

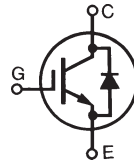
# High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

## IXBH42N250

$$V_{CES} = 2500V$$

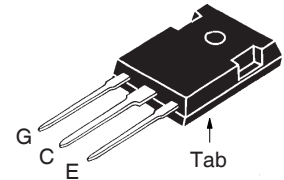
$$I_{C110} = 42A$$

$$V_{CE(sat)} \leq 3.0V$$



Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_C = 25^\circ C$ to $150^\circ C$	2500	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	2500	V
$V_{GES}$	Continuous	$\pm 25$	V
$V_{GEM}$	Transient	$\pm 35$	V
$I_{C25}$	$T_C = 25^\circ C$	104	A
$I_{C110}$	$T_C = 110^\circ C$	42	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	400	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 20\Omega$ Clamped Inductive Load	$I_{CM} = 84$ 1250	A V
<b><math>T_{SC}</math></b> <b>(SCSOA)</b>	$V_{GE} = 15V$ , $T_J = 125^\circ C$ , $R_G = 82\Omega$ , $V_{CE} = 1250V$ , Non-Repetitive	10	$\mu s$
$P_C$	$T_C = 25^\circ C$	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>		6	g

### TO-247 AD



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

### Features

- High Blocking Voltage
- International Standard Package
- Anti-Parallel Diode
- Low Conduction Losses

### Advantages

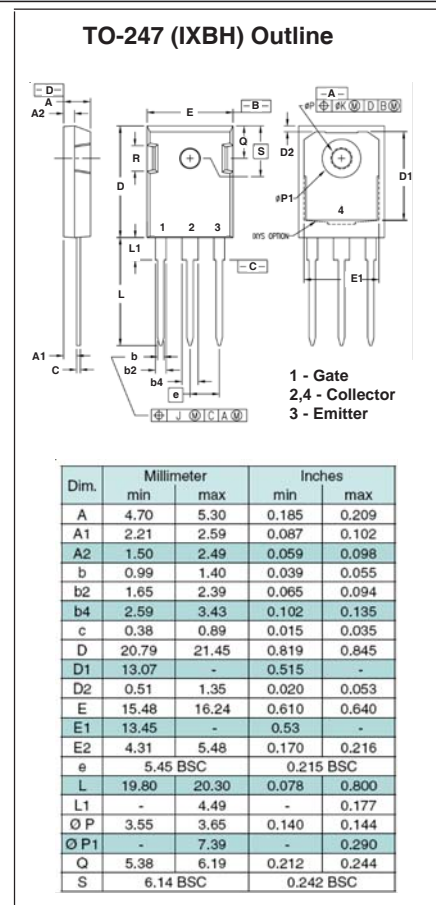
- Low Gate Drive Requirement
- High Power Density

### 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.
$BV_{CES}$	$I_C = 1mA$ , $V_{GE} = 0V$	2500		V
$V_{GE(th)}$	$I_C = 1mA$ , $V_{CE} = V_{GE}$	3.0		5.0 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$		250	50 $\mu A$ $\mu A$
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 25V$			$\pm 200$ nA
$V_{CE(sat)}$	$I_C = 42A$ , $V_{GE} = 15V$ , Note 1 $T_J = 125^\circ C$		2.5 3.1	3.0 V V

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 42\text{A}, V_{CE} = 10\text{V}$ , Note 1	28	45	S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		4780	pF
$C_{oes}$			170	pF
$C_{res}$			56	pF
$R_{Gi}$	Gate Input Resistance		3.0	$\Omega$
$Q_g$	$I_C = 42\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$		200	nC
$Q_{ge}$			28	nC
$Q_{gc}$			75	nC
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 42\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 20\Omega$		72	ns
$t_r$			330	ns
$t_{d(off)}$			445	ns
$t_f$			610	ns
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 42\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 20\Omega$		72	ns
$t_r$			580	ns
$t_{d(off)}$			460	ns
$t_f$			490	ns
$R_{thJC}$			0.25	$^\circ\text{C/W}$
$R_{thCS}$		0.21		$^\circ\text{C/W}$



