

High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBT22N300HV IXBH22N300HV



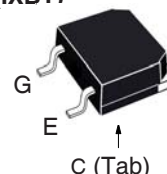
$$V_{CES} = 3000V$$

$$I_{C110} = 22A$$

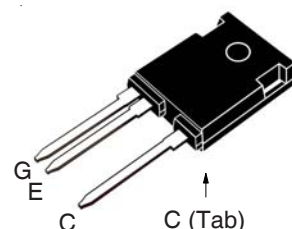
$$V_{CE(sat)} \leq 2.7V$$

| Symbol | Test Conditions | Maximum Ratings | |
|--|--|---------------------------------------|------------|
| V_{CES} | $T_J = 25^\circ C$ to $150^\circ C$ | 3000 | V |
| V_{CGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$ | 3000 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ C$ | 60 | A |
| I_{C110} | $T_C = 110^\circ C$ | 22 | A |
| I_{CM} | $T_C = 25^\circ C$, 1ms | 190 | A |
| SSOA (RBSOA) | $V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 15\Omega$ Clamped Inductive Load | $I_{CM} = 180$ $V_{CES} \leq 1500$ | A V |
| T_{SC} (SCSOA) | $V_{GE} = 15V$, $T_J = 125^\circ C$, $R_G = 52\Omega$, $V_{CE} = 1500V$, Non-Repetitive | 10 | μs |
| P_C | $T_C = 25^\circ C$ | 290 | 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} | Plastic Body for 10s | 260 | $^\circ C$ |
| M_d | Mounting Torque (TO-247HV) | 1.13/10 | Nm/lb.in |
| Weight | TO-268HV | 4 | g |
| | TO-247HV | 6 | g |

TO-268HV (IXBT)



TO-247HV (IXBH)



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

Features

- High Voltage Packages
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage

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

| Symbol | Test Conditions ($T_J = 25^\circ C$ Unless Otherwise Specified) | Characteristic Values | | |
|---------------|---|-----------------------|------|----------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250\mu A$, $V_{GE} = 0V$ | 3000 | | V |
| $V_{GE(th)}$ | $I_C = 250\mu A$, $V_{CE} = V_{GE}$ | 3.0 | | 5.0 V |
| I_{CES} | $V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ C$ | | | 25 μA 1.5 mA |
| I_{GES} | $V_{CE} = 0V$, $V_{GE} = \pm 20V$ | | | ± 100 nA |
| $V_{CE(sat)}$ | $I_C = 22A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$ | | 2.2 | 2.7 V |
| | | | 2.7 | V |

| Symbol Test Conditions | | Characteristic Values | | |
|--|--|--|------|-----------|
| (T _J = 25°C Unless Otherwise Specified) | | Min. | Typ. | Max. |
| g_{FS} | I _C = 22A, V _{CE} = 10V, Note 1 | 13 | 22 | S |
| C_{ies} | V _{CE} = 25V, V _{GE} = 0V, f = 1MHz | | 2200 | pF |
| C_{oes} | | | 85 | pF |
| C_{res} | | | 30 | pF |
| Q_{g(on)} | I _C = 22A, V _{GE} = 15V, V _{CE} = 1500V | | 110 | nC |
| Q_{ge} | | | 13 | nC |
| Q_{gc} | | | 45 | nC |
| t_{d(on)} | Resistive Switching Times, T_J = 25°C | | 46 | ns |
| t_r | | I _C = 22A, V _{GE} = 15V | 360 | ns |
| t_{d(off)} | | V _{CE} = 960V, R _G = 15Ω | 205 | ns |
| t_f | | | 1820 | ns |
| t_{d(on)} | Resistive Switching Times, T_J = 125°C | | 43 | ns |
| t_r | | I _C = 22A, V _{GE} = 15V | 700 | ns |
| t_{d(off)} | | V _{CE} = 960V, R _G = 15Ω | 220 | ns |
| t_f | | | 1650 | ns |
| R_{thJC} | | | | 0.43 °C/W |
| R_{thCS} | TO-247HV | 0.21 | | °C/W |

