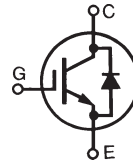


**High Voltage
BIMOSFET™ Monolithic
Bipolar MOS Transistor
Extended FBSOA**

**IXCH36N250
IXCK36N250**



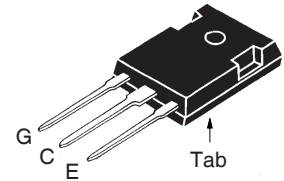
$$V_{CES} = 2500V$$

$$I_{C110} = 36A$$

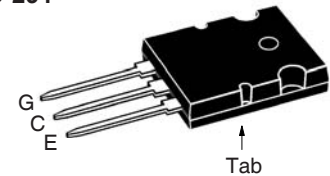
$$V_{CE(sat)} \leq 3.3V$$

| Symbol | Test Conditions | Maximum Ratings | |
|--|--|---|------------|
| V_{CES} | $T_C = 25^\circ C$ to $150^\circ C$ | 2500 | V |
| V_{CGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$ | 2500 | V |
| V_{GES} | Continuous | ± 25 | V |
| V_{GEM} | Transient | ± 35 | V |
| I_{C25} | $T_C = 25^\circ C$ | 73 | A |
| I_{C110} | $T_C = 110^\circ C$ | 36 | A |
| I_{CM} | $T_C = 25^\circ C$, 1ms | 360 | A |
| SSOA (RBSOA) | $V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 20\Omega$ Clamped Inductive Load | $I_{CM} = 144$ $V_{CE} \leq 0.8 \cdot V_{CES}$ | A |
| T_{SC} (SCSOA) | $V_{GE} = 15V$, $T_J = 125^\circ C$, $R_G = 82\Omega$, $V_{CE} = 1250V$, Non-Repetitive | 10 | μs |
| P_C | $T_C = 25^\circ C$ | 595 | W |
| T_J | | -55 ... +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | -55 ... +150 | $^\circ C$ |
| T_L | 1.6mm (0.062 in.) from Case for 10s | 300 | $^\circ C$ |
| T_{SOLD} | Plastic Body for 10 seconds | 260 | $^\circ C$ |
| M_d | Mounting Torque | 1.13/10 | Nm/lb.in. |
| Weight | TO-247 | 6 | g |
| | TO-264 | 10 | g |

TO-247 AD



TO-264



G = Gate E = Emitter
C = Collector Tab = Collector

Features

- High Blocking Voltage
- High Peak Current Capability
- Anti-Parallel Diode
- Low Saturation Voltage
- Extended FBSOA and SCSOA

Advantages

- Low Gate Drive Requirement
- High Power Density

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- Laser Generators
- Capacitor Discharge Circuits
- AC Switches
- Protection Circuits

| Symbol | Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified) | Characteristic Values | | |
|---------------|---|-----------------------|------|-----------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250\mu A$, $V_{GE} = 0V$ | 2500 | | V |
| $V_{GE(th)}$ | $I_C = 250\mu A$, $V_{CE} = V_{GE}$ | 4.0 | | 6.5 V |
| I_{CES} | $V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ C$ | | | 50 μA 1.75 mA |
| I_{GES} | $V_{CE} = 0V$, $V_{GE} = \pm 25V$ | | | ± 100 nA |
| $V_{CE(sat)}$ | $I_C = 36A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$ | 2.6 | | 3.3 V |
| | | 3.0 | | V |

| Symbol Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified) | | Characteristic Values | | |
|--|--|-----------------------|------|-------------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $I_C = 36\text{A}, V_{CE} = 10\text{V}$, Note 1 | 22 | 33 | S |
| C_{ies} | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$ | 3980 | | pF |
| C_{oes} | | 170 | | pF |
| C_{res} | | 60 | | pF |
| Q_g | $I_C = 36\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$ | 177 | | nC |
| Q_{ge} | | 30 | | nC |
| Q_{gc} | | 80 | | nC |
| $t_{d(on)}$ | Resistive Switching Times, $T_J = 25^\circ\text{C}$ $I_C = 36\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 20\Omega$ | 115 | | ns |
| t_r | | 580 | | ns |
| $t_{d(off)}$ | | 430 | | ns |
| t_f | | 880 | | ns |
| $t_{d(on)}$ | Resistive Switching Times, $T_J = 125^\circ\text{C}$ $I_C = 36\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 20\Omega$ | 105 | | ns |
| t_r | | 830 | | ns |
| $t_{d(off)}$ | | 480 | | ns |
| t_f | | 900 | | ns |
| R_{thJC} | | | | 0.21 $^\circ\text{C/W}$ |
| R_{thCS} | TO-247 | 0.21 | | $^\circ\text{C/W}$ |
| | TO-264 | 0.15 | | $^\circ\text{C/W}$ |