## Reverse Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_F$	$I_F = 42\text{A}, V_{GE} = 0\text{V}$ , Note 1			2.5 V
$t_{rr}$	$I_F = 21\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$		1.7	$\mu\text{s}$
$I_{RM}$		$V_R = 100\text{V}, V_{GE} = 0\text{V}$		43

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

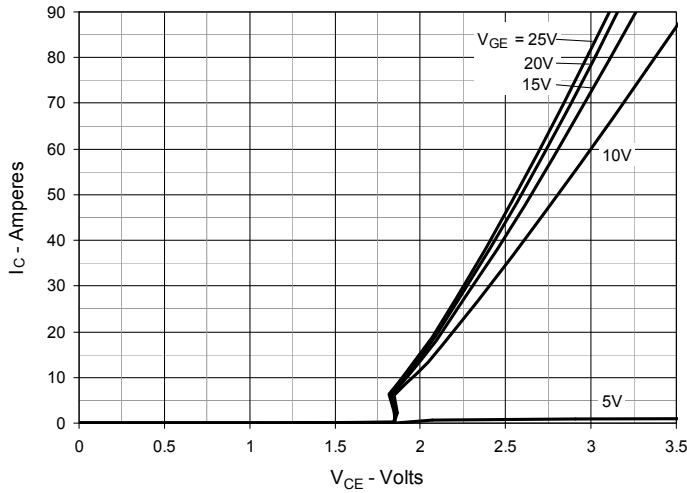
### ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

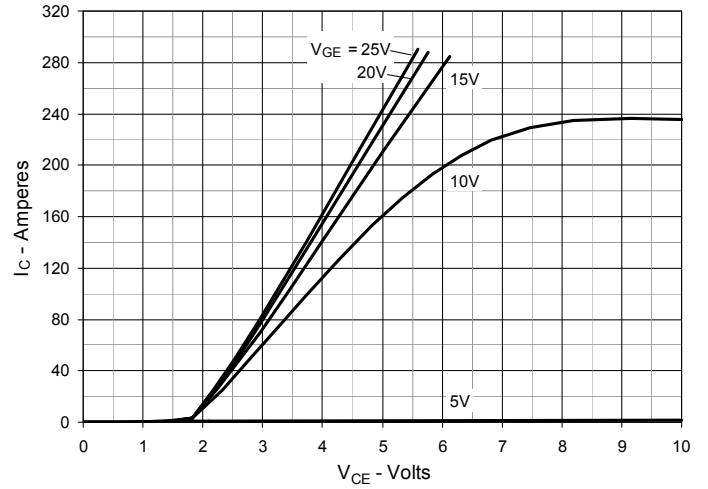
IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.

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
	4,860,072	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	

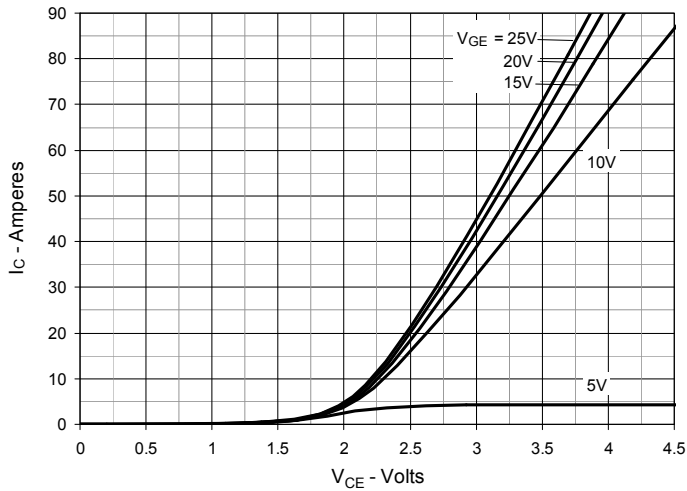
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



