

Polar™
Power MOSFET
IXTS01N90P-89
IXTS01N90P-223

$$V_{DSS} = 900V$$

$$I_{D25} = 100mA$$

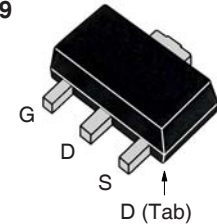
$$R_{DS(on)} \leq 75\Omega$$

N-Channel Enhancement Mode

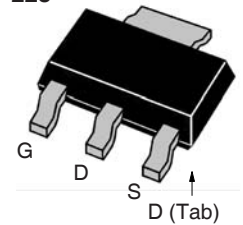


| Symbol | Test Conditions | Maximum Ratings | |
|---------------|--|-----------------|------------|
| V_{DSS} | $T_J = 25^\circ C$ to $150^\circ C$ | 900 | V |
| V_{DGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$ | 900 | V |
| V_{GSS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ C$ | 100 | mA |
| I_{DM} | $T_C = 25^\circ C$, Pulse Width Limited by T_{JM} | 450 | mA |
| dv/dt | $I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ C$ | 10 | V/ns |
| P_D | $T_C = 25^\circ C$ | 25 | W |
| T_J | | -55 ... +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | -55 ... +150 | $^\circ C$ |
| T_L | Maximum Lead Temperature for Soldering | 300 | $^\circ C$ |
| T_{SOLD} | 1.6 mm (0.062in.) from Case for 10s | 260 | $^\circ C$ |
| Weight | SOT-89 | 0.35 | g |
| | SOT-223 | 0.40 | g |

SOT-89



SOT-223


 G = Gate D = Drain
 S = Source Tab = Drain

Features

- High Voltage, Low Leakage Mosfet in SMD Package
- Suitable for $V_{GE} = 5V$ Drive

Applications

- DC-DC Converters
- Switch-Mode and Resonant-Mode Power Supplies
- Protection Circuits

| Symbol | Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|--------------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = 250\mu A$ | 900 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 100\mu A$ | 1.5 | | 3.0 V |
| I_{GSS} | $V_{GS} = \pm 20V$, $V_{DS} = 0V$ | | | ± 25 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 125^\circ C$ | | | 25 nA 2 μA |
| $R_{DS(on)}$ | $V_{GS} = 5V$, $I_D = 0.5 \cdot I_{D25}$, Note 1 | | 64 | 77 Ω |
| | $V_{GS} = 10V$, $I_D = 0.5 \cdot I_{D25}$, Note 1 | | 62 | 75 Ω |

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|--|-----------------------|------|----------|
| | | Min. | Typ. | Max |
| g_{fs} | $V_{DS} = 50\text{V}$, $I_D = 0.5 \cdot I_{D25}$, Note 1 | 70 | 120 | mS |
| C_{iss} | $V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$ | | 82.0 | pF |
| C_{oss} | | | 5.7 | pF |
| C_{rss} | | | 1.4 | pF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 50\text{V}$, $I_D = 0.5 \cdot I_{D25}$ $R_G = 50\Omega$ (External) | | 5 | ns |
| t_r | | | 20 | ns |
| $t_{d(off)}$ | | | 30 | ns |
| t_f | | | 65 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ | | 2.2 | nC |
| Q_{gs} | | | 0.4 | nC |
| Q_{gd} | | | 0.7 | nC |
| R_{thJC} | | | | 5.0 °C/W |

Source-Drain Diode

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|----------|---|-----------------------|------|--------|
| | | Min. | Typ. | Max |
| I_S | $V_{GS} = 0\text{V}$ | | | 100 mA |
| I_{SM} | Repetitive, pulse Width Limited by T_{JM} | | | 400 mA |
| V_{SD} | $I_F = I_S$, $V_{GS} = 0\text{V}$, Note 1 | | | 1.4 V |
| t_{rr} | $I_F = 1\text{A}$, $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$ | | 285 | ns |
| Q_{RM} | | | 860 | nC |
| I_{RM} | | | 6 | A |

Note 1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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| | | | | | | | | | | |
|--|-----------|-----------|-----------|-----------|-------------|-------------|-------------|-------------|-------------|-------------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665 | 6,404,065B1 | 6,683,344 | 6,727,585 | 7,005,734B2 | 7,157,338B2 |
| | 4,860,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123B1 | 6,534,343 | 6,710,405B2 | 6,759,692 | 7,063,975B2 | |
| | 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728B1 | 6,583,505 | 6,710,463 | 6,771,478B2 | 7,071,537 | |

Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

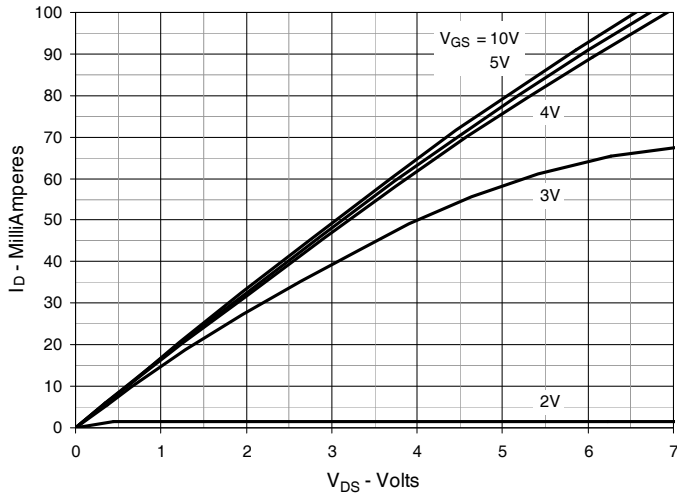


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

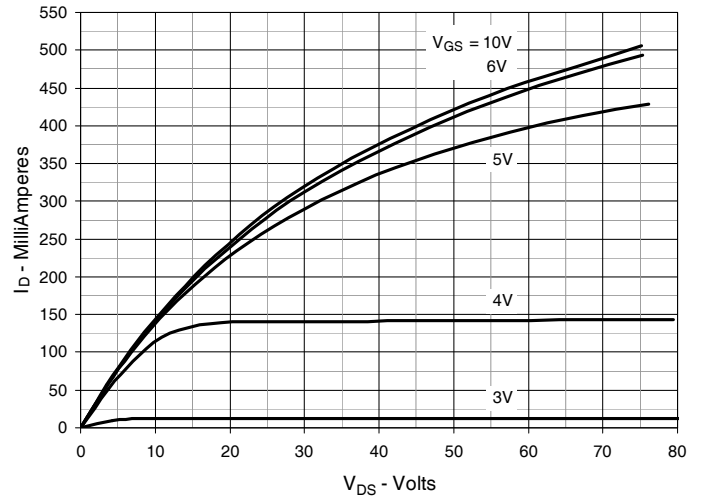


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

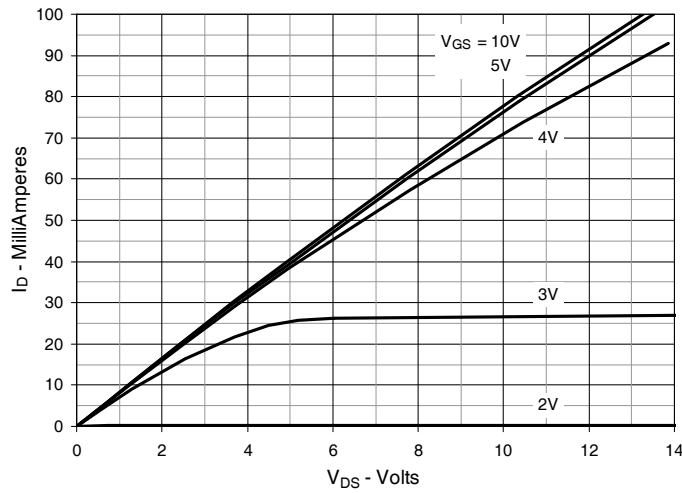


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 50\text{mA}$ Value vs. Junction Temperature

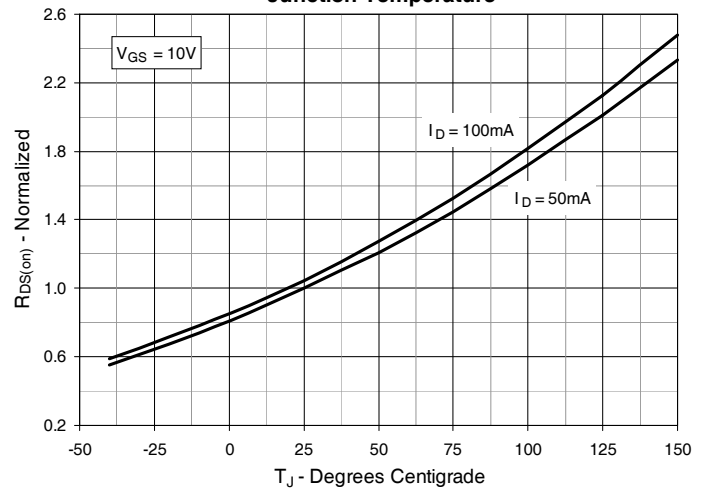


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 50\text{mA}$ Value vs. Drain Current