Reverse Diode

| Symbol Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified) | | Characteristic Values | | |
|--|--|-----------------------|------|---------------|
| | | Min. | Typ. | Max |
| V_F | $I_F = 36\text{A}, V_{GE} = 0\text{V}$, Note 1 | | | 2.5 V |
| t_{rr} | $I_F = 23\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$ | 1.7 | | μs |
| I_{RM} | | 43 | | A |

Note:

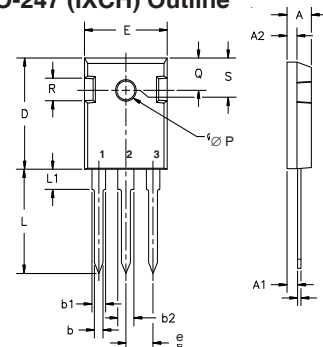
1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.

Additional provisions for lead to lead voltage isolation are required at $V_{CE} > 1200\text{V}$.

IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.

| | | | | | | | | | | |
|--|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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 | 6,404,065 B1 | 6,683,344 | 6,727,585 | 7,005,734 B2 | 7,157,338B2 |
| | 4,850,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123 B1 | 6,534,343 | 6,710,405 B2 | 6,759,692 | 7,063,975 B2 | |
| | 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728 B1 | 6,583,505 | 6,710,463 | 6,771,478 B2 | 7,071,537 | |

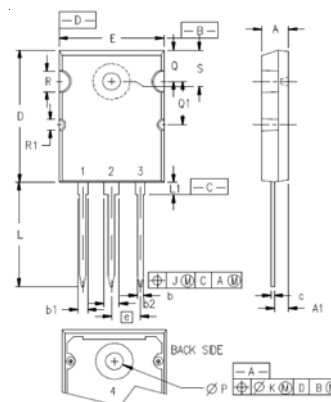
TO-247 (IXCH) Outline



Terminals: 1 - Gate 2 - Collector
3 - Emitter

| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.7 | 5.3 | .185 | .209 |
| A ₁ | 2.2 | 2.54 | .087 | .102 |
| A ₂ | 2.2 | 2.6 | .059 | .098 |
| b | 1.0 | 1.4 | .040 | .055 |
| b ₁ | 1.65 | 2.13 | .065 | .084 |
| b ₂ | 2.87 | 3.12 | .113 | .123 |
| C | .4 | .8 | .016 | .031 |
| D | 20.80 | 21.46 | .819 | .845 |
| E | 15.75 | 16.26 | .610 | .640 |
| e | 5.20 | 5.72 | 0.205 | 0.225 |
| L | 19.81 | 20.32 | .780 | .800 |
| L1 | | 4.50 | | .177 |
| ØP | 3.55 | 3.65 | .140 | .144 |
| Q | 5.89 | 6.40 | 0.232 | 0.252 |
| R | 4.32 | 5.49 | .170 | .216 |
| S | 6.15 | BSC | 242 | BSC |

TO-264 (IXCK) Outline



Terminals: 1 = Gate
2,4 = Collector
3 = Emitter

| SYM | INCHES | | MILLIMETERS | |
|-----|---------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .185 | .209 | 4.70 | 5.31 |
| A1 | .102 | .118 | 2.59 | 3.00 |
| b | .037 | .055 | 0.94 | 1.40 |
| b1 | .087 | .102 | 2.21 | 2.59 |
| b2 | .110 | .126 | 2.79 | 3.20 |
| c | .017 | .029 | 0.43 | 0.74 |
| D | 1.007 | 1.047 | 25.58 | 26.59 |
| E | .760 | .799 | 19.30 | 20.29 |
| e | .215BSC | | 5.46 BSC | |
| J | .000 | .010 | 0.00 | 0.25 |
| K | .000 | .010 | 0.00 | 0.25 |
| L | .779 | .842 | 19.79 | 21.39 |
| L1 | .087 | .102 | 2.21 | 2.59 |
| ØP | .122 | .136 | 3.10 | 3.51 |
| Q | .240 | .256 | 6.10 | 6.50 |
| Q1 | .330 | .346 | 8.38 | 8.79 |
| ØR | .155 | .187 | 3.94 | 4.75 |
| ØR1 | .085 | .093 | 2.16 | 2.36 |
| S | .243 | .253 | 6.17 | 6.43 |