Reverse Diode

| Symbol Test Conditions | | Characteristic Values | | |
|--|--|---|------|-------|
| (T _J = 25°C Unless Otherwise Specified) | | Min. | Typ. | Max |
| V_F | I _F = 22A, V _{GE} = 0V, Note 1 | | | 2.7 V |
| t_{rr} | I _F = 11A, V _{GE} = 0V, -di _F /dt = 100A/μs | | 1.4 | μs |
| I_{RM} | | V _R = 100V, V _{GE} = 0V | | 30 |
| Q_{RM} | | | 21 | μC |

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

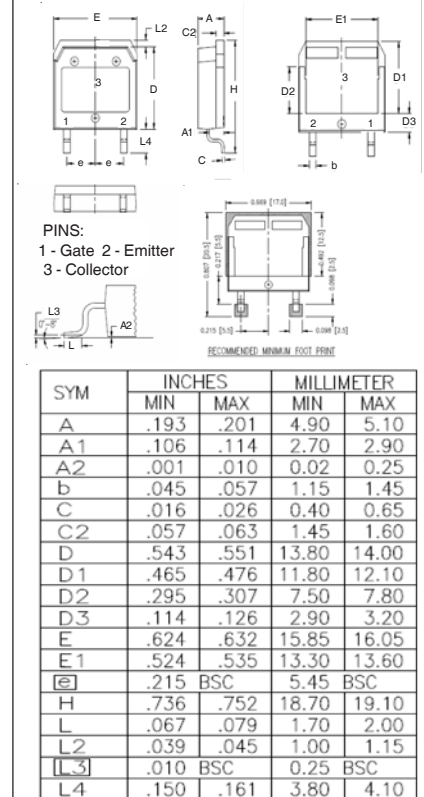
ADVANCE TECHNICAL INFORMATION

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.

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

IXYS MOSFETs and IGBTs are covered 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
by one or more of the following U.S. patents: 4,860,072 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-268HV Outline



