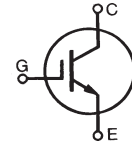


**GenX3™**  
**600V IGBT**

High-Speed PT IGBTs for  
40-100kHz Switching

**IXGI48N60C3**  
**IXGA48N60C3**  
**IXGP48N60C3**  
**IXGH48N60C3**

**V<sub>CES</sub> = 600V**  
**I<sub>C110</sub> = 48A**  
**V<sub>CE(sat)</sub> ≤ 2.5V**  
**t<sub>fi(typ)</sub> = 38ns**



| Symbol                        | Test Conditions   | Maximum Ratings   |           |
|-------------------------------|---|---|-----------|
| V <sub>CES</sub>              | T <sub>C</sub> = 25°C to 150°C  | 600   | V         |
| V <sub>CGR</sub>              | T <sub>J</sub> = 25°C to 150°C, R <sub>GE</sub> = 1MΩ   | 600   | V         |
| V <sub>GES</sub>              | Continuous  | ± 20  | V         |
| V <sub>GEM</sub>              | Transient   | ± 30  | V         |
| I <sub>C25</sub>              | T <sub>C</sub> = 25°C   | 75  | A         |
| I <sub>C110</sub>             | T <sub>C</sub> = 110°C  | 48  | A         |
| I <sub>CM</sub>               | T <sub>C</sub> = 25°C, 1ms  | 250   | A         |
| I <sub>A</sub>                | T <sub>C</sub> = 25°C   | 30  | A         |
| E <sub>AS</sub>               | T <sub>C</sub> = 25°C   | 300   | mJ        |
| <b>SSOA</b><br><b>(RBSOA)</b> | V <sub>GE</sub> = 15V, T <sub>VJ</sub> = 125°C, R <sub>G</sub> = 3Ω<br>Clamped Inductive Load | I <sub>CM</sub> = 100<br>V <sub>CE</sub> ≤ V <sub>CES</sub> | A         |
| P <sub>C</sub>                | T <sub>C</sub> = 25°C   | 300   | W         |
| T <sub>J</sub>                |   | -55 ... +150  | °C        |
| T <sub>JM</sub>               |   | 150   | °C        |
| T <sub>stg</sub>              |   | -55 ... +150  | °C        |
| T <sub>L</sub>                | Maximum Lead Temperature for Soldering  | 300   | °C        |
| T <sub>SOLD</sub>             | 1.6 mm (0.062in.) from Case for 10s   | 260   | °C        |
| F <sub>C</sub>                | Mounting Force (TO-263)   | 10..65 / 2.5..14.6  | N/lb.     |
| M <sub>d</sub>                | Mounting Torque (TO-247&TO-220)   | 1.13/10   | Nm/lb.in. |
| <b>Weight</b>                 | TO-262 Lead   | 0.4   | g         |
|                               | TO-263  | 2.5   | g         |
|                               | TO-220  | 3.0   | g         |
|                               | TO-247  | 6.0   | g         |

**Features**

- Optimized for Low Switching Losses
- Square RBSOA
- Avalanche Rated
- Fast Switching
- International Standard Packages

**Advantages**

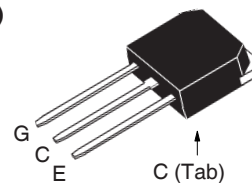
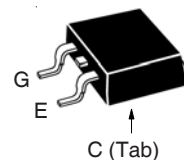
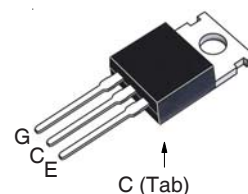
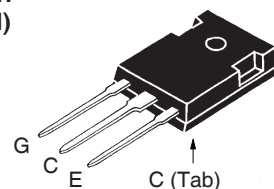
- High Power Density
- Low Gate Drive Requirement

**Applications**

- High Frequency Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts

| Symbol               | Test Conditions<br>(T <sub>J</sub> = 25°C Unless Otherwise Specified)               | Characteristic Values |            |                 |
|----------------------|---|-----------------------|------------|-----------------|
|                      |   | Min.                  | Typ.       | Max.            |
| BV <sub>CES</sub>    | I <sub>C</sub> = 250μA, V <sub>GE</sub> = 0V  | 600                   |            | V               |
| V <sub>GE(th)</sub>  | I <sub>C</sub> = 250μA, V <sub>CE</sub> = V <sub>GE</sub>                           | 3.0                   |            | 5.5 V           |
| I <sub>CES</sub>     | V <sub>CE</sub> = V <sub>CES</sub> , V <sub>GE</sub> = 0V<br>T <sub>J</sub> = 125°C |                       |            | 25 μA<br>250 μA |
| I <sub>GES</sub>     | V <sub>CE</sub> = 0V, V <sub>GE</sub> = ± 20V                                       |                       |            | ±100 nA         |
| V <sub>CE(sat)</sub> | I <sub>C</sub> = 30A, V <sub>GE</sub> = 15V, Note 1<br>T <sub>J</sub> = 125°C       |                       | 2.3<br>1.8 | 2.5 V<br>V      |

