

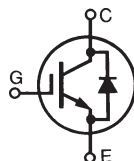
# High Voltage, BiMOSFET™ Monolithic Bipolar MOS Transistor

## IXBF42N300

$$V_{CES} = 3000V$$

$$I_{C110} = 24A$$

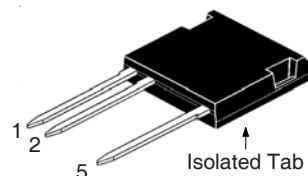
$$V_{CE(sat)} \leq 3.0V$$



(Electrically Isolated Tab)

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	$\pm 25$	V
$V_{GEM}$	Transient	$\pm 35$	V
$I_{C25}$	$T_C = 25^\circ C$	60	A
$I_{C110}$	$T_C = 110^\circ C$	24	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	380	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 20\Omega$ Clamped Inductive Load	$I_{CM} = 84$ $V_{CE} \leq 0.8 \cdot V_{CES}$	A
$T_{SC}$ <b>(SCSOA)</b>	$V_{GE} = 15V$ , $T_J = 125^\circ C$ , $R_G = 82\Omega$ , $V_{CE} = 1500V$ , Non-Repetitive	10	$\mu s$
$P_C$	$T_C = 25^\circ C$	240	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	3000	V~
<b>Weight</b>		5	g

### ISOPLUS i4-Pak™



1 = Gate  
2 = Emitter  
5 = Collector

### Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 3000V~ Electrical Isolation
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage
- FBSOA Rated
- SCSOA Rated

### Advantages

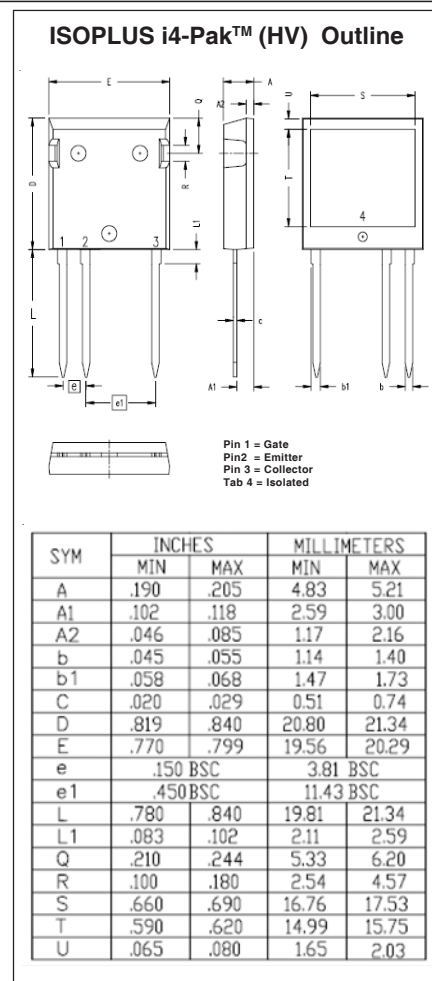
- Low Gate Drive Requirement
- High Power Density

### Applications

- Laser Generators
- Capacitor Discharge Circuits
- AC Switches
- Protection Circuits

Symbol	Test Conditions ( $T_J = 25^\circ C$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 1mA$ , $V_{GE} = 0V$	3000		V
$V_{GE(th)}$	$I_C = 1mA$ , $V_{CE} = V_{GE}$	3.0		5.0 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$ Note 2, $T_J = 125^\circ C$		250	50 $\mu A$ 50 $\mu A$
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 25V$			$\pm 200$ nA
$V_{CE(sat)}$	$I_C = 42A$ , $V_{GE} = 15V$ , Note 1 $T_J = 125^\circ C$		2.5 3.1	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> $I_C = 42, V_{GE} = 15\text{V}$ $V_{CE} = 1500\text{V}, R_G = 20\Omega$		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> $I_C = 42, V_{GE} = 15\text{V}$ $V_{CE} = 1500\text{V}, R_G = 20\Omega$		72	ns
$t_r$			580	ns
$t_{d(off)}$			460	ns
$t_f$			490	ns
$R_{thJC}$				0.52 $^\circ\text{C/W}$
$R_{thCS}$		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
$V_F$	$I_F = 42\text{A}, V_{GE} = 0\text{V}$ , Note 1			2.5 V
$t_{rr}$	$I_F = 21\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}, V_{GE} = 0\text{V}$		1.7	$\mu\text{s}$
$I_{RM}$			43	A

