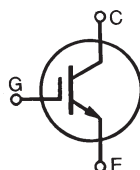


# Polar™ High Speed IGBT

## IXGQ240N30PB

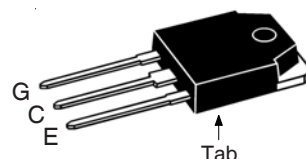
$V_{CES} = 300V$   
 $I_{CP} = 500A$   
 $V_{CE(sat)} \leq 1.6V$

For PDP Applications



| Symbol                        | Test Conditions   | Maximum Ratings                         |            |
|-------------------------------|---|---|------------|
| $V_{CES}$                     | $T_J = 25^\circ C$ to $150^\circ C$   | 300                                     | V          |
| $V_{GES}$                     | Continuous  | $\pm 20$                                | V          |
| $V_{GEM}$                     | Transient   | $\pm 30$                                | V          |
| $I_{C25}$                     | $T_C = 25^\circ C$ (Chip Capability)  | 240                                     | A          |
| $I_{CP}$                      | $T_J \leq 150^\circ C$ , $tp < 10\mu s$   | 500                                     | A          |
| $I_{C(RMS)}$                  | Lead Current Limit  | 75                                      | A          |
| <b>SSOA</b><br><b>(RBSOA)</b> | $V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 1\Omega$<br>Clamped Inductive Load | $I_{CM} = 240$<br>$V_{CE} \leq V_{CES}$ | A          |
| $P_d$                         | $T_C = 25^\circ C$  | 500                                     | 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                                     | $^\circ C$ |
| $T_{SOLD}$                    | 1.6 mm (0.062in.) from Case for 10s   | 260                                     | $^\circ C$ |
| $M_d$                         | Mounting Torque   | 1.13/10                                 | Nm/lb.in.  |
| <b>Weight</b>                 |   | 5.5                                     | g          |

TO-3P



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

### Features

- Low  $V_{CE(sat)}$ 
  - for Minimum On-State Conduction Losses
- MOS Gate Turn-On
  - Drive Simplicity

