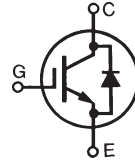


**High Voltage
BIMOSFET™ Monolithic
Bipolar MOS Transistor
Extended FBSOA**

**IXCH36N250
IXCK36N250**



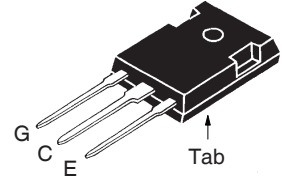
$$V_{CES} = 2500V$$

$$I_{C110} = 36A$$

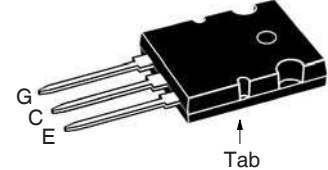
$$V_{CE(sat)} \leq 3.3V$$

| 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} | $I_C = 36\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$ | 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 | $I_F = 36\text{A}, V_{GE} = 0\text{V}, \text{Note 1}$ | | | 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:

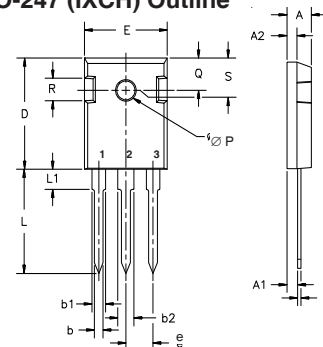
1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.