TO-247HV Outline

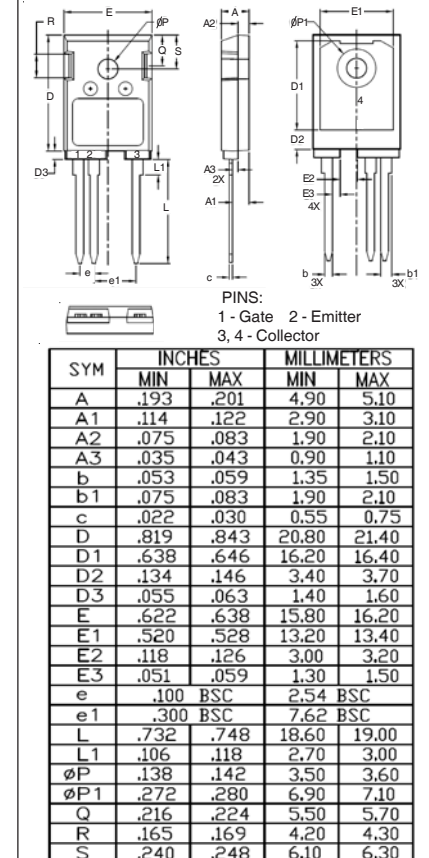


Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

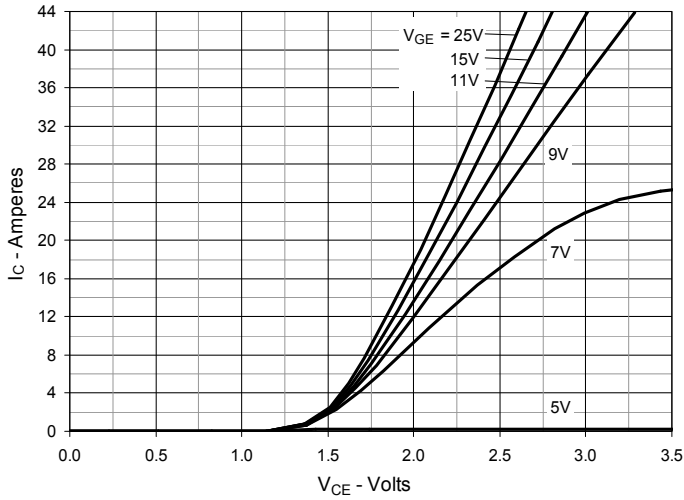


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

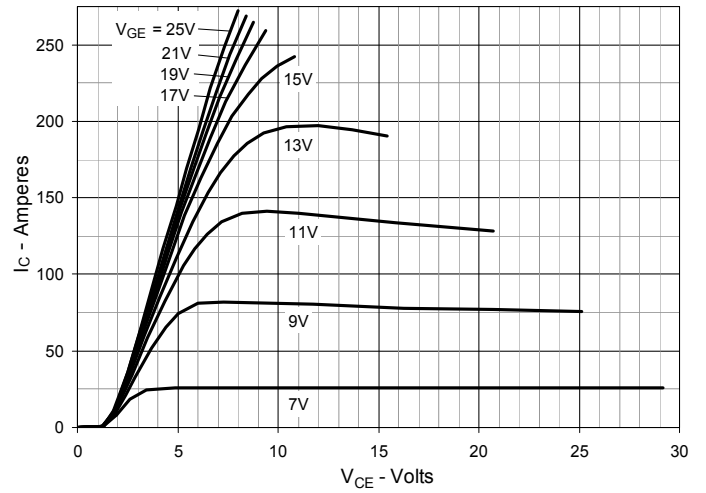


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

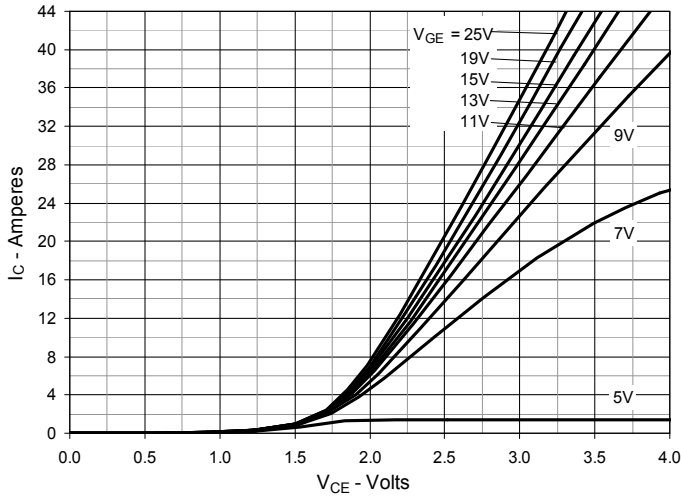


