

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

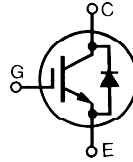
## IXBF32N300

$$V_{CES} = 3000V$$

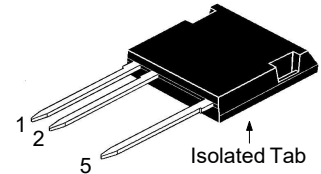
$$I_{C90} = 22A$$

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

(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
$I_{C25}$	$T_C = 25^\circ C$	40	A
$I_{C90}$	$T_C = 90^\circ C$	22	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	250	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 10\Omega$ Clamped Inductive Load	$I_{CM} = 80$ $V_{CES} \leq 2400$	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	$^\circ C$
$T_L$	Maximum Lead Temperature for Soldering 1.6 mm (0.062 in.) from Case for 10s	300	$^\circ C$
$F_C$	Mounting Force	20..120 / 4.5..27	Nm/lb.in.
$V_{ISOL}$	50/60Hz, 1 Minute	3000	V
<b>Weight</b>		5	g

### Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 3000V Electrical Isolation
- High Blocking Voltage
- International Standard Package
- 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
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	2.5		5.0 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$ Note 2, $T_J = 125^\circ C$			50 $\mu A$ 2 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = 32A$ , $V_{GE} = 15V$ , Note 1 $T_J = 125^\circ C$		2.8 3.5	3.2 V V

Symbol Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 32\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	16	26	S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		3140	pF
$C_{oes}$			124	pF
$C_{res}$			40	pF
$Q_g$	$I_C = 32\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$		142	nC
$Q_{ge}$			20	nC
$Q_{gc}$			57	nC
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 32\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 2\Omega$		50	ns
$t_r$			185	ns
$t_{d(off)}$			160	ns
$t_f$			720	ns
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 32\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 2\Omega$		58	ns
$t_r$			515	ns
$t_{d(off)}$			165	ns
$t_f$			630	ns
$R_{thJC}$			0.78	$^\circ\text{C/W}$
$R_{thCS}$		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.
$V_F$	$I_F = 32\text{A}, V_{GE} = 0\text{V}$			2.1 V
$t_{rr}$	$I_F = 16\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}, V_{GE} = 0\text{V}$		1.5	$\mu\text{s}$
$I_{RM}$			33	A

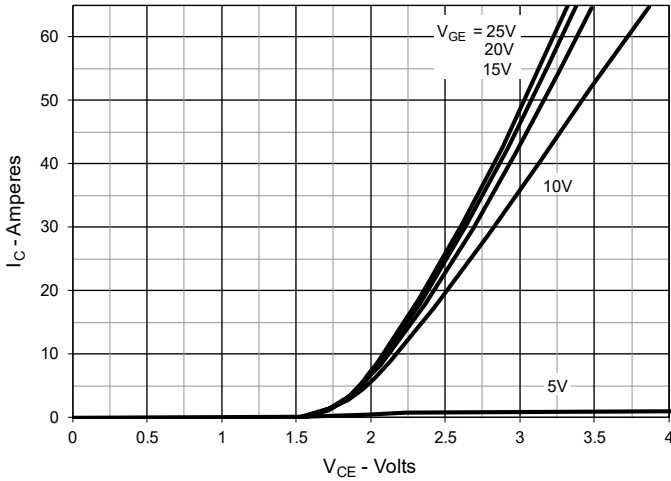
### Notes:

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

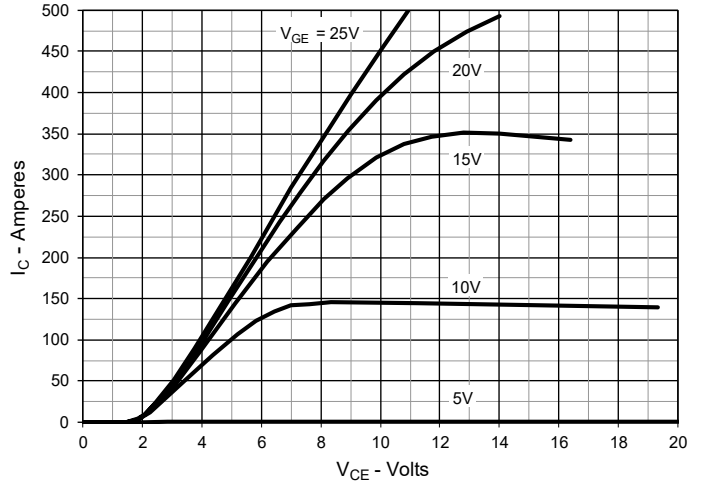
Littelfuse reserves the right to change limits, test conditions and dimensions.

