

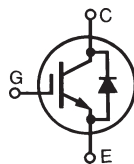
# High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

## IXBA12N300HV IXBT12N300HV

$$V_{CES} = 3000V$$

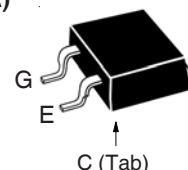
$$I_{C110} = 12A$$

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

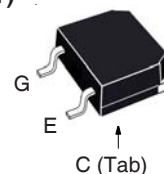


Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_C = 25^\circ C$ to $150^\circ C$	3000	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	3000	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$	30	A
$I_{C110}$	$T_C = 110^\circ C$	12	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	100	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 30\Omega$ Clamped Inductive Load	$I_{CM} = 98$ 1500	A V
$P_C$	$T_C = 25^\circ C$	160	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 (TO-263)	10..65 / 22..14.6	N/lb
<b>Weight</b>	TO-263	2.5	g
	TO-268	4.0	g

TO-263 (IXBA)



TO-268 (IXBT)



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

### Features

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

### Advantages

- Low Gate Drive Requirement
- High Power Density

### Applications:

- Switched-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
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	3.0		V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			25 $\mu A$ 1 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = 12A$ , $V_{GE} = 15V$ , Note 1 $T_J = 125^\circ C$		2.8	3.2 V
			3.5	V

### Symbol Test Conditions

( $T_J = 25^\circ\text{C}$  Unless Otherwise Specified)

### Characteristic Values

		Min.	Typ.	Max.	
$g_{fS}$	$I_C = 12\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	6.5	10.8		S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		1290		pF
$C_{oes}$			56		pF
$C_{res}$			19		pF
$Q_g$	$I_C = 12\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$		62		nC
$Q_{ge}$			13		nC
$Q_{gc}$			8.5		nC
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 12\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 10\Omega$		64		ns
$t_r$			140		ns
$t_{d(off)}$			180		ns
$t_f$			540		ns
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 12\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 10\Omega$		65		ns
$t_r$			395		ns
$t_{d(off)}$			175		ns
$t_f$			530		ns
$R_{thJC}$				0.78	$^\circ\text{C/W}$

### Reverse Diode

### Symbol Test Conditions

( $T_J = 25^\circ\text{C}$  Unless Otherwise Specified)

### Characteristic Values

		Min.	Typ.	Max.	
$V_F$	$I_F = 12\text{A}, V_{GE} = 0\text{V}$			2.1	V
$t_{rr}$	$I_F = 6\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$		1.4		$\mu\text{s}$
$I_{RM}$		$V_R = 100\text{V}, V_{GE} = 0\text{V}$		21	

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

### ADVANCE TECHNICAL INFORMATION

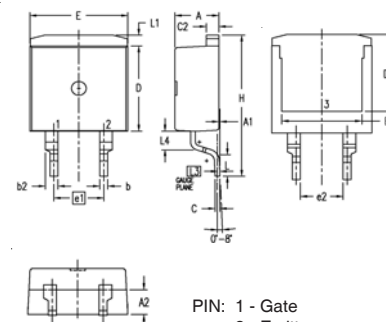
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test 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	

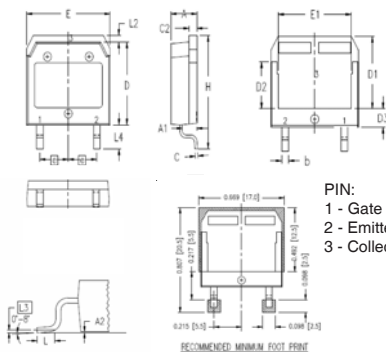
### TO-263 (VHV) Outline



PIN: 1 - Gate  
2 - Emitter  
3 - Collector

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	.054	1.18	1.38
C	.018	.024	0.45	0.60
C2	.049	.055	1.25	1.40
D	.354	.370	9.00	9.40
D1	.311	.327	7.90	8.30
E	.386	.402	9.80	10.20
E1	.307	.323	7.80	8.20
e1	.200 BSC		5.08 BSC	
(e2)	.163	.174	4.13	4.43
H	.591	.614	15.00	15.60
L	.079	.102	2.00	2.60
L1	.039	.055	1.00	1.40
L3	.010 BSC		0.254 BSC	
(L4)	.071	.087	1.80	2.20

### TO-268 (VHV) Outline



PIN:  
1 - Gate  
2 - Emitter  
3 - Collector

SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.465	.476	11.80	12.10
D2	.295	.307	7.50	7.80
D3	.114	.126	2.90	3.20
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
(e)	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.067	.079	1.70	2.00
L2	.039	.045	1.00	1.15
(L3)	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

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

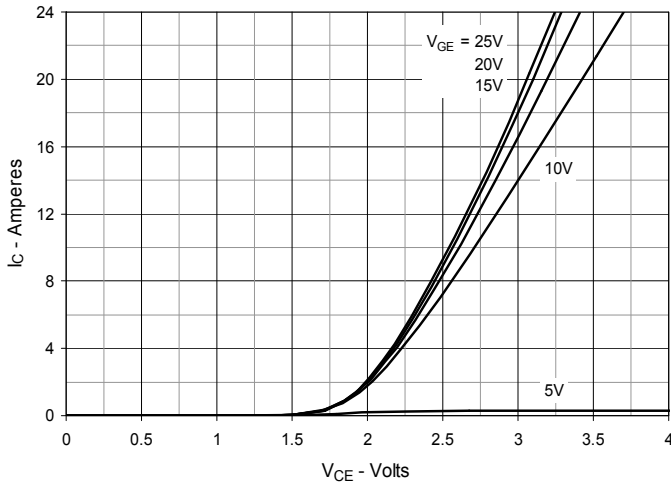


Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$

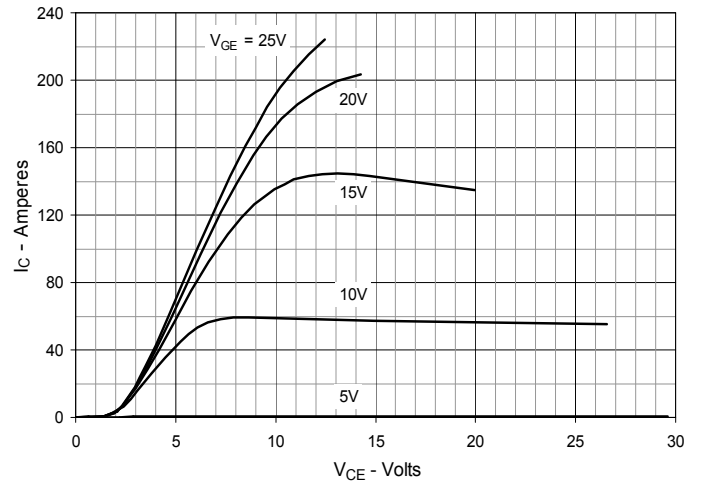


Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$

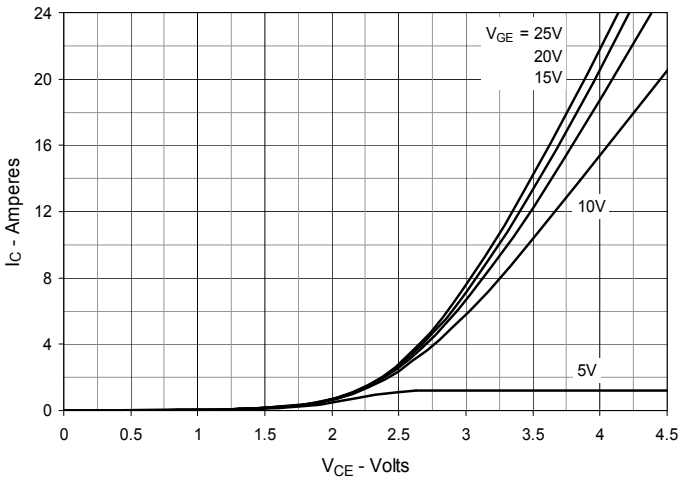


Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature

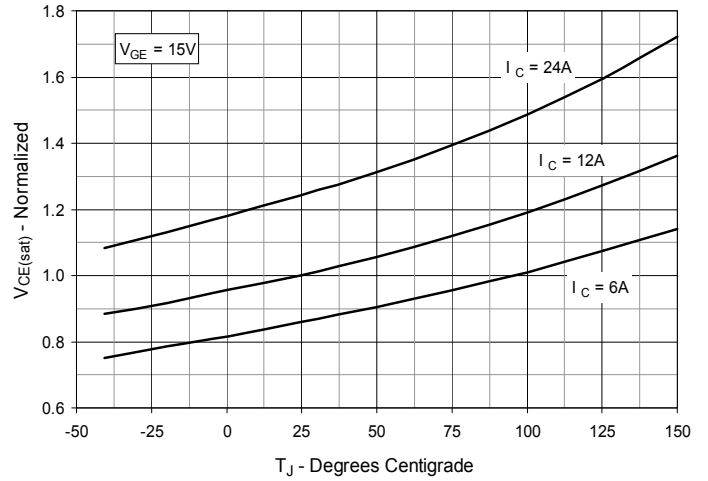


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

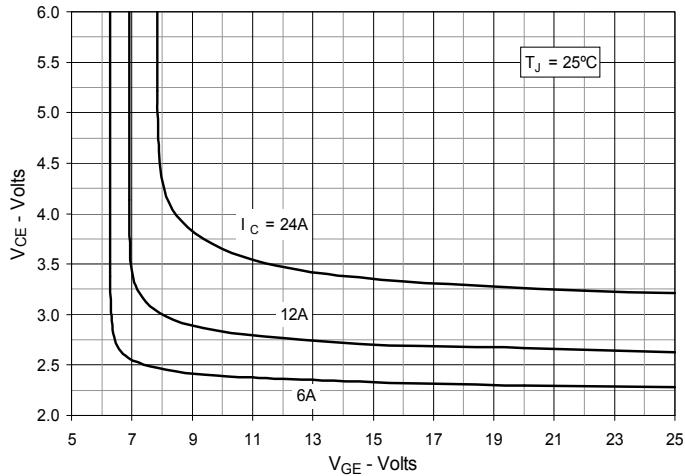


Fig. 6. Input Admittance

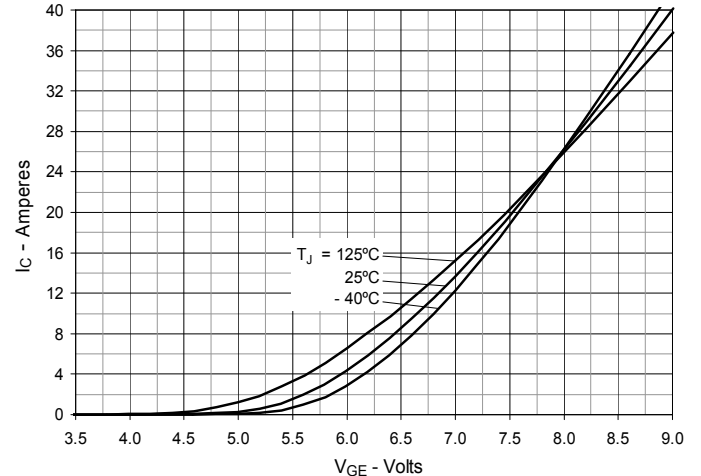


Fig. 7. Transconductance

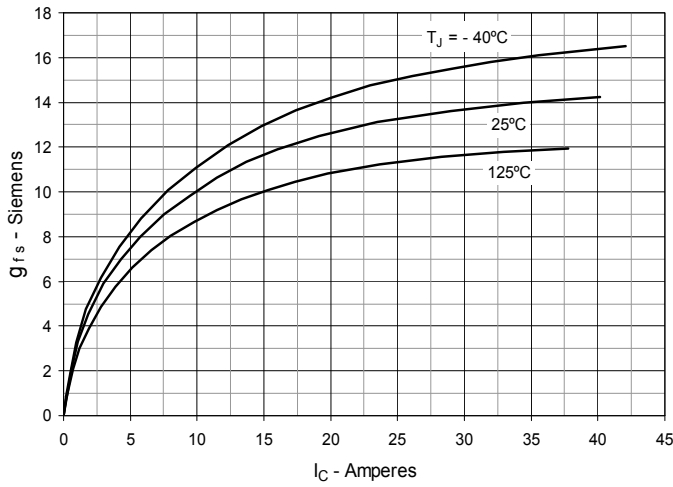


Fig. 8. Forward Voltage Drop of Intrinsic Diode

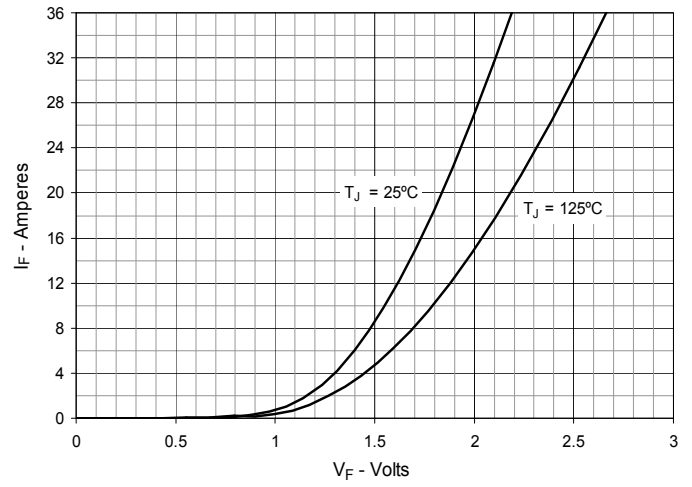


Fig. 9. Gate Charge

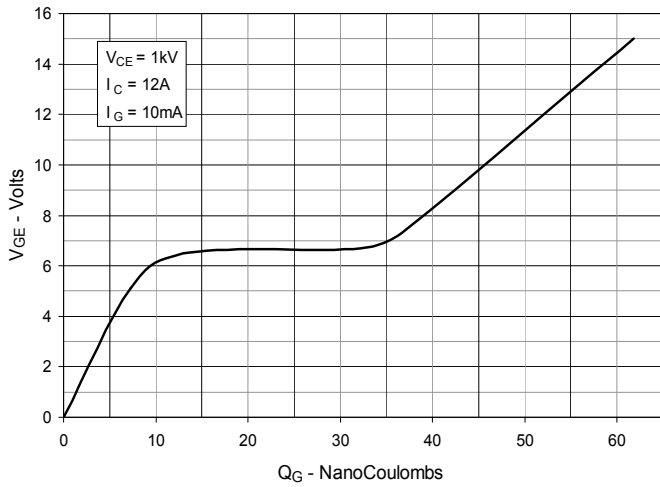


Fig. 10. Capacitance

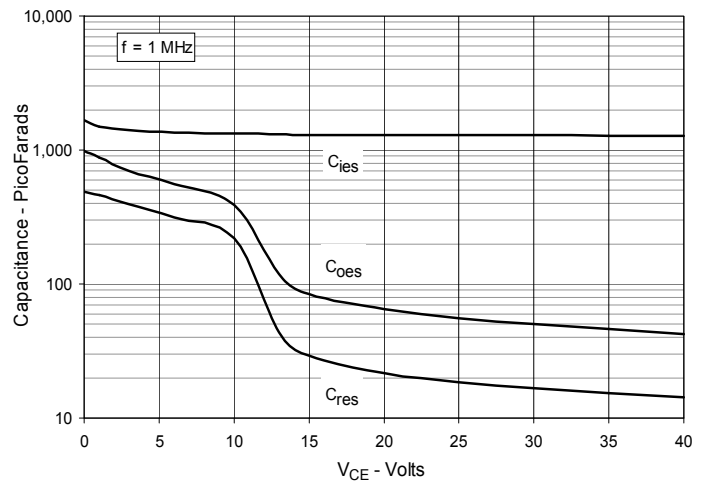


Fig. 11. Reverse-Bias Safe Operating Area

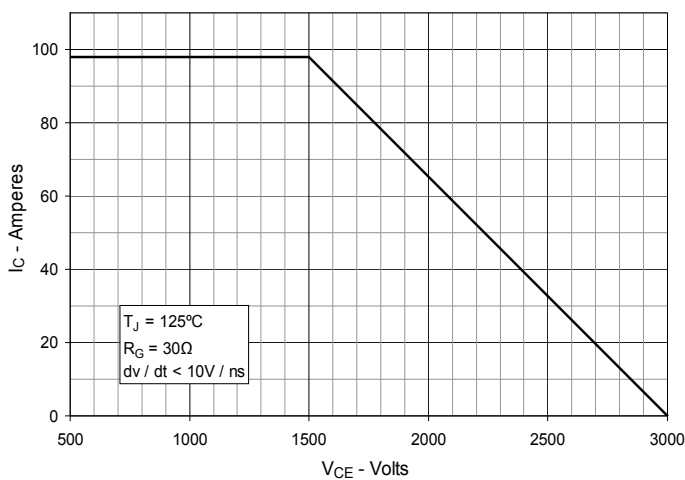
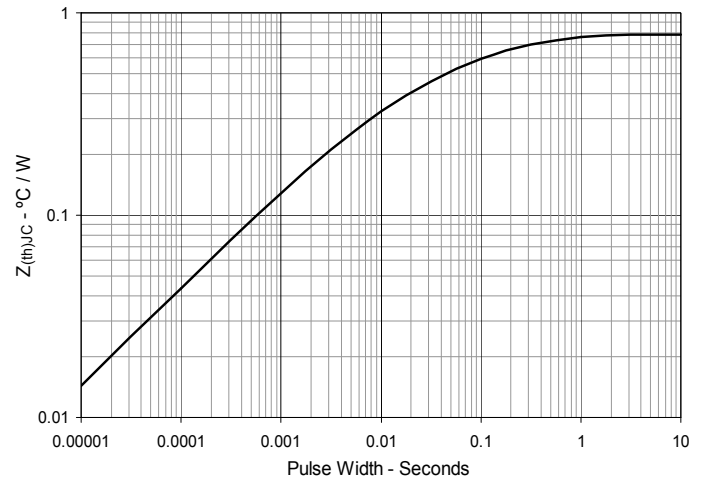
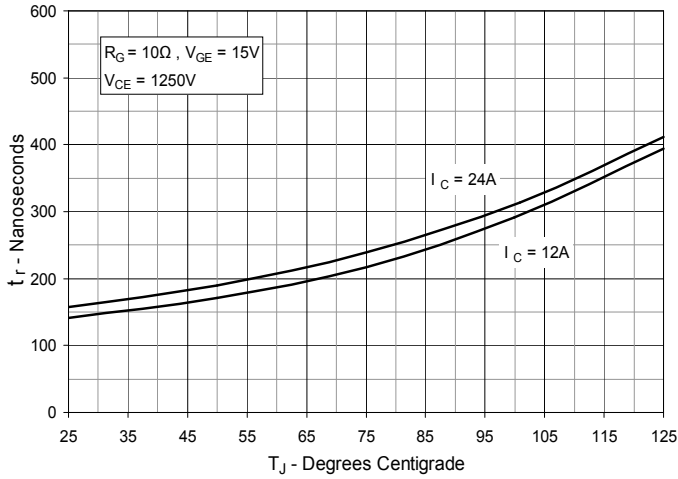


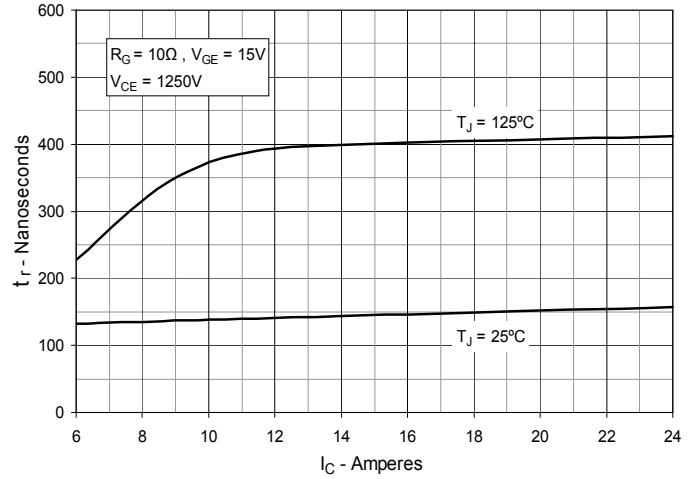
Fig. 12. Maximum Transient Thermal Impedance



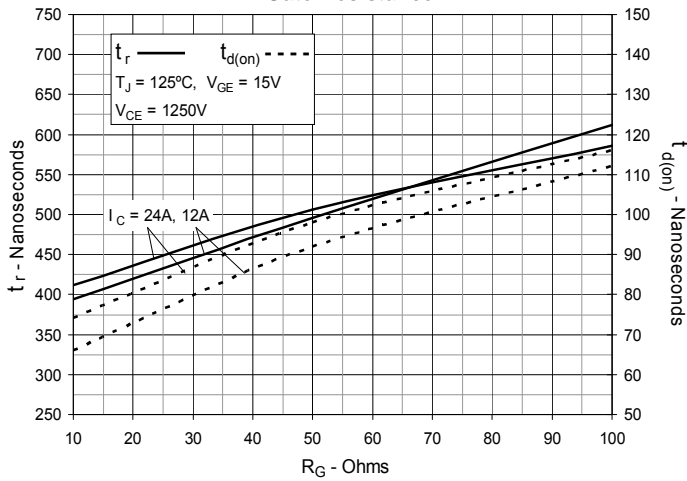
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**



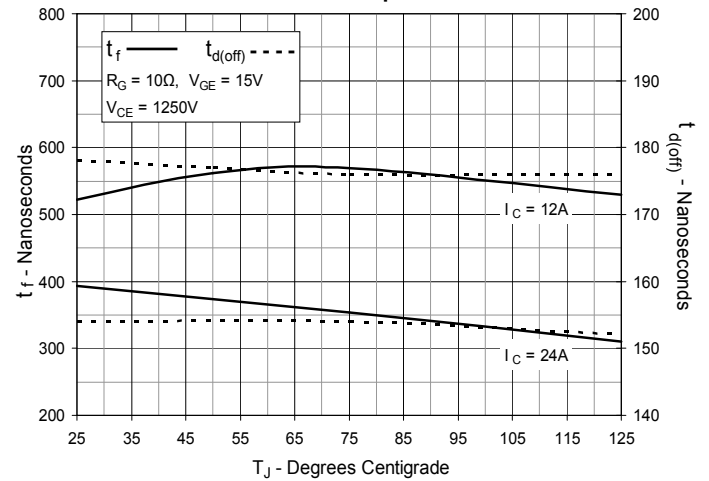
**Fig. 14. Resistive Turn-on Rise Time vs. Collector Current**



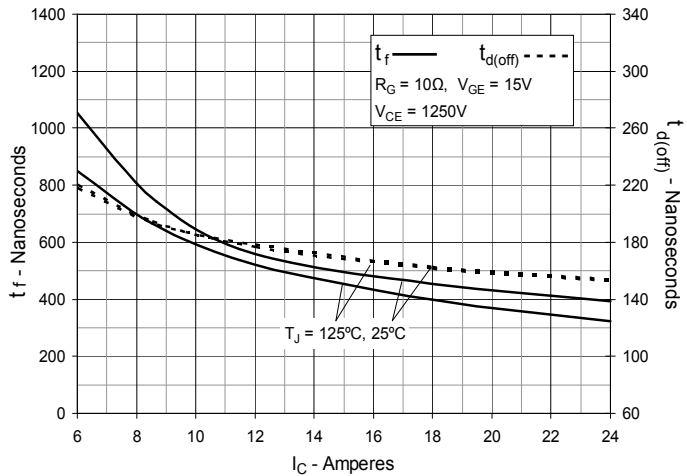
**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**



**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**