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

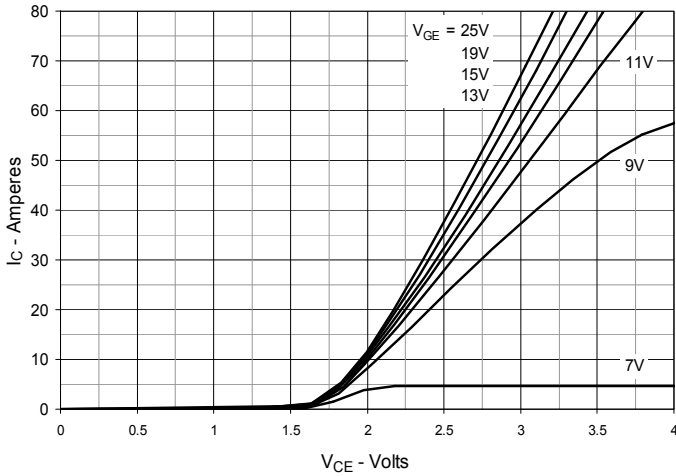


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

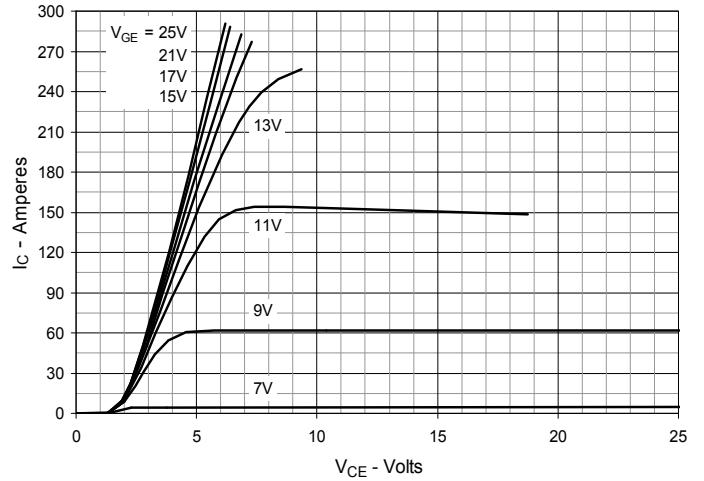


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

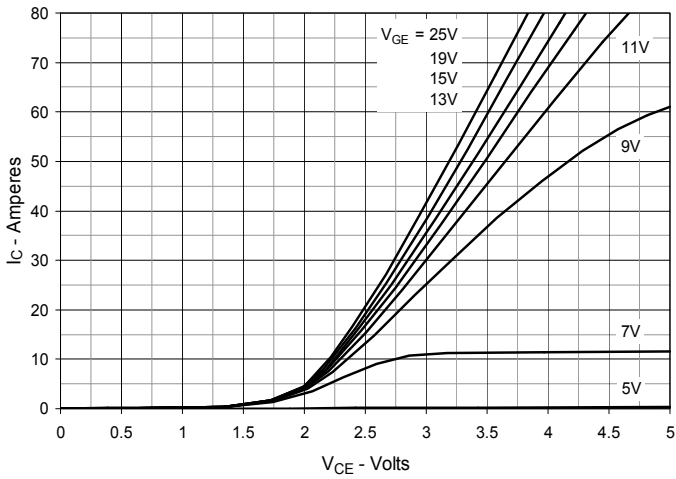


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