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
	4,850,072	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	

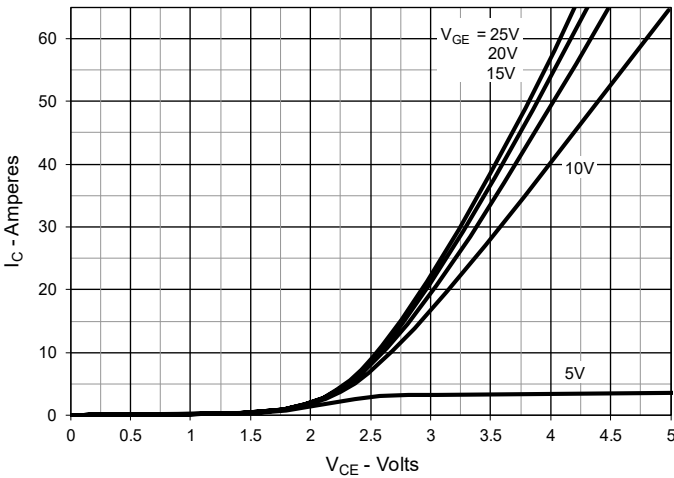
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



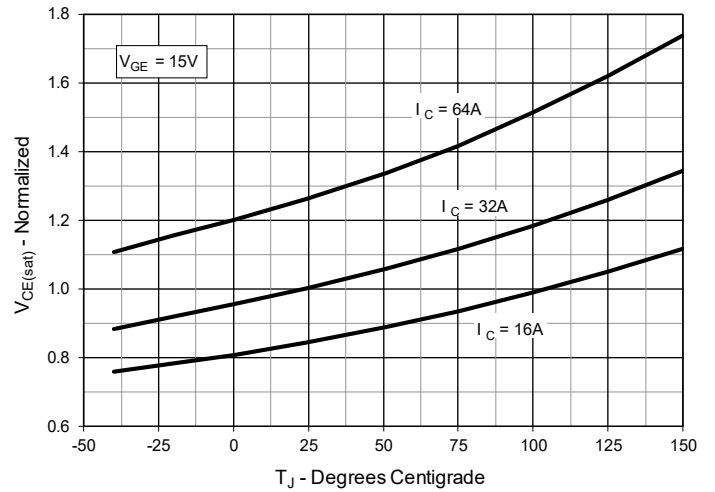
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



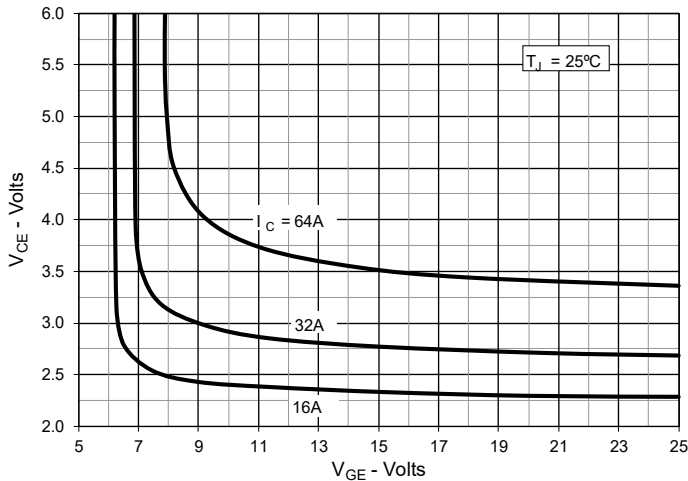
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



