

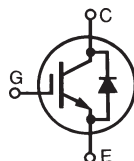
# High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

## IXBF20N300

$$V_{CES} = 3000V$$

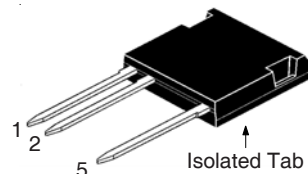
$$I_{C90} = 15A$$

$$V_{CE(sat)} \leq 3.2V$$



(Electrically Isolated Tab)

ISOPLUS i4-Pak™



1 = Gate  
2 = Emitter

5 = Collector

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_C = 25^\circ C$ 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	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$	27	A
$I_{C90}$	$T_C = 90^\circ C$	15	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	140	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 20\Omega$ Clamped Inductive Load	$I_{CM} = 50$ $V_{CE} \leq 0.8 \cdot V_{CES}$	A
$P_C$	$T_C = 25^\circ C$	110	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$T_L$	1.6mm (0.062 in.) from Case for 10s	300	$^\circ C$
$T_{SOLD}$	Plastic Body for 10 seconds	260	$^\circ C$
$F_C$	Mounting Force	20..120 / 4.5..27	Nm/lb.in.
$V_{ISOL}$	50/60Hz, 1 Minute	4000	V~
<b>Weight</b>		5	g

### Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 4000V Electrical Isolation
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage

### Advantages

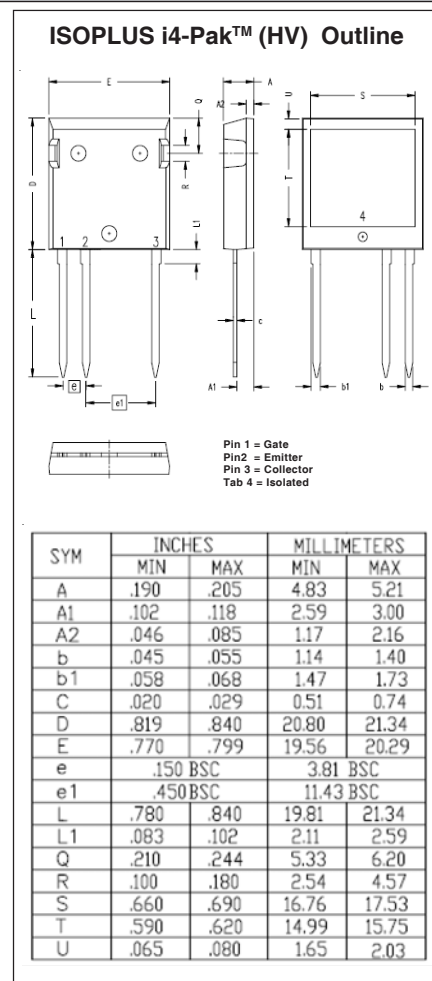
- Low Gate Drive Requirement
- High Power Density

### 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
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	2.5		5.0 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$ Note 2, $T_J = 125^\circ C$			35 $\mu A$ 1.5 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = 20A$ , $V_{GE} = 15V$ , Note 1  $T_J = 125^\circ C$		2.7 3.2	V V

Symbol Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 20\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	11	18	S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		2230	pF
$C_{oes}$			92	pF
$C_{res}$			33	pF
$Q_g$	$I_C = 20\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$		105	nC
$Q_{ge}$			13	nC
$Q_{gc}$			45	nC
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 20\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 10\Omega$		64	ns
$t_r$			210	ns
$t_{d(off)}$			300	ns
$t_f$			504	ns
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 20\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 10\Omega$		68	ns
$t_r$			540	ns
$t_{d(off)}$			300	ns
$t_f$			395	ns
$R_{thJC}$			1.13	$^\circ\text{C/W}$
$R_{thCS}$		0.15		$^\circ\text{C/W}$



## Reverse Diode

Symbol Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
$V_F$	$I_F = 20\text{A}, V_{GE} = 0\text{V}$			2.1 V
$t_{rr}$	$I_F = 10\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$		1.35	$\mu\text{s}$
$I_{RM}$		$V_R = 100\text{V}, V_{GE} = 0\text{V}$		30

## Notes:

1. Pulse test,  $t < 300\mu\text{s}$ , duty cycle,  $d < 2\%$ .
2. Device must be heatsunk for high-temperature leakage current measurements to avoid thermal runaway.