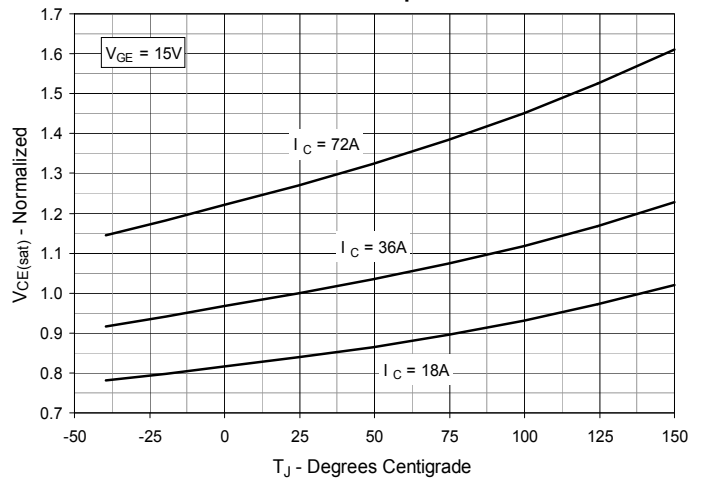


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

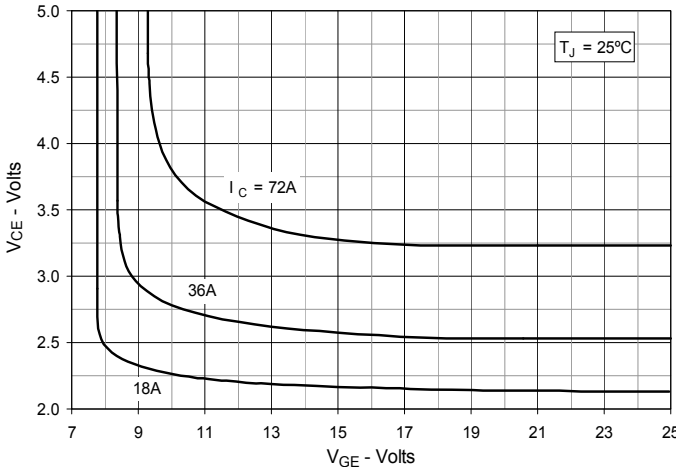


Fig. 6. Input Admittance

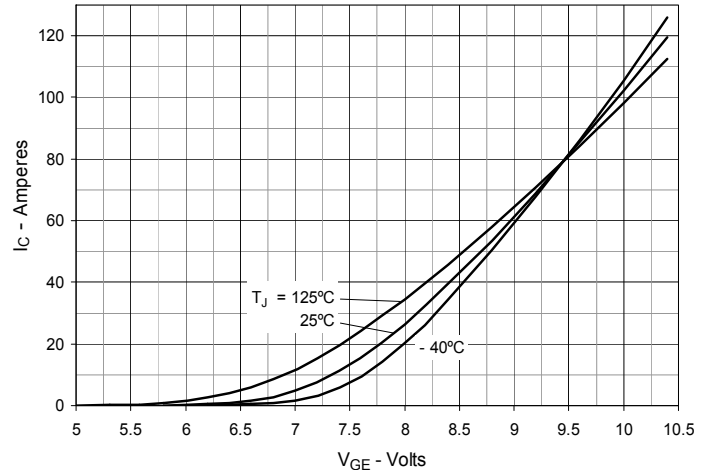


Fig. 7. Transconductance

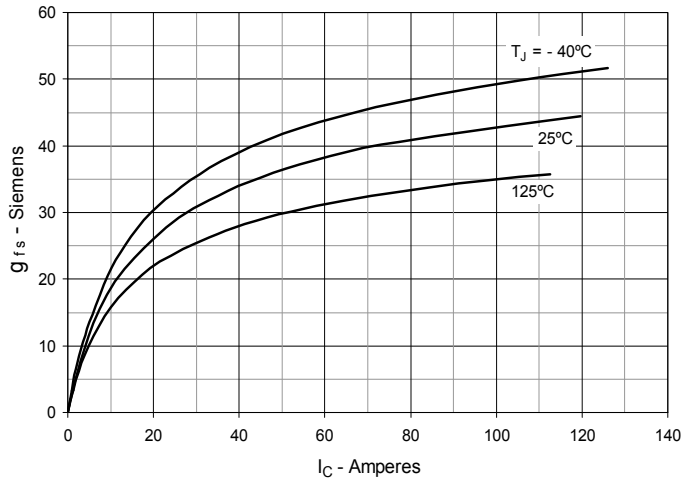


Fig. 8. Forward Voltage Drop of Intrinsic Diode