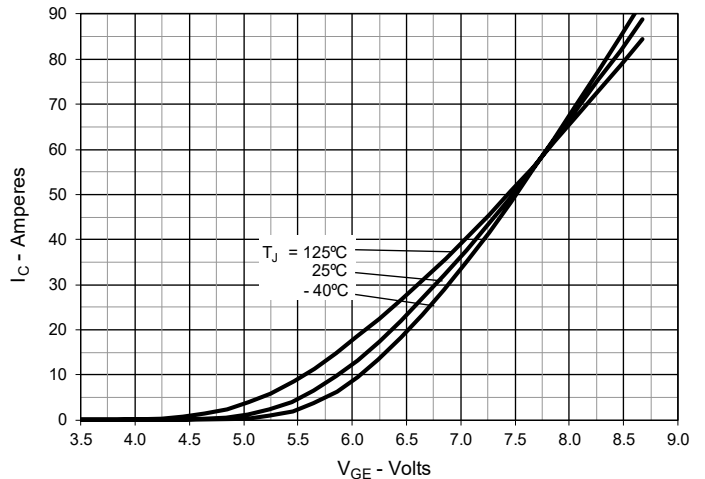
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**



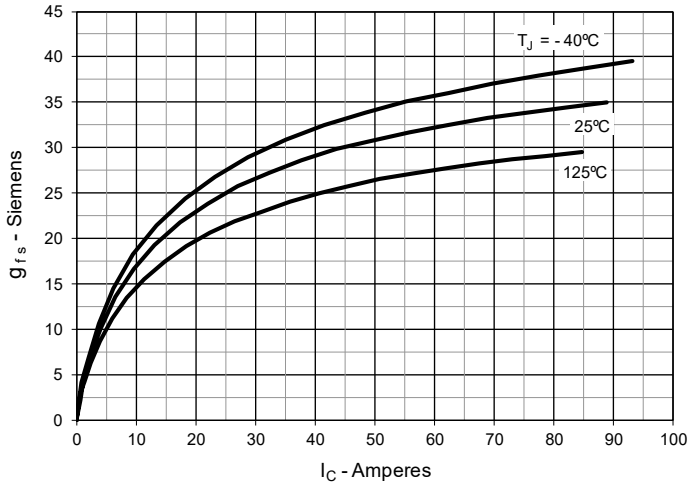
**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**



