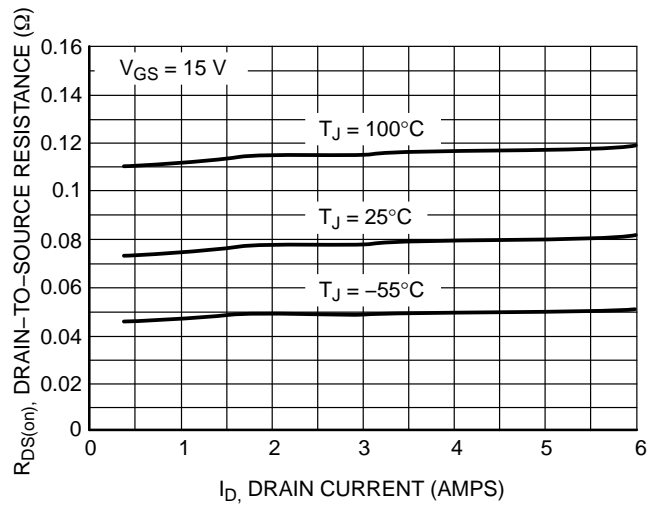


Figure 4. On-Resistance versus Drain Current and Gate Voltage

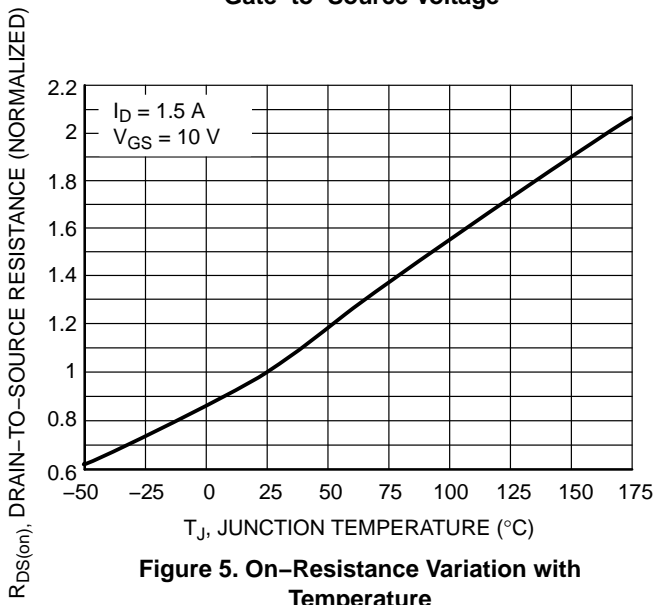


Figure 5. On-Resistance Variation with Temperature

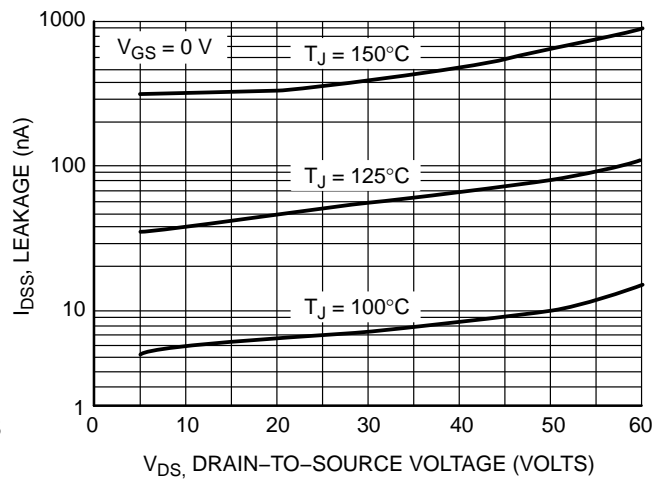


Figure 6. Drain-to-Source Leakage Current versus Voltage

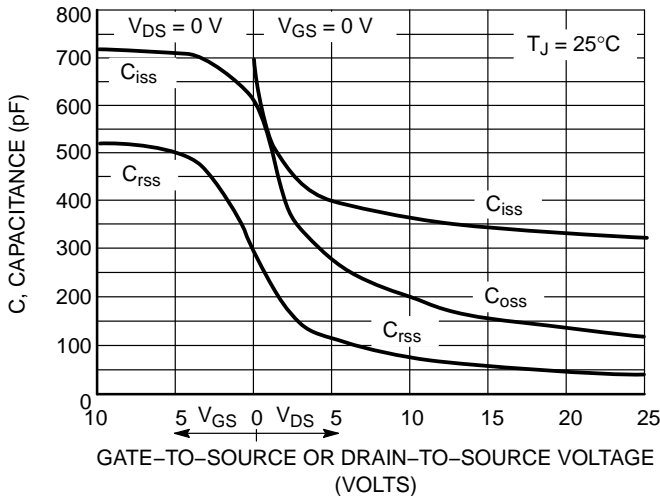


Figure 7. Capacitance Variation

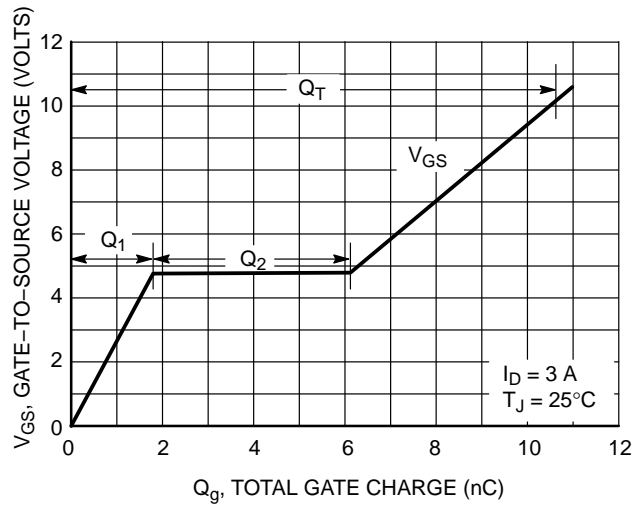


Figure 8. Gate-to-Source and Drain-to-Source Voltage versus Total Charge

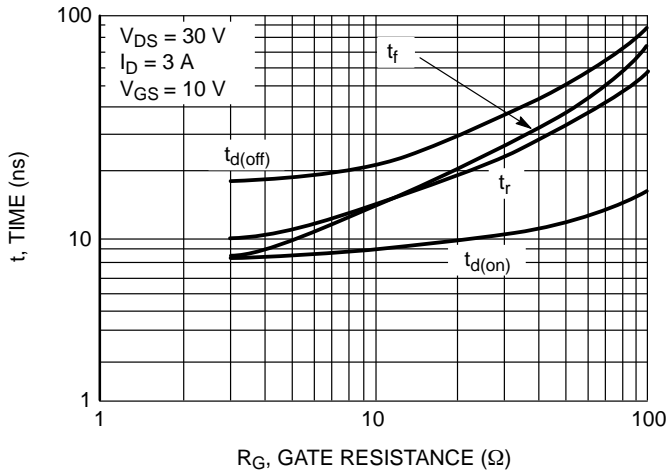


