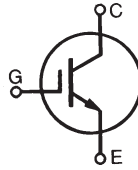


GenX3™ 300V IGBT IXGH120N30C3

High speed PT IGBTs for
50-150kHz switching



$$V_{CES} = 300V$$

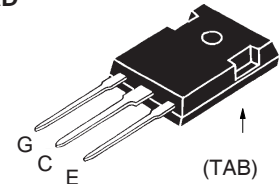
$$I_{C110} = 120A$$

$$V_{CE(sat)} \leq 2.1V$$

$$t_{fi(typ)} = 86ns$$

| Symbol | Test Conditions | Maximum Ratings | |
|-------------------------------|---|-----------------|------------|
| V_{CES} | $T_J = 25^\circ C$ to $150^\circ C$ | 300 | V |
| V_{CGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$ | 300 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ C$ (limited by leads) | 75 | A |
| I_{C110} | $T_C = 110^\circ C$ (chip capability) | 120 | A |
| I_{CM} | $T_C = 25^\circ C$, 1ms | 600 | A |
| I_A | $T_C = 25^\circ C$ | 120 | A |
| E_{AS} | $T_C = 25^\circ C$ | 850 | mJ |
| SSOA (RBSOA) | $V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 2\Omega$ Clamped inductive load @ $\leq 300V$ | $I_{CM} = 240$ | A |
| P_C | $T_C = 25^\circ C$ | 540 | 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} | 1.6mm (0.062 in.) from case for 10s | 260 | $^\circ C$ |
| M_d | Mounting torque | 1.13/10 | Nm/lb.in. |
| Weight | | 6 | g |

TO-247 AD
(IXGH)



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

Features

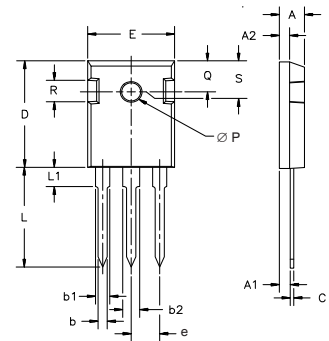
- High Frequency IGBT
- Square RBSOA
- High avalanche capability
- Drive simplicity with MOS Gate Turn-On
- High current handling capability

Applications

- PFC Circuits
- PDP Systems
- Switched-mode and resonant-mode converters and inverters
- SMPS
- AC motor speed control
- DC servo and robot drives
- DC choppers

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ C$, unless otherwise specified) | | |
|---------------|--|---|------|----------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250\mu A$, $V_{GE} = 0V$ | 300 | | V |
| $V_{GE(th)}$ | $I_C = 250\mu A$, $V_{CE} = V_{GE}$ | 2.5 | | V |
| I_{CES} | $V_{CE} = V_{CES}$ $V_{GE} = 0V$ $T_J = 125^\circ C$ | | | 50 μA 1.0 mA |
| I_{GES} | $V_{CE} = 0V$, $V_{GE} = \pm 20V$ | | | ± 100 nA |
| $V_{CE(sat)}$ | $I_C = 120A$, $V_{GE} = 15V$ $T_J = 125^\circ C$ | 1.75 1.70 | 2.10 | V V |

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | |
|--------------|---|-----------------------|-------------------------|--------|
| | | Min. | Typ. | Max. |
| g_{fs} | $I_C = 60\text{A}$, $V_{CE} = 10\text{V}$, Pulse test, $t \leq 300\mu\text{s}$; duty cycle, $d \leq 2\%$. | 50 | 83 | S |
| C_{ies} | $V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$ | | 8700 | pF |
| C_{oes} | | | 715 | pF |
| C_{res} | | | 195 | pF |
| Q_g | $I_C = I_{C110}$, $V_{GE} = 15\text{V}$, $V_{CE} = 0.5 \cdot V_{CES}$ | | 230 | nC |
| Q_{ge} | | | 32 | nC |
| Q_{gc} | | | 87 | nC |
| $t_{d(on)}$ | Inductive Load, $T_J = 25^\circ\text{C}$ $I_C = 60\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 200\text{V}$, $R_G = 2\Omega$ | | 28 | ns |
| t_{ri} | | | 37 | ns |
| E_{on} | | | 0.23 | mJ |
| $t_{d(off)}$ | | | 109 | 160 ns |
| t_{fi} | | | 86 | ns |
| E_{off} | | | 0.73 | 1.3 mJ |
| $t_{d(on)}$ | Inductive Load, $T_J = 125^\circ\text{C}$ $I_C = 60\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 200\text{V}$, $R_G = 2\Omega$ | | 28 | ns |
| t_{ri} | | | 38 | ns |
| E_{on} | | | 0.37 | mJ |
| $t_{d(off)}$ | | | 120 | ns |
| t_{fi} | | | 113 | ns |
| E_{off} | | | 0.88 | mJ |
| R_{thJC} | | | 0.23 $^\circ\text{C/W}$ | |
| R_{thCK} | | 0.21 | $^\circ\text{C/W}$ | |