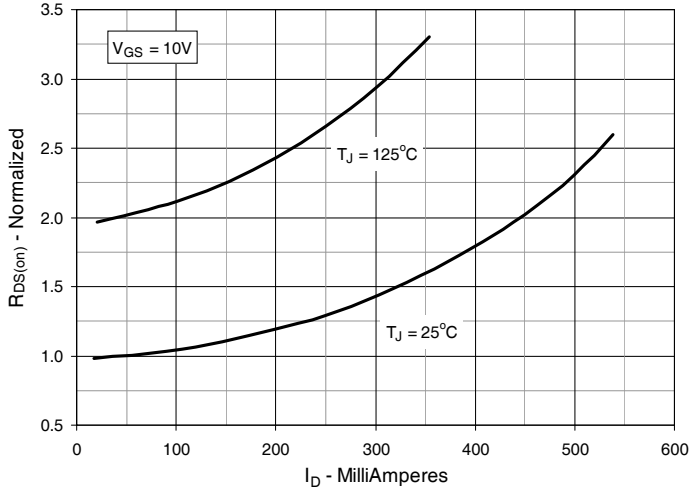


Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature

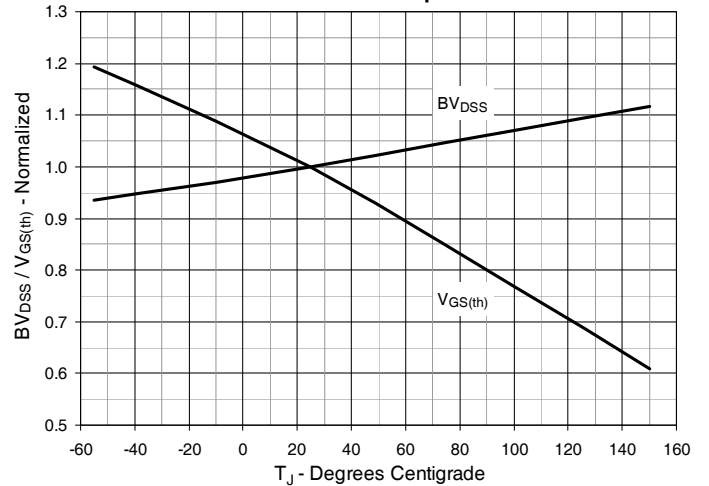


Fig. 7. Maximum Drain Current vs. Case Temperature

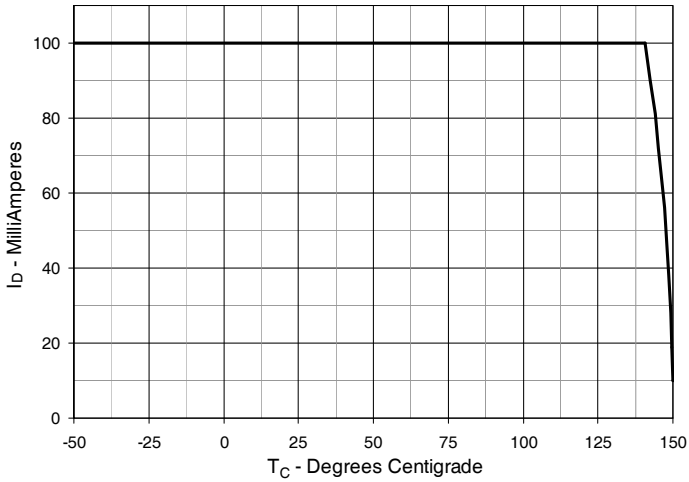


Fig. 8. Input Admittance