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 | |

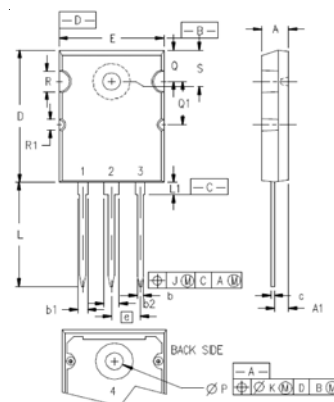
TO-247 (IXCH) Outline



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 @ $T_J = 25^\circ\text{C}$

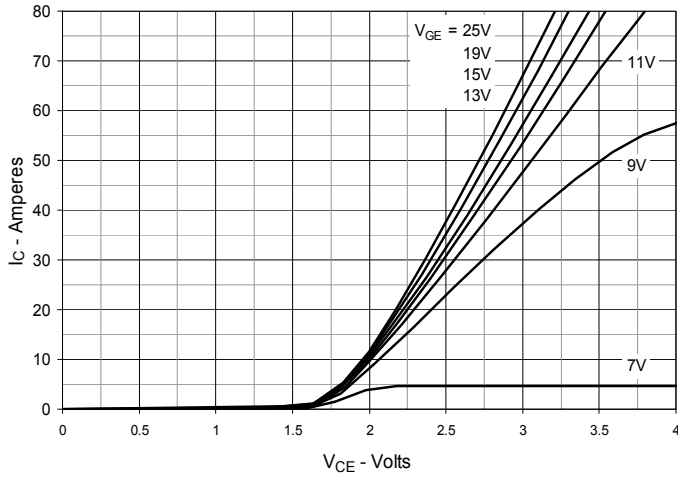


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

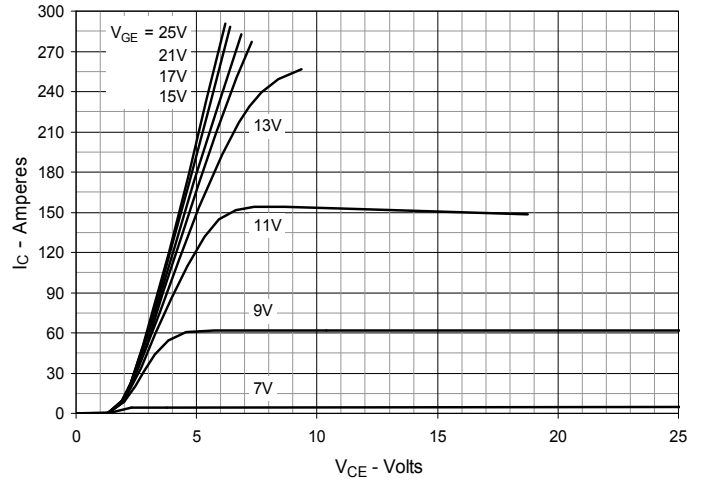


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

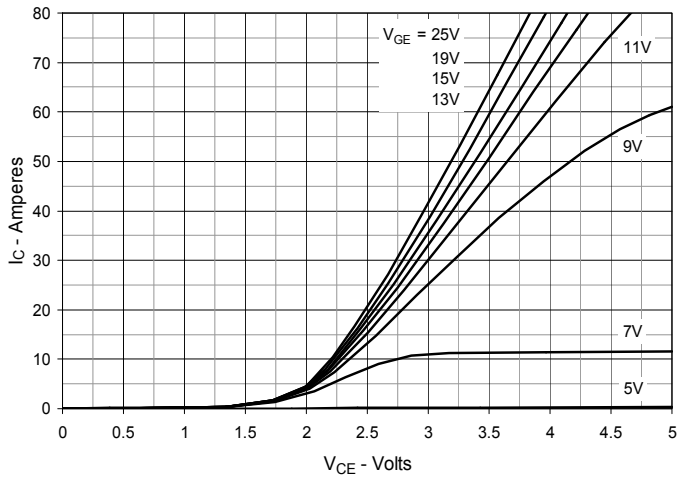