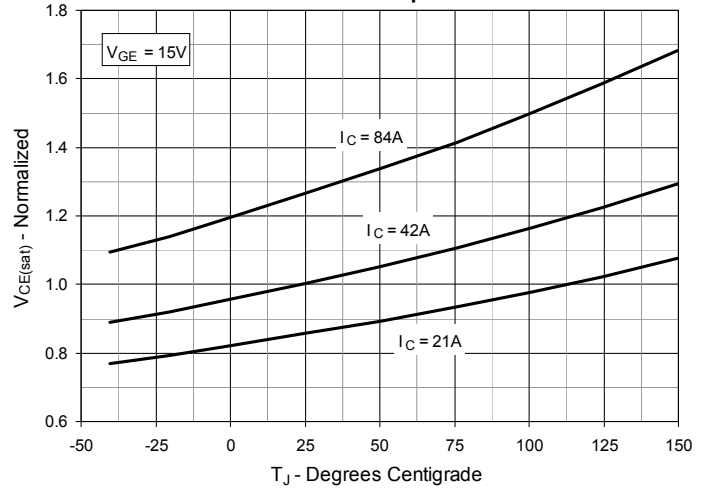
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



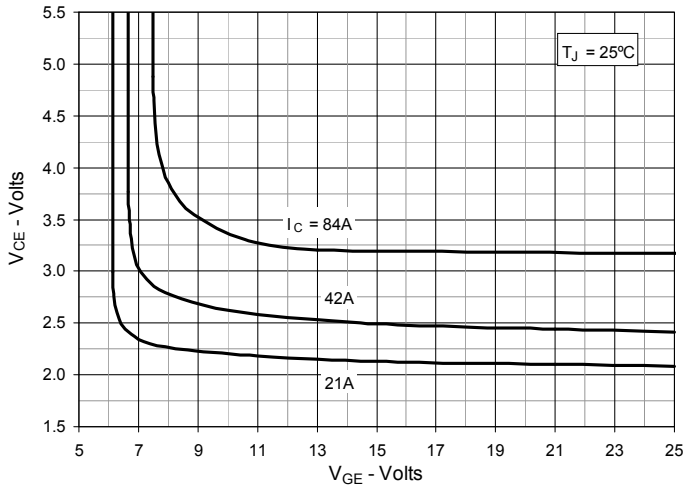
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



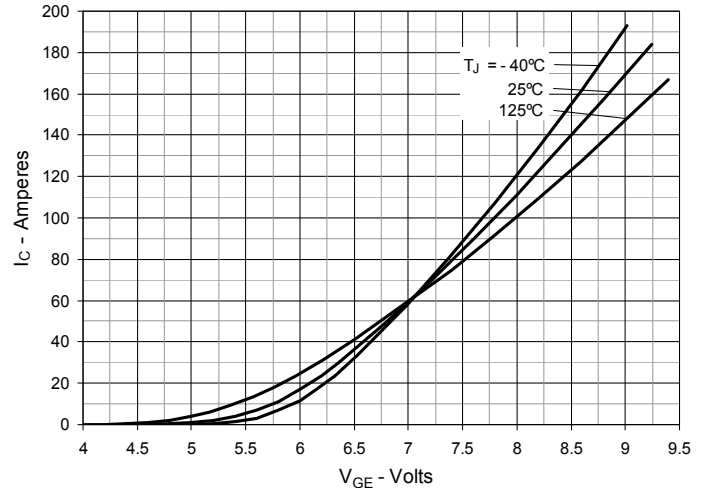
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**



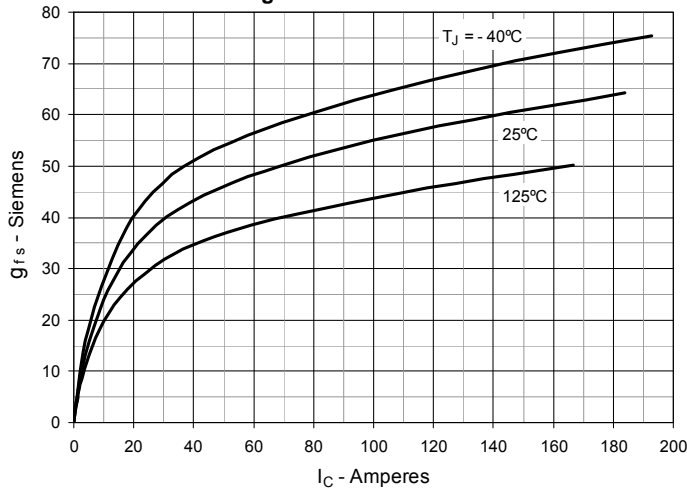
**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**