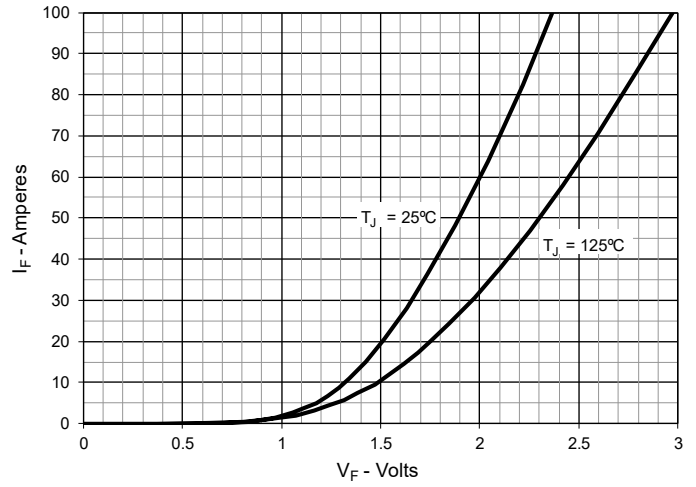
**Fig. 6. Input Admittance**



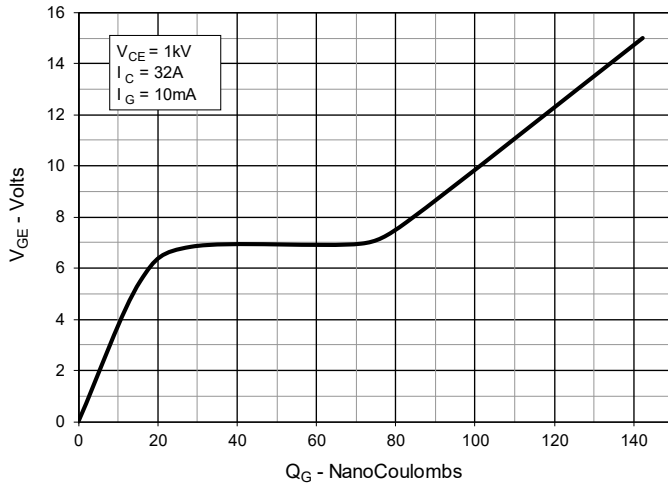
**Fig. 7. Transconductance**



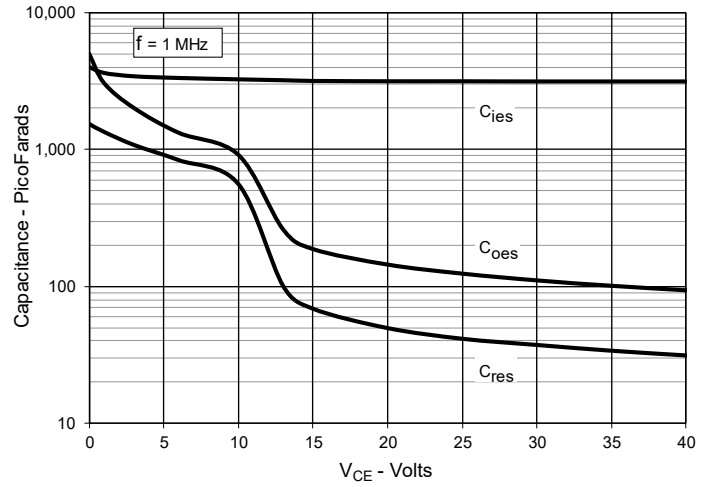
**Fig. 8. Forward Voltage Drop of Intrinsic Diode**



