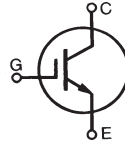


GenX3™ 1200V IGBT
**IXGA20N120B3
IXGP20N120B3**

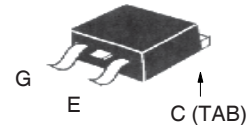
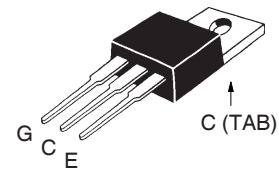
$$V_{CES} = 1200V$$

$$I_{C90} = 20A$$

$$V_{CE(sat)} \leq 3.1V$$

 High Speed Low Vsat PT
IGBTs 3-20 kHz Switching


| Symbol | Test Conditions | Maximum Ratings | |
|-------------------------------|---|---------------------------------------|------------|
| V_{CES} | $T_J = 25^\circ C$ to $150^\circ C$ | 1200 | V |
| V_{CGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$ | 1200 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ C$ | 36 | A |
| I_{C90} | $T_C = 90^\circ C$ | 20 | A |
| I_{CM} | $T_C = 25^\circ C$, 1ms | 80 | A |
| SSOA (RBSOA) | $V_{GE} = 15V$, $T_J = 125^\circ C$, $R_G = 15\Omega$ Clamped Inductive load | $I_{CM} = 40$ @ $V_{CE} \leq 1200$ | A V |
| P_C | $T_C = 25^\circ C$ | 180 | W |
| T_J | | -55 ... +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | -55 ... +150 | $^\circ C$ |
| M_d | Mounting Torque (TO-220) | 1.13/10 | Nm/lb.in. |
| F_C | Mounting Force (TO-263) | 10..65 / 2.2..14.6 | N/lb. |
| T_L | Maximum Lead Temperature for Soldering | 300 | $^\circ C$ |
| T_{SOLD} | 1.6mm (0.062 in.) from Case for 10s | 260 | $^\circ C$ |
| Weight | TO-263 | 2.5 | g |
| | TO-220 | 3.0 | g |

TO-263 (IXGA)

TO-220 (IXGP)


G = Gate C = Collector
E = Emitter TAB = Collector

Features

- Optimized for Low Conduction and Switching Losses
- Square RBSOA
- International Standard Packages

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Welding Machines
- Inductive Heating

| Symbol | Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified) | Characteristic Values | | |
|---------------|---|-----------------------|------------|--------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250\mu A$, $V_{GE} = 0V$ | 1200 | | V |
| $V_{GE(th)}$ | $I_C = 250\mu A$, $V_{CE} = V_{GE}$ | 2.5 | | V |
| I_{CES} | $V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ C$ | | | 25 μA 1 mA |
| I_{GES} | $V_{CE} = 0V$, $V_{GE} = \pm 20V$ | | | ± 100 nA |
| $V_{CE(sat)}$ | $I_C = 16A$, $V_{GE} = 15V$, Note 2 $T_J = 125^\circ C$ | | 2.7 2.8 | 3.1 V |

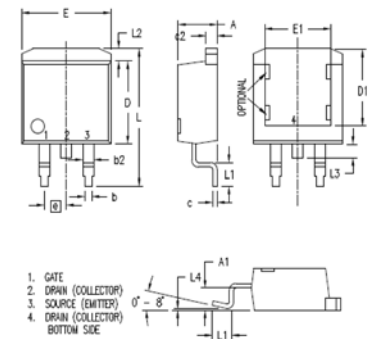
| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--|--|-----------------------|------|--|
| | | Min. | Typ. | Max. |
| g_{fs} | $I_C = 16\text{A}$, $V_{CE} = 10\text{V}$, Note 2 | 7.5 | 12.5 | S |
| C_{ies} C_{oes} C_{res} | $V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$ | | 1070 | pF |
| | | | 80 | pF |
| | | | 32 | pF |
| Q_g Q_{ge} Q_{gc} | $I_C = 16\text{A}$, $V_{GE} = 15\text{V}$, $V_{CE} = 0.5 \cdot V_{CES}$ | | 51 | nC |
| | | | 7.4 | nC |
| | | | 23 | nC |
| $t_{d(on)}$ t_{ri} E_{on} $t_{d(off)}$ t_{fi} E_{off} | Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 16\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 600\text{V}$, $R_G = 15\Omega$ Note 1 | | 16 | ns |
| | | | 31 | ns |
| | | | 0.92 | mJ |
| | | | 150 | ns |
| | | | 155 | ns |
| | | | 0.56 | mJ |
| $t_{d(on)}$ t_{ri} E_{on} $t_{d(off)}$ t_{fi} E_{off} | Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 16\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 600\text{V}$, $R_G = 15\Omega$ Note 1 | | 16 | ns |
| | | | 45 | ns |
| | | | 1.60 | mJ |
| | | | 180 | ns |
| | | | 540 | ns |
| | | | 1.63 | mJ |
| R_{thJC} R_{thCK} | TO-220 | | 0.50 | 0.69°C/W $^\circ\text{C/W}$ |