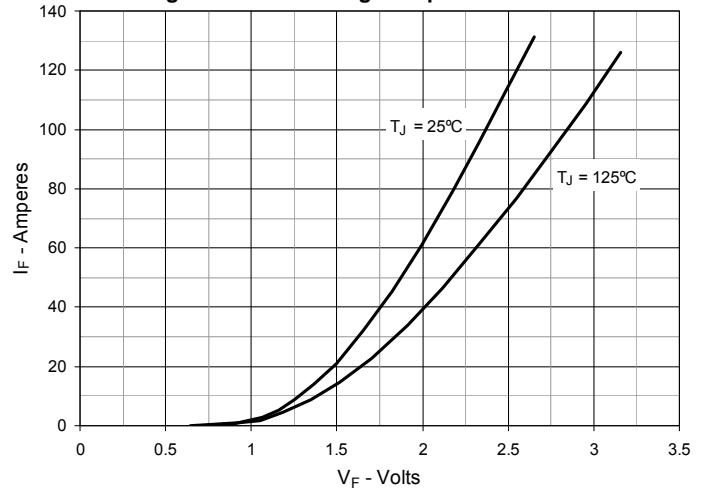
**Fig. 6. Input Admittance**



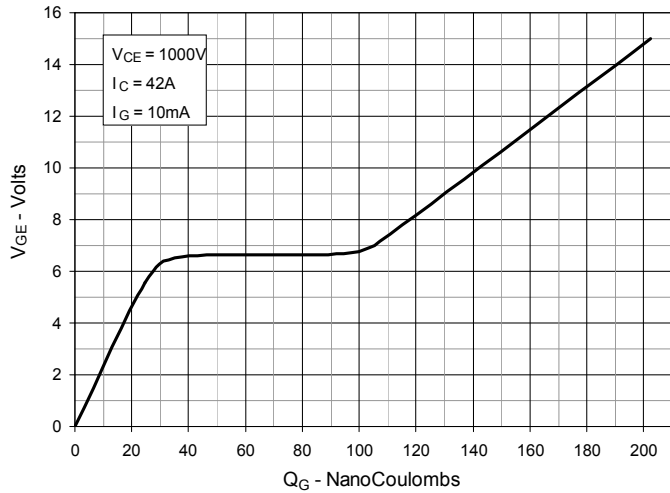
**Fig. 7. Transconductance**



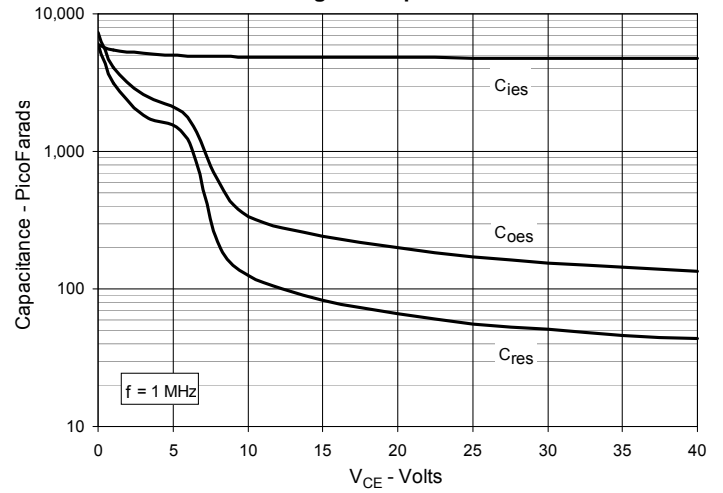
**Fig. 8. Forward Voltage Drop of Intrinsic Diode**



