

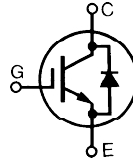
**High Voltage, High Gain  
BIMOSFET™ Monolithic  
Bipolar MOS Transistor**

**IXBT20N300HV**

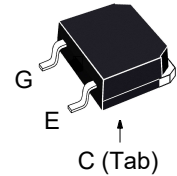
$V_{CES} = 3000V$

$I_{C110} = 20A$

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



**TO-268HV**



G = Gate      C = Collector  
E = Emitter    Tab = 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
$I_{C25}$	$T_C = 25^\circ C$	50	A
$I_{C110}$	$T_C = 110^\circ C$	20	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	$I_{CM} = 130$ 1500	A V
$P_C$	$T_C = 25^\circ C$	250	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$T_{SOLD}$	Plastic Body for 10s	260	$^\circ C$
<b>Weight</b>		4	g

**Features**

- High Voltage Package
- High Blocking Voltage
- 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.
$BV_{CES}$	$I_C = 250\mu A$ , $V_{GE} = 0V$	3000		V
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	2.5		5.0 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			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	3.2 V V

Symbol Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 20\text{A}, V_{CE} = 10\text{V}$ , 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
$R_{thJC}$			0.50	$^\circ\text{C/W}$

**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
$t_{rr}$	$I_F = 10\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}, V_{GE} = 0\text{V}$		1.35	$\mu\text{s}$
$I_{RM}$			30	A

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

Littelfuse 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 @  $T_J = 25^\circ\text{C}$

