# LinearL2™ Power MOSFET w/Extended FBSOA

# IXTT140N075L2HV
# IXTH140N075L2

$V_{DSS}$ = 75V
$I_{D25}$ = 140A
$R_{DS(on)}$ ≤ 11mΩ

N-Channel Enhancement Mode
Avalanche Rated
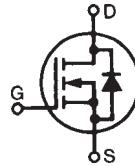
**TO-268HV (IXTT)**
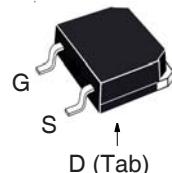
**TO-247 (IXTH)**
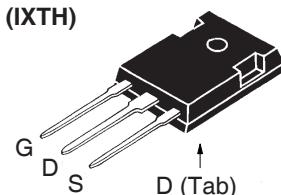
G = Gate          D  = Drain
S  = Source     Tab  = Drain

| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 150°C | 75 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 150°C, $R_{GS}$ = 1MΩ | 75 | V |
| $V_{GSS}$ | Continuous | ±20 | V |
| $V_{GSM}$ | Transient | ±30 | V |
| $I_{D25}$ | $T_C$ = 25°C | 140 | A |
| $I_{DM}$ | $T_C$ = 25°C, Pulse Width Limited by $T_{JM}$ | 500 | A |
| $I_A$ | $T_C$ = 25°C | 140 | A |
| $E_{AS}$ | $T_C$ = 25°C | 1.5 | J |
| $P_D$ | $T_C$ = 25°C | 540 | W |
| $T_J$ | | -55...+150 | °C |
| $T_{JM}$ | | 150 | °C |
| $T_{stg}$ | | -55...+150 | °C |
| $T_L$ | Maximum Lead Temperature for Soldering | 300 | °C |
| $T_{SOLD}$ | 1.6 mm (0.062in.) from Case for 10s | 260 | °C |
| $M_d$ | Mounting Torque  (TO-247) | 1.13/10 | Nm/lb.in |
| Weight | TO-268HV | 4 | g |
| | TO-247 | 6 | g |

**Features**

- Designed for Linear Operation
- International Standard Packages
- AvalancheRated
- Guaranteed FBSOA at 75°C

**Advantages**

- Easy to Mount
- Space Savings
- High Power Density

**Applications**

- Solid State Circuit Breakers
- Soft Start Controls
- Linear Amplifiers
- Programmable Loads
- Current Regulators

| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values | | | |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250µA | 75 | | | V |
| $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA | 2.0 | | 4.5 | V |
| $I_{GSS}$ | $V_{GS}$ = ±20V, $V_{DS}$ = 0V | | | ±100 | nA |
| $I_{DSS}$ | $V_{DS}$ = $V_{DSS}$, $V_{GS}$ = 0V | | | 5 | µA |
| | $T_J$ = 125°C | | | 25 | µA |
| $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 0.5 • $I_{D25}$, Note 1 | | | 11 | mΩ |

**IXYS**

| Symbol | Test Conditions (T$_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values | | | |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $g_{fs}$ | V$_{DS}$ = 10V, I$_D$ = 60A, Note 1 | 50 | 65 | 80 | S |
| $R_{Gi}$ | Gate Input Resistance | | 1.24 | | Ω |
| $C_{iss}$ | | | 9300 | | pF |
| $C_{oss}$ | V$_{GS}$ = 0V, V$_{DS}$ = 25V, f = 1MHz | | 2190 | | pF |
| $C_{rss}$ | | | 750 | | pF |
| $t_{d(on)}$ | **Resistive Switching Times** | | 26 | | ns |
| $t_r$ | V$_{GS}$ = 10V, V$_{DS}$ = 0.5 • V$_{DSS}$, I$_D$ = 0.5 • I$_{D25}$ | | 83 | | ns |
| $t_{d(off)}$ | R$_G$ = 2Ω (External) | | 100 | | ns |
| $t_f$ | | | 33 | | ns |
| $Q_{g(on)}$ | | | 275 | | nC |
| $Q_{gs}$ | V$_{GS}$ = 10V, V$_{DS}$ = 0.5 • V$_{DSS}$, I$_D$ = 0.5 • I$_{D25}$ | | 40 | | nC |
| $Q_{gd}$ | | | 108 | | nC |
| $R_{thJC}$ | | | | 0.23 | °C/W |
| $R_{thCS}$ | TO-247 | | 0.21 | | °C/W |