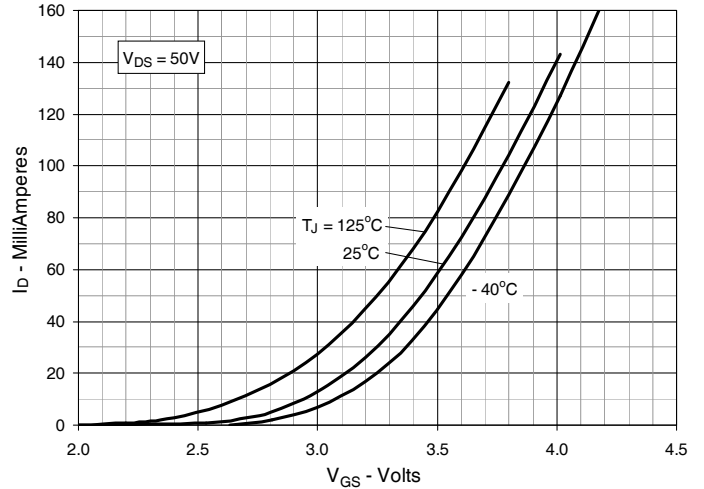


Fig. 9. Transconductance

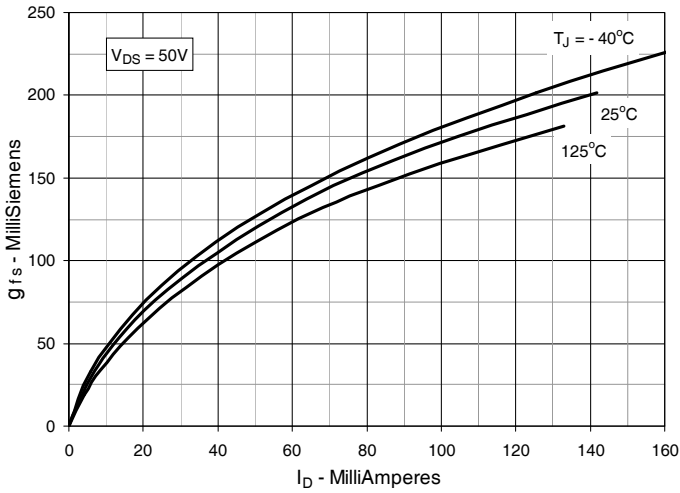


Fig. 10. Forward Voltage Drop of Intrinsic Diode

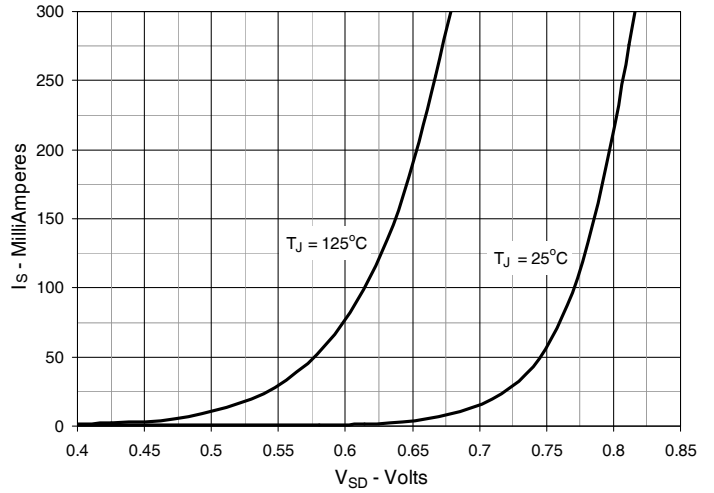


Fig. 11. Gate Charge

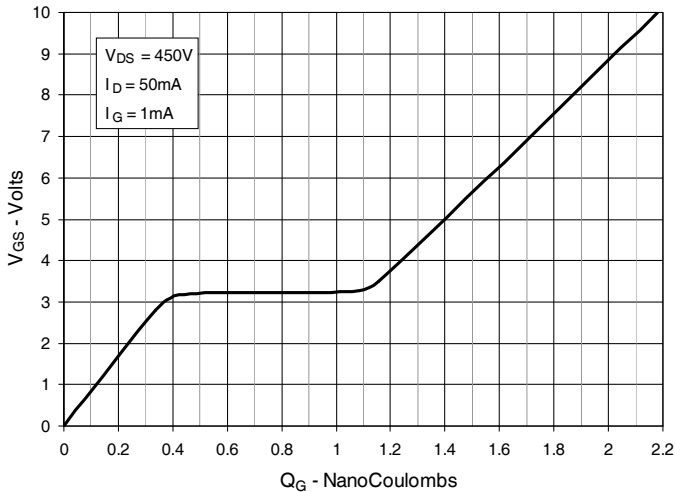