| Symbol<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified) | Test Conditions   | Characteristic Values |      |                    |
|--|---|-----------------------|------|--------------------|
|  |   | Min.                  | Typ. | Max.               |
| $g_{fs}$   | $I_C = 30\text{A}, V_{CE} = 10\text{V}$ , Note 1  | 20                    | 30   | S                  |
| $C_{ies}$  | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$  |                       | 1960 | pF                 |
| $C_{oes}$  |   |                       | 207  | pF                 |
| $C_{res}$  |   |                       | 66   | pF                 |
| $Q_g$  | $I_C = 30\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$   |                       | 77   | nC                 |
| $Q_{ge}$   |   |                       | 16   | nC                 |
| $Q_{gc}$   |   |                       | 32   | nC                 |
| $t_{d(on)}$  | <b>Inductive Load, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = 30\text{A}, V_{GE} = 15\text{V}$<br>$V_{CE} = 400\text{V}, R_G = 3\Omega$<br>Note 2  |                       | 19   | ns                 |
| $t_{ri}$   |   |                       | 26   | ns                 |
| $E_{on}$   |   |                       | 0.41 | mJ                 |
| $t_{d(off)}$   |   |                       | 60   | 100 ns             |
| $t_{fi}$   |   |                       | 38   | ns                 |
| $E_{off}$  |   |                       | 0.23 | 0.42 mJ            |
| $t_{d(on)}$  | <b>Inductive Load, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = 30\text{A}, V_{GE} = 15\text{V}$<br>$V_{CE} = 400\text{V}, R_G = 3\Omega$<br>Note 2 |                       | 19   | ns                 |
| $t_{ri}$   |   |                       | 26   | ns                 |
| $E_{on}$   |   |                       | 0.65 | mJ                 |
| $t_{d(off)}$   |   |                       | 92   | ns                 |
| $t_{fi}$   |   |                       | 95   | ns                 |
| $E_{off}$  |   |                       | 0.57 | mJ                 |
| $R_{thJC}$   |   |                       | 0.42 | $^\circ\text{C/W}$ |
| $R_{thCS}$   | (TO-247)  |                       | 0.21 | $^\circ\text{C/W}$ |
|  | (TO-220)  |                       | 0.50 | $^\circ\text{C/W}$ |

**TO-262 Lead (IXGI)**

**TO-263 (IXGA)**

**TO-220 (IXGP)**

**TO-247 (IXGH)**


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

**Notes:**

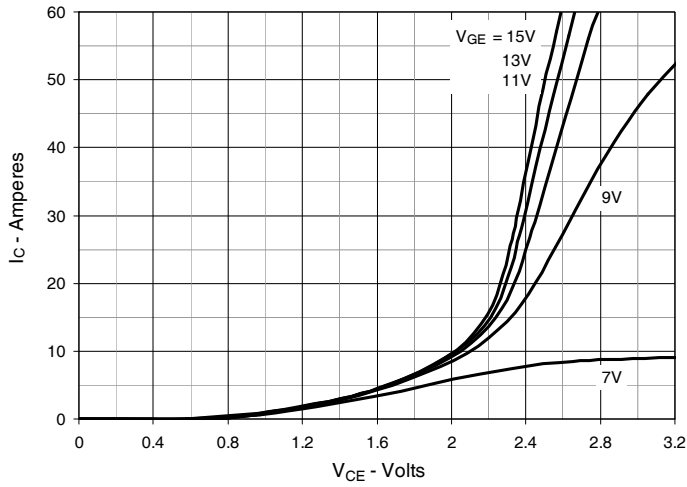
1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .
2. Switching times & energy losses may increase for higher  $V_{CE}(\text{Clamp})$ ,  $T_J$  or  $R_G$ .

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

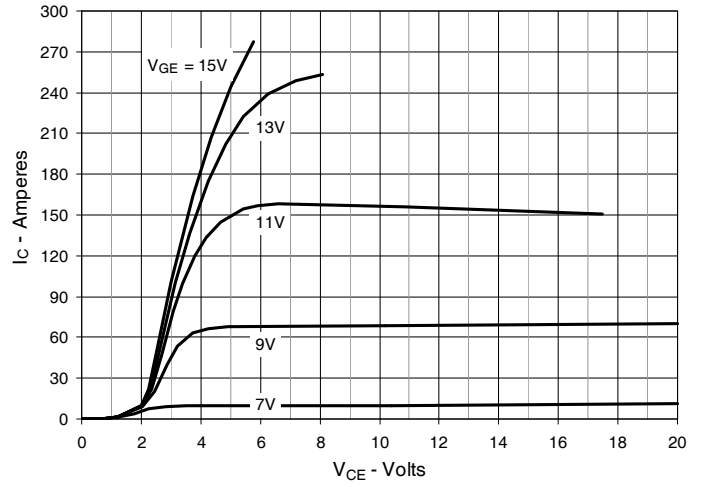
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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 |
| 4,860,072 | 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    |             |