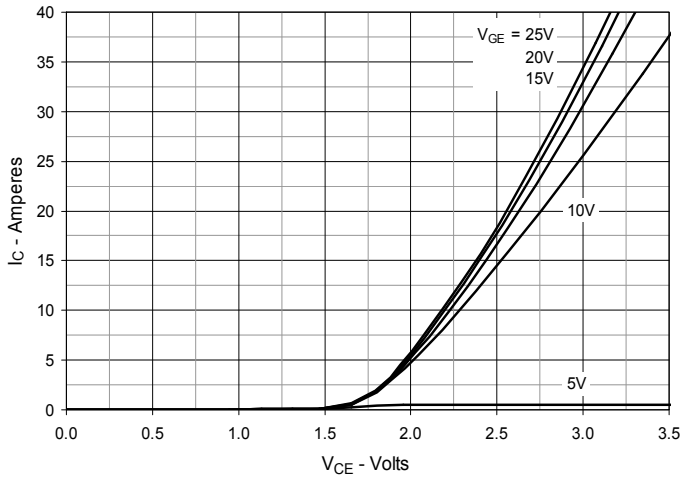
### PRELIMINARY TECHNICAL INFORMATION

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.

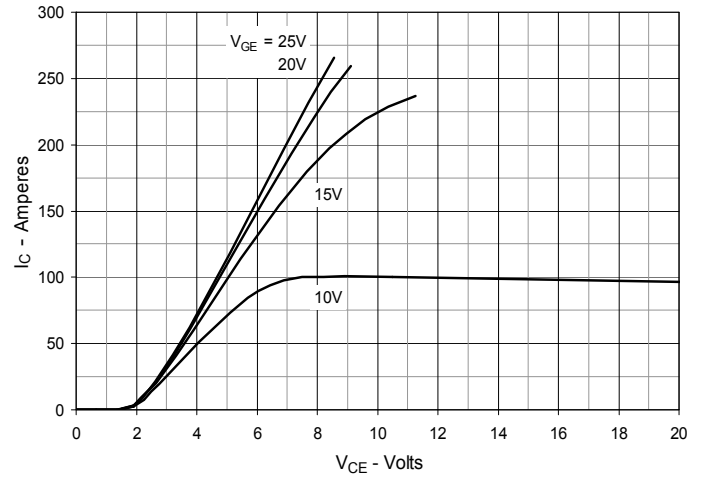
IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.

IXYS MOSFETs and IGBTs are covered 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: 4,850,072 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

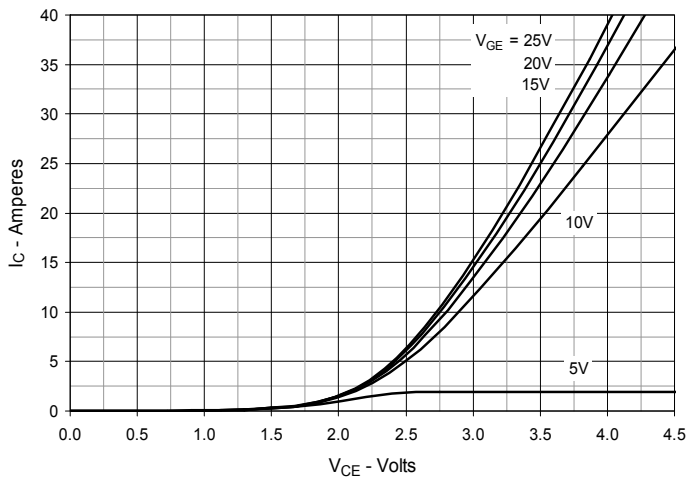
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