**Safe Operating Area Specification**

| Symbol | Test Conditions | Characteristic Values | | | |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| **SOA** | V$_{DS}$ = 75V, I$_D$ = 4.35A, T$_C$ = 75°C, Tp = 5s | 326 | | | W |

**Source-Drain Diode**

| Symbol | Test Conditions (T$_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values | | | |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $I_S$ | V$_{GS}$ = 0V | | | 140 | A |
| $I_{SM}$ | Repetitive, pulse width limited by T$_{JM}$ | | | 560 | A |
| $V_{SD}$ | I$_F$ = 100A, V$_{GS}$ = 0V, Note 1 | | | 1.4 | V |
| $t_{rr}$ | | | 200 | | ns |
| $I_{RM}$ | I$_F$ = 70A, -di/dt = 100A/μs, V$_R$ = 37.5V, V$_{GS}$ = 0V | | 14.0 | | A |
| $Q_{RM}$ | | | 1.4 | | μC |

Note:    1. Pulse test, t ≤ 300μs; duty cycle, d ≤ 2%.

## PRELIMINARY 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.

**Fig. 1. Output Characteristics @ T$_J$ = 25$^o$C**
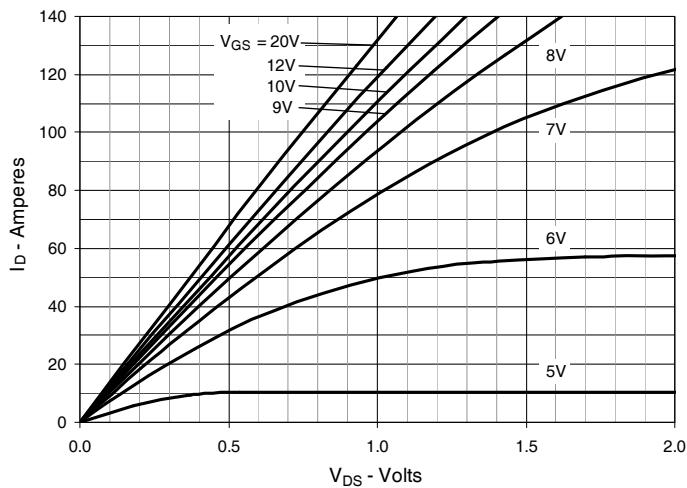


**Fig. 2. Extended Output Characteristics @ T$_J$ = 25$^o$C**
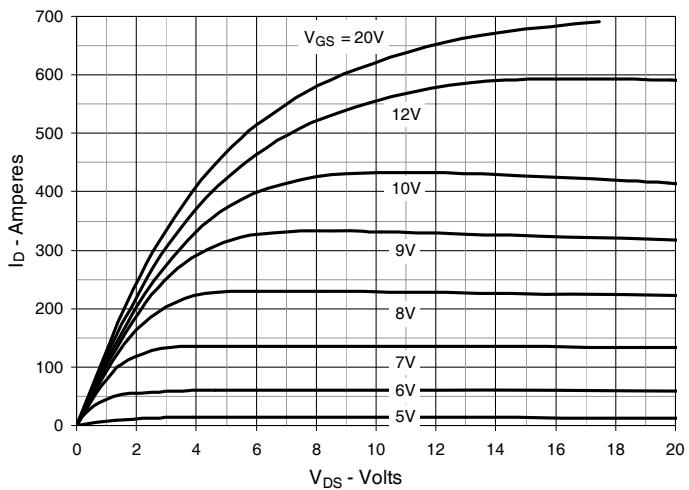


**Fig. 3. Output Characteristics @ T$_J$ = 125$^o$C**
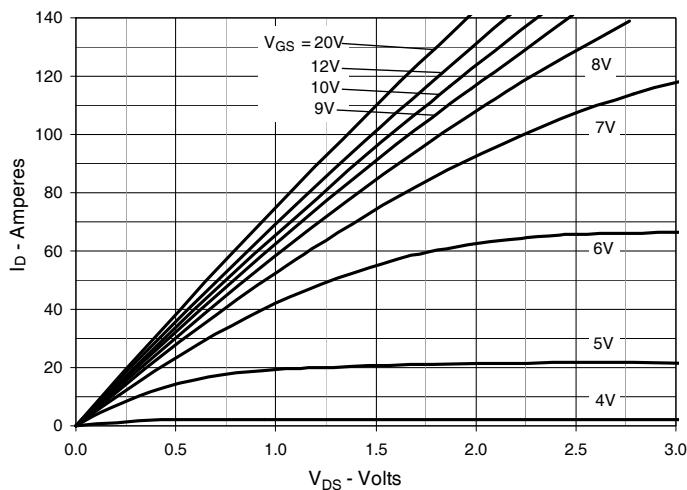


**Fig. 4. R$_{DS(on)}$ Normalized to I$_D$ = 70A Value vs. Junction Temperature**
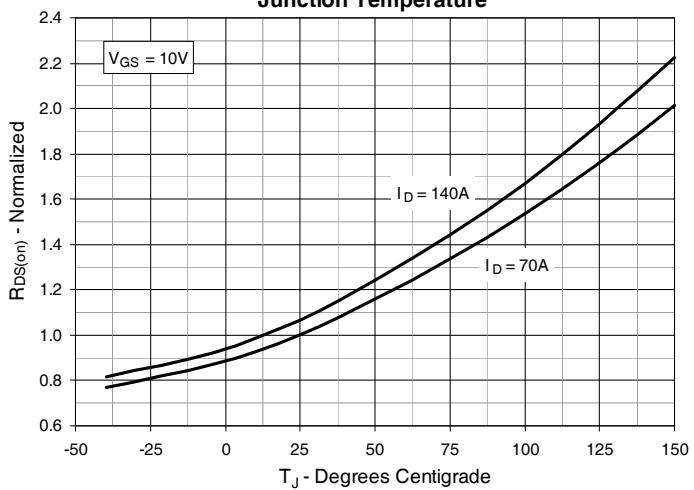