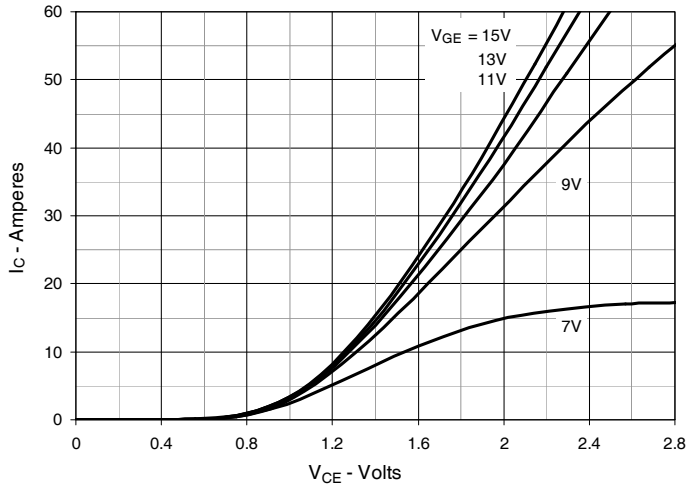
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



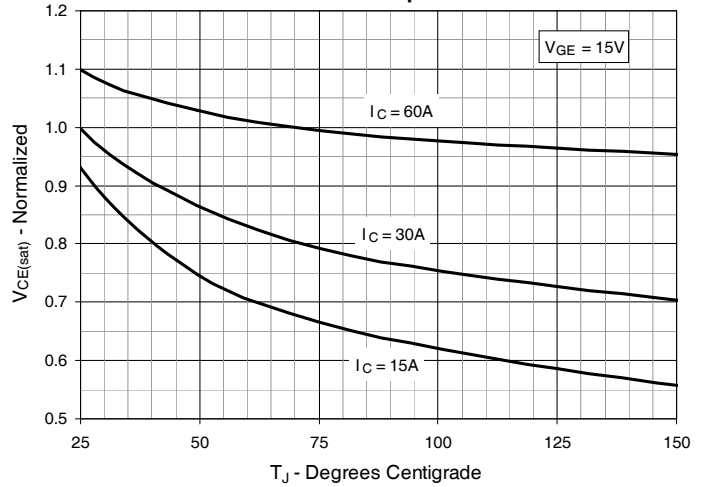
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



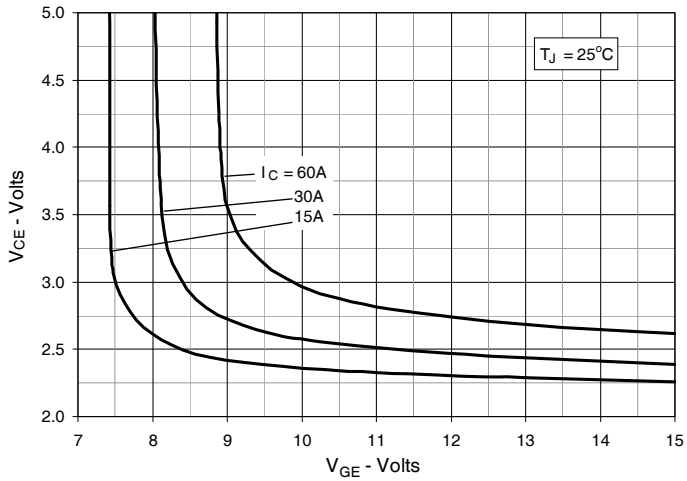
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