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

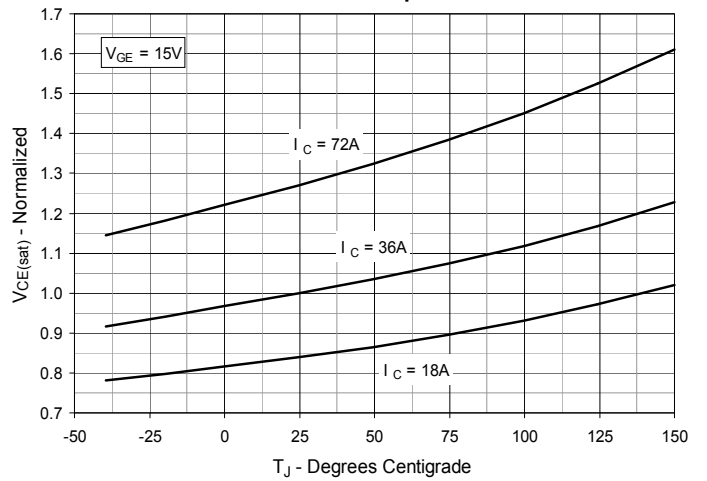


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

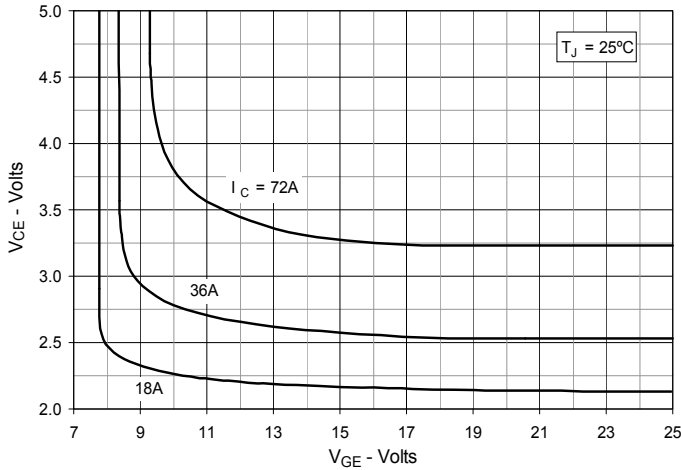


Fig. 6. Input Admittance

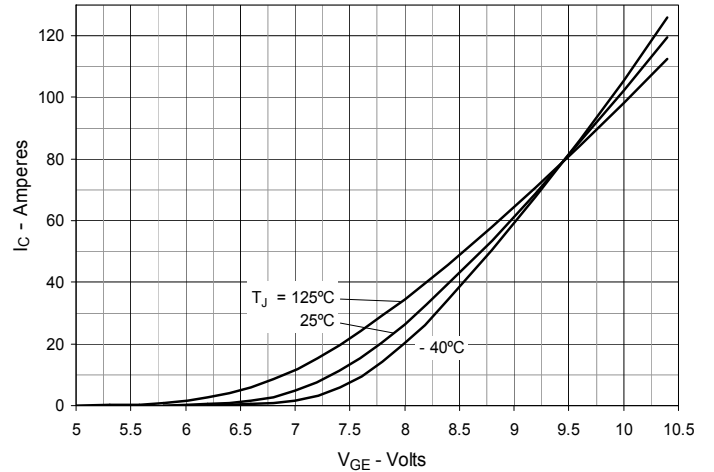


Fig. 7. Transconductance

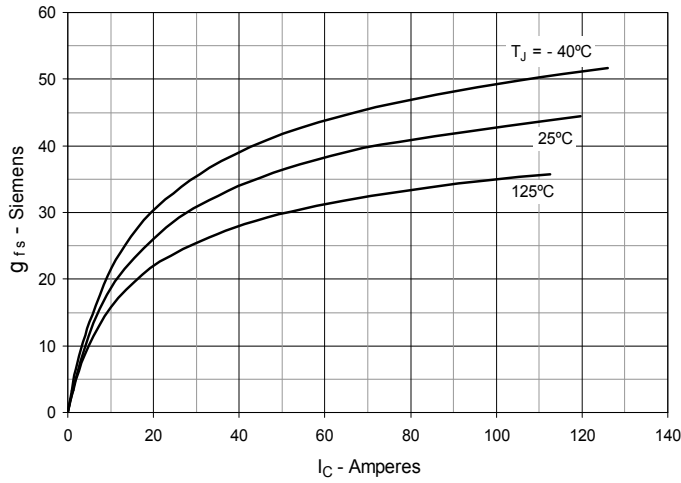


Fig. 8. Forward Voltage Drop of Intrinsic Diode

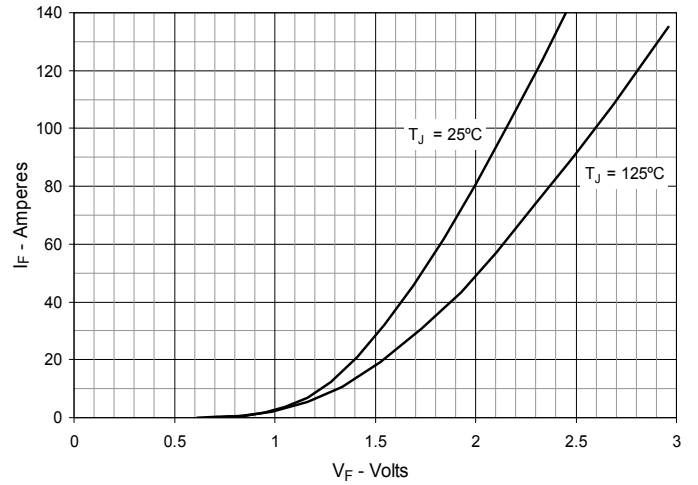


Fig. 9. Gate Charge

