

High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

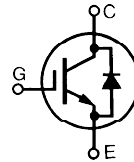
IXBF20N300

$$V_{CES} = 3000V$$

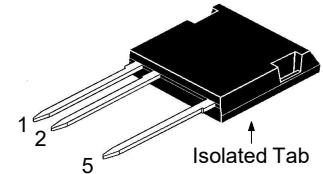
$$I_{C110} = 14A$$

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

(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	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$	34	A
I_{C110}	$T_C = 110^\circ C$	14	A
I_{CM}	$T_C = 25^\circ C$, 1ms	150	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 20\Omega$ Clamped Inductive Load	$I_{CM} = 130$	A
		1500	V
P_C	$T_C = 25^\circ C$	150	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	4000	V~
Weight		5	g

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 4000V~ Electrical Isolation
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage

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}	$V_{CE} = 0.8 \cdot V_{CES}$, $V_{GE} = 0V$ Note 2, $T_J = 125^\circ C$			35 μA 1.5 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 20A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$		2.7	3.2 V
			3.2	V

Symbol Test Conditions

(T_J = 25°C Unless Otherwise Specified)

Characteristic Values

Min.

Typ.

Max.

g_{fs}	I_C = 20A, V_{CE} = 10V, Note 1	11	18	S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		2230	pF
C_{oes}			92	pF
C_{res}			33	pF
Q_g	I_C = 20A, V_{GE} = 15V, V_{CE} = 1000V		105	nC
Q_{ge}			13	nC
Q_{gc}			45	nC
t_{d(on)}	Resistive Switching Times, T_J = 25°C		64	ns
t_r			210	ns
t_{d(off)}			300	ns
t_f			504	ns
t_{d(on)}	Resistive Switching Times, T_J = 125°C		68	ns
t_r			540	ns
t_{d(off)}			300	ns
t_f			395	ns
R_{thJC}			0.15	0.83 °C/W
R_{thCS}				°C/W

Reverse Diode

Symbol Test Conditions

(T_J = 25°C Unless Otherwise Specified)

Characteristic Values

Min.

Typ.

Max.

V_F	I_F = 20A, V_{GE} = 0V		2.1	V
t_{rr}	I_F = 10A, V_{GE} = 0V, -di_F/dt = 100A/μs V_R = 100V, V_{GE} = 0V		1.35	μs
I_{RM}			30	A

Notes:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 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
4,860,072	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	