**Fig. 5. R$_{DS(on)}$ Normalized to I$_D$ = 70A Value vs. Drain Current**
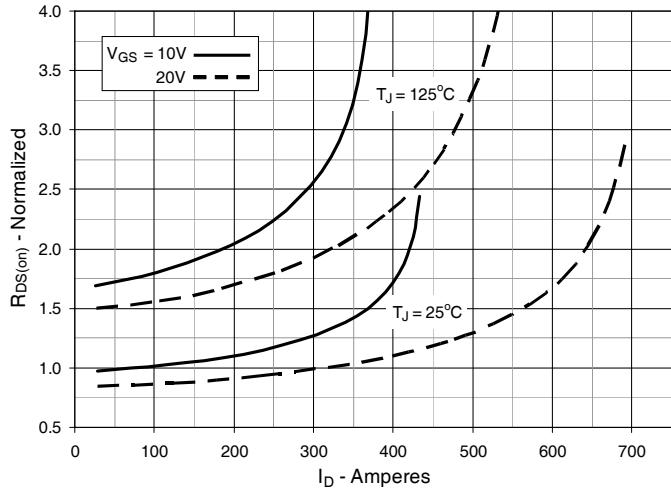


**Fig. 6. Maximum Drain Current vs. Case Temperature**
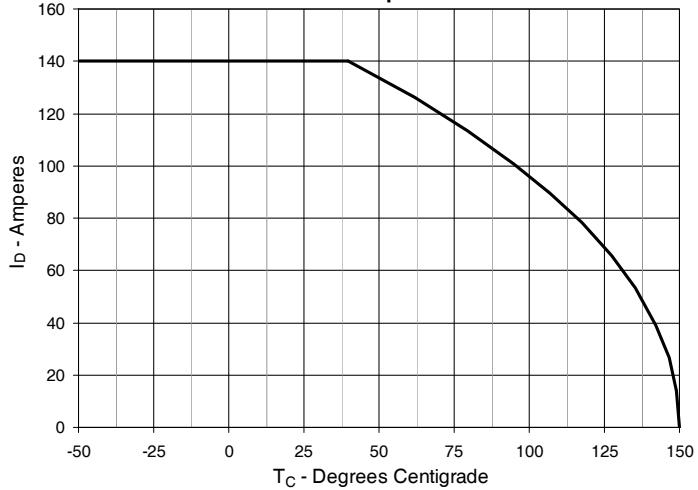
**Fig. 7. Input Admittance**
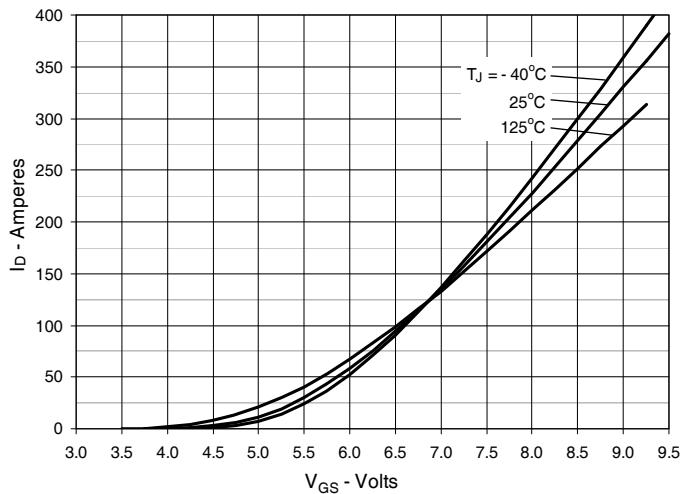