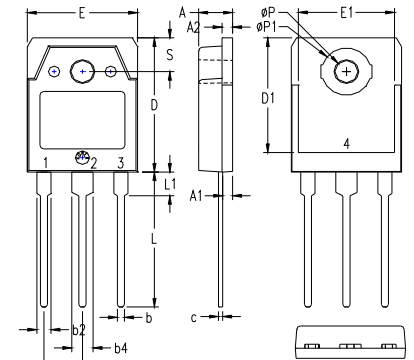
### Applications

- PDP Screen Drivers

| Symbol        | Test Conditions<br>( $T_J = 25^\circ C$ , Unless Otherwise Specified) | Characteristic Values |      |                          |
|---------------|---|-----------------------|------|--------------------------|
|               |   | Min.                  | Typ. | Max.                     |
| $BV_{CES}$    | $I_C = 250\mu A$ , $V_{GE} = 0V$                                      | 300                   |      | V                        |
| $V_{GE(th)}$  | $I_C = 1mA$ , $V_{CE} = V_{GE}$                                       | 3.0                   |      | 5.0 V                    |
| $I_{CES}$     | $V_{CE} = V_{CES}$ , $V_{GE} = 0V$<br>$T_J = 125^\circ C$             |                       |      | 1 $\mu A$<br>200 $\mu A$ |
| $I_{GES}$     | $V_{CE} = 0V$ , $V_{GE} = \pm 20V$                                    |                       |      | $\pm 100$ nA             |
| $V_{CE(sat)}$ | $I_C = 120A$ , $V_{GE} = 15V$ , Note 1<br>$T_J = 125^\circ C$         | 1.35                  | 1.40 | V                        |
|               | $I_C = 240A$<br>$T_J = 125^\circ C$                                   | 1.85                  | 2.10 | V                        |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)   | Characteristic Values |      |                         |
|--------------|---|-----------------------|------|-------------------------|
|              |   | Min.                  | Typ. | Max.                    |
| $g_{fs}$     | $I_C = 120\text{A}$ , $V_{CE} = 10\text{V}$ , Note 1  | 75                    | 130  | S                       |
| $C_{ies}$    | $V_{CE} = 25\text{V}$ , $V_{GE} = 0\text{V}$ , $f = 1\text{MHz}$  |                       | 6900 | pF                      |
| $C_{oes}$    |   |                       | 435  | pF                      |
| $C_{res}$    |   |                       | 97   | pF                      |
| $Q_g$        | $I_C = 120\text{A}$ , $V_{GE} = 15\text{V}$ , $V_{CE} = 0.5 \cdot V_{CES}$  |                       | 225  | nC                      |
| $Q_{ge}$     |   |                       | 37   | nC                      |
| $Q_{gc}$     |   |                       | 88   | nC                      |
| $t_{d(on)}$  | <b>Resistive Switching Times, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = 120\text{A}$ , $V_{GE} = 15\text{V}$<br>$V_{CE} = 0.8 \cdot V_{CES}$ , $R_G = 1\Omega$  |                       | 30   | ns                      |
| $t_r$        |   |                       | 70   | ns                      |
| $t_{d(off)}$ |   |                       | 104  | ns                      |
| $t_f$        |   |                       | 45   | ns                      |
| $t_{d(on)}$  | <b>Resistive Switching Times, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = 120\text{A}$ , $V_{GE} = 15\text{V}$<br>$V_{CE} = 0.8 \cdot V_{CES}$ , $R_G = 1\Omega$ |                       | 29   | ns                      |
| $t_r$        |   |                       | 104  | ns                      |
| $t_{d(off)}$ |   |                       | 103  | ns                      |
| $t_f$        |   |                       | 100  | ns                      |
| $R_{thJC}$   |   |                       |      | 0.25 $^\circ\text{C/W}$ |
| $R_{thCS}$   |   | 0.21                  |      | $^\circ\text{C/W}$      |

### TO-3P (IXGQ) Outline



Pins: 1 - Gate 2 - Drain  
3 - Source 4, Tab - Drain

| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .185     | .193 | 4.70        | 4.90  |
| A1  | .051     | .059 | 1.30        | 1.50  |
| A2  | .057     | .065 | 1.45        | 1.65  |
| b   | .035     | .045 | 0.90        | 1.15  |
| b2  | .075     | .087 | 1.90        | 2.20  |
| b4  | .114     | .126 | 2.90        | 3.20  |
| c   | .022     | .031 | 0.55        | 0.80  |
| D   | .780     | .791 | 19.80       | 20.10 |
| D1  | .665     | .677 | 16.90       | 17.20 |
| E   | .610     | .622 | 15.50       | 15.80 |
| E1  | .531     | .539 | 13.50       | 13.70 |
| e   | .215 BSC |      | 5.45 BSC    |       |
| L   | .779     | .795 | 19.80       | 20.20 |
| L1  | .134     | .142 | 3.40        | 3.60  |
| øP1 | .126     | .134 | 3.20        | 3.40  |
| S   | .272     | .280 | 6.90        | 7.10  |
| S   | .193     | .201 | 4.90        | 5.10  |

All metal area are tin plated.

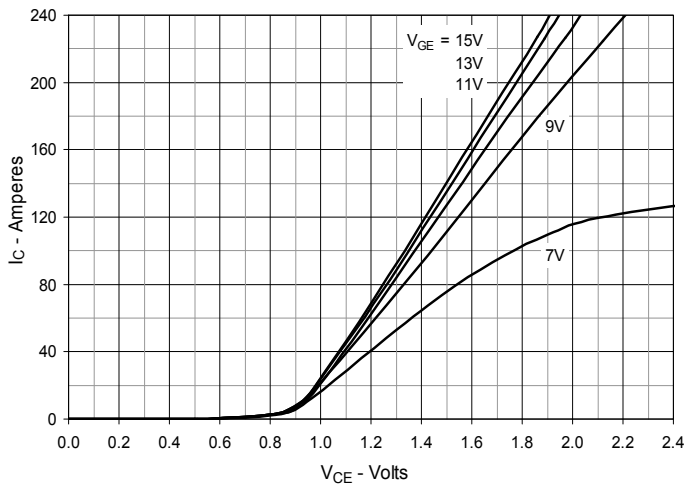
Note 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