**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**

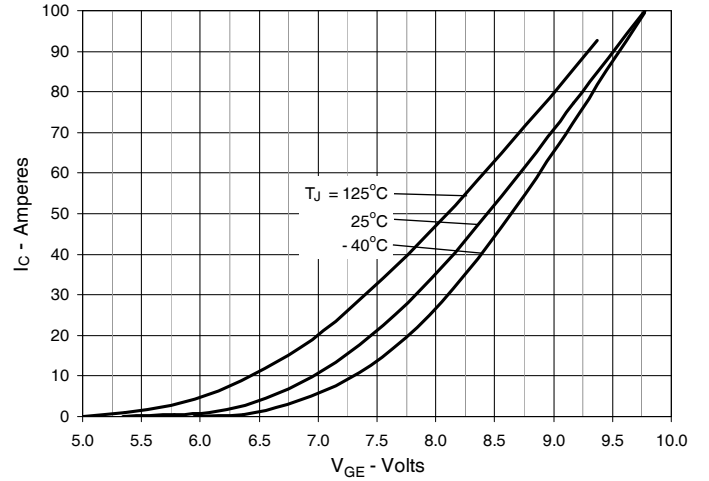


Fig. 7. Transconductance

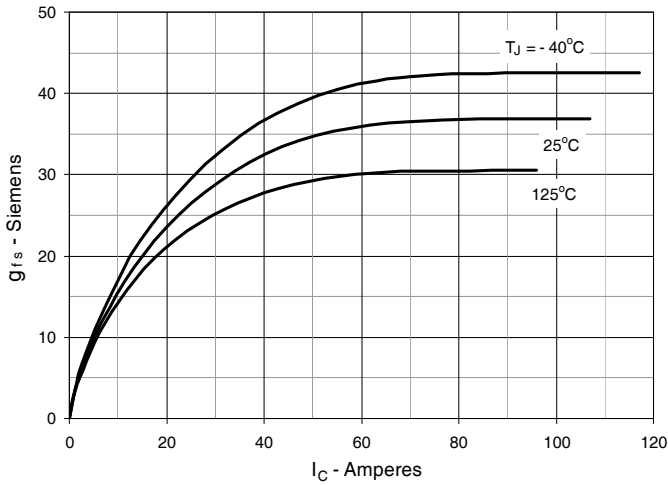


Fig. 8. Gate Charge

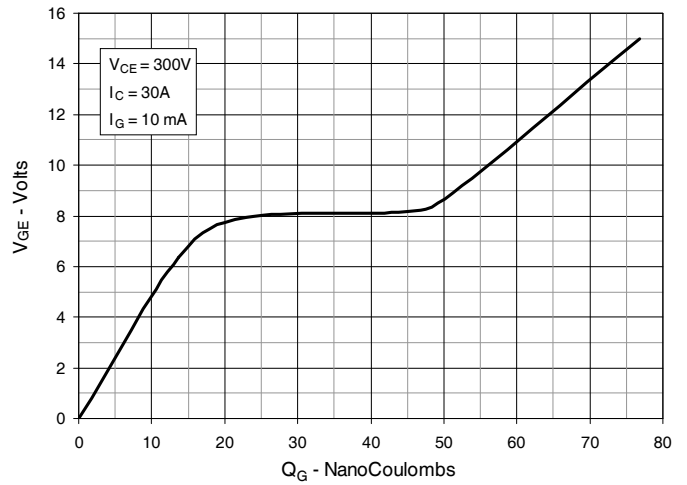


Fig. 9. Capacitance

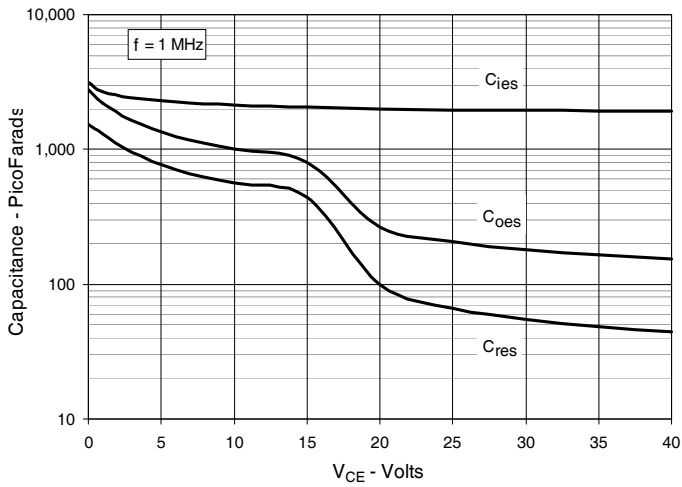


Fig. 10. Reverse-Bias Safe Operating Area

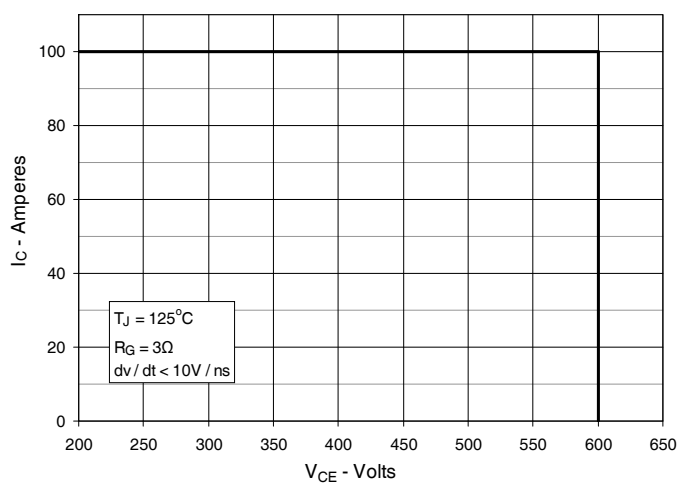
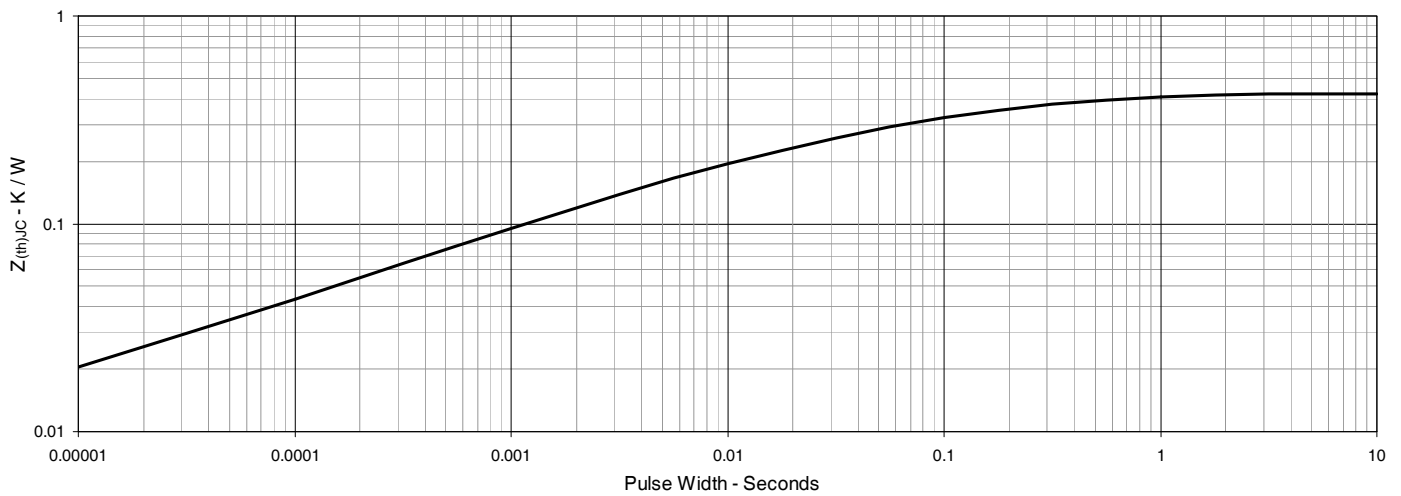
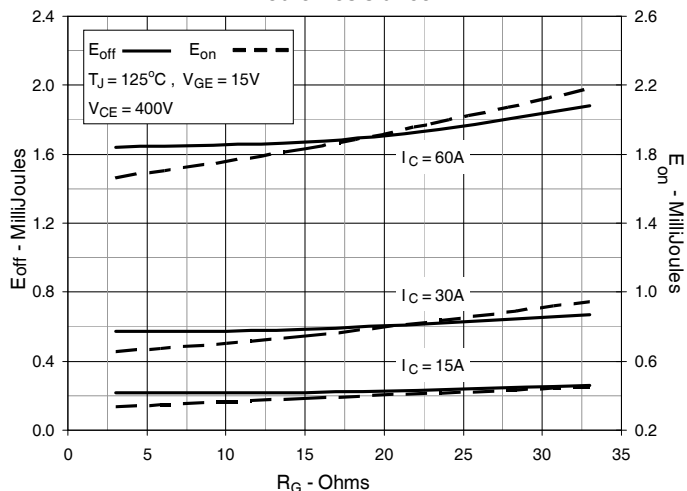