**Fig. 8. Transconductance**
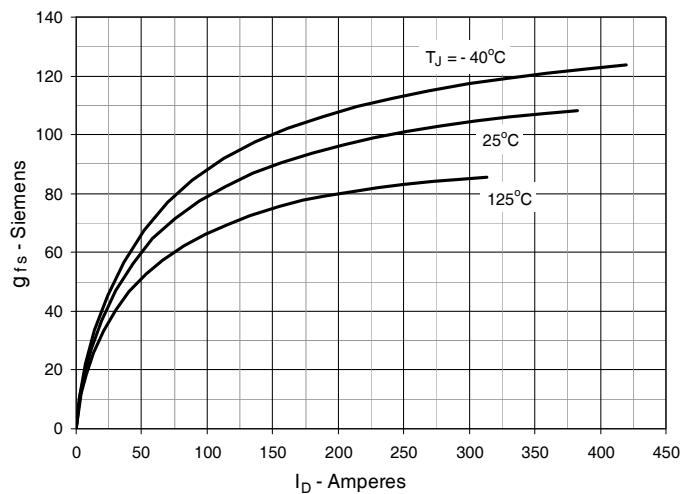


**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



**Fig. 10. Gate Charge**

$V_{DS} = 37.5V$
$I_D = 70A$
$I_G = 10mA$
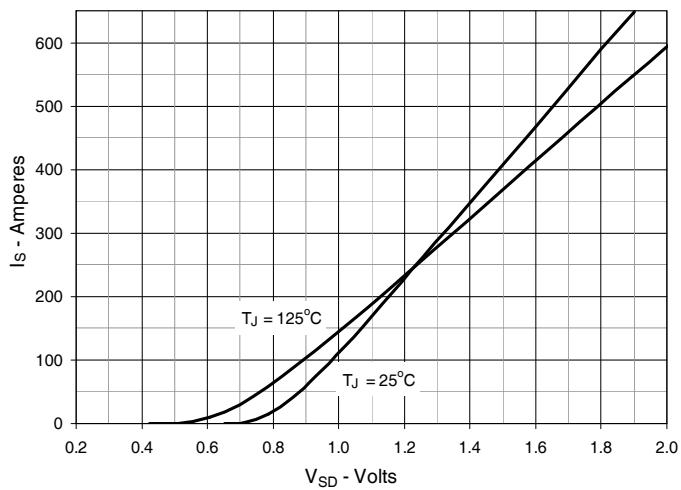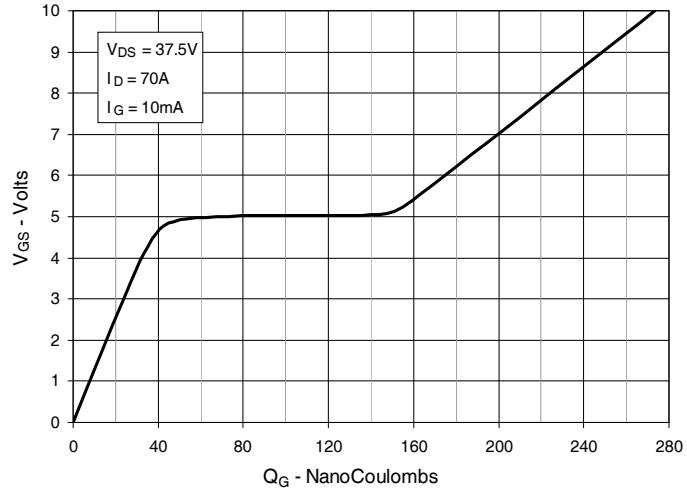