- Notes:
- Switching Times may Increase for V_{CE} (Clamp) $> 0.5 \cdot V_{CES}$, Higher T_J or Increased R_G .
 - Pulse Test, $t \leq 300\mu\text{s}$; Duty Cycle, $d \leq 2\%$.

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

TO-263 (IXGA) Outline



| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .160 | .190 | 4.06 | 4.83 |
| A1 | .080 | .110 | 2.03 | 2.79 |
| b | .020 | .039 | 0.51 | 0.99 |
| b2 | .045 | .055 | 1.14 | 1.40 |
| c | .016 | .029 | 0.40 | 0.74 |
| c2 | .045 | .055 | 1.14 | 1.40 |
| D | .340 | .380 | 8.64 | 9.65 |
| D1 | .315 | .350 | 8.00 | 8.89 |
| E | .380 | .410 | 9.65 | 10.41 |
| E1 | .245 | .320 | 6.22 | 8.13 |
| e | .100 BSC | | 2.54 BSC | |
| L | .575 | .625 | 14.61 | 15.88 |
| L1 | .090 | .110 | 2.29 | 2.79 |
| L2 | .040 | .055 | 1.02 | 1.40 |
| L3 | .050 | .070 | 1.27 | 1.78 |
| L4 | 0 | .005 | 0 | 0.13 |