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

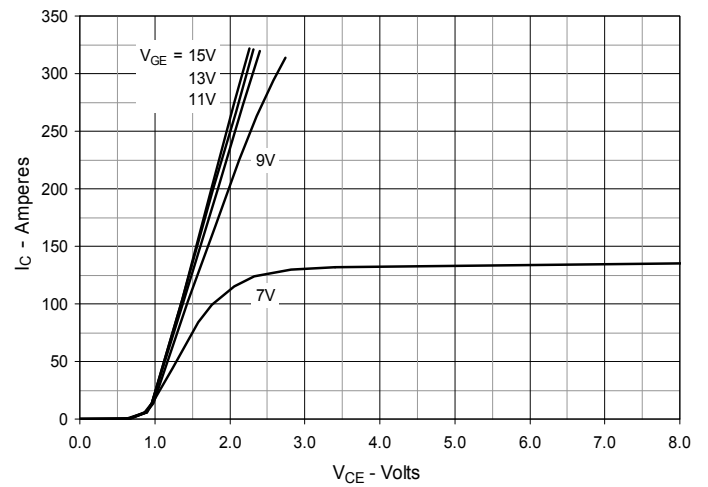
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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    |             |

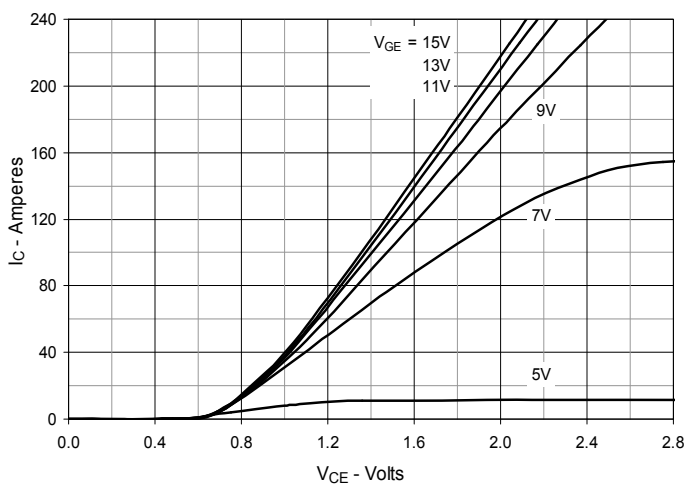
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



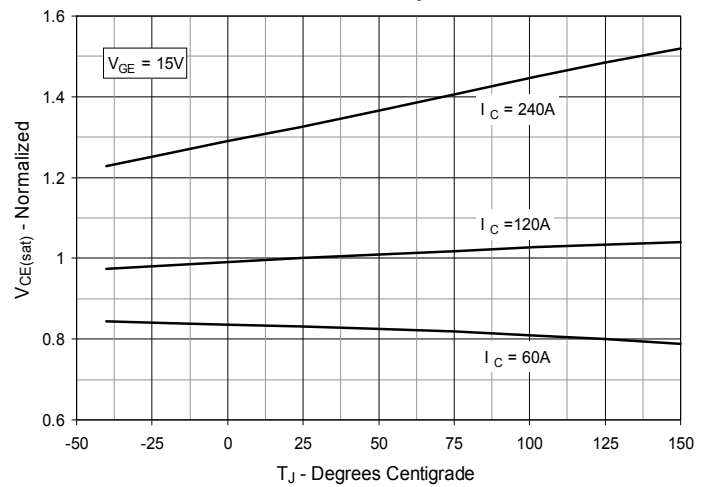
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