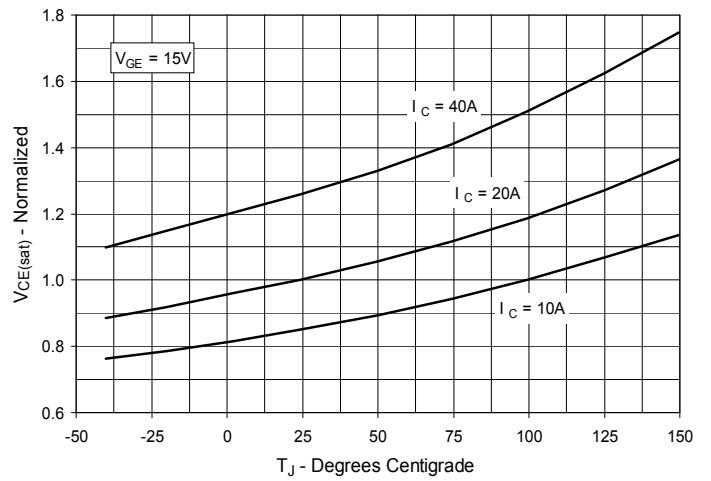
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



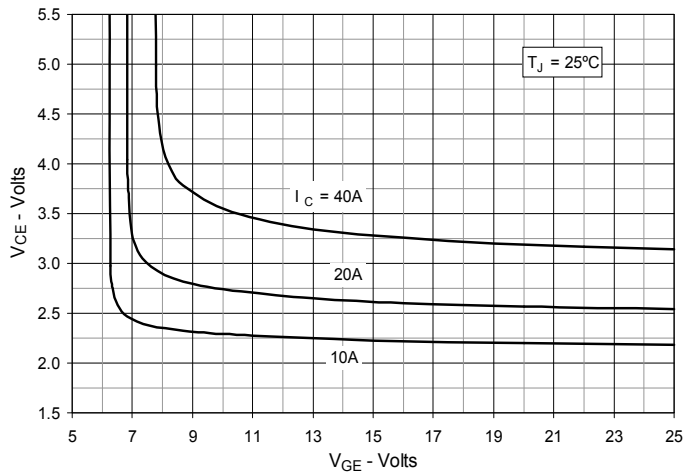
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



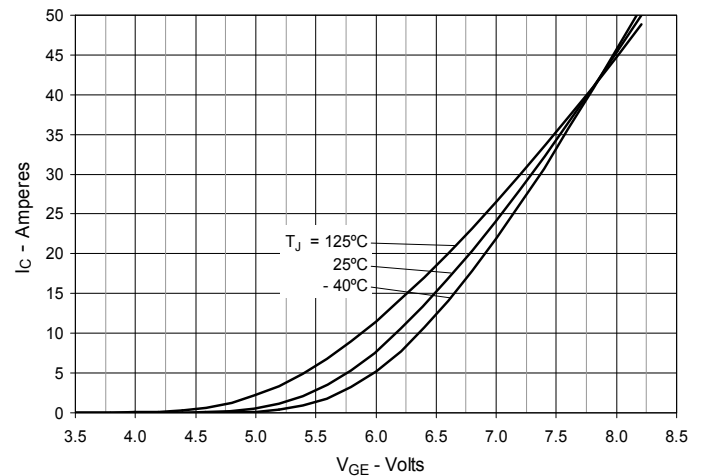
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**



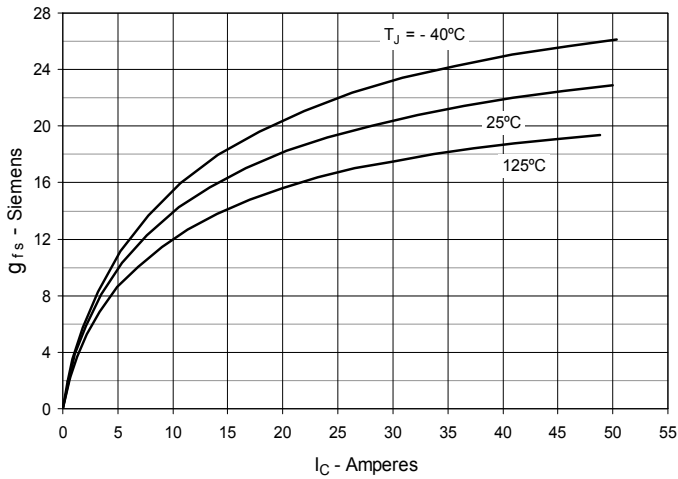
**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**