TO-220 (IXGP) Outline

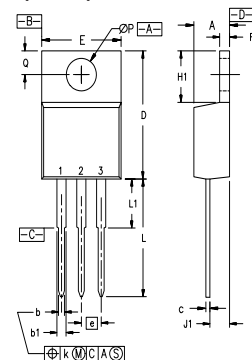


Fig. 1. Output Characteristics @ 25°C

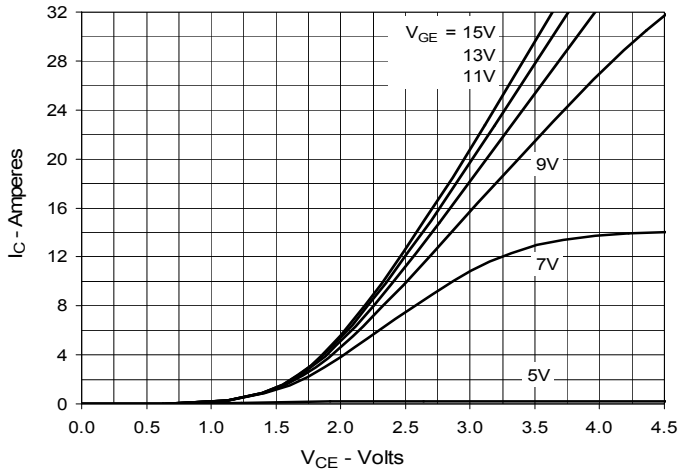


Fig. 2. Extended Output Characteristics @ 25°C

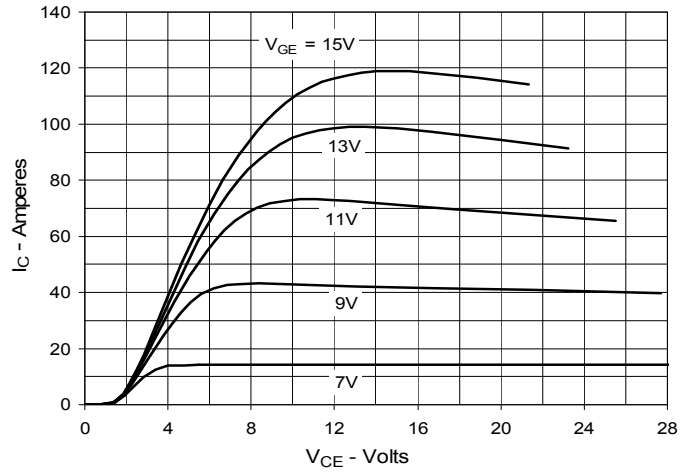


Fig. 3. Output Characteristics @ 125°C

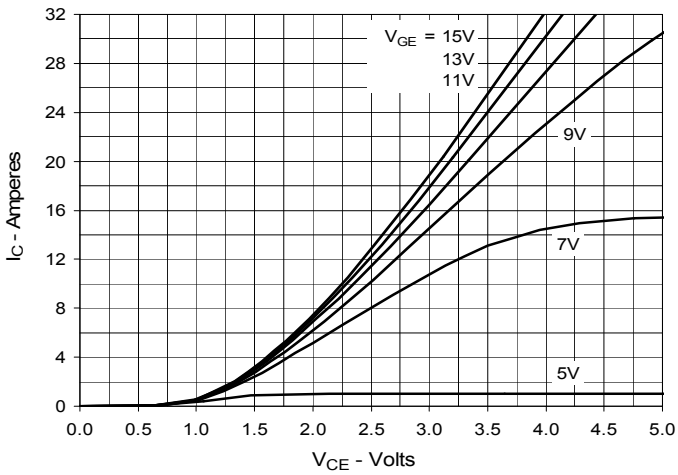


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