TO-247 AD Outline


| 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 |
| ∅P | 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 |

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.

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 | |

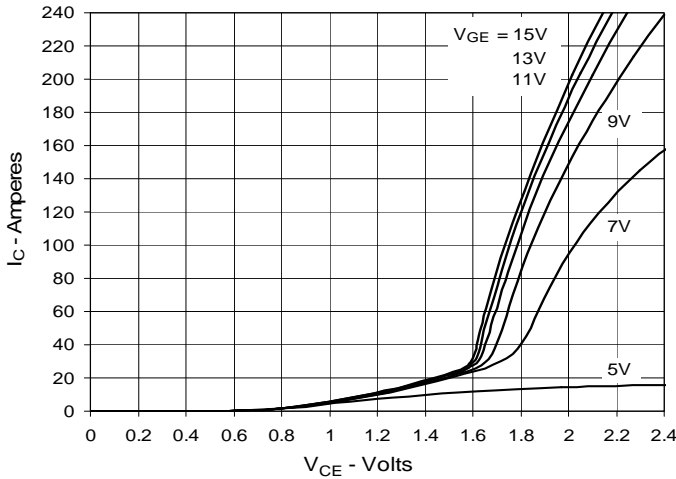
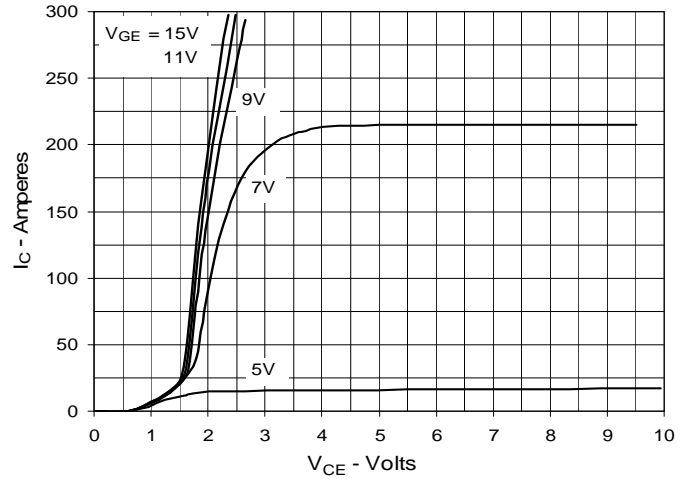
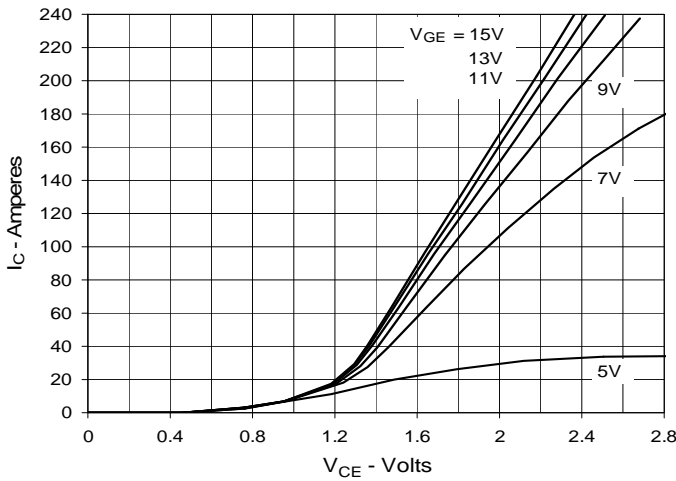
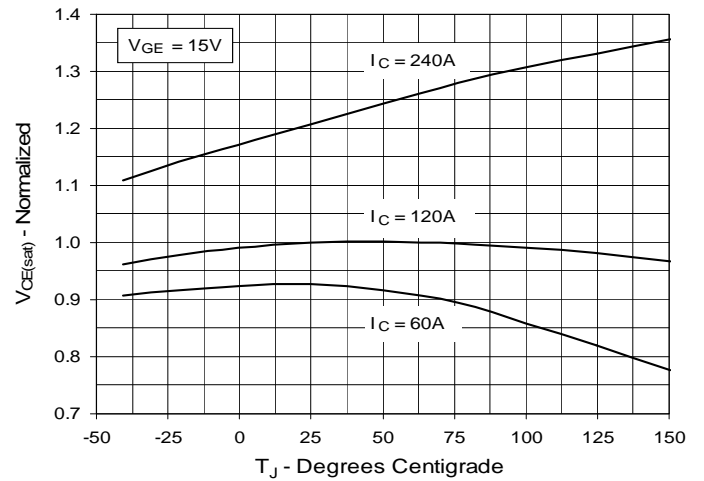
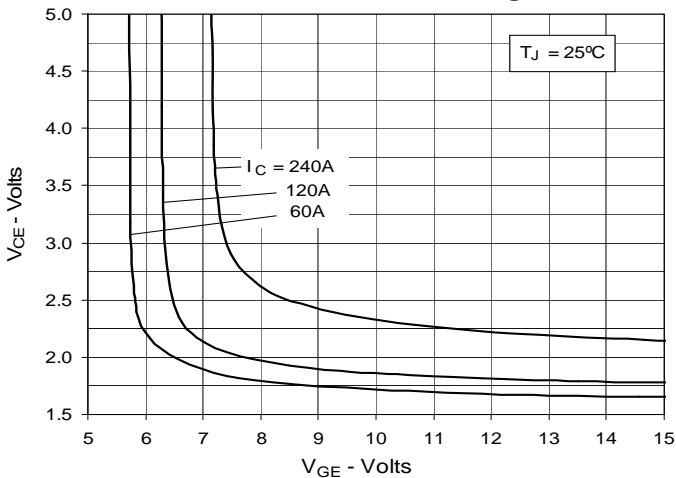
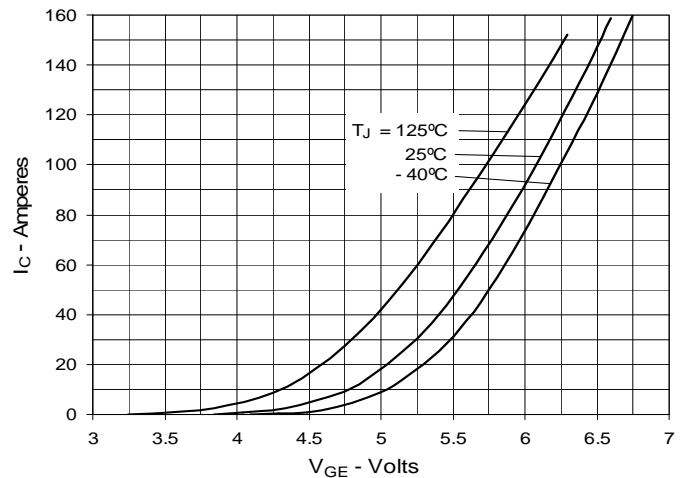
Fig. 1. Output Characteristics @ 25°C