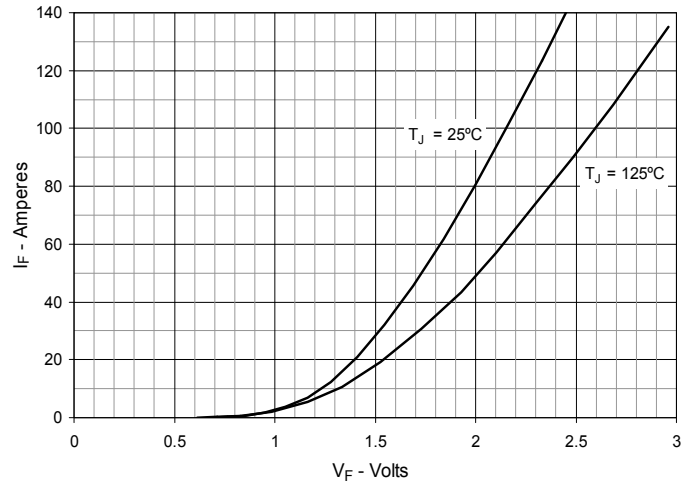


Fig. 9. Gate Charge

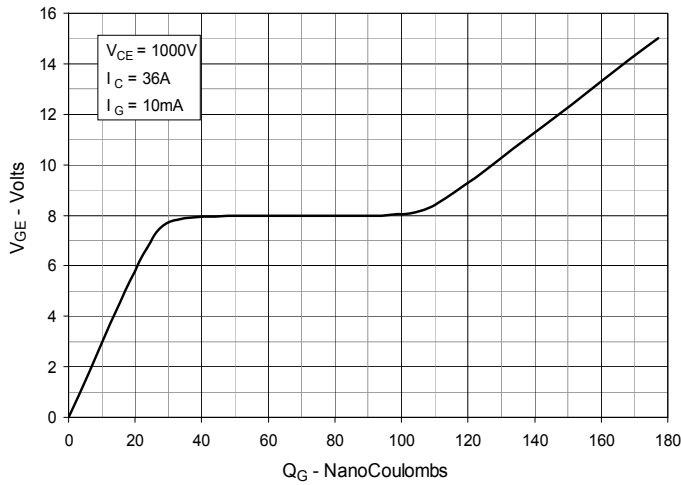


Fig. 10. Capacitance

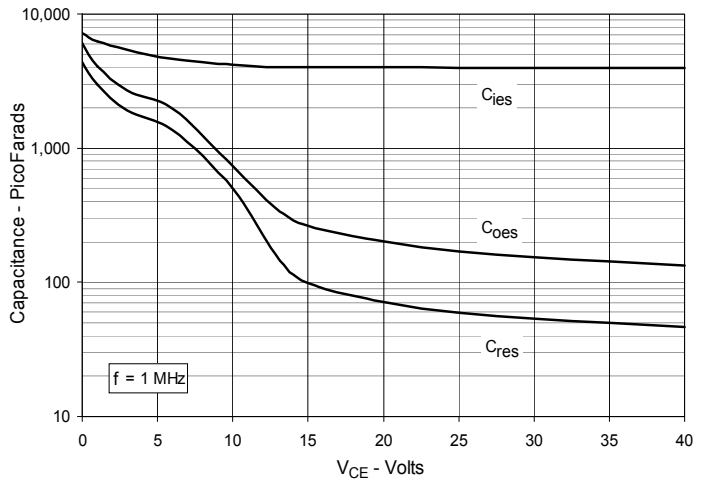


Fig. 11. Reverse-Bias Safe Operating Area

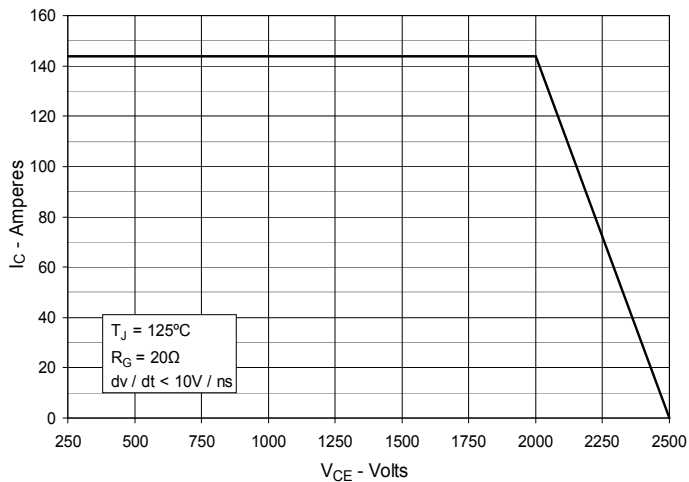


Fig. 12. Maximum Transient Thermal Impedance