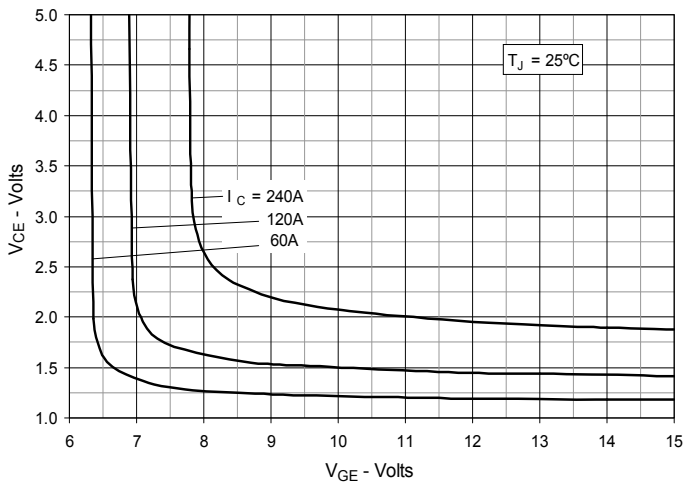
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



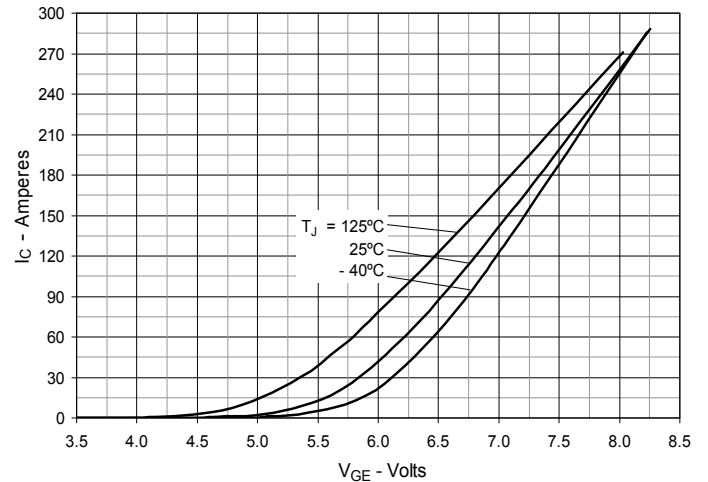
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**



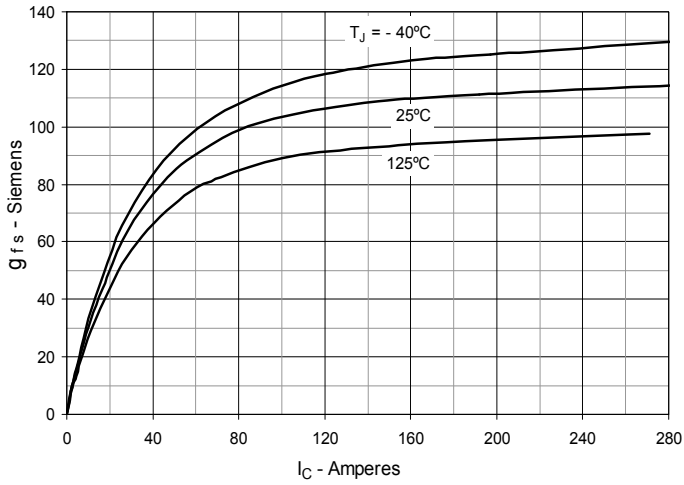
**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**