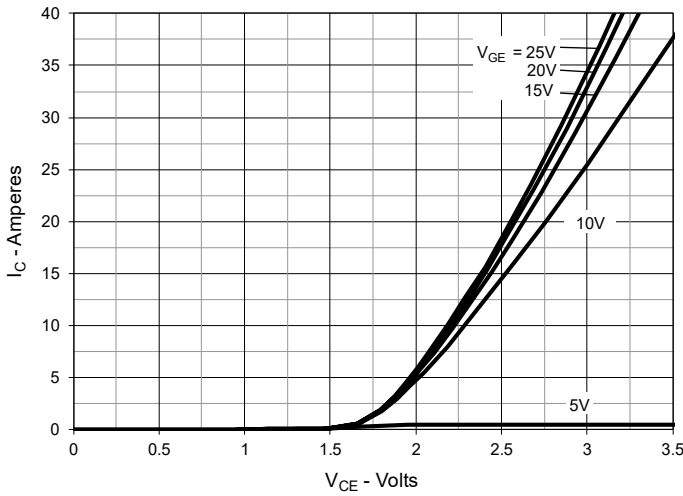


Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$

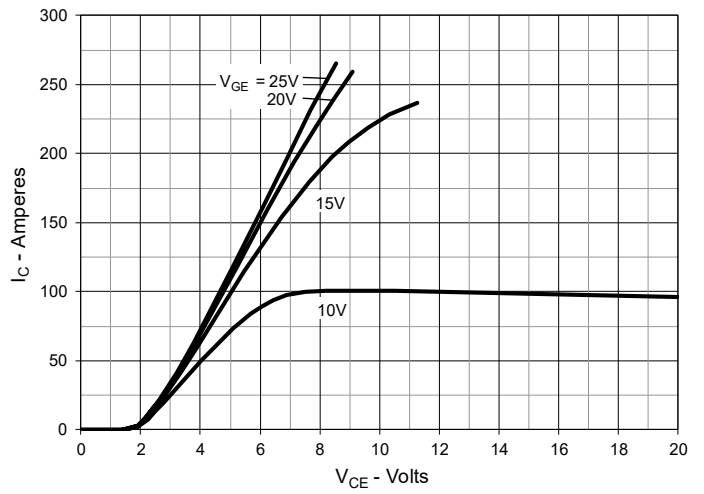


Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$

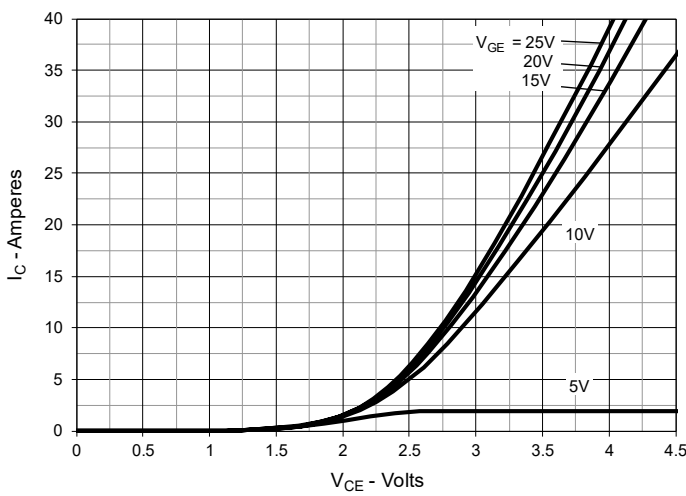


Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature

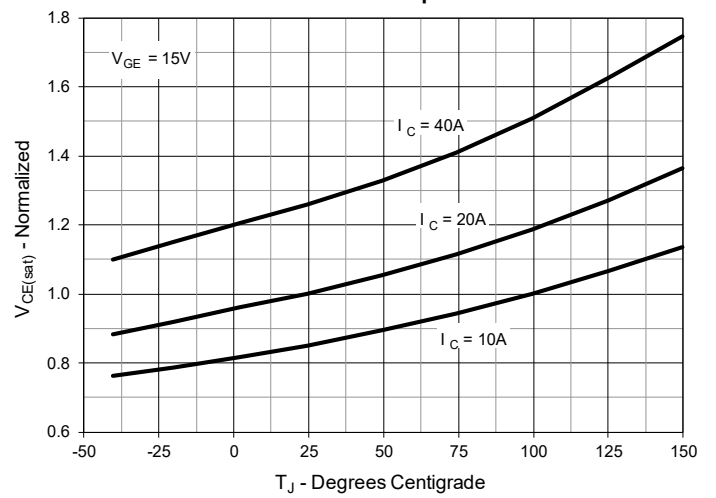