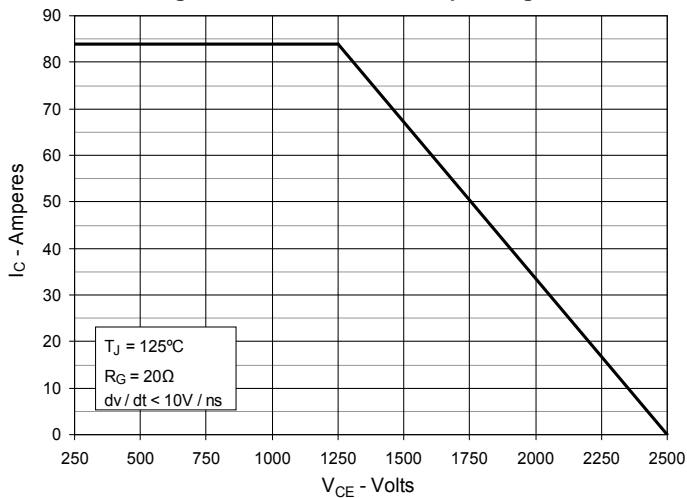
**Fig. 9. Gate Charge**



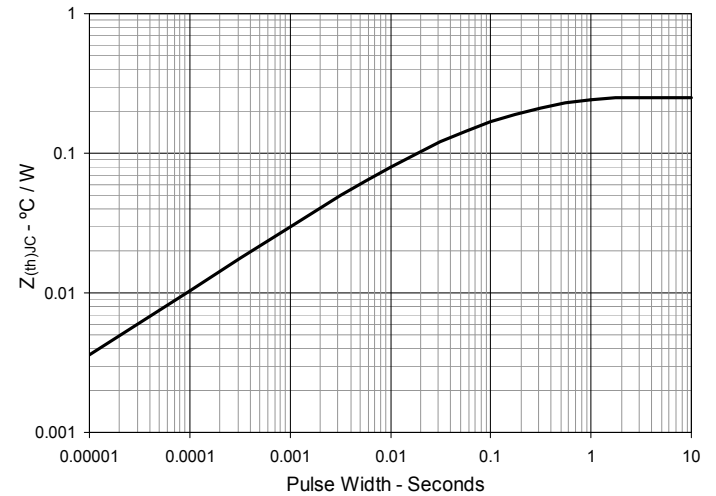
**Fig. 10. Capacitance**



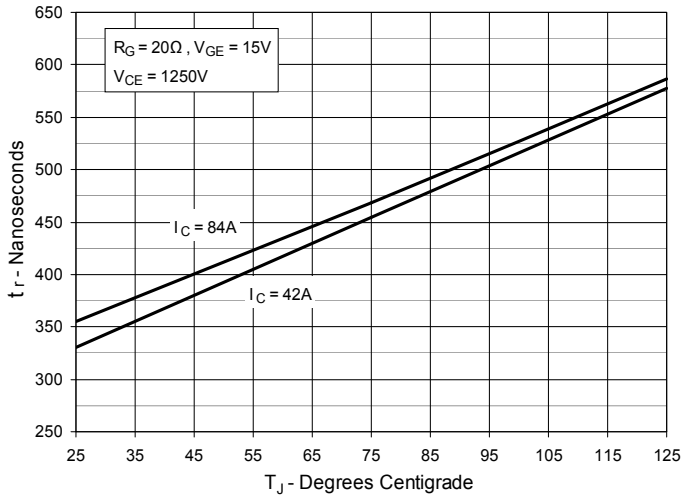
**Fig. 11. Reverse-Bias Safe Operating Area**



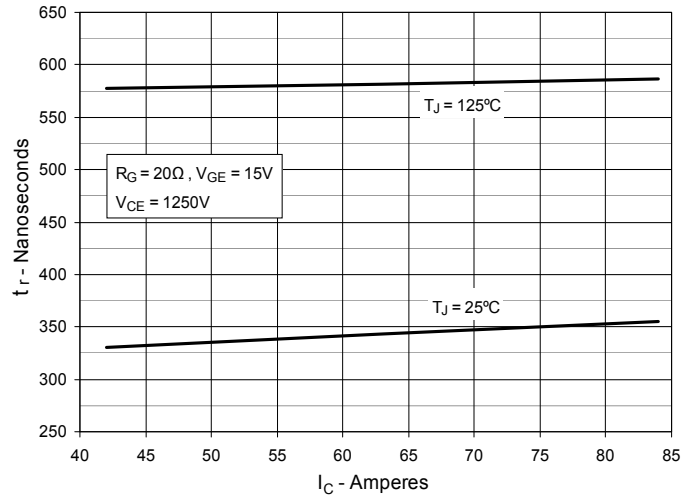
**Fig. 12. Maximum Transient Thermal Impedance**