**Fig. 11. Capacitance**

$f = 1 MHz$

$C_{iss}$
$C_{oss}$
$C_{rss}$
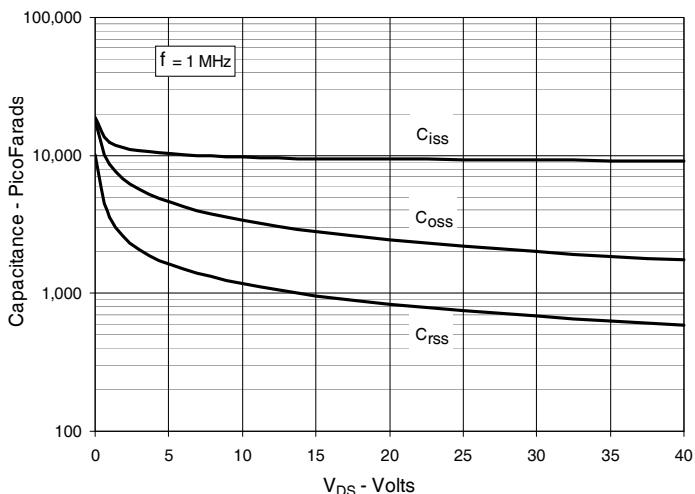


**Fig. 12. Maximum Transient Thermal Impedance**



IXYS reserves the right to change limits, test conditions, and dimensions.
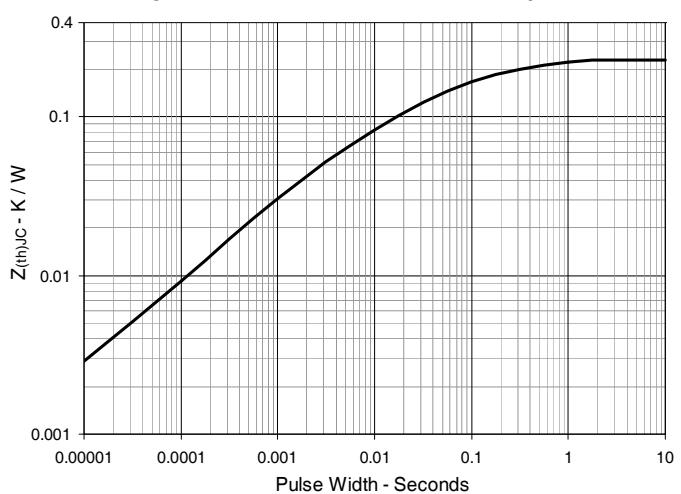
**Fig. 13. Forward-Bias Safe Operating Area
@ T_C = 25°C**