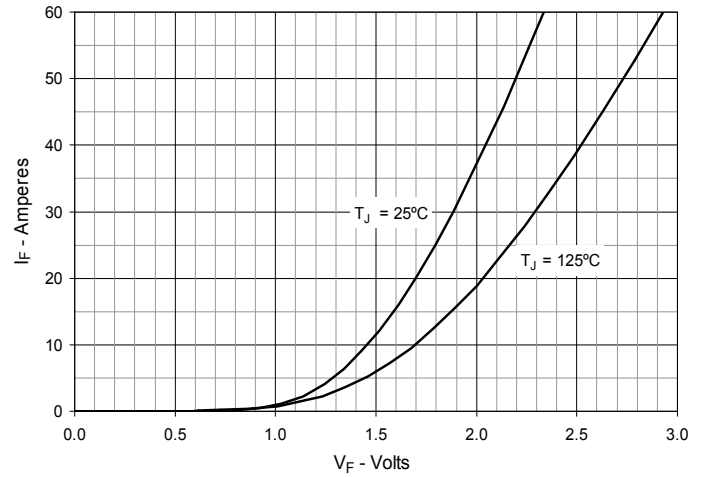
**Fig. 6. Input Admittance**



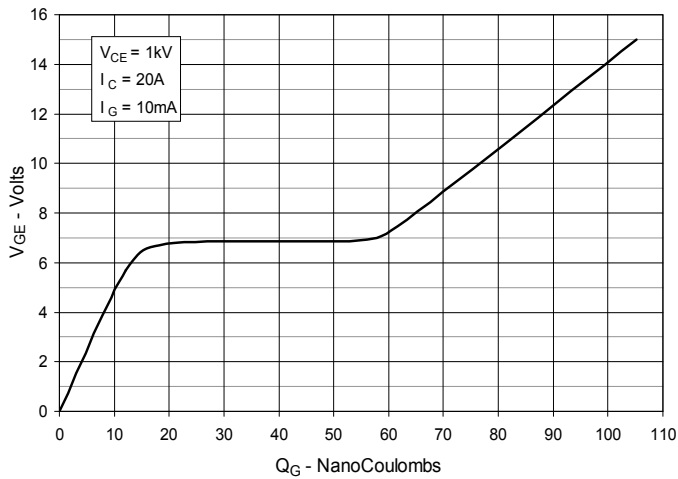
**Fig. 7. Transconductance**



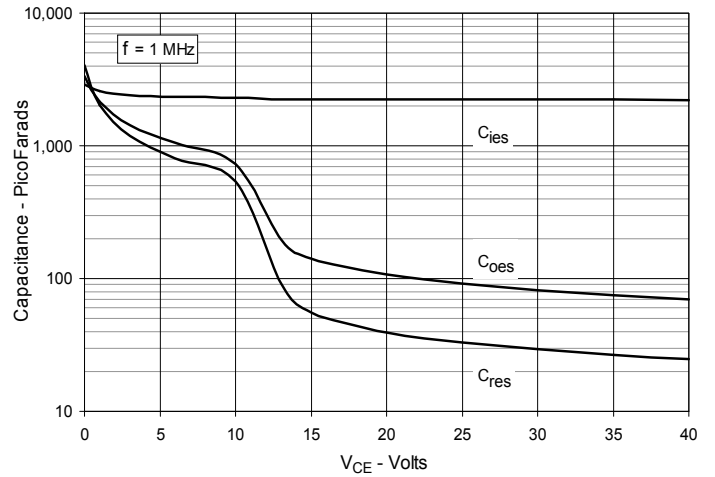
**Fig. 8. Forward Voltage Drop of Intrinsic Diode**