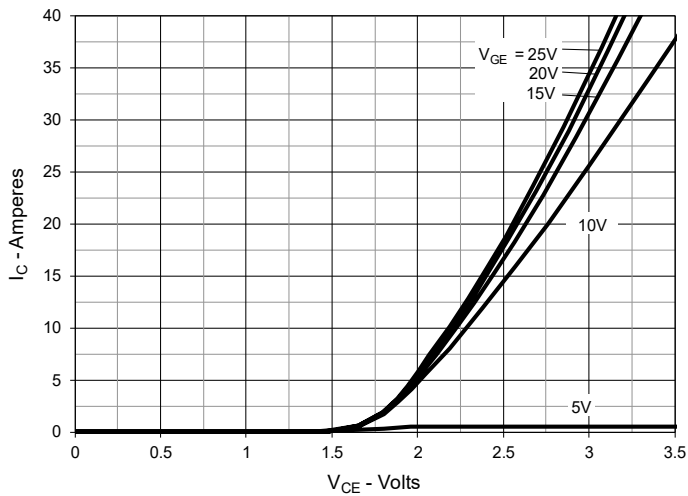
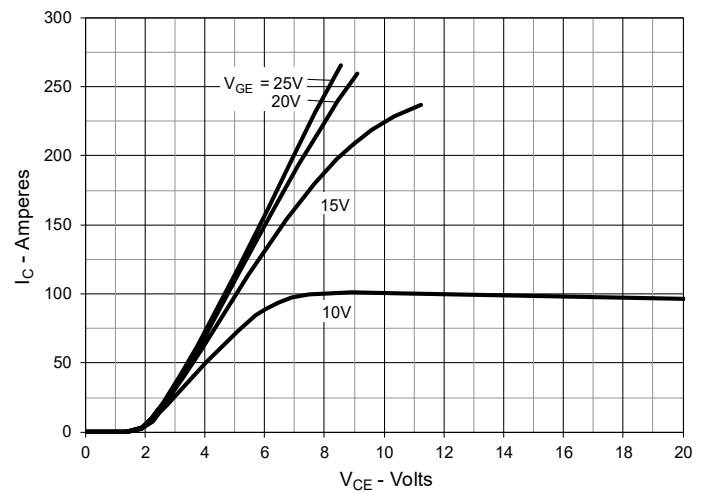
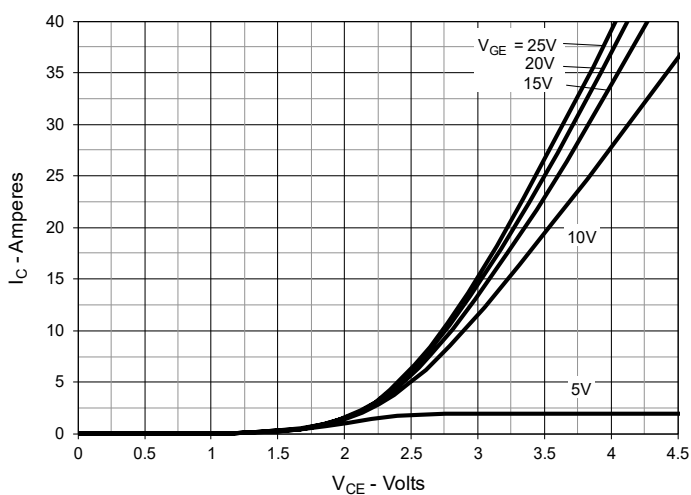
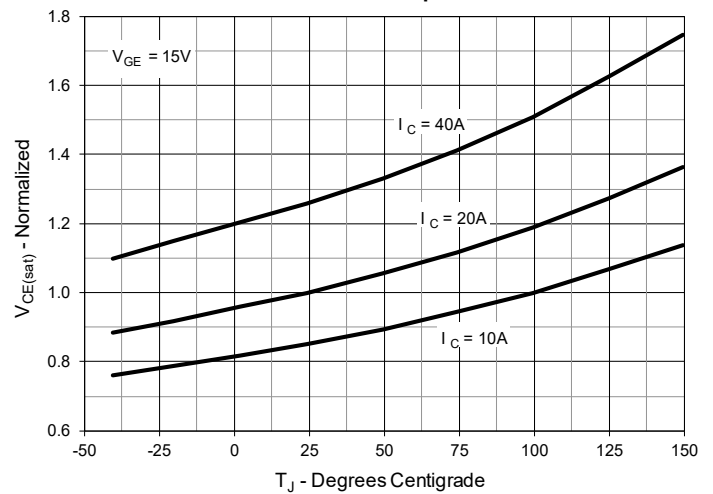
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$ Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$ Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$ Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