## 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.

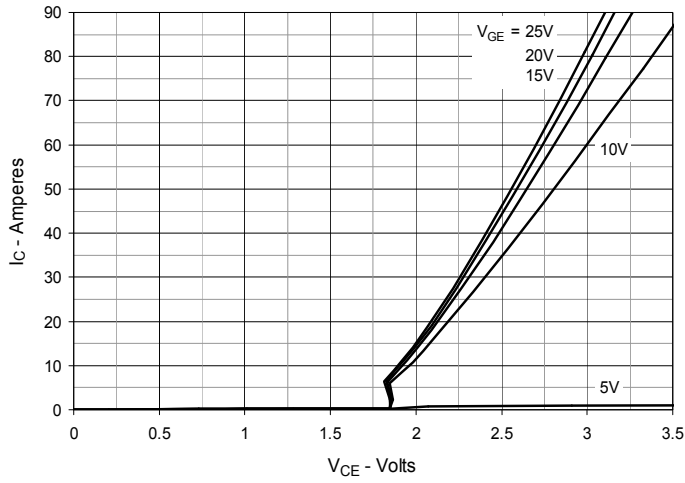
### PRELIMINARY TECHNICAL INFORMATION

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.

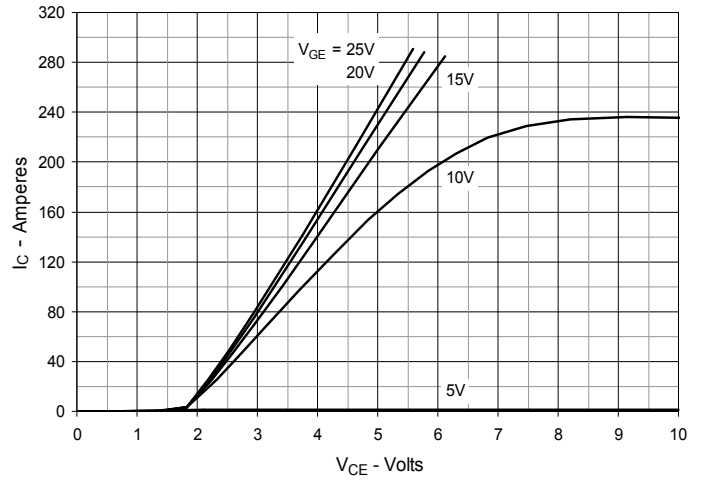
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IXYS MOSFETs and IGBTs are covered 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2  
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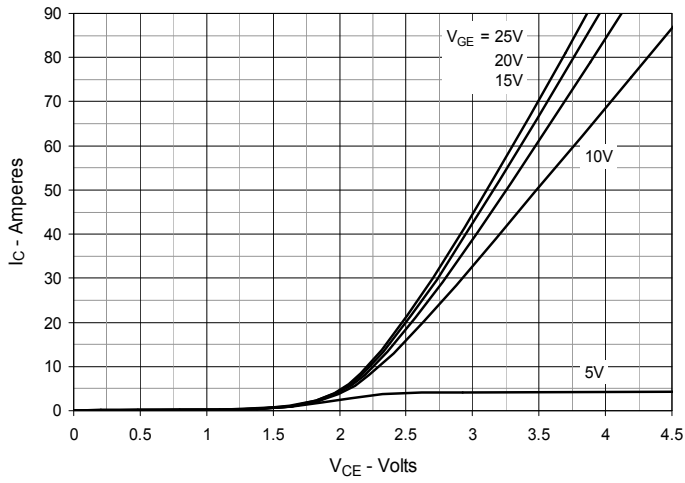
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



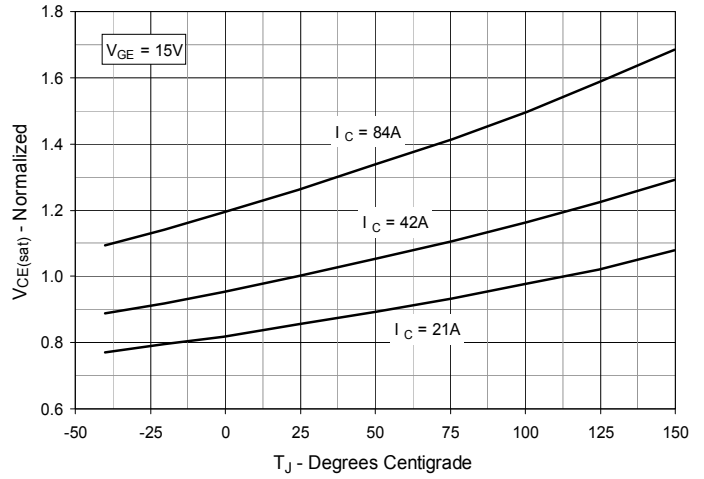
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



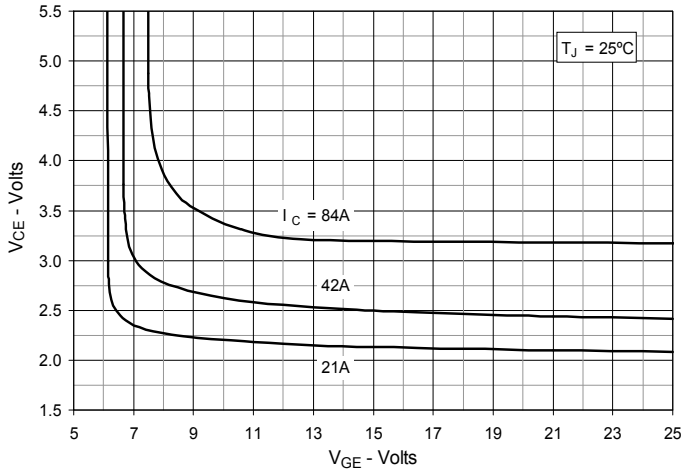
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



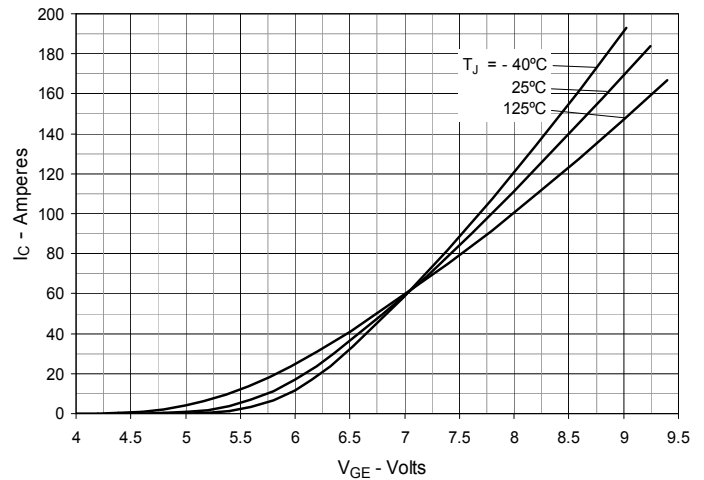
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**

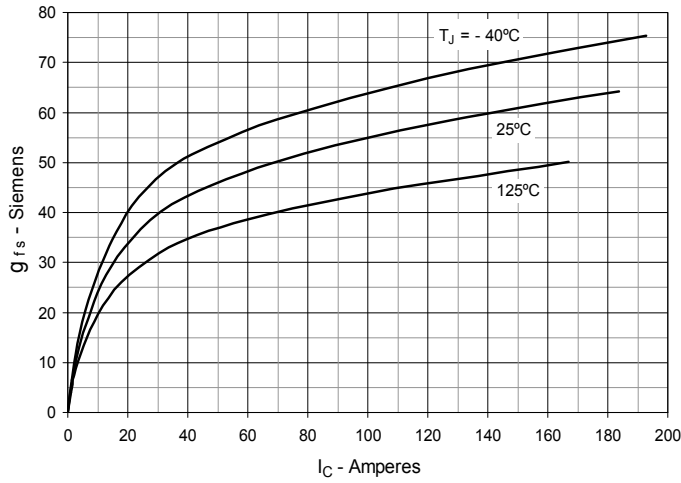
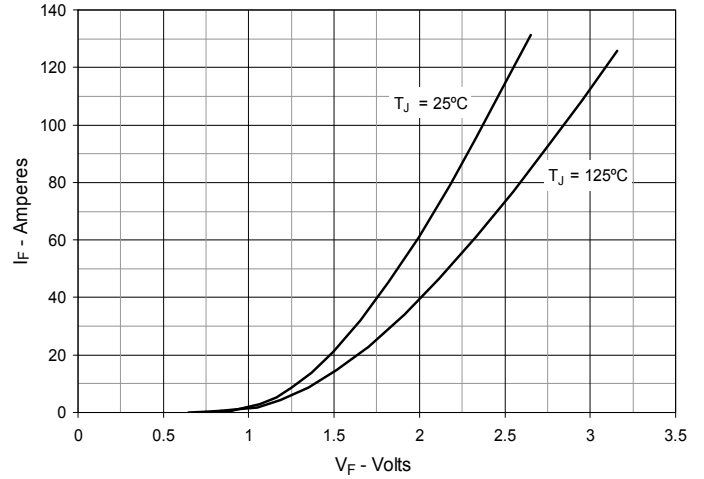
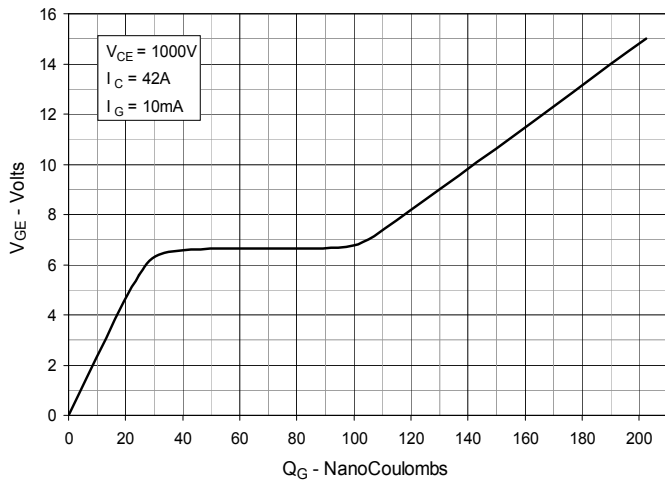
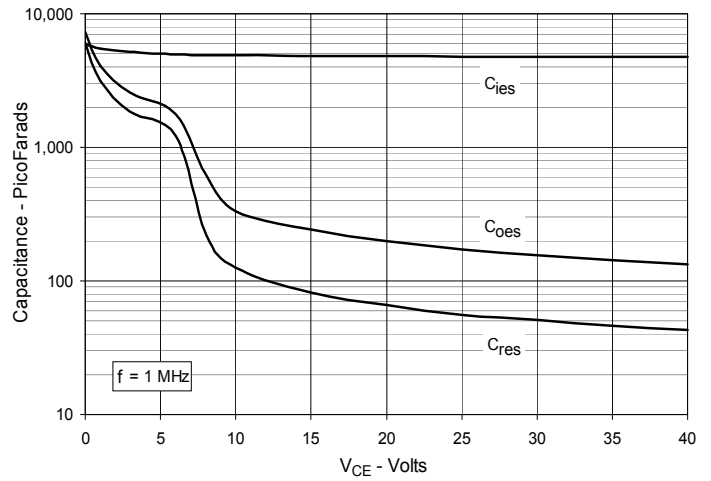
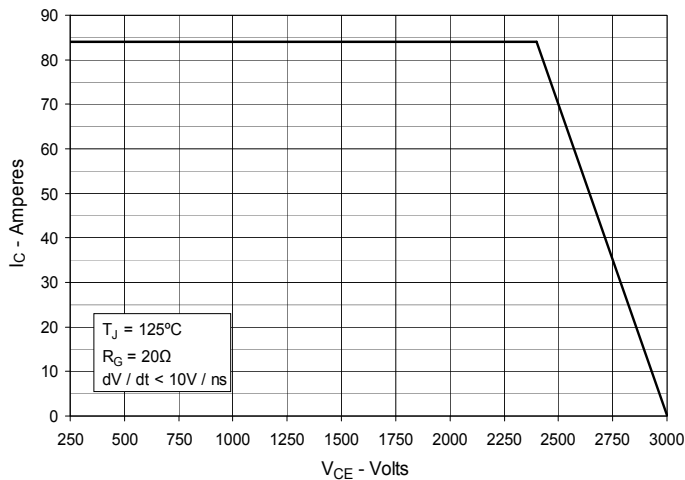
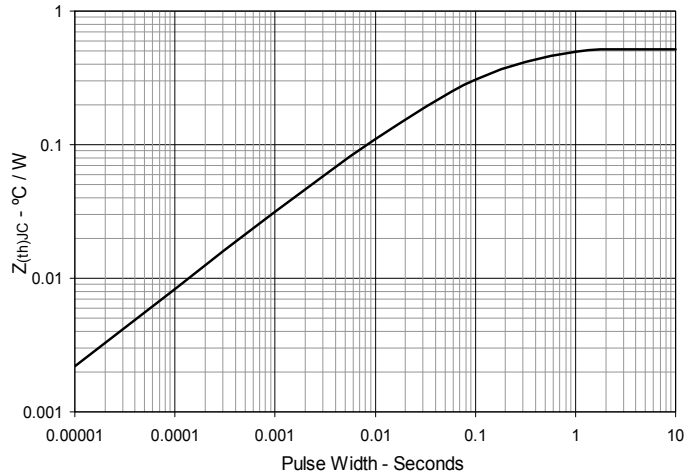


**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**

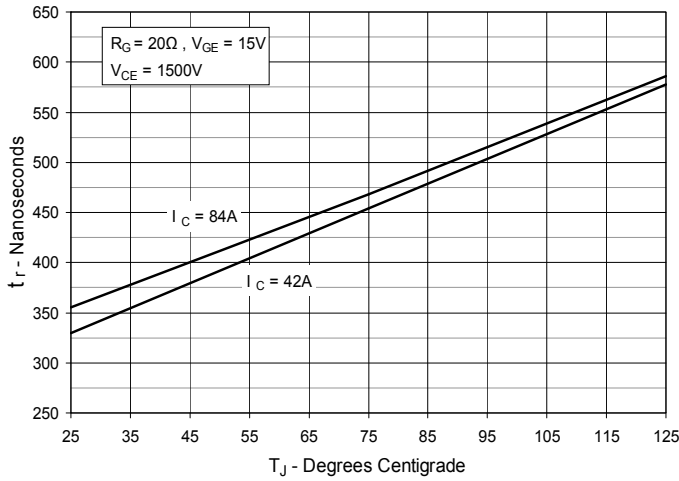


**Fig. 6. Input Admittance**

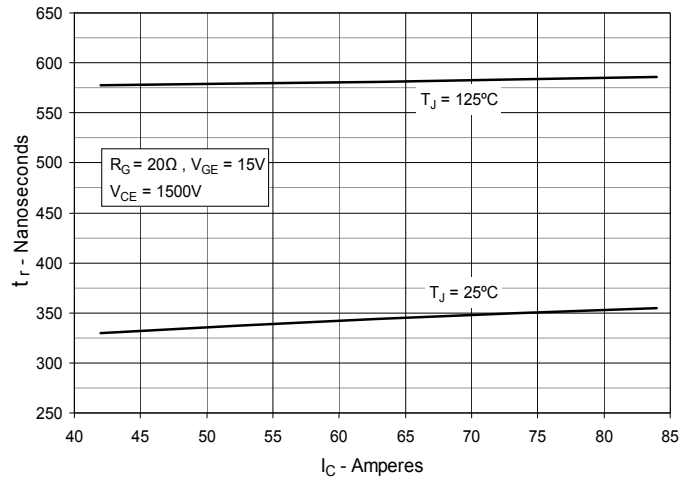


**Fig. 7. Transconductance**

**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**


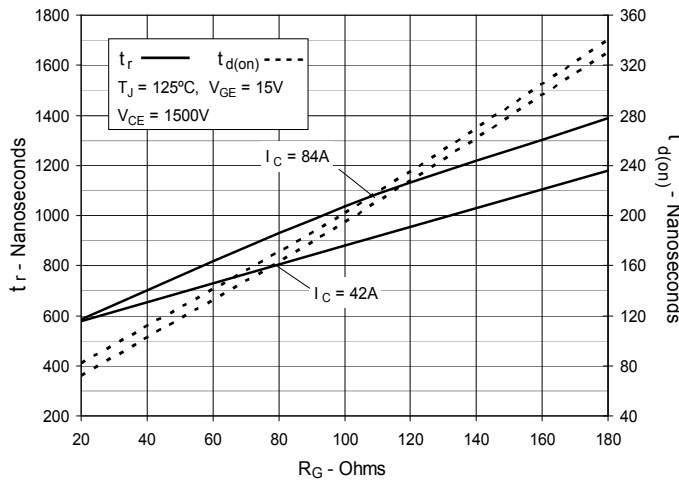
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**



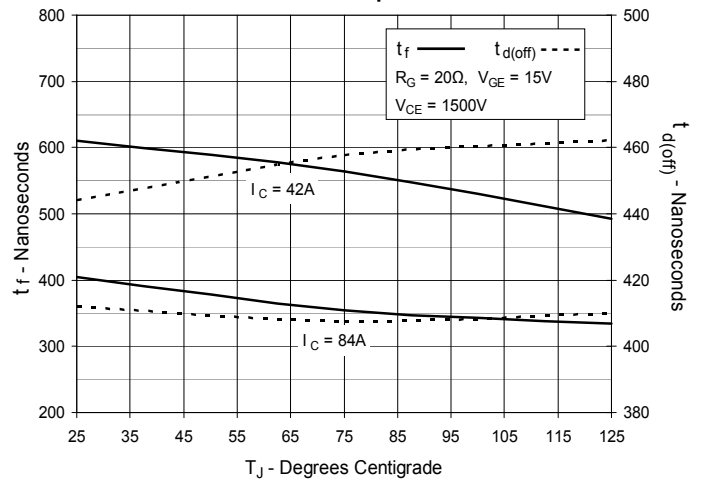
**Fig. 14. Resistive Turn-on Rise Time vs. Collector Current**



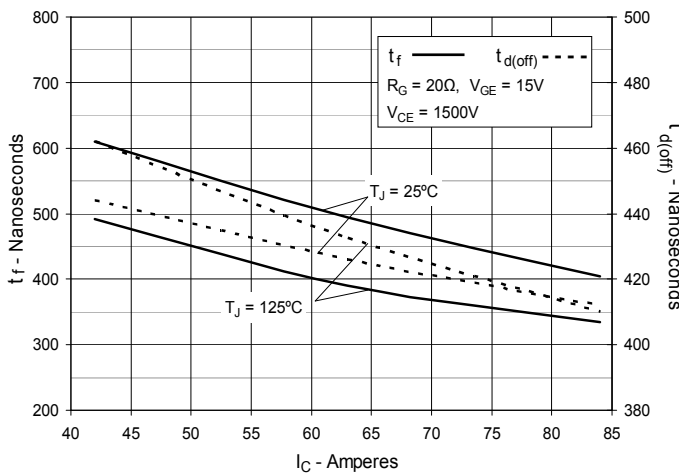
**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**



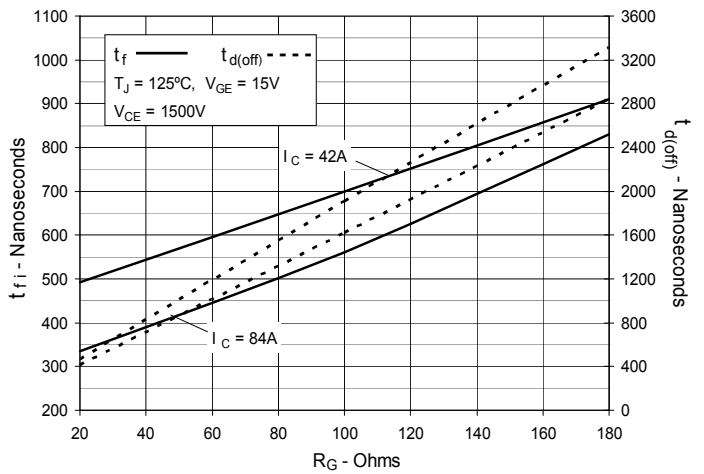
**Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature**



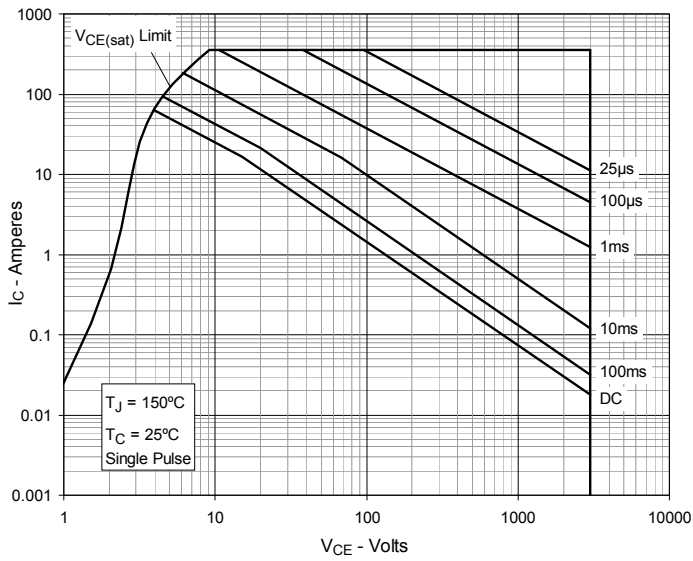
**Fig. 17. Resistive Turn-off Switching Times vs. Collector Current**



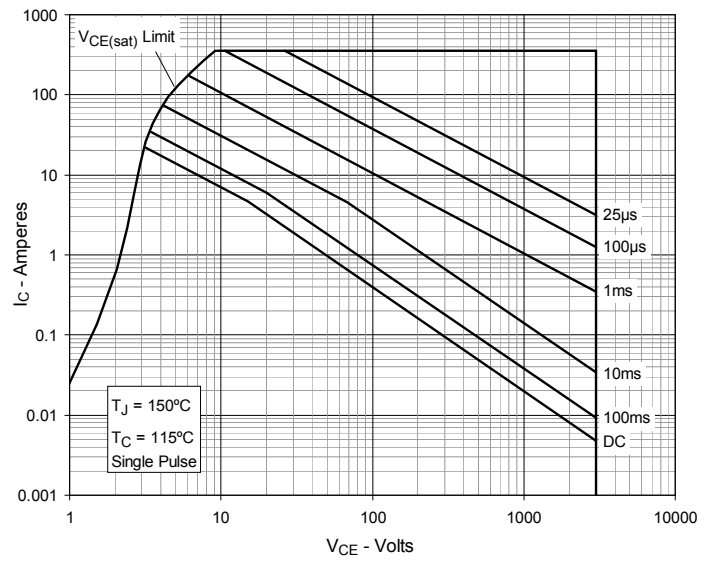
**Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance**



**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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