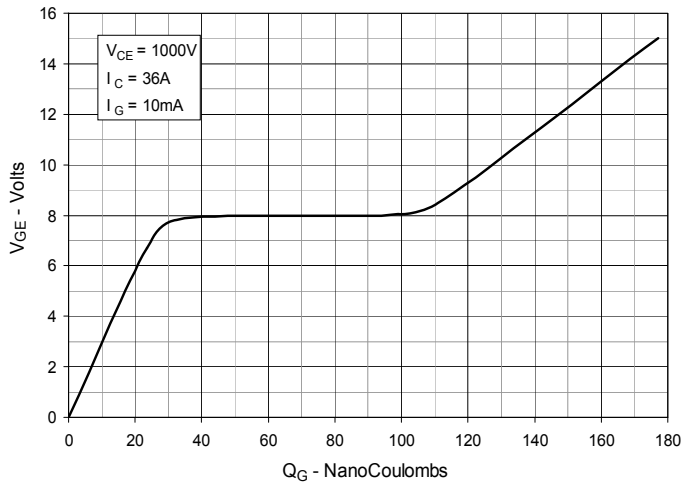


Fig. 10. Capacitance

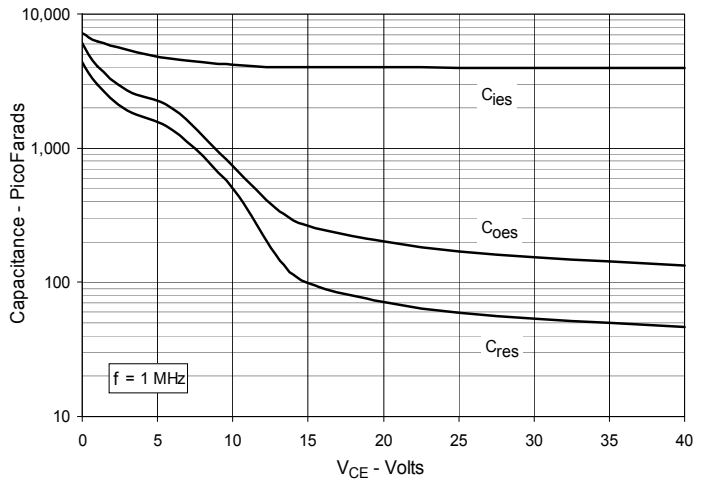


Fig. 11. Reverse-Bias Safe Operating Area

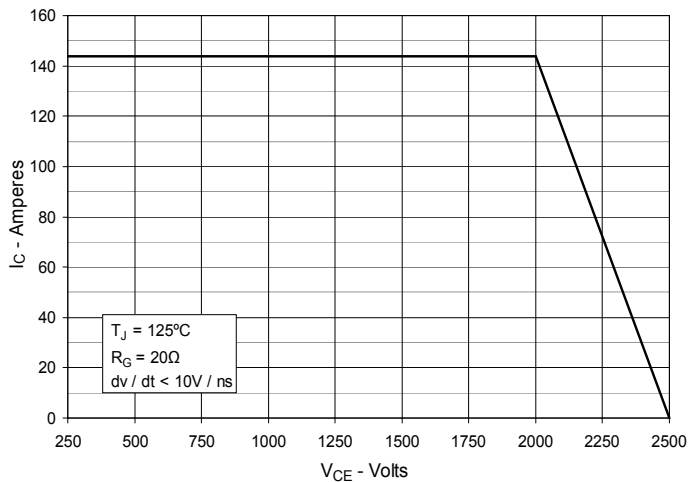


Fig. 12. Maximum Transient Thermal Impedance

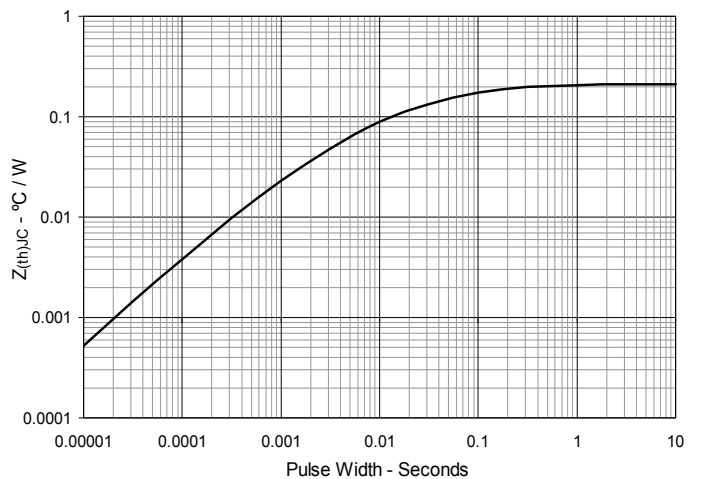


Fig. 13. Forward-Bias Safe Operating Area @ $T_C = 25^\circ\text{C}$

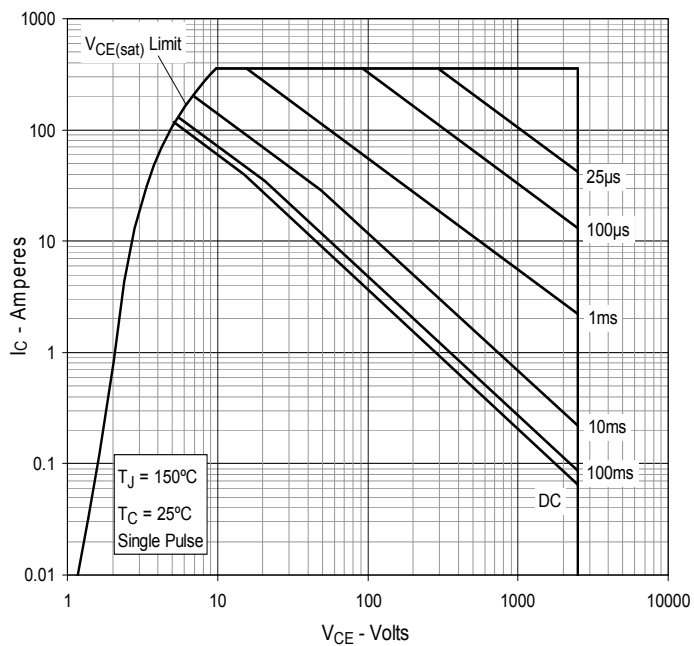


Fig. 14. Forward-Bias Safe Operating Area @ $T_C = 75^\circ\text{C}$