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

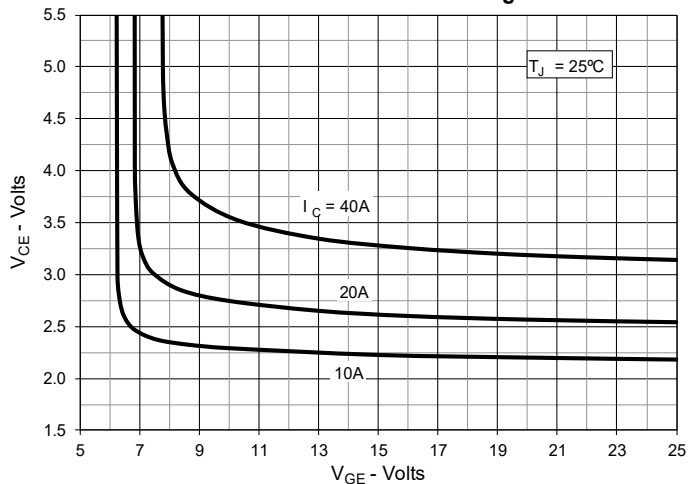


Fig. 6. Input Admittance

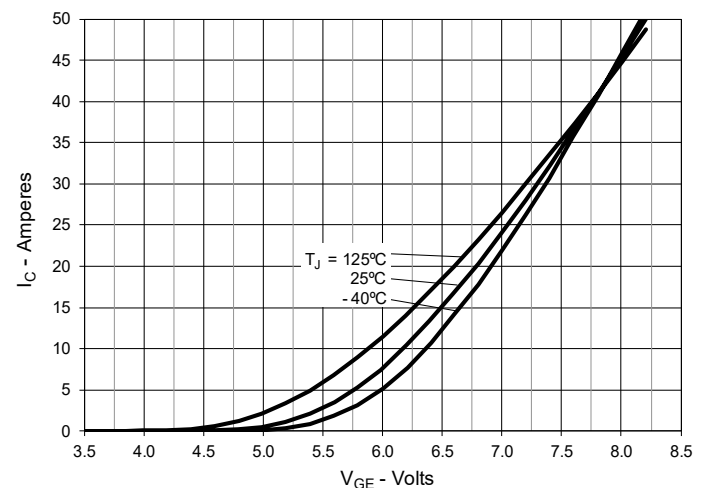


Fig. 7. Transconductance

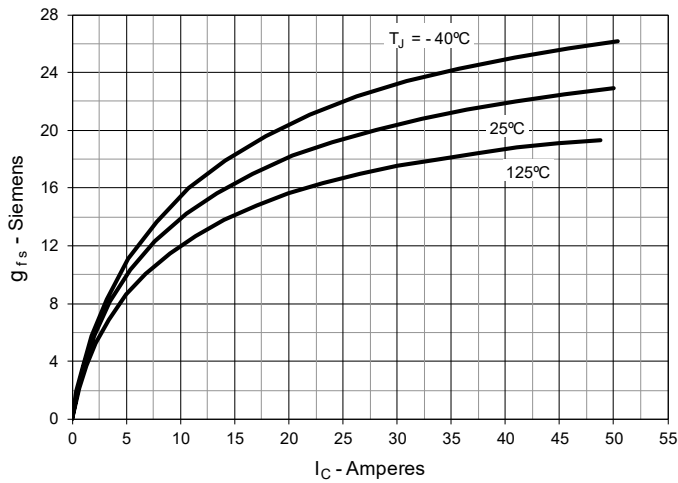


Fig. 8. Forward Voltage Drop of Intrinsic Diode

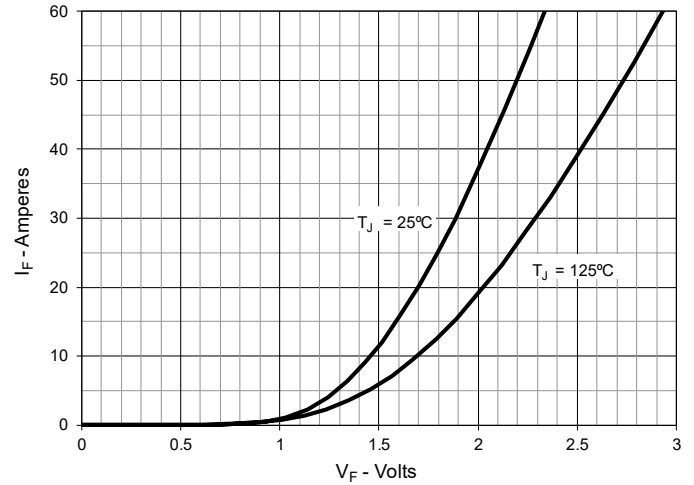


Fig. 9. Gate Charge

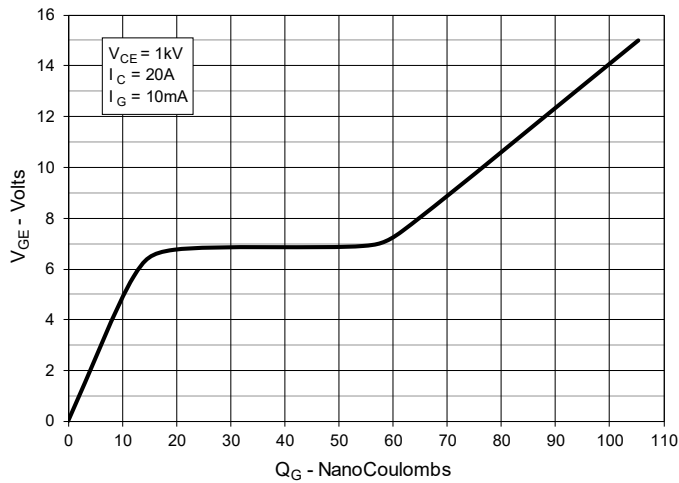