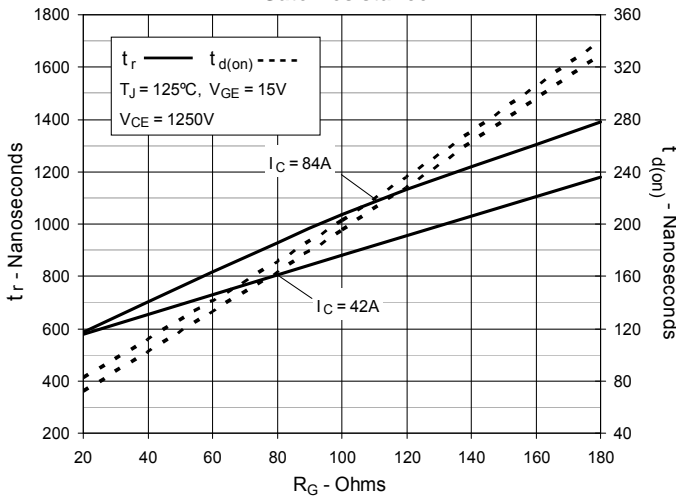
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**



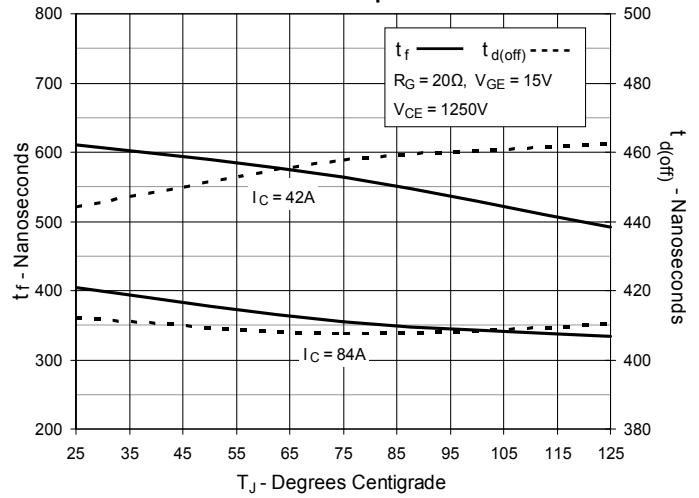
**Fig. 14. Resistive Turn-on Rise Time vs. Collector Current**



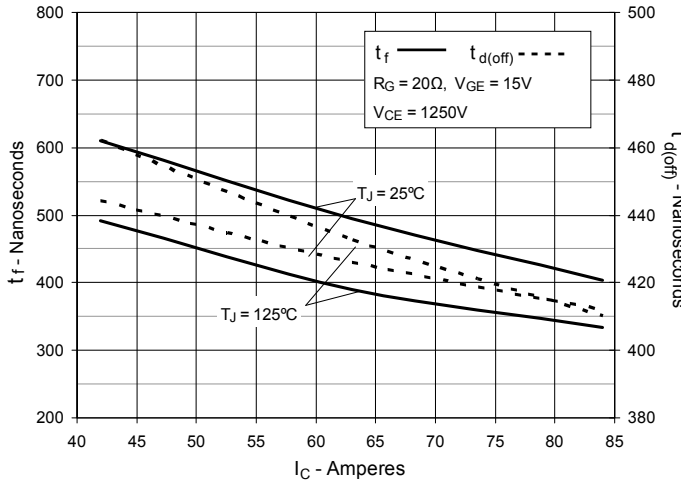
**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**