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


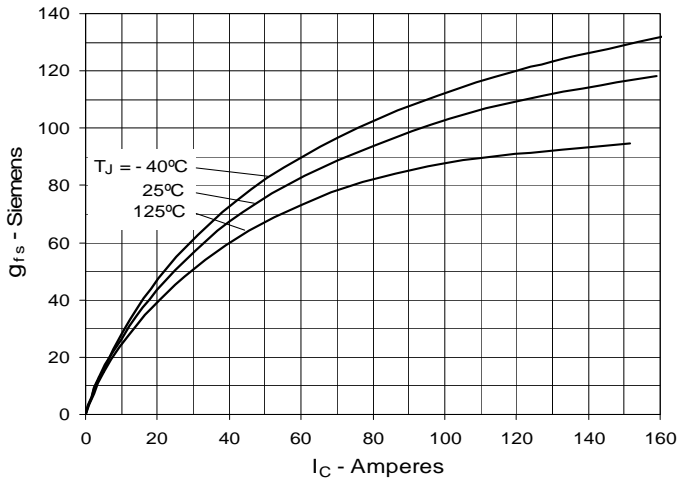
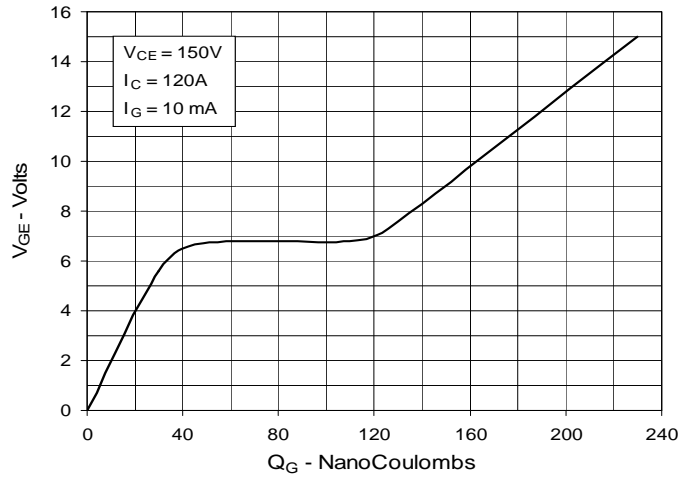
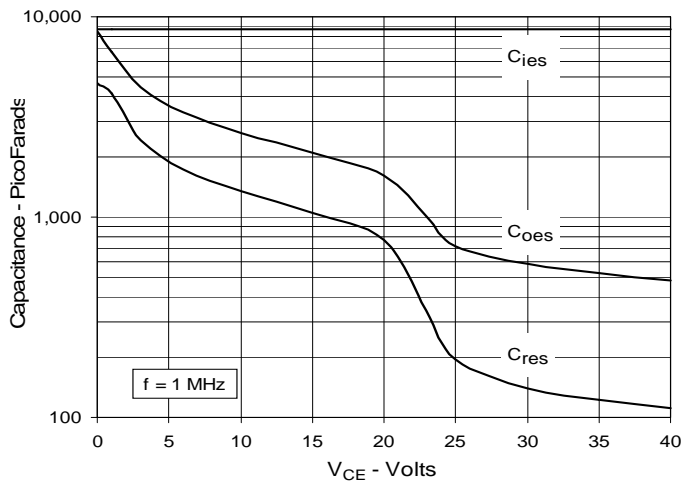
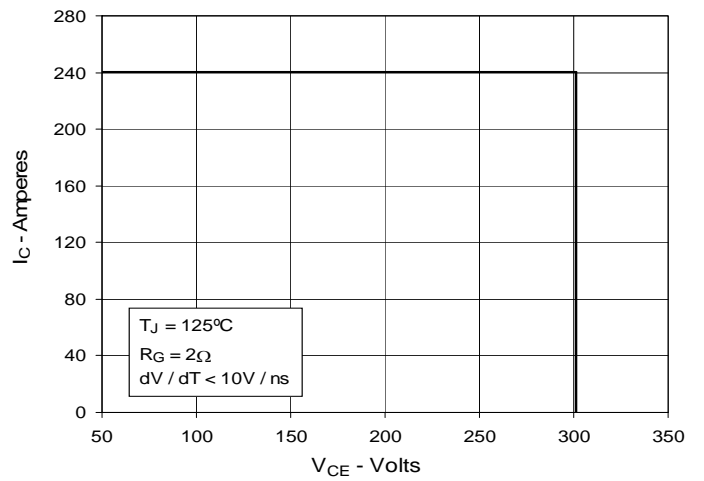
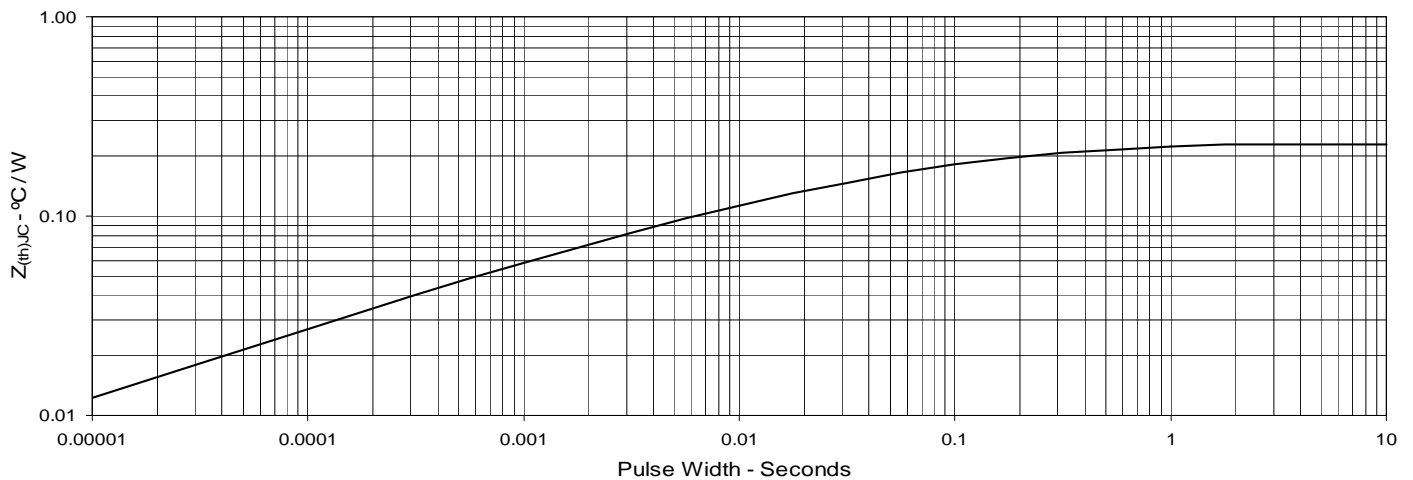
Fig. 7. Transconductance