Fig. 10. Capacitance

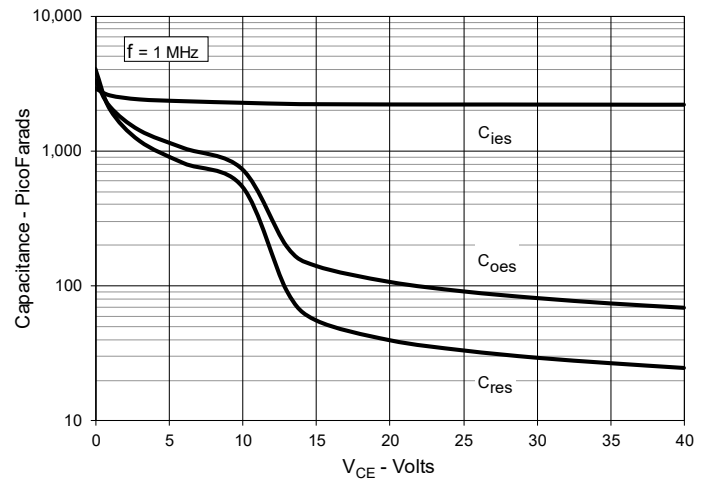


Fig. 11. Reverse-Bias Safe Operating Area

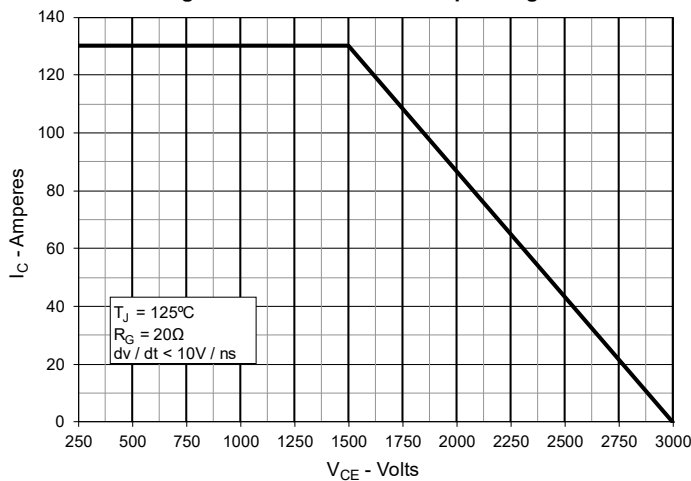


Fig. 12. Maximum Transient Thermal Impedance

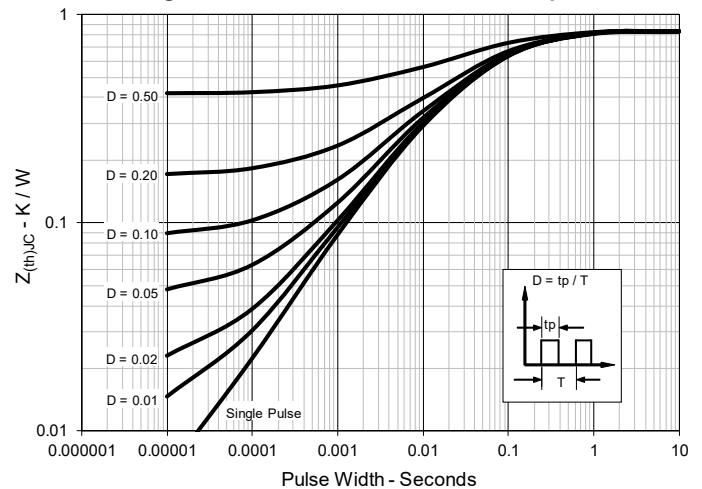


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

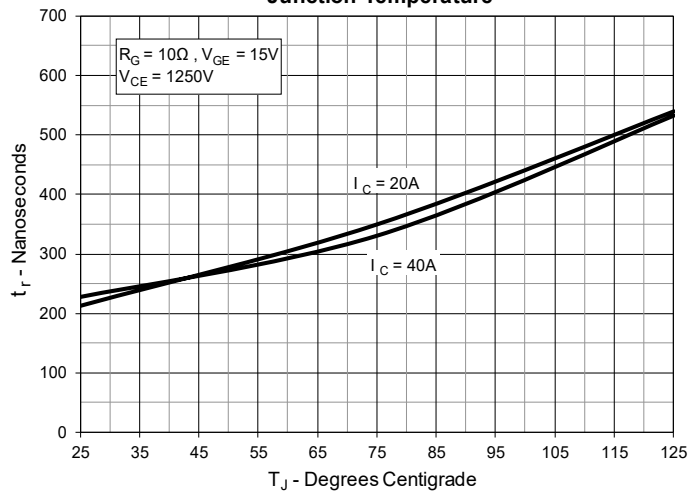


Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