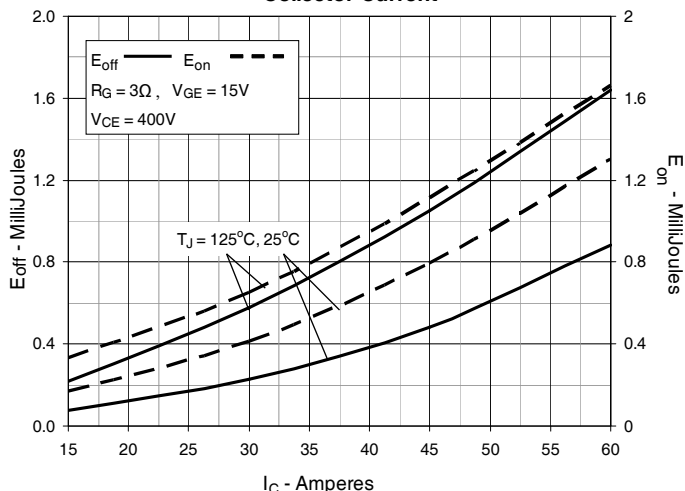
Fig. 11. Maximum Transient Thermal Impedance



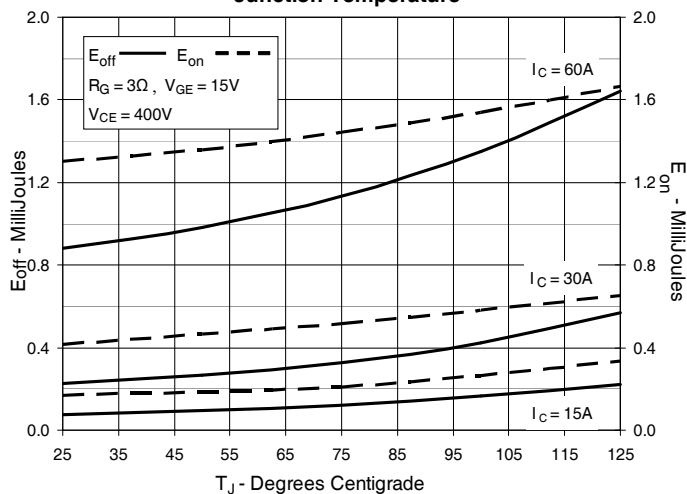
**Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance**



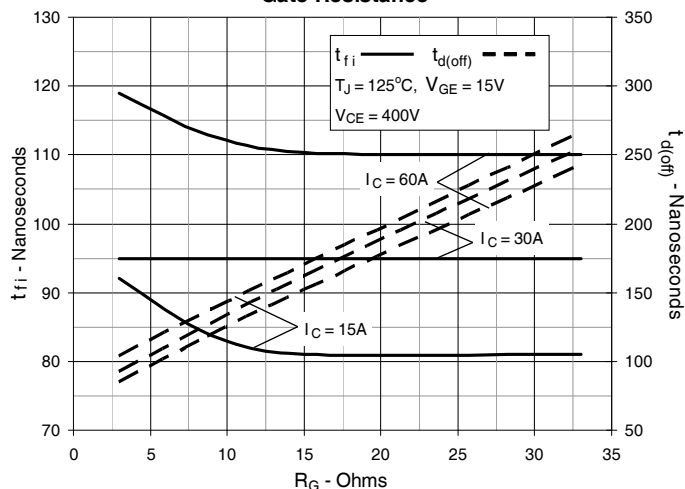
**Fig. 13. Inductive Switching Energy Loss vs. Collector Current**