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

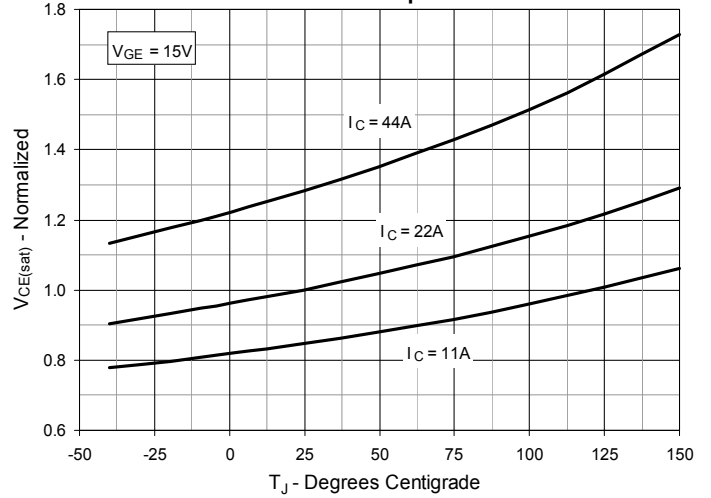


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

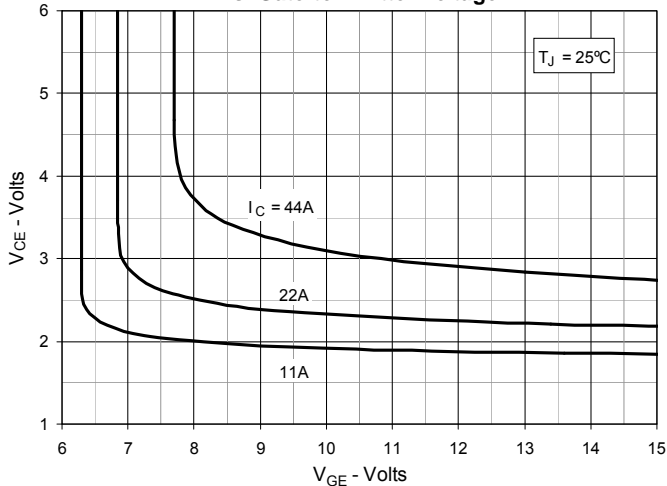


Fig. 6. Input Admittance

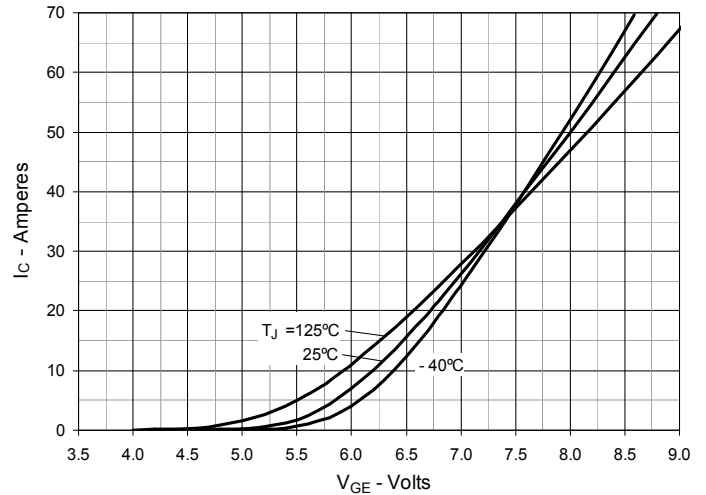


Fig. 7. Transconductance

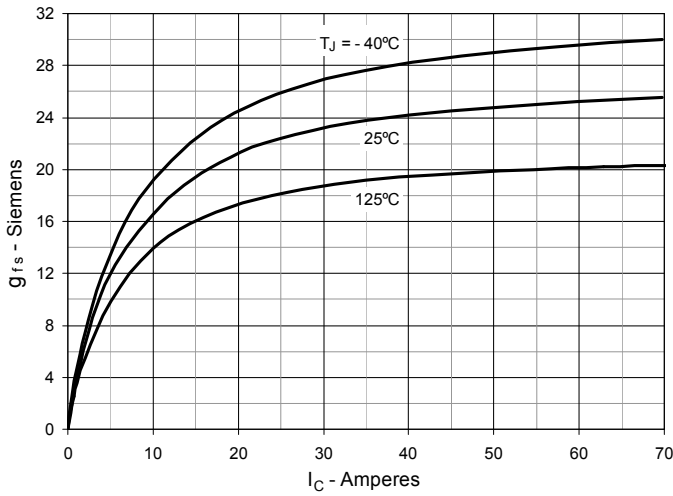