Figure 9. Resistive Switching Time Variation versus Gate Resistance

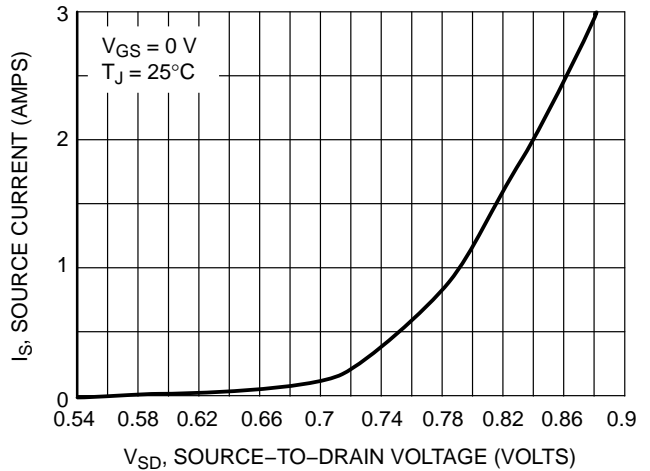


Figure 10. Diode Forward Voltage versus Current

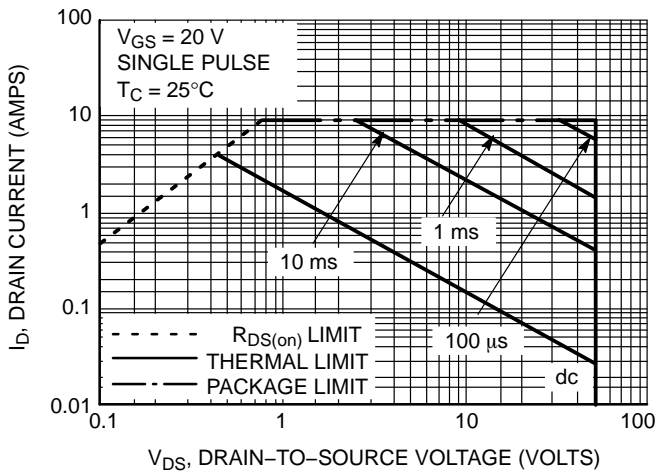


Figure 11. Maximum Rated Forward Biased Safe Operating Area

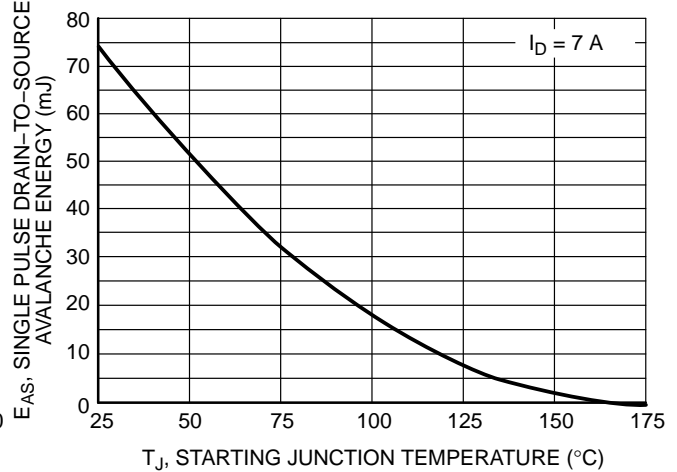


Figure 12. Maximum Avalanche Energy versus Starting Junction Temperature

NTF3055-100, NVF3055-100

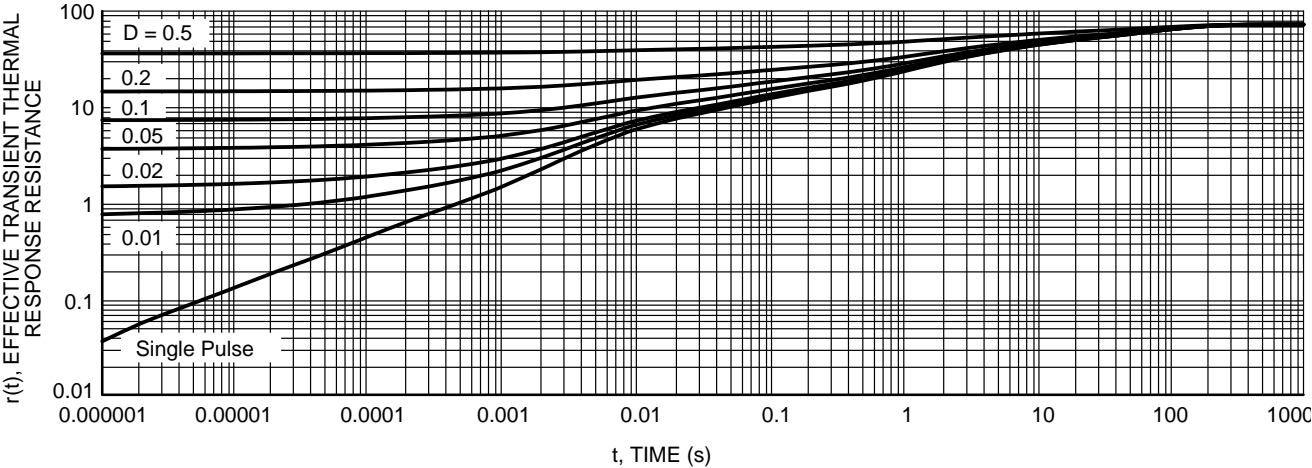
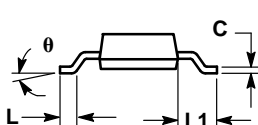
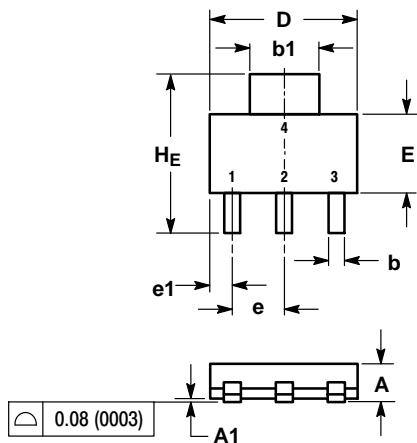


Figure 13. Thermal Response