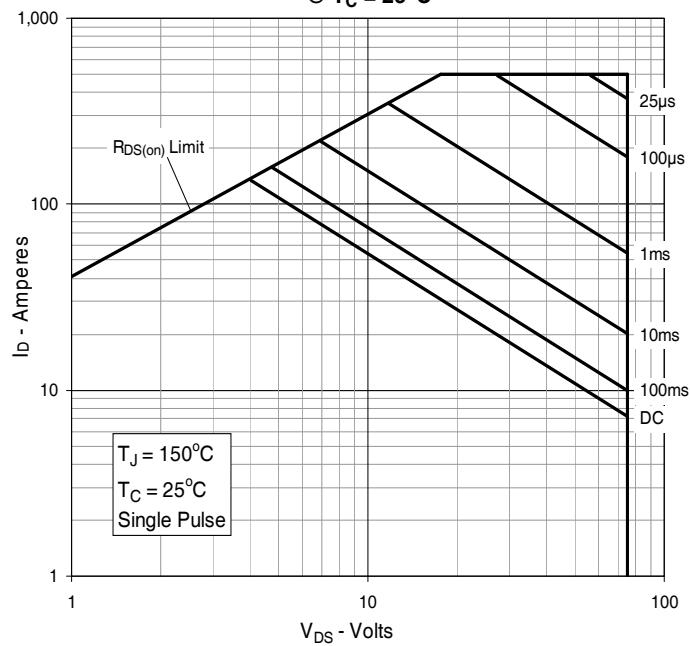


**Fig. 14. Forward-Bias Safe Operating Area
@ T_C = 75°C**

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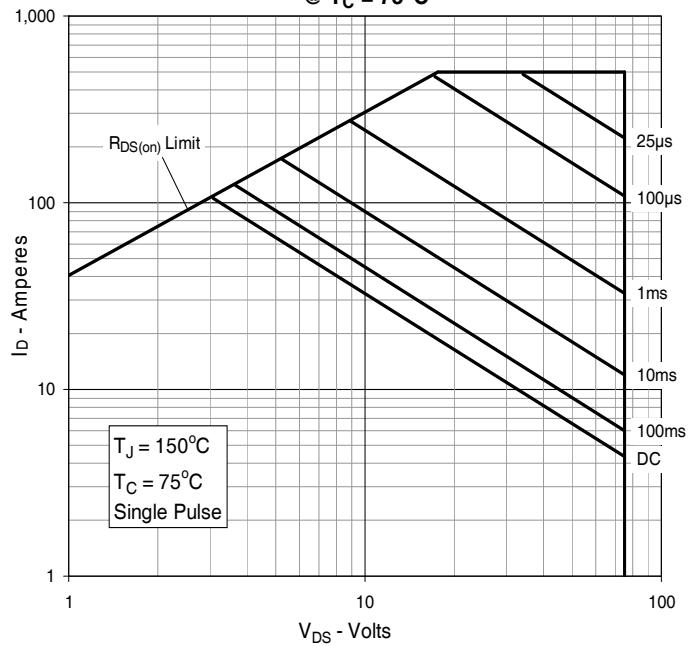
## TO-268HV Outline
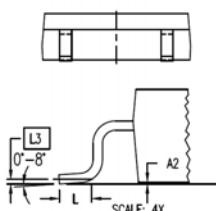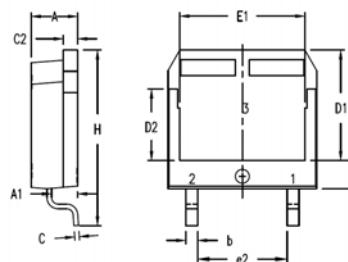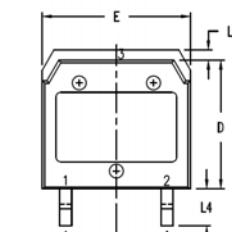