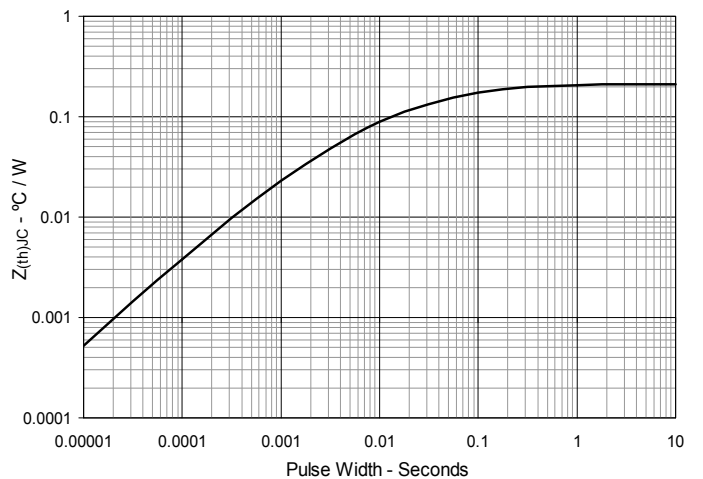


Fig. 13. Forward-Bias Safe Operating Area @ $T_C = 25^\circ\text{C}$

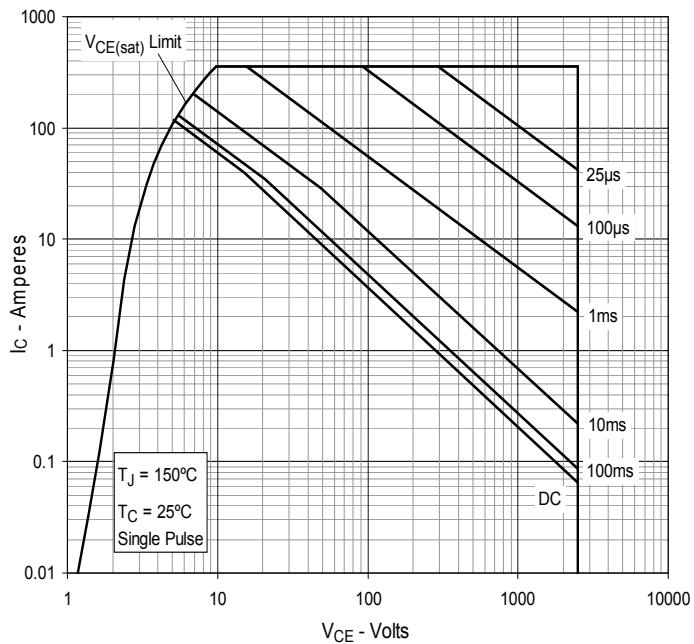
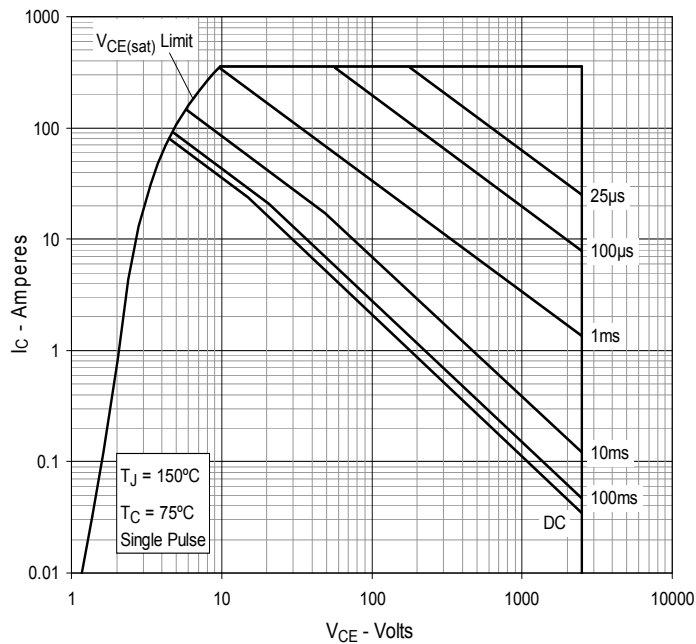


Fig. 14. Forward-Bias Safe Operating Area @ $T_C = 75^\circ\text{C}$





Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.