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

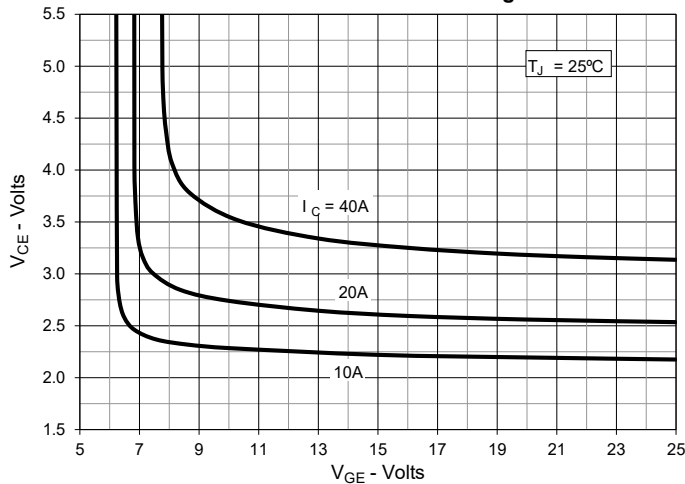


Fig. 6. Input Admittance

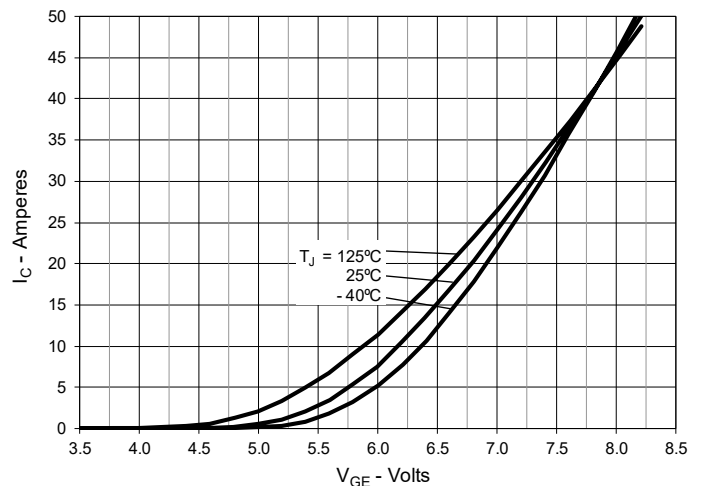


Fig. 7. Transconductance

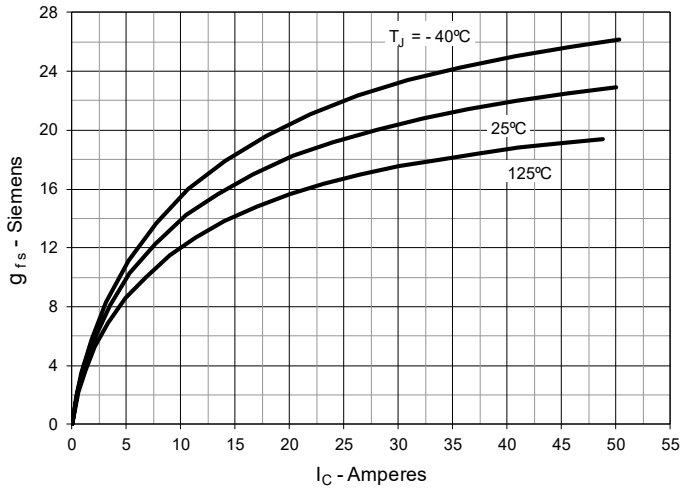


Fig. 8. Forward Voltage Drop of Intrinsic Diode

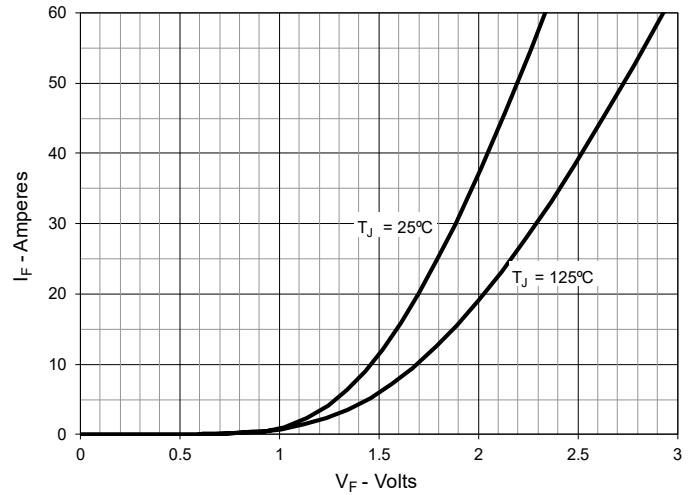


Fig. 9. Gate Charge

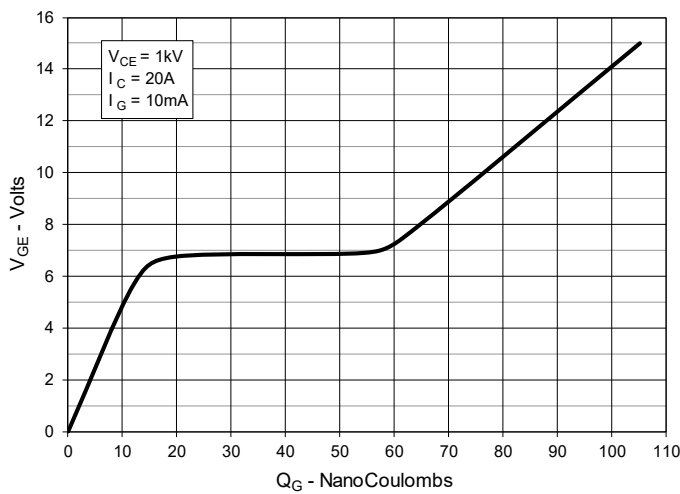