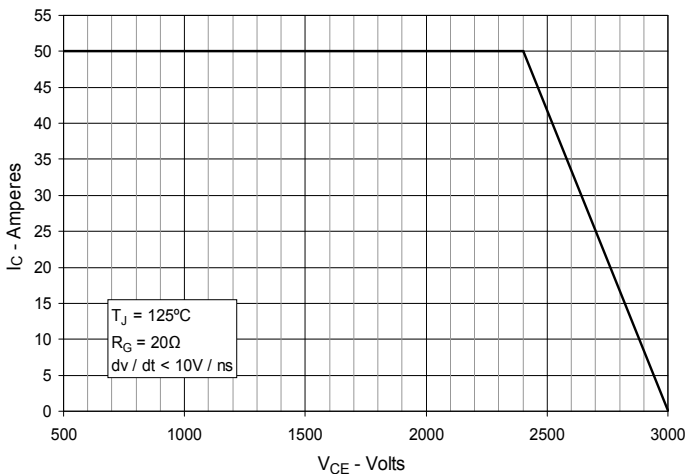
**Fig. 9. Gate Charge**



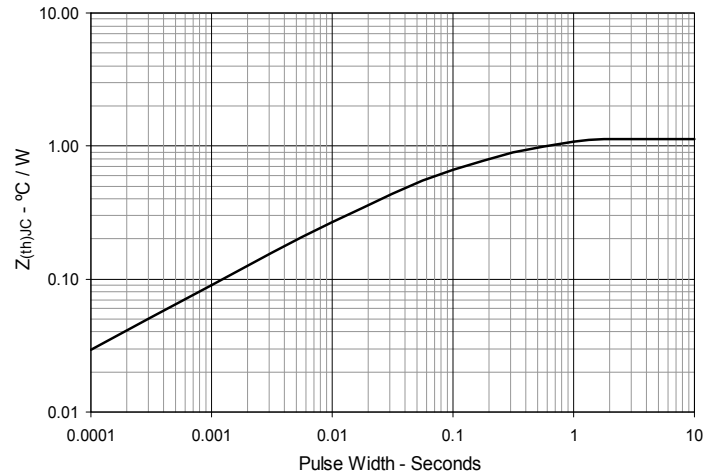
**Fig. 10. Capacitance**



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

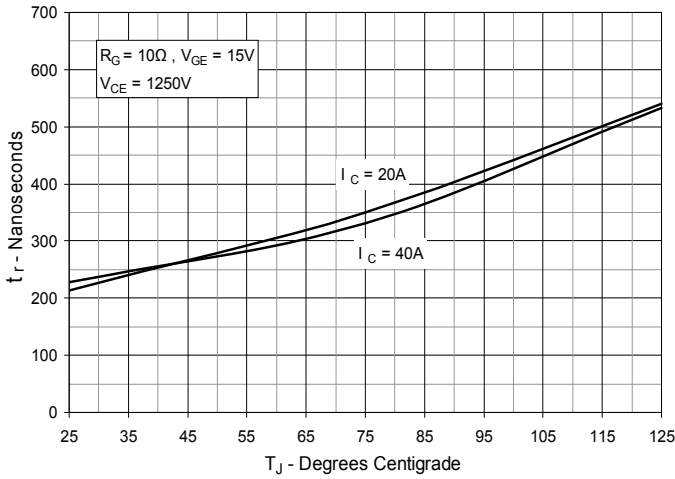


**Fig. 12. Maximum Transient Thermal Impedance**

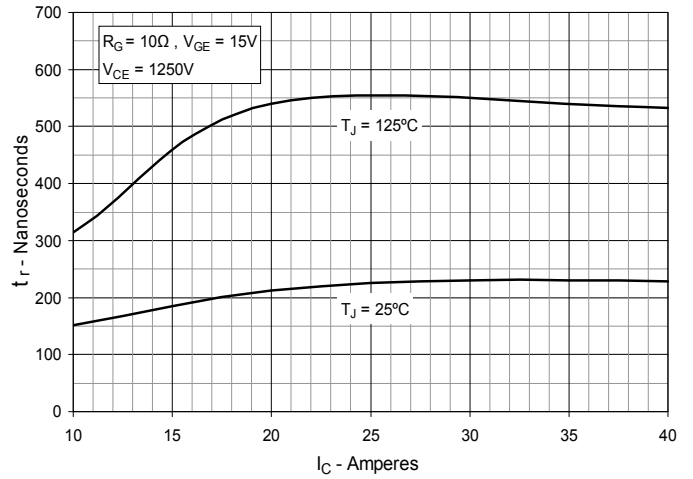


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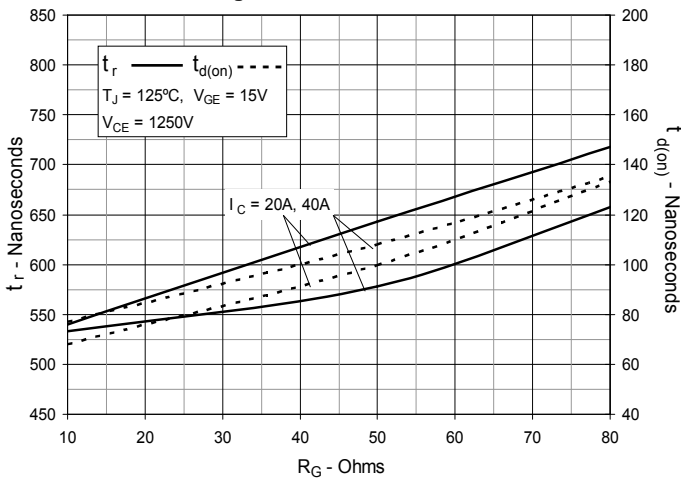