Fig. 12. Capacitance

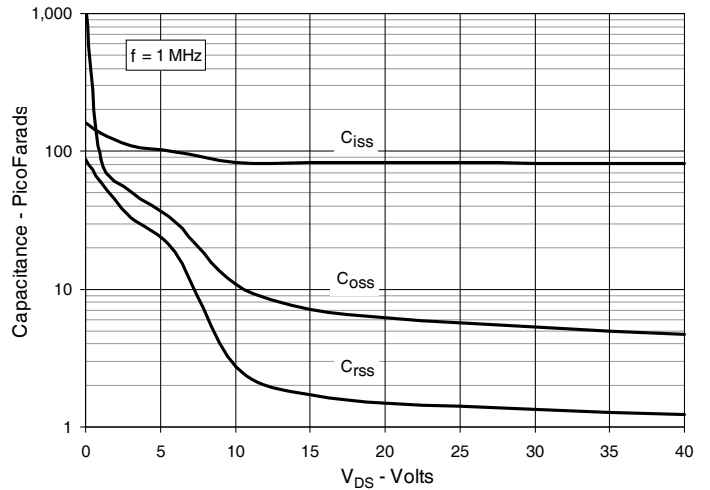


Fig. 13. Forward-Bias Safe Operating Area

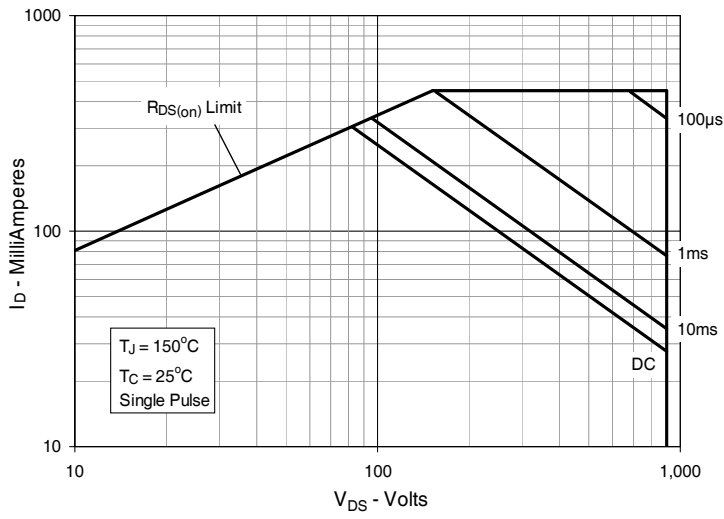
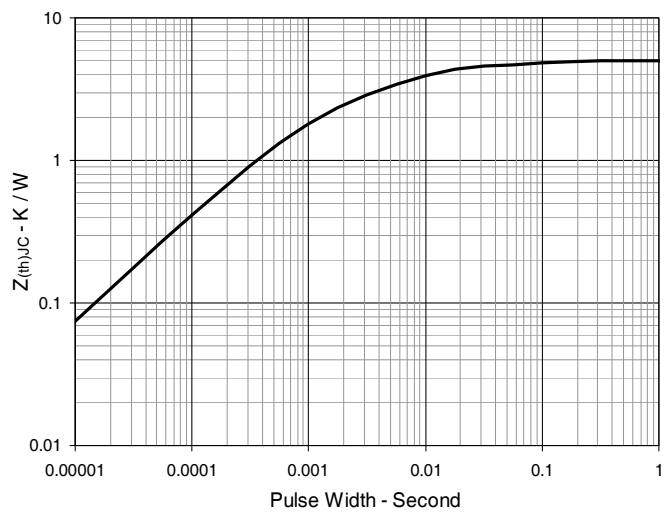
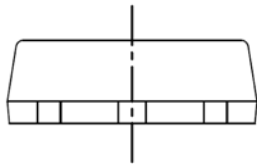
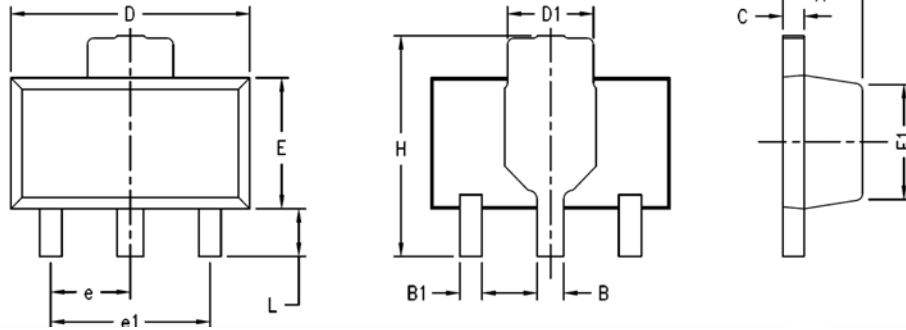