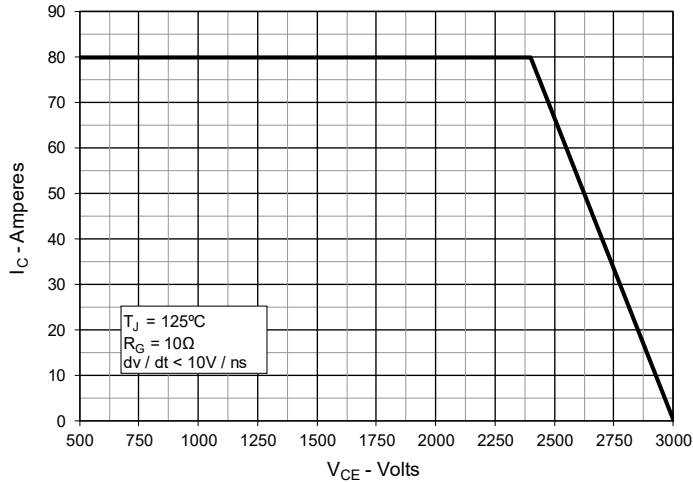
**Fig. 9. Gate Charge**



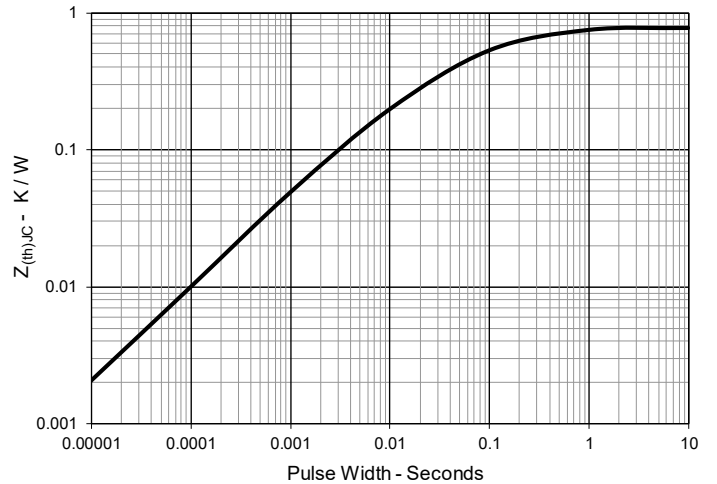
**Fig. 10. Capacitance**

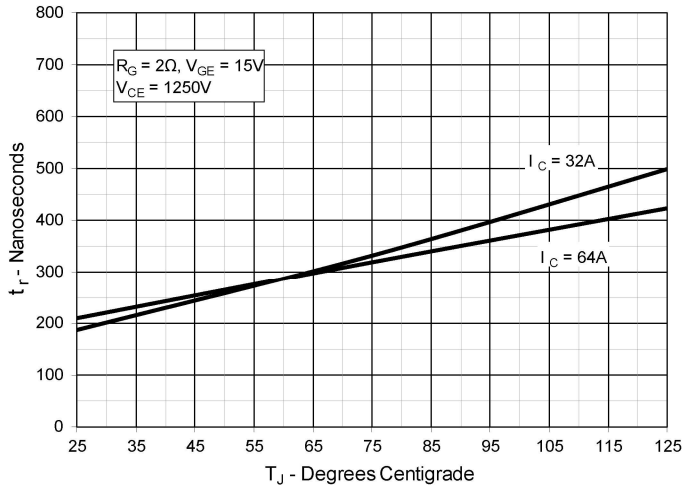
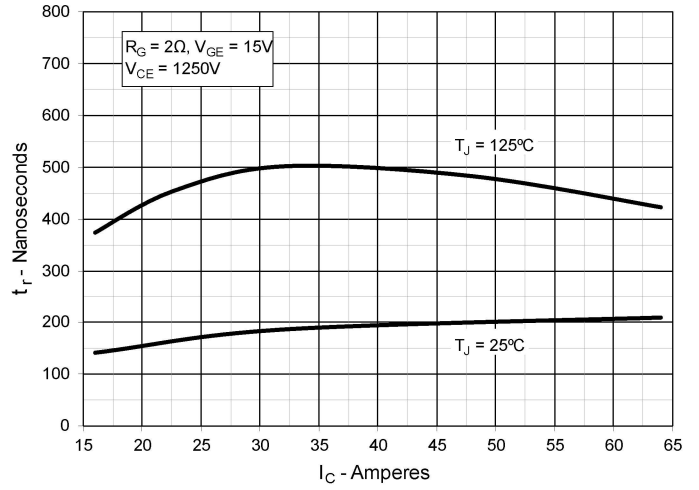
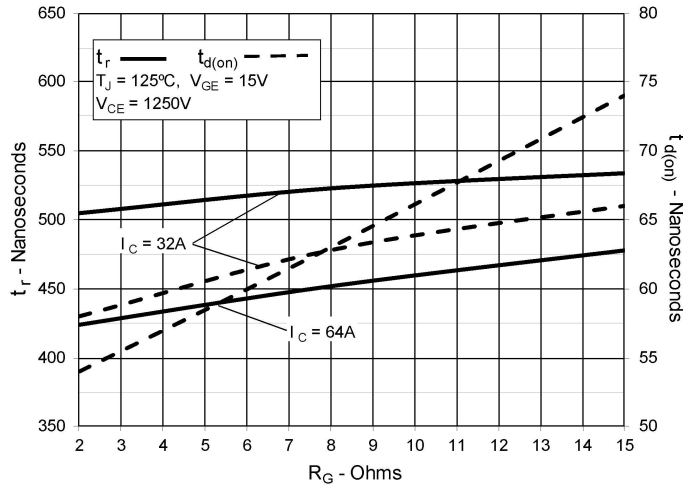
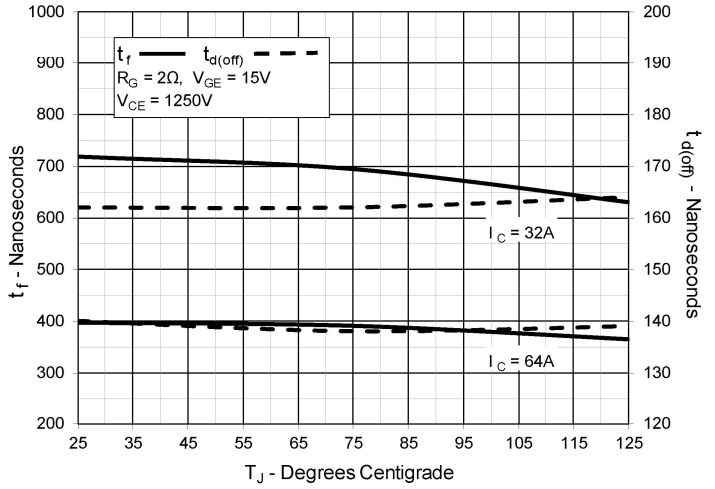
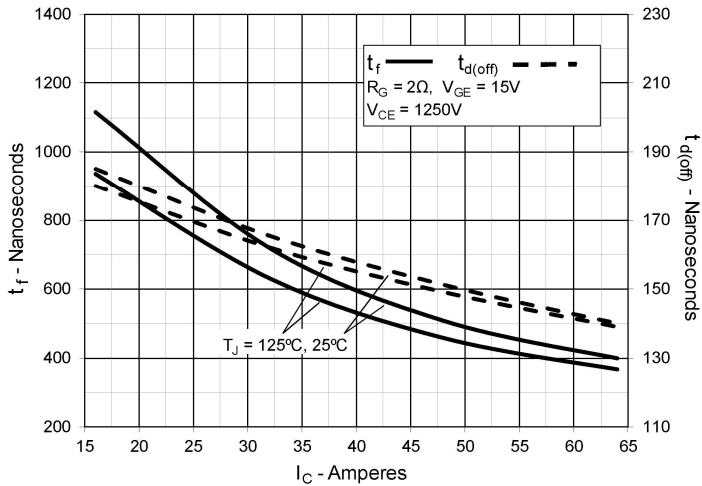
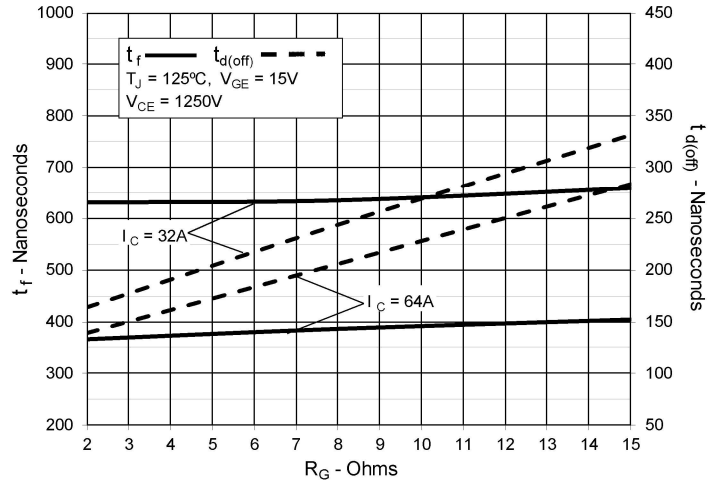