**Fig. 13. Resistive Turn-on  
Rise Time vs. Junction Temperature**



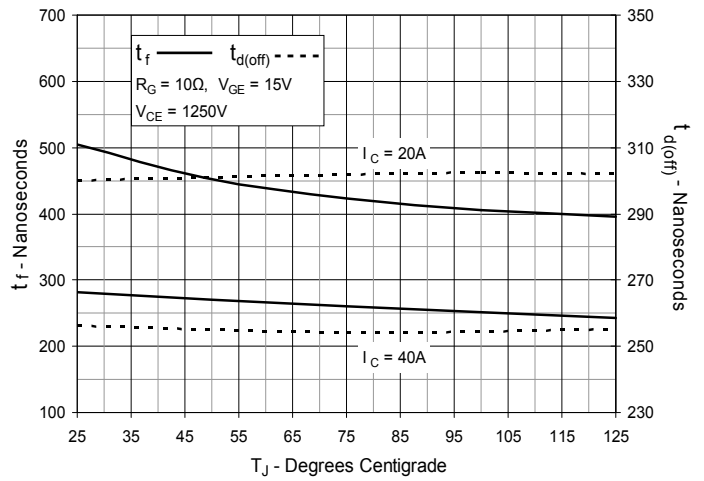
**Fig. 14. Resistive Turn-on  
Rise Time vs. Collector Current**



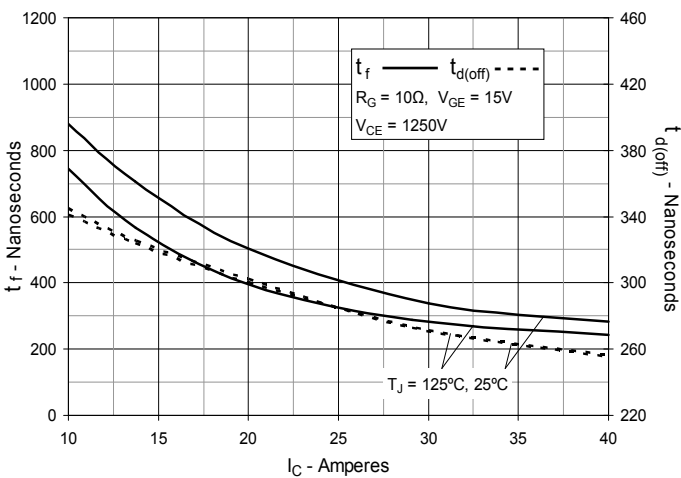
**Fig. 15. Resistive Turn-on  
Switching Times vs. Gate Resistance**



**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**