Fig. 8. Gate Charge

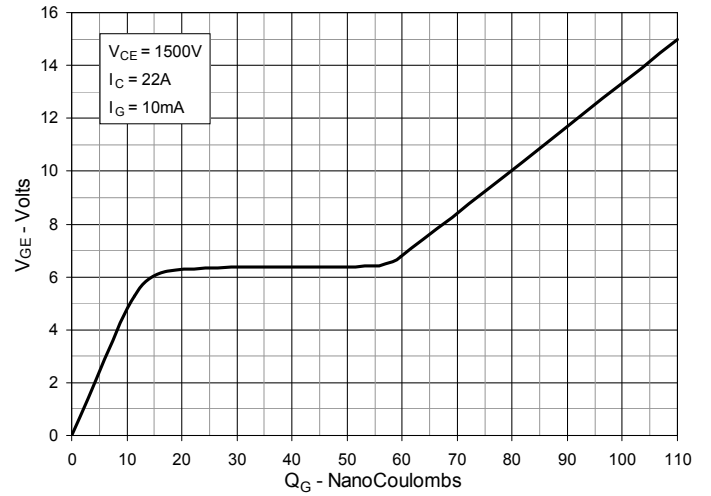


Fig. 9. Forward Voltage Drop of Intrinsic Diode

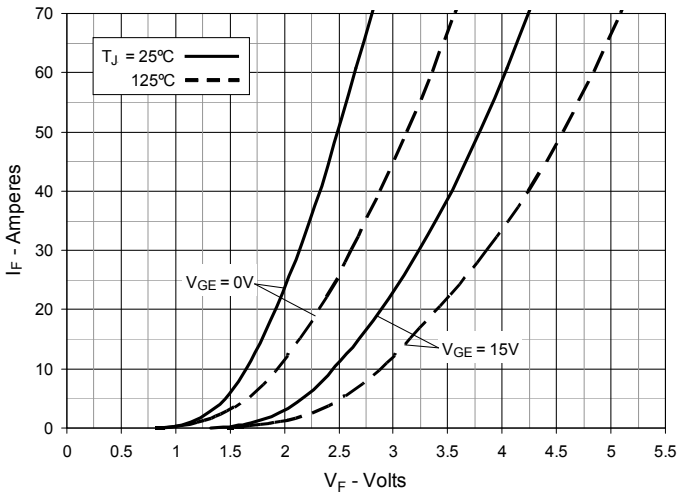


Fig. 10. Capacitance

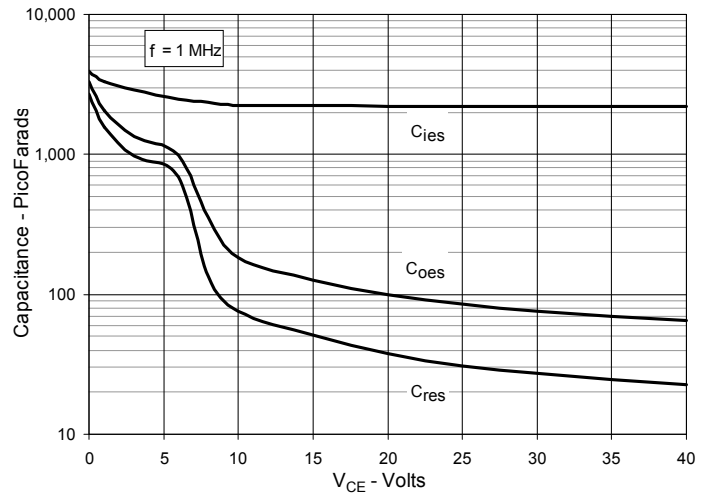


Fig. 11. Reverse-Bias Safe Operating Area

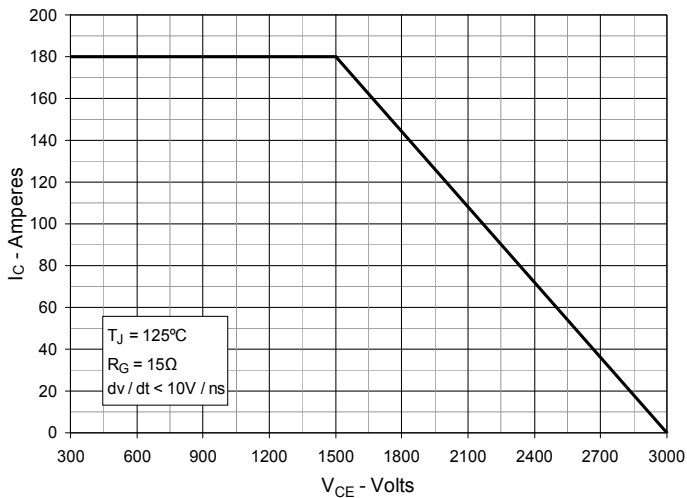


Fig. 12. Maximum Transient Thermal Impedance