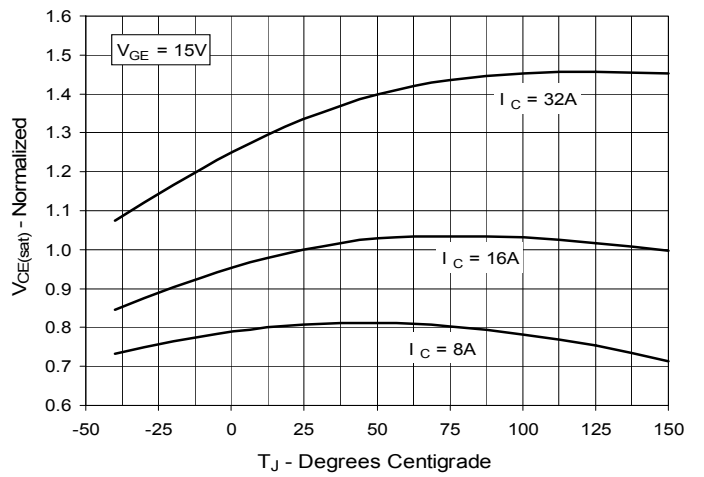


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

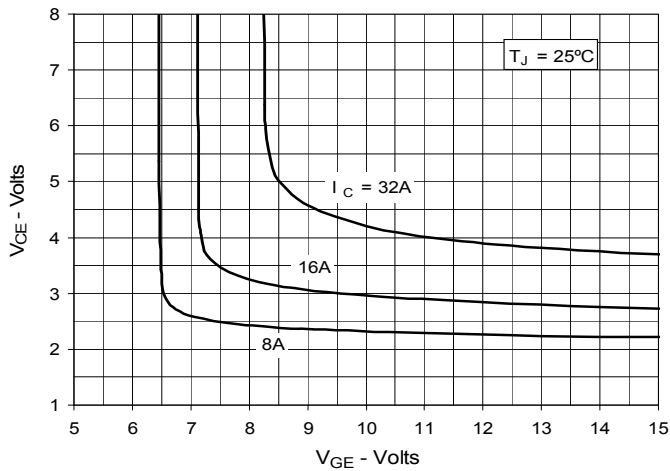


Fig. 6. Input Admittance

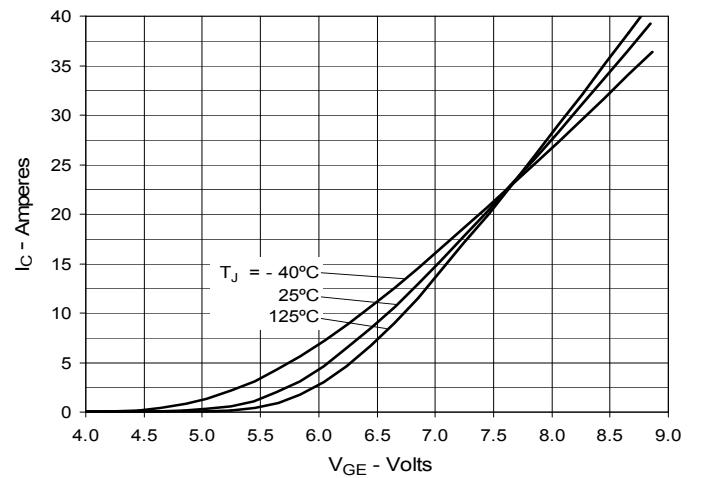


Fig. 7. Transconductance

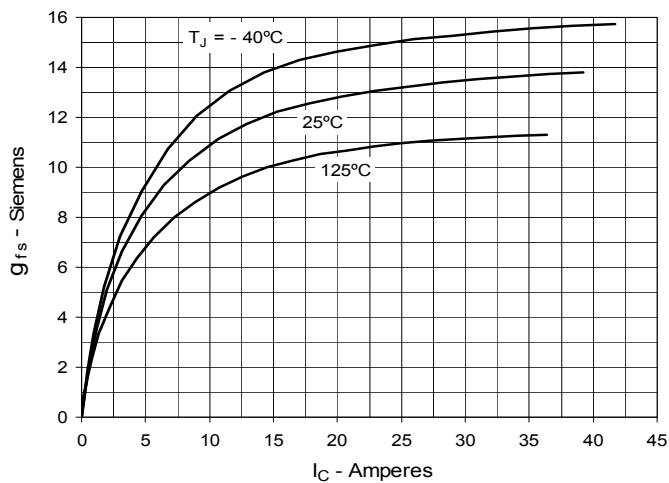


Fig. 8. Gate Charge

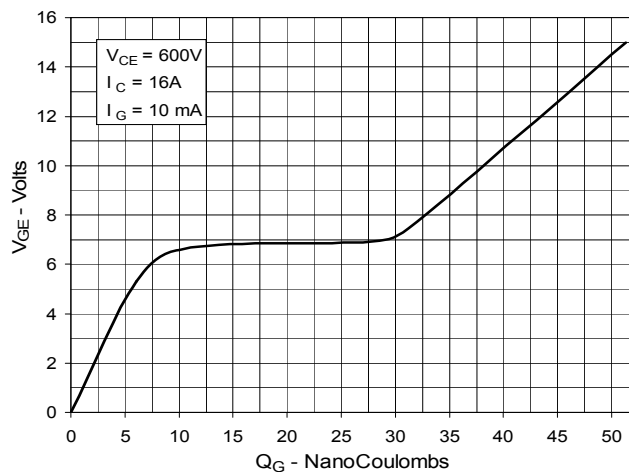


Fig. 9. Capacitance