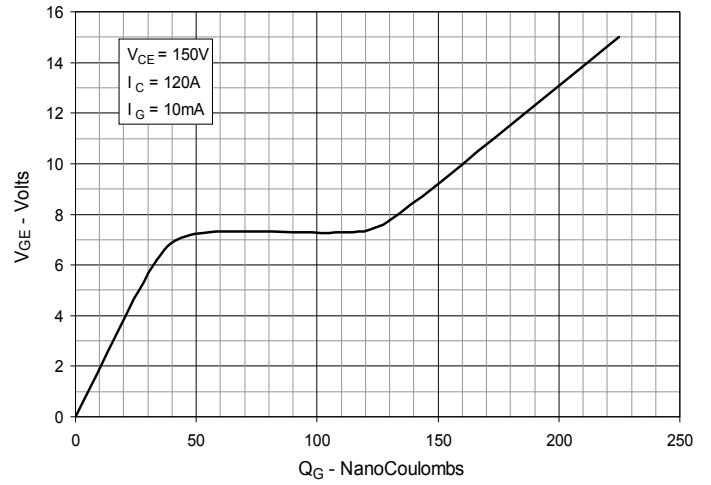
**Fig. 6. Input Admittance**



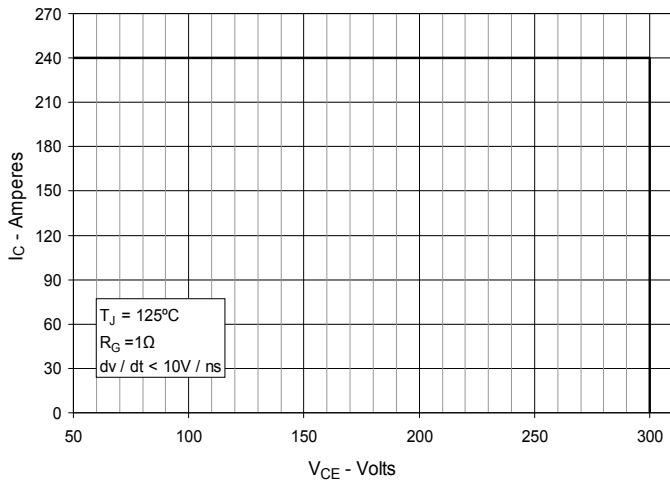
**Fig. 7. Transconductance**



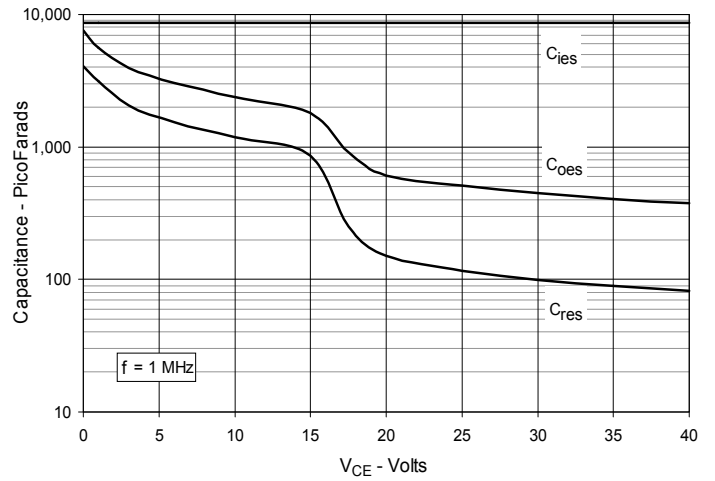
**Fig. 8. Gate Charge**



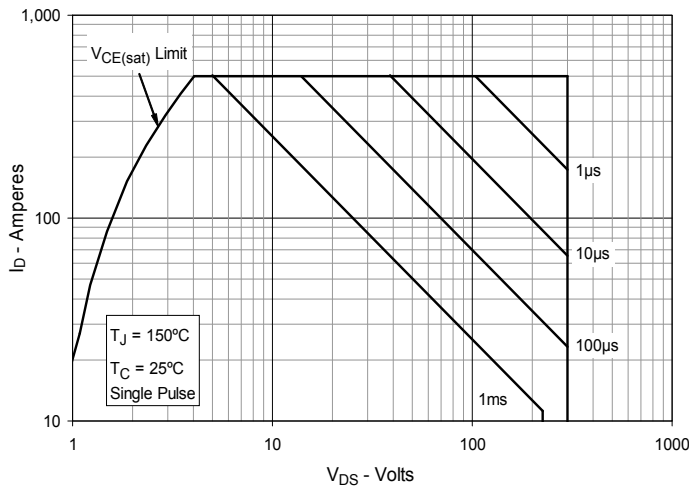
**Fig. 9. Reverse-Bias Safe Operating Area**