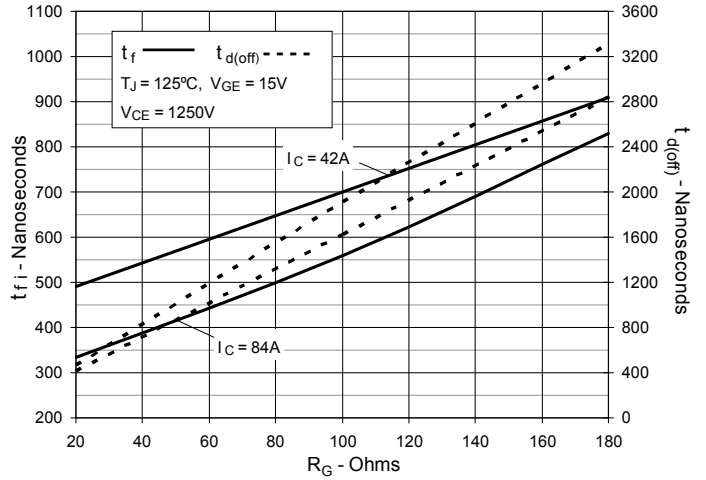
**Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature**



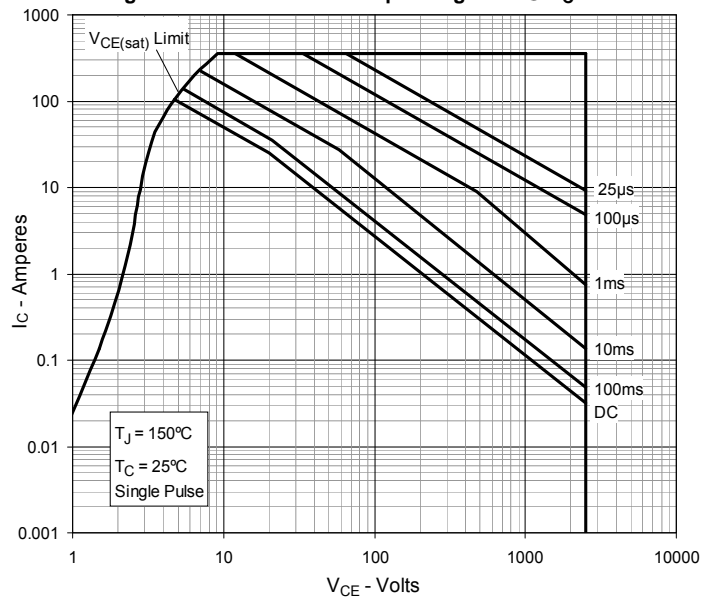
**Fig. 17. Resistive Turn-off Switching Times vs. Collector Current**



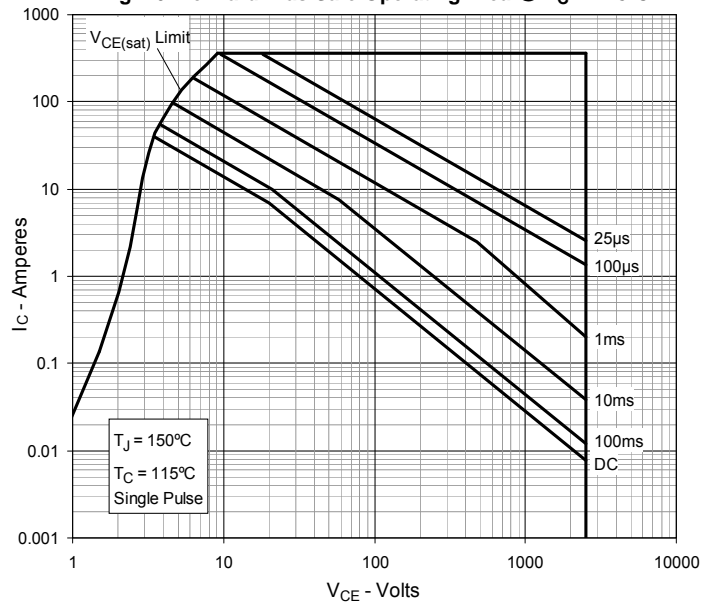
**Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance**



**Fig. 19. Forward-Bias Safe Operating Area @  $T_C = 25^\circ\text{C}$**



**Fig. 20. Forward-Bias Safe Operating Area @  $T_C = 115^\circ\text{C}$**





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