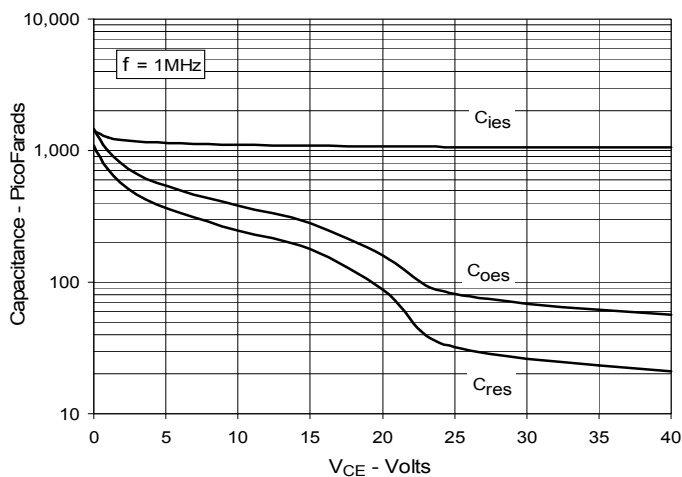


Fig. 10. Reverse-Bias Safe Operating Area

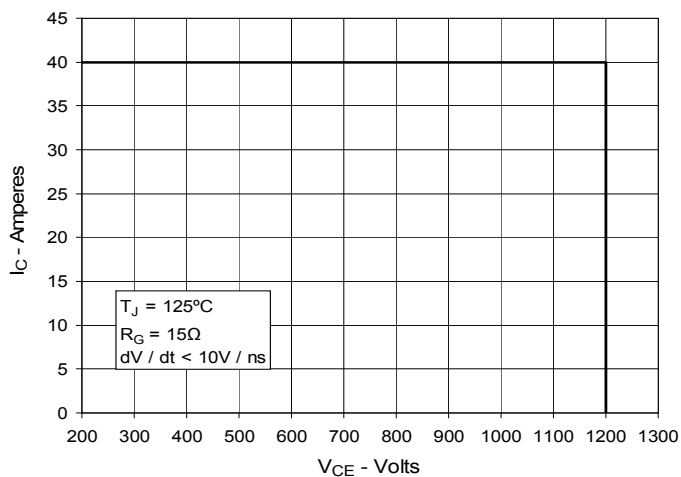


Fig. 11. Maximum Transient Thermal Impedance

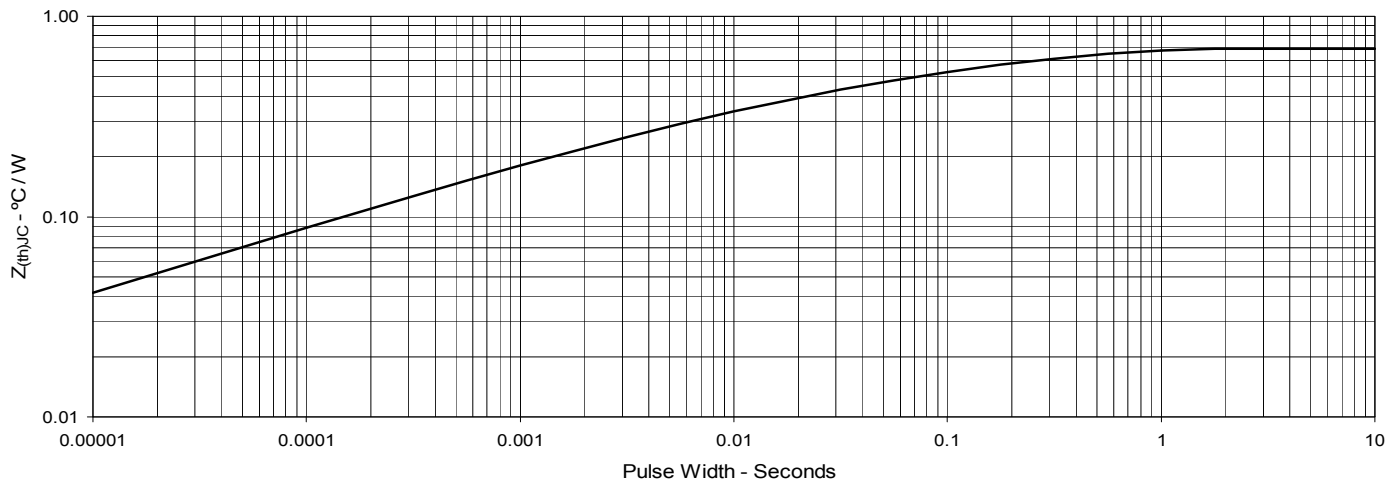


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

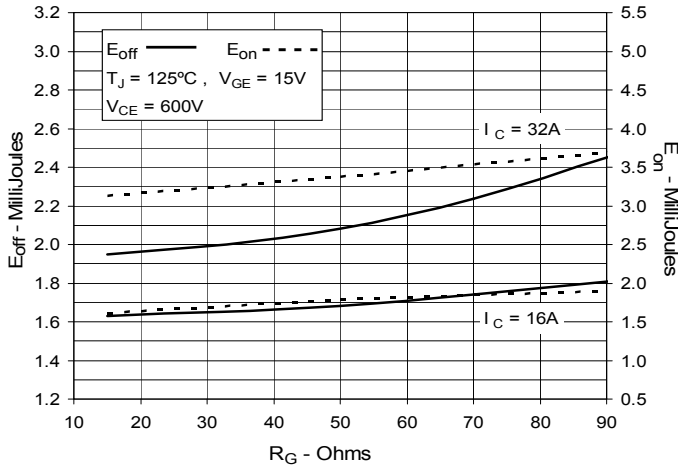


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