Fig. 10. Capacitance

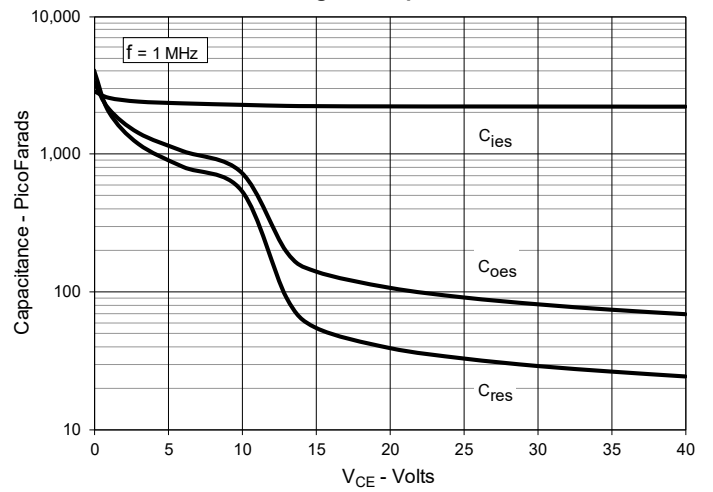


Fig. 11. Reverse-Bias Safe Operating Area

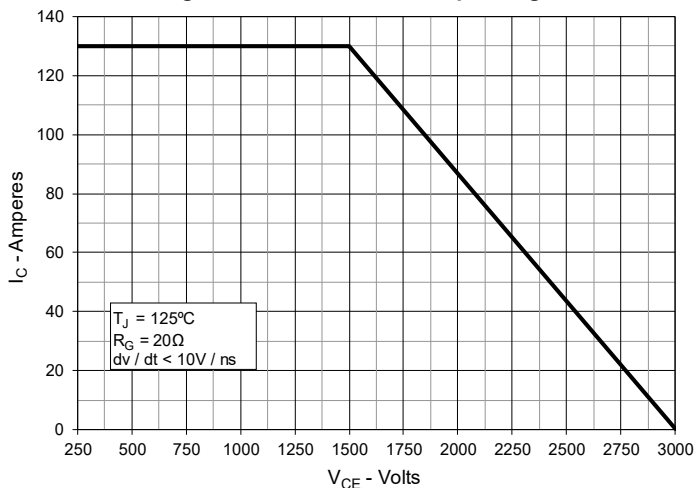


Fig. 12. Maximum Transient Thermal Impedance

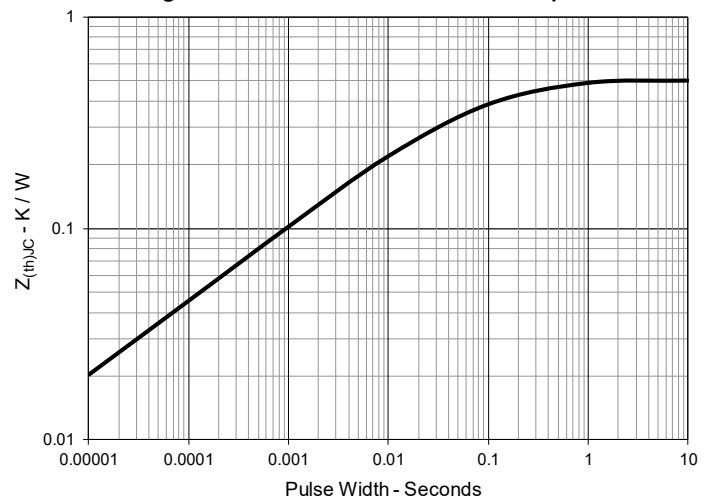


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

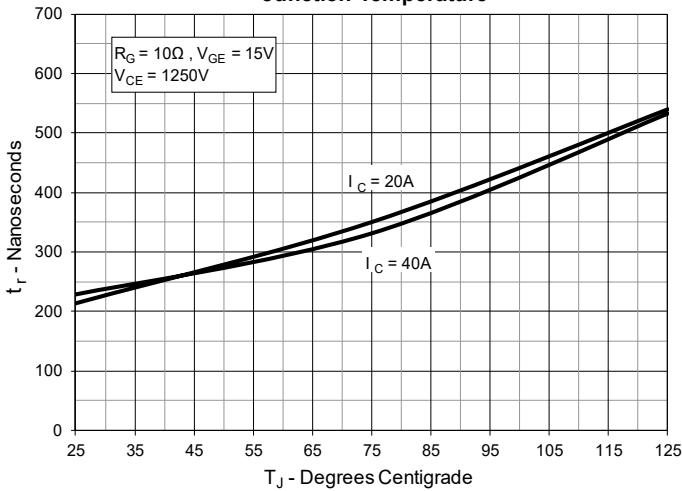


Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