Fig. 8. Gate Charge

Fig. 9. Capacitance

Fig. 10. Reverse-Bias Safe Operating Area

Fig. 11. Maximum Transient Thermal Impedance


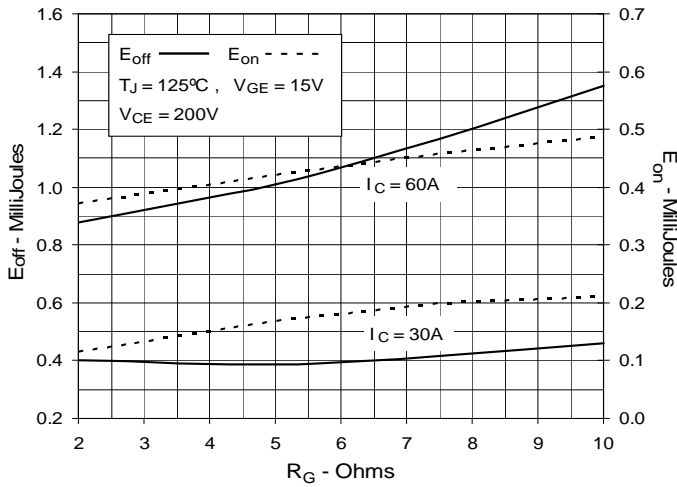
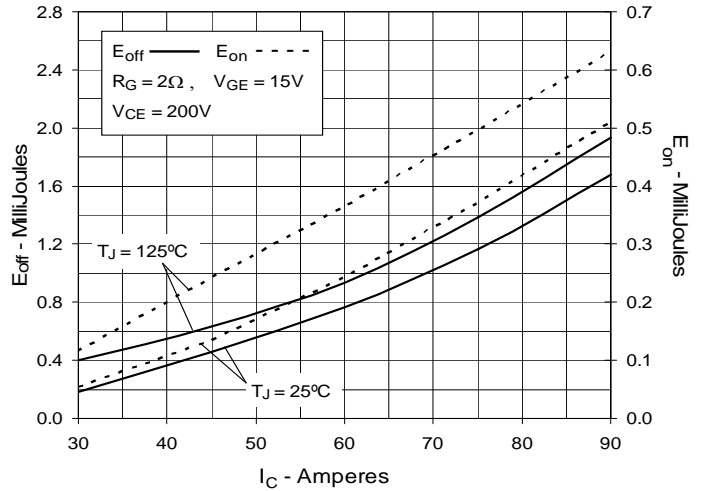