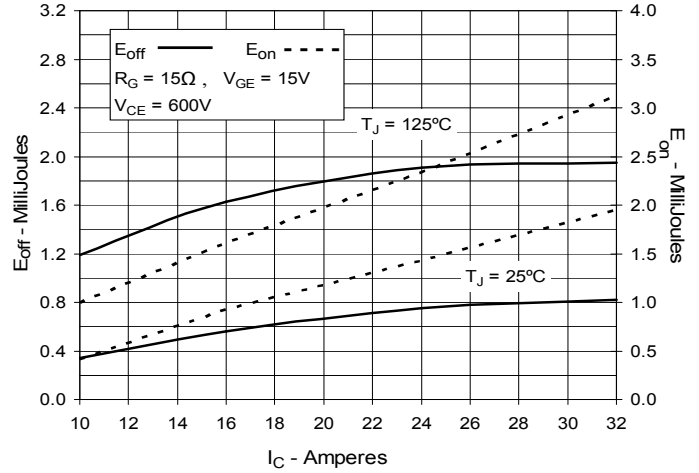


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

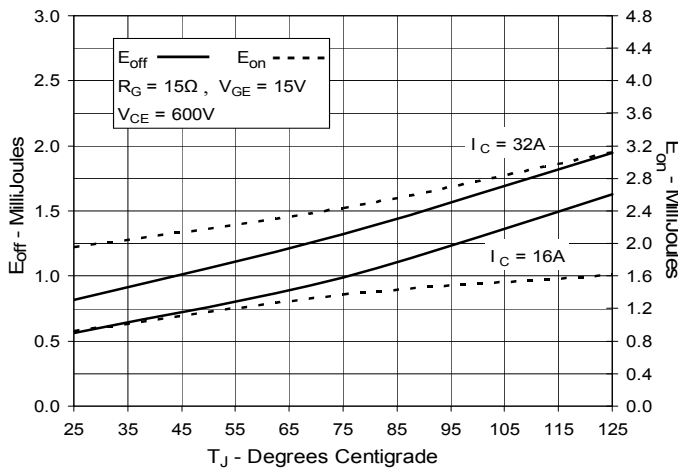


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

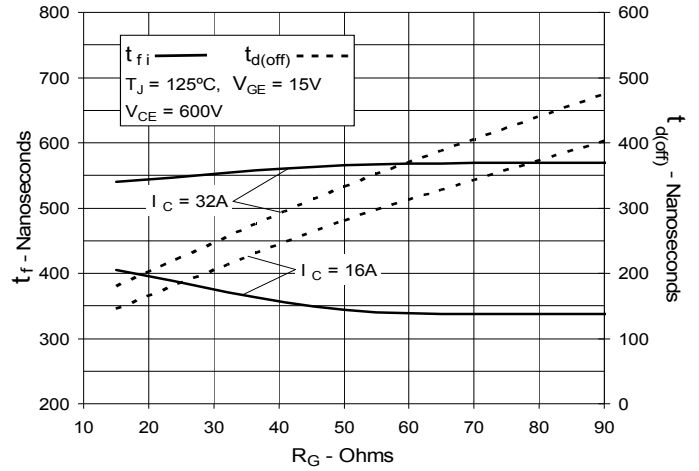


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

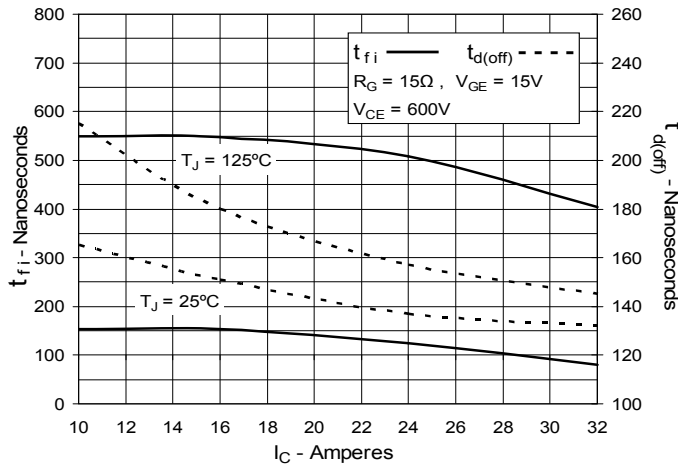


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