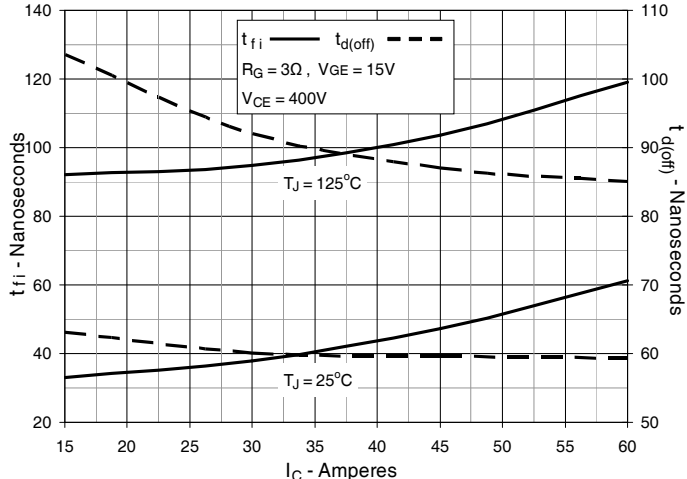
**Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature**



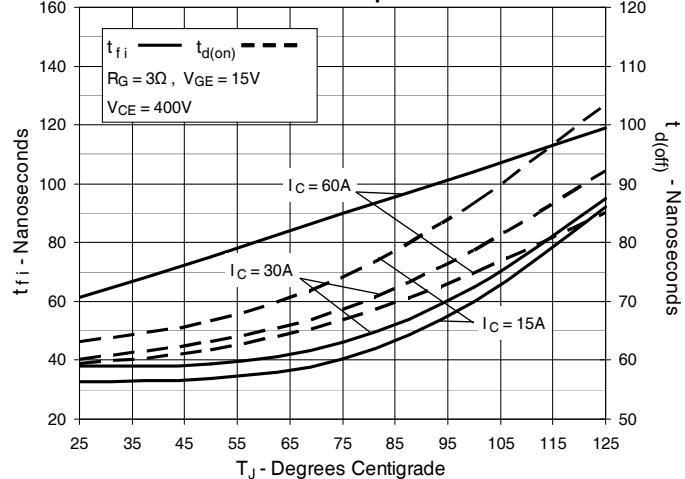
**Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance**



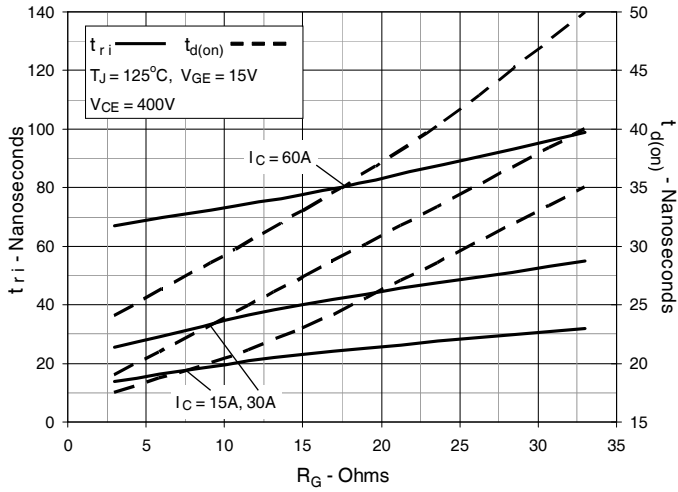
**Fig. 16. Inductive Turn-off Switching Times vs. Collector Current**



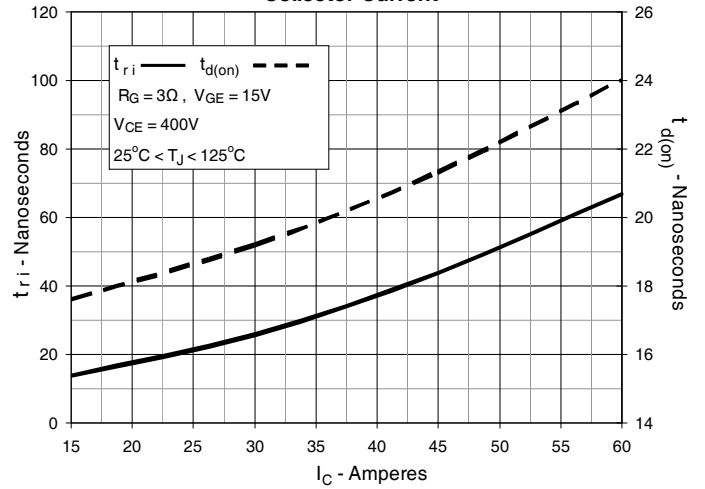
**Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature**