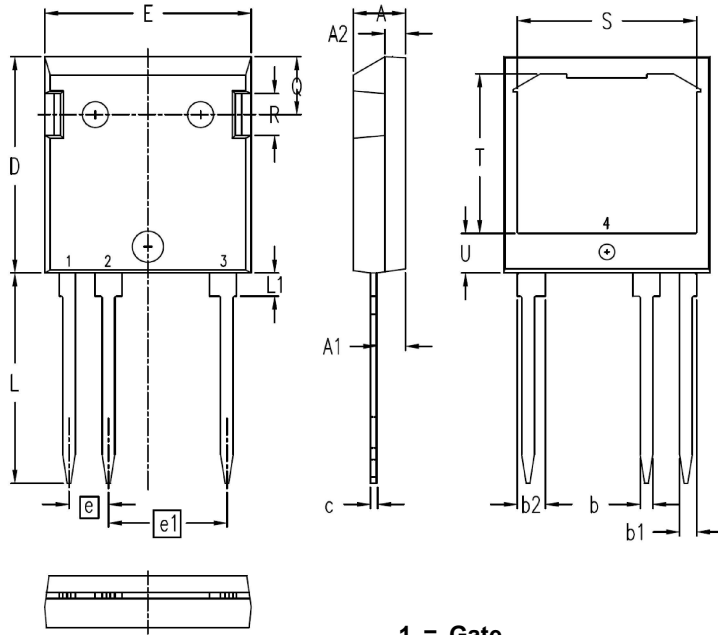
**Fig. 11. Reverse-Bias Safe Operating Area**



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



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

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

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


**ISOPLUS i4-Pak Outline**


**1 = Gate**  
**2 = Emitter**  
**3,4 = Colector**

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.075	.083	1.90	2.10
b	.047	.055	1.20	1.40
b1	.061	.069	1.55	1.75
b2	.087	.094	2.20	2.40
c	.020	.029	0.51	0.74
D	.819	.846	20.80	21.50
E	.768	.799	19.50	20.30
e	.150 BSC		3.81 BSC	
e1	.450 BSC		11.43 BSC	
L	.780	.838	19.80	21.30
L1	.083	.094	2.10	2.40
Q	.213	.236	5.40	6.00
R	.157	.169	4.00	4.30
S	.673	.685	17.10	17.40
T	.602	.614	15.30	15.60
U	.142	.154	3.60	3.90