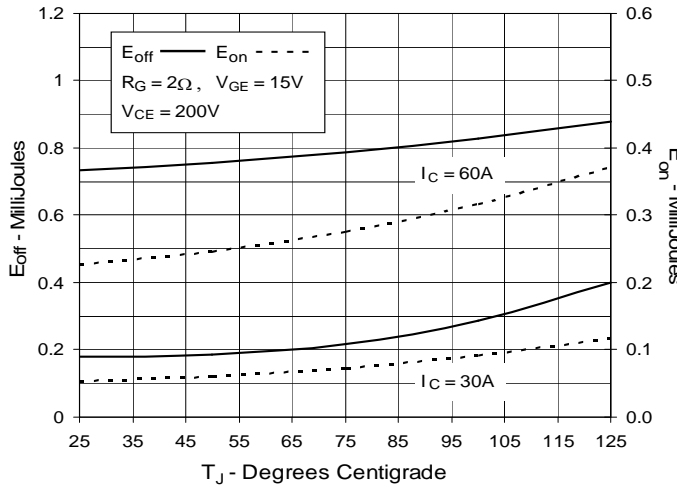
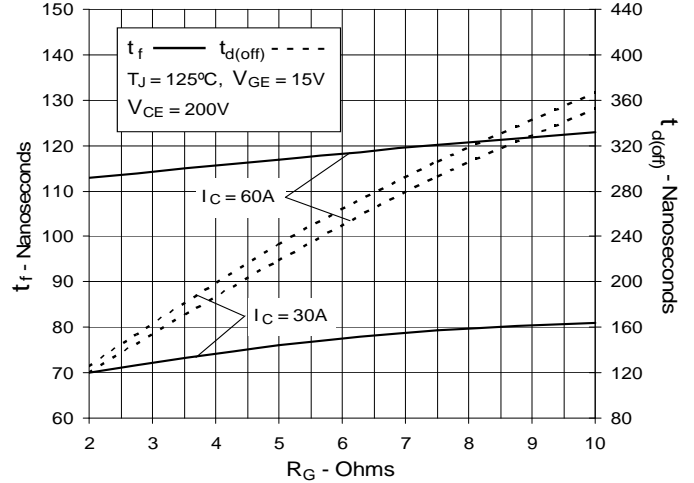
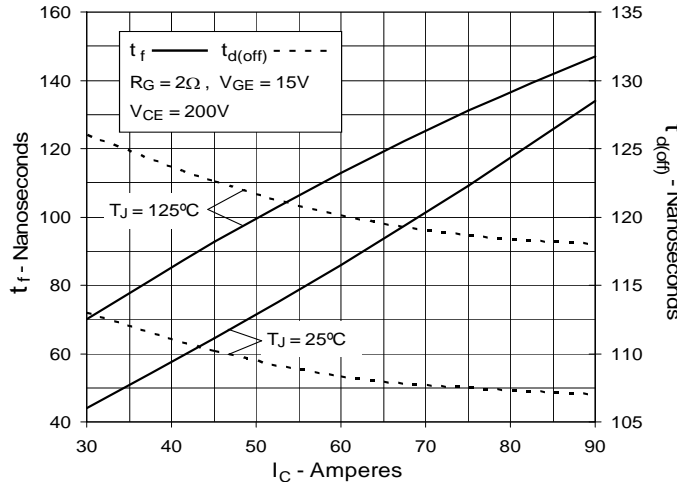
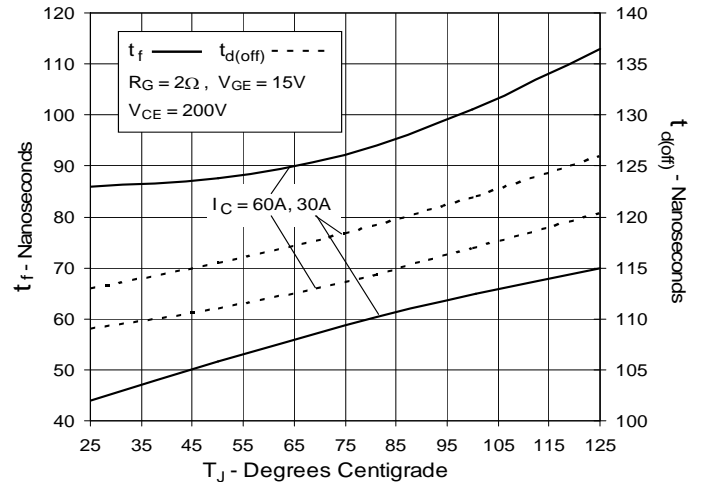
Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

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


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

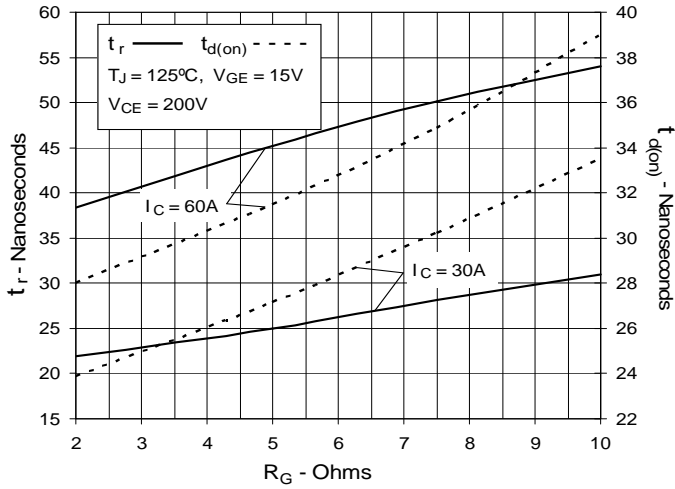


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

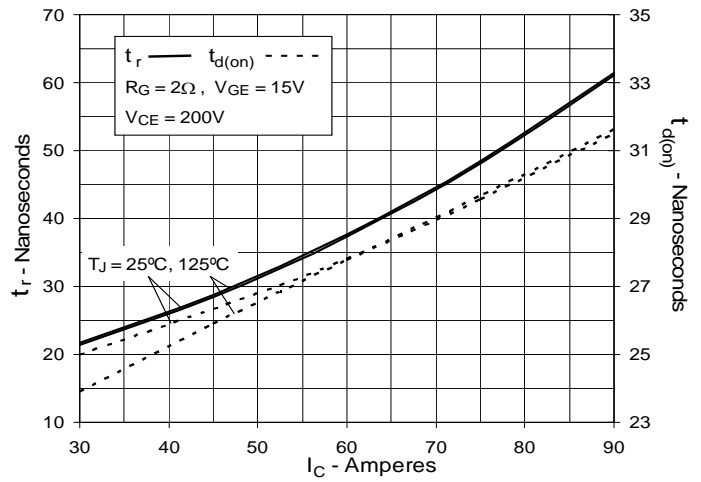
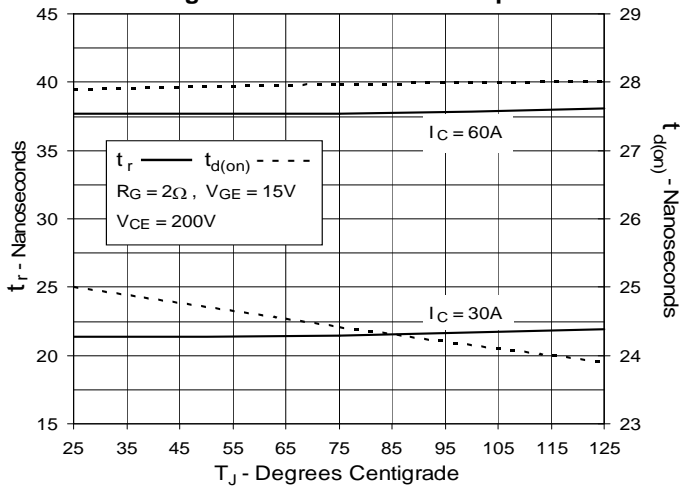


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature





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