Fig. 14. Maximum Transient Thermal Impedance



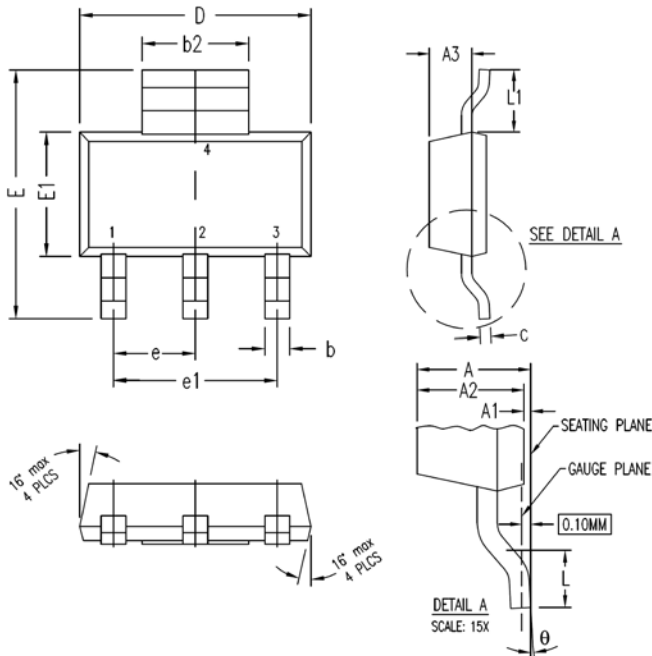
SOT-89 Outline



NOTE:
1. All leads are matte pure tin plated.

| SYM | INCHES | | MILLI METER | |
|-----|--------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.055 | 0.063 | 1.40 | 1.60 |
| B | 0.017 | 0.022 | 0.43 | 0.56 |
| B1 | 0.014 | 0.019 | 0.36 | 0.48 |
| C | 0.014 | 0.017 | 0.36 | 0.43 |
| D | 0.173 | 0.181 | 4.39 | 4.60 |
| D1 | 0.066 | 0.070 | 1.67 | 1.78 |
| E | 0.090 | 0.099 | 2.29 | 2.51 |
| E1 | 0.084 | 0.086 | 2.13 | 2.18 |
| e | 0.059 | | 1.50 | |
| e1 | 0.118 | | 3.00 | |
| H | 0.155 | 0.167 | 3.93 | 4.24 |
| L | 0.029 | 0.041 | 0.74 | 1.04 |

SOT-223 Outline



| SYM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.063 | 0.071 | 1.60 | 1.80 |
| A1 | 0.001 | 0.005 | 0.02 | 0.13 |
| A2 | 0.059 | 0.067 | 1.50 | 1.70 |
| A3 | 0.043 | 0.051 | 1.10 | 1.30 |
| b | 0.026 | 0.033 | 0.66 | 0.84 |
| b2 | 0.116 | 0.124 | 2.95 | 3.15 |
| c | 0.009 | 0.015 | 0.24 | 0.38 |
| D | 0.248 | 0.264 | 6.30 | 6.70 |
| E | 0.264 | 0.287 | 6.70 | 7.30 |
| E1 | 0.130 | 0.146 | 3.30 | 3.70 |
| e | 0.087 | 0.094 | 2.20 | 2.40 |
| e1 | 0.177 | 0.185 | 4.50 | 4.70 |
| L | 0.024 | 0.036 | 0.62 | 0.92 |
| L1 | 0.065 | 0.073 | 1.65 | 1.85 |
| θ | 0° | 10° | 0° | 10° |



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