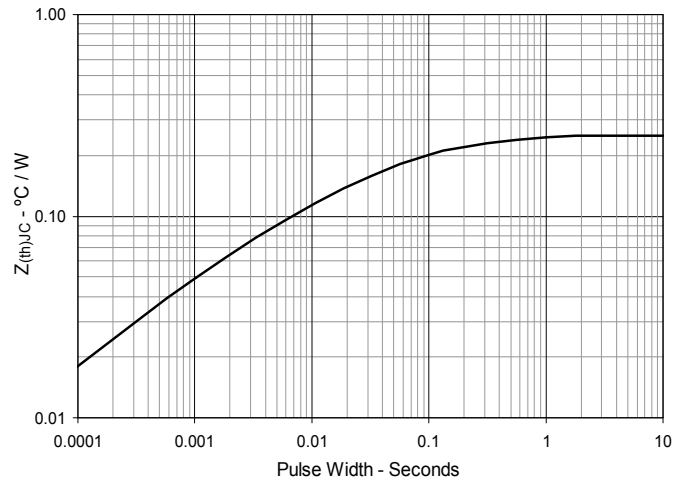
**Fig. 10. Capacitance**



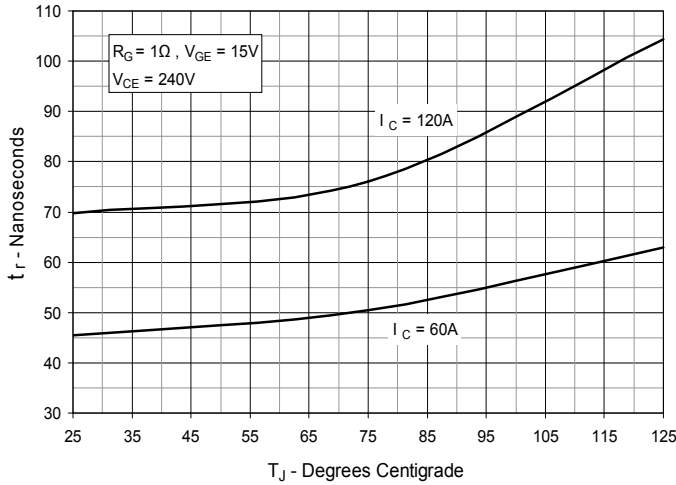
**Fig. 11. Forward-Bias Safe Operating Area**



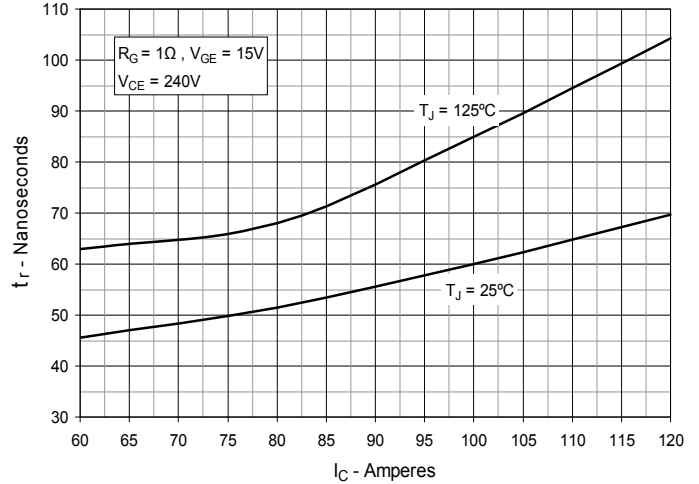
**Fig. 12. Maximum Transient Thermal Impedance**



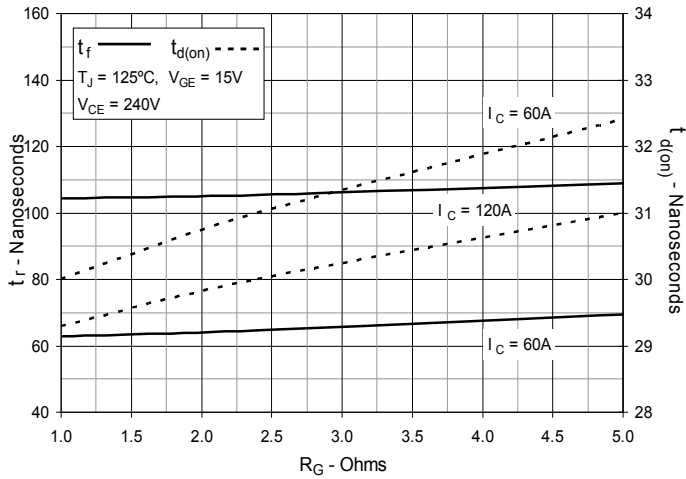
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**