NTF3055-100, NVF3055-100

PACKAGE DIMENSIONS

SOT-223 (TO-261)
CASE 318E-04
ISSUE N

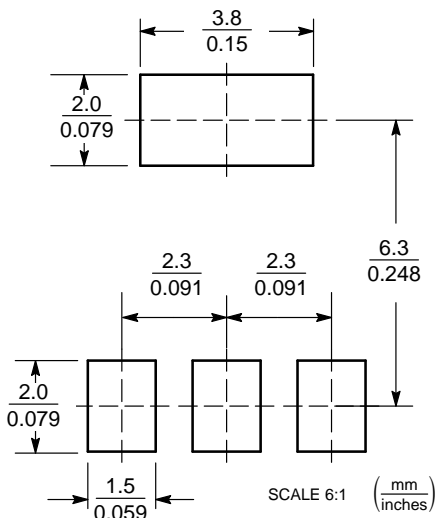


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCH.

| DIM | MILLIMETERS | | | INCHES | | |
|-----|-------------|------|------|--------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.50 | 1.63 | 1.75 | 0.060 | 0.064 | 0.068 |
| A1 | 0.02 | 0.06 | 0.10 | 0.001 | 0.002 | 0.004 |
| b | 0.60 | 0.75 | 0.89 | 0.024 | 0.030 | 0.035 |
| b1 | 2.90 | 3.06 | 3.20 | 0.115 | 0.121 | 0.126 |
| c | 0.24 | 0.29 | 0.35 | 0.009 | 0.012 | 0.014 |
| D | 6.30 | 6.50 | 6.70 | 0.249 | 0.256 | 0.263 |
| E | 3.30 | 3.50 | 3.70 | 0.130 | 0.138 | 0.145 |
| e | 2.20 | 2.30 | 2.40 | 0.087 | 0.091 | 0.094 |
| e1 | 0.85 | 0.94 | 1.05 | 0.033 | 0.037 | 0.041 |
| L | 0.20 | --- | --- | 0.008 | --- | --- |
| L1 | 1.50 | 1.75 | 2.00 | 0.060 | 0.069 | 0.078 |
| HE | 6.70 | 7.00 | 7.30 | 0.264 | 0.276 | 0.287 |
| θ | | - | | | - | |

STYLE 3:
PIN 1. GATE 10°
2. DRAIN 0°
3. SOURCE
4. DRAIN 10°

SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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