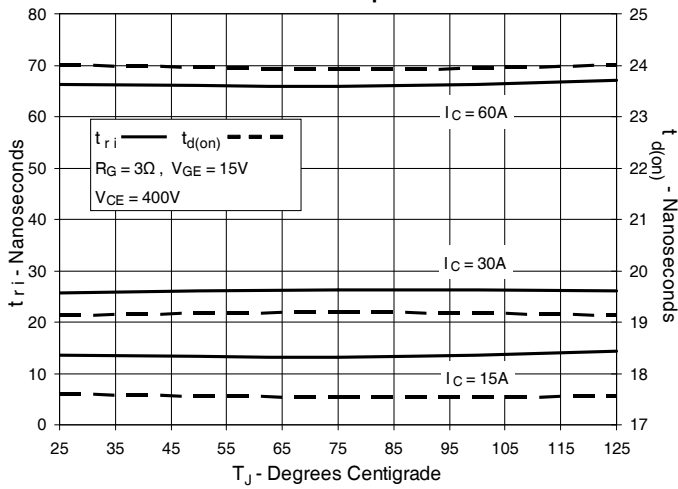
**Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance**



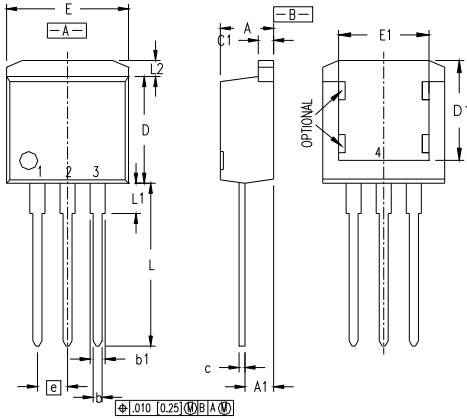
**Fig. 19. Inductive Turn-on Switching Times vs. Collector Current**



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



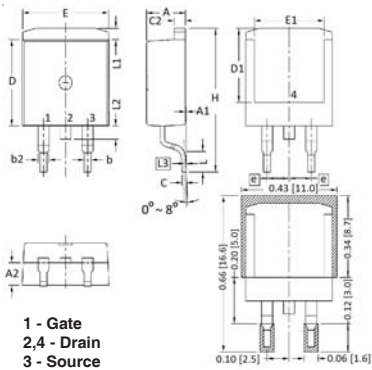
### TO - 262 Leaded Outline



Pins: 1 - Gate 2,4 - Collector  
3 - Emitter

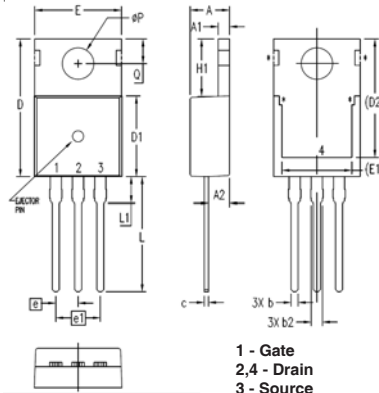
| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .160     | .190 | 4.06        | 4.83  |
| A1  | .080     | .110 | 2.03        | 2.79  |
| b   | .025     | .039 | 0.51        | 0.99  |
| b2  | .025     | .039 | 1.14        | 1.40  |
| c   | .018     | .029 | 0.46        | 0.74  |
| c2  | .018     | .029 | 1.14        | 1.40  |
| D   | .340     | .380 | 8.64        | 9.65  |
| D1  | .315     | .350 | 8.00        | 8.89  |
| E   | .380     | .405 | 9.65        | 10.29 |
| E1  | .245     | .320 | 6.22        | 8.13  |
| e   | .100 BSC |      | 2.54 BSC    |       |
| L   | .500     | .580 | 14.61       | 15.88 |
| L1  | .080     | .130 | 2.29        | 2.79  |
| L2  | .040     | .055 | 1.02        | 1.40  |

### TO-263 Outline



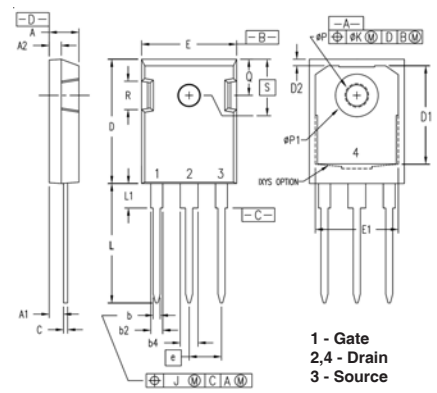
1 - Gate  
2,4 - Drain  
3 - Source

### TO-220 Outline



1 - Gate  
2,4 - Drain  
3 - Source

### TO-247 Outline



1 - Gate  
2,4 - Drain  
3 - Source

| SYM | INCHES   |      | MILLIMETER |       |
|-----|----------|------|------------|-------|
|     | MIN      | MAX  | MIN        | MAX   |
| A   | .170     | .185 | 4.30       | 4.70  |
| A1  | .000     | .008 | 0.00       | 0.20  |
| A2  | .091     | .098 | 2.30       | 2.50  |
| b   | .028     | .035 | 0.70       | 0.90  |
| b2  | .046     | .060 | 1.18       | 1.52  |
| C   | .018     | .024 | 0.45       | 0.60  |
| C2  | .049     | .060 | 1.25       | 1.52  |
| D   | .340     | .370 | 8.63       | 9.40  |
| D1  | .300     | .327 | 7.62       | 8.30  |
| E   | .380     | .410 | 9.65       | 10.41 |
| E1  | .270     | .330 | 6.86       | 8.38  |
| e   | .100 BSC |      | 2.54 BSC   |       |
| H   | .580     | .620 | 14.73      | 15.75 |
| L   | .075     | .105 | 1.91       | 2.67  |
| L1  | .039     | .060 | 1.00       | 1.52  |
| L2  | —        | .070 | —          | 1.77  |
| L3  | .010 BSC |      | 0.254 BSC  |       |