PINS:
1 - Gate  2 - Source
3 - Drain
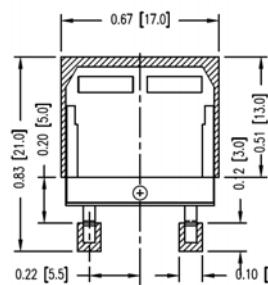
| SYM | INCHES | | MILLIMETER | |
|-----|--------|--------|------------|--------|
| | MIN | MAX | MIN | MAX |
| A | .193 | .201 | 4.90 | 5.10 |
| A1 | .106 | .114 | 2.70 | 2.90 |
| A2 | .001 | .010 | 0.02 | 0.25 |
| b | .045 | .057 | 1.15 | 1.45 |
| C | .016 | .026 | 0.40 | 0.65 |
| C2 | .057 | .063 | 1.45 | 1.60 |
| D | .543 | .551 | 13.80 | 14.00 |
| D1 | .465 | .476 | 11.80 | 12.10 |
| D2 | .295 | .307 | 7.50 | 7.80 |
| D3 | .114 | .126 | 2.90 | 3.20 |
| E | .624 | .632 | 15.85 | 16.05 |
| E1 | .524 | .535 | 13.30 | 13.60 |
| e | .215 BSC | | 5.45 BSC | |
| (e2) | .374 | .386 | 9.50 | 9.80 |
| H | .736 | .752 | 18.70 | 19.10 |
| L | .067 | .079 | 1.70 | 2.00 |
| L2 | .039 | .045 | 1.00 | 1.15 |
| L3 | .010 BSC | | 0.25 BSC | |
| L4 | .150 | .161 | 3.80 | 4.10 |

## TO-247 Outline
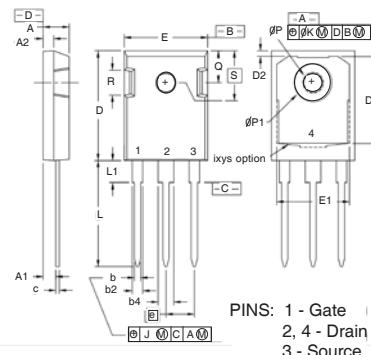


PINS:  1 - Gate
2, 4 - Drain
3 - Source

| SYM | INCHES | | MILLIMETERS | |
|-----|--------|--------|-------------|--------|
| | MIN | MAX | MIN | MAX |
| A | .190 | .205 | 4.83 | 5.21 |
| A1 | .090 | .100 | 2.29 | 2.54 |
| A2 | .075 | .085 | 1.91 | 2.16 |
| b | .045 | .055 | 1.14 | 1.40 |
| b2 | .075 | .087 | 1.91 | 2.20 |
| b4 | .115 | .126 | 2.92 | 3.20 |
| C | .024 | .031 | 0.61 | 0.80 |
| D | .819 | .840 | 20.80 | 21.34 |
| D1 | .650 | .690 | 16.51 | 17.53 |
| D2 | .035 | .050 | 0.89 | 1.27 |
| E | .620 | .635 | 15.75 | 16.13 |
| E1 | .545 | .565 | 13.84 | 14.35 |
| e | .215 BSC | | 5.45 BSC | |
| J | -- | .010 | -- | 0.25 |
| K | -- | .025 | -- | 0.64 |
| L | .780 | .810 | 19.81 | 20.57 |
| L1 | .150 | .170 | 3.81 | 4.32 |
| øP | .140 | .144 | 3.55 | 3.65 |
| øP1 | .275 | .290 | 6.99 | 7.37 |
| Q | .220 | .244 | 5.59 | 6.20 |
| R | .170 | .190 | 4.32 | 4.83 |
| S | .242 BSC | | 6.15 BSC | |

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