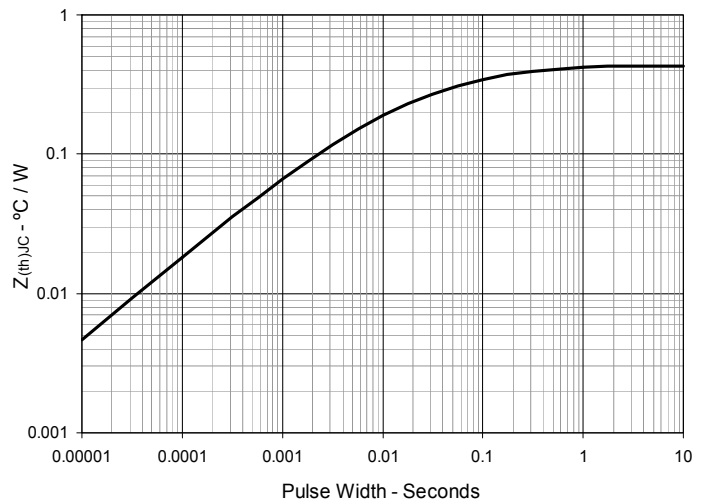


Fig. 13. Forward-Bias Safe Operating Area @ $T_C = 25^\circ\text{C}$

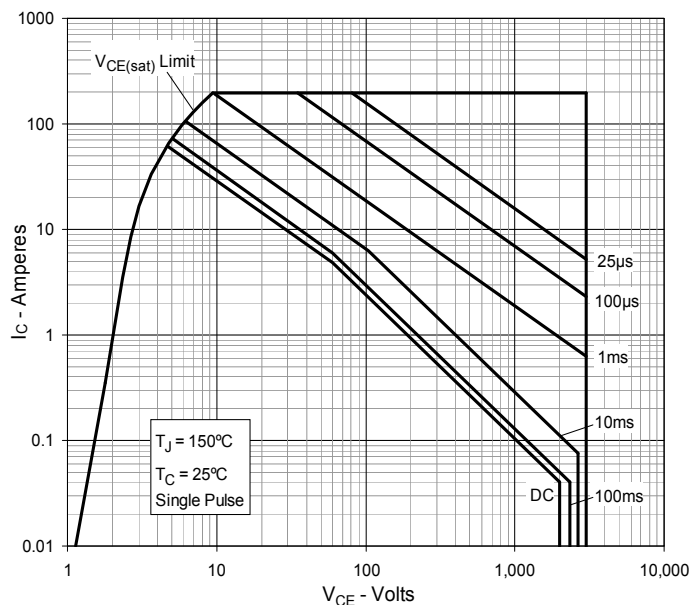
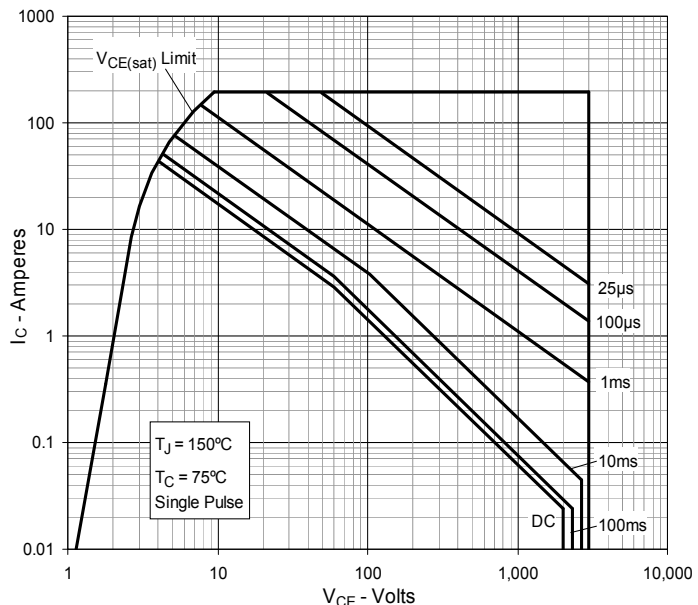


Fig. 14. Forward-Bias Safe Operating Area @ $T_C = 75^\circ\text{C}$





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