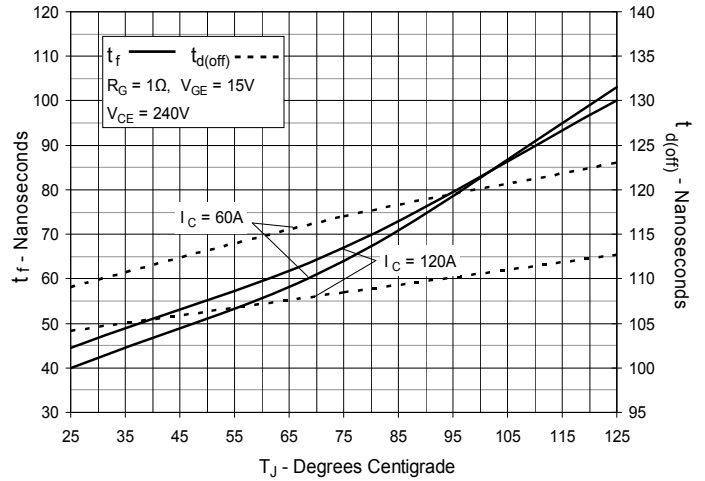
**Fig. 14. Resistive Turn-on Rise Time vs. Collector Current**



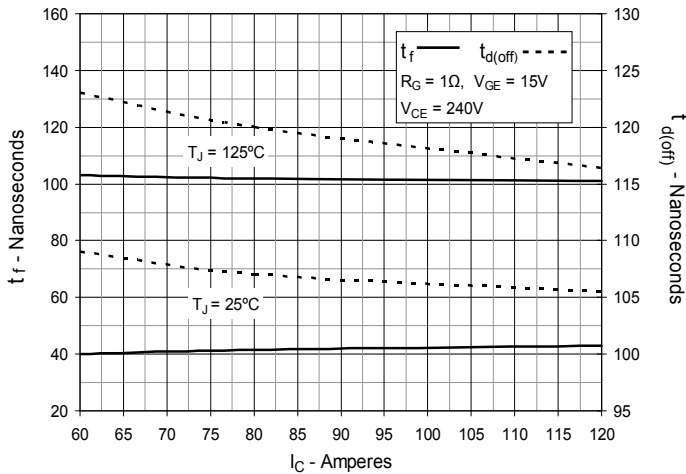
**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**



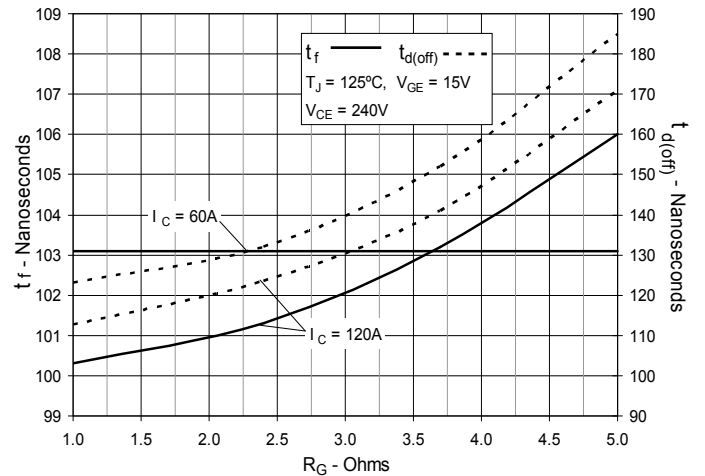
**Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature**



**Fig. 17. Resistive Turn-off Switching Times vs. Collector Current**



**Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance**



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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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