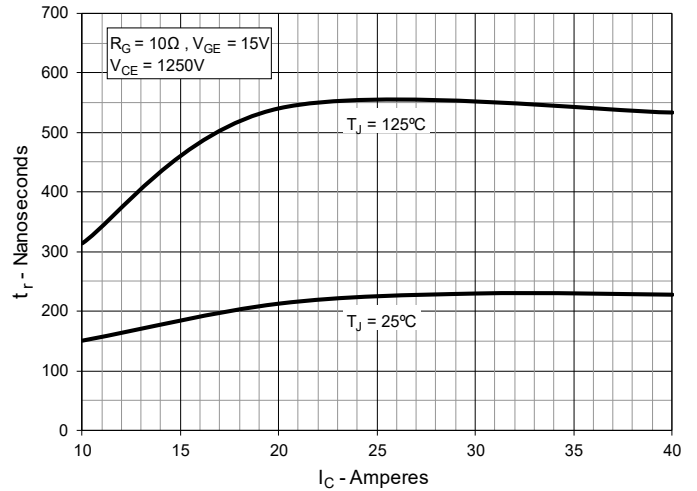


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

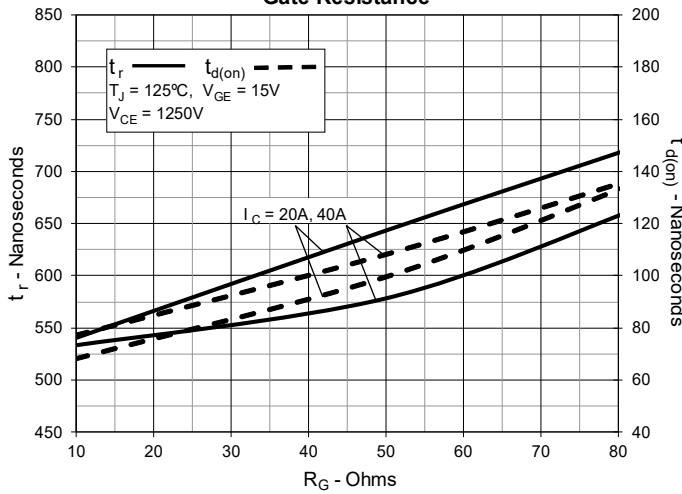


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

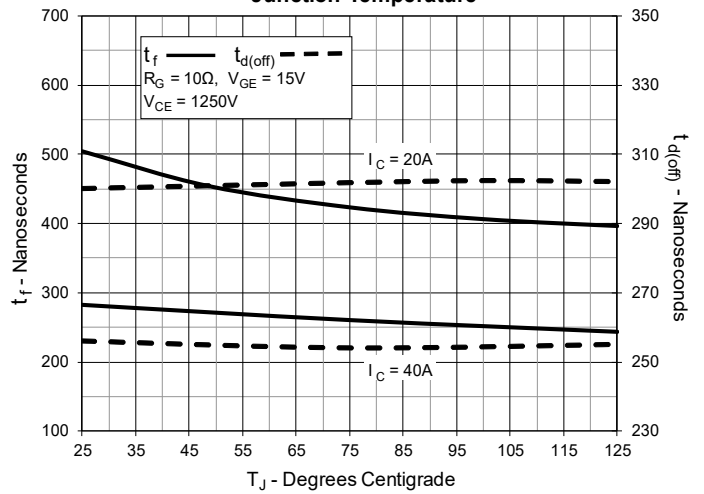


Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

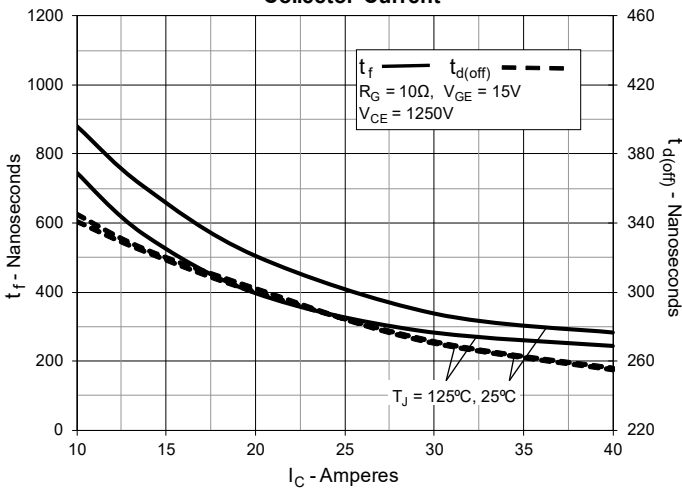