| SYM  | INCHES   |      | MILLIMETERS |       |
|------|----------|------|-------------|-------|
|      | MIN      | MAX  | MIN         | MAX   |
| A    | .169     | .185 | 4.30        | 4.70  |
| A1   | .047     | .055 | 1.20        | 1.40  |
| A2   | .079     | .106 | 2.00        | 2.70  |
| b    | .024     | .039 | 0.60        | 1.00  |
| b2   | .045     | .057 | 1.15        | 1.45  |
| c    | .014     | .026 | 0.35        | 0.65  |
| D    | .587     | .626 | 14.90       | 15.90 |
| D1   | .335     | .370 | 8.50        | 9.40  |
| (D2) | .500     | .531 | 12.70       | 13.50 |
| E    | .382     | .406 | 9.70        | 10.30 |
| (E1) | .283     | .323 | 7.20        | 8.20  |
| e    | .100 BSC |      | 2.54 BSC    |       |
| e1   | .200 BSC |      | 5.08 BSC    |       |
| H1   | .244     | .268 | 6.20        | 6.80  |
| L    | .492     | .547 | 12.50       | 13.90 |
| L1   | .110     | .154 | 2.80        | 3.90  |
| ∅P   | .134     | .150 | 3.40        | 3.80  |
| Q    | .106     | .126 | 2.70        | 3.20  |

| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .190     | .205 | 4.83        | 5.21  |
| A1  | .090     | .100 | 2.29        | 2.54  |
| A2  | .075     | .085 | 1.91        | 2.16  |
| b   | .045     | .055 | 1.14        | 1.40  |
| b2  | .075     | .087 | 1.91        | 2.20  |
| b4  | .115     | .126 | 2.92        | 3.20  |
| C   | .024     | .031 | 0.61        | 0.80  |
| D   | .819     | .840 | 20.80       | 21.34 |
| D1  | .650     | .690 | 16.51       | 17.53 |
| D2  | .035     | .050 | 0.89        | 1.27  |
| E   | .620     | .635 | 15.75       | 16.13 |
| E1  | .545     | .565 | 13.84       | 14.35 |
| e   | .215 BSC |      | 5.45 BSC    |       |
| J   | —        | .010 | —           | 0.25  |
| K   | —        | .025 | —           | 0.64  |
| L   | .780     | .810 | 19.81       | 20.57 |
| L1  | .150     | .170 | 3.81        | 4.32  |
| ∅P  | .140     | .144 | 3.55        | 3.65  |
| ∅P1 | .275     | .290 | 6.99        | 7.37  |
| Q   | .220     | .244 | 5.59        | 6.20  |
| R   | .170     | .190 | 4.32        | 4.83  |
| S   | .242 BSC |      | 6.15 BSC    |       |

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [IGBT Transistors](#) category:*

*Click to view products by [IXYS](#) manufacturer:*

Other Similar products are found below :

[748152A](#) [APT20GT60BRDQ1G](#) [APT50GT60BRG](#) [NGTB10N60FG](#) [STGFW20V60DF](#) [APT30GP60BG](#) [APT45GR65B2DU30](#)  
[GT50JR22\(STA1ES\)](#) [TIG058E8-TL-H](#) [IGW40N120H3FKSA1](#) [VS-CPV364M4KPBF](#) [NGTB25N120FL2WAG](#) [NGTG40N120FL2WG](#)  
[RJH60F3DPQ-A0#T0](#) [APT40GR120B2SCD10](#) [APT15GT120BRG](#) [APT20GT60BRG](#) [NGTB75N65FL2WAG](#) [NGTG15N120FL2WG](#)  
[IXA30RG1200DHGLB](#) [IXA40RG1200DHGLB](#) [APT70GR65B2DU40](#) [NTE3320](#) [QP12W05S-37A](#) [IHF40N65R5SFKSA1](#) [APT70GR120J](#)  
[APT35GP120JDQ2](#) [IKZA40N65RH5XKSA1](#) [IKFW75N65ES5XKSA1](#) [IKFW50N65ES5XKSA1](#) [IKFW50N65EH5XKSA1](#)  
[IKFW40N65ES5XKSA1](#) [IKFW60N65ES5XKSA1](#) [IMBG120R090M1HXTMA1](#) [IMBG120R220M1HXTMA1](#) [XD15H120CX1](#)  
[XD25H120CX0](#) [XP15PJS120CL1B1](#) [IGW30N60H3FKSA1](#) [STGWA8M120DF3](#) [IGW08T120FKSA1](#) [IGW75N60H3FKSA1](#)  
[HGTG40N60B3](#) [FGH60N60SMD\\_F085](#) [FGH75T65UPD](#) [STGWA15H120F2](#) [IKA10N60TXKSA1](#) [IHW20N120R5XKSA1](#) [RJH60D2DPP-](#)  
[M0#T2](#) [IKP20N60TXKSA1](#)