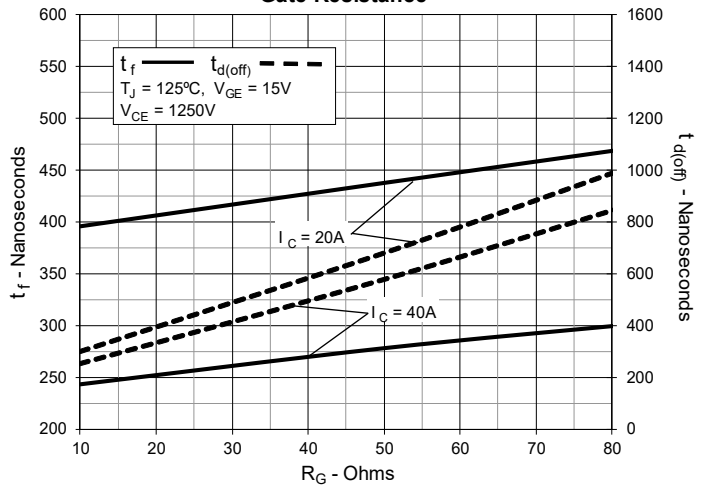
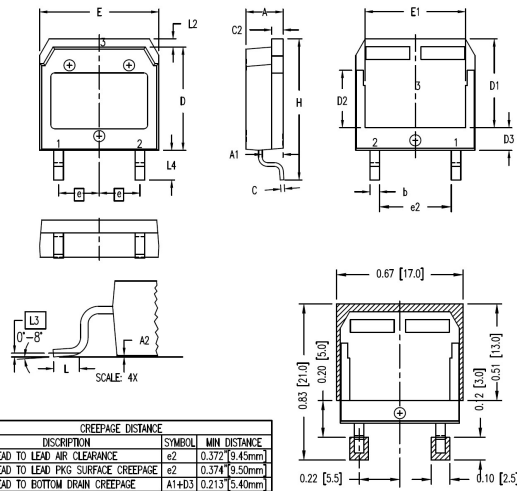


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



TO-268HV Outline



- 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
<u>e</u>	.215	BSC	5.45	BSC
(e2)	.374	.386	9.50	9.80
H	.736	.752	18.70	19.10
L	.067	.079	1.70	2.00
L2	.039	.045	1.00	1.15
<u>L3</u>	.010	BSC	0.25	BSC
L4	.150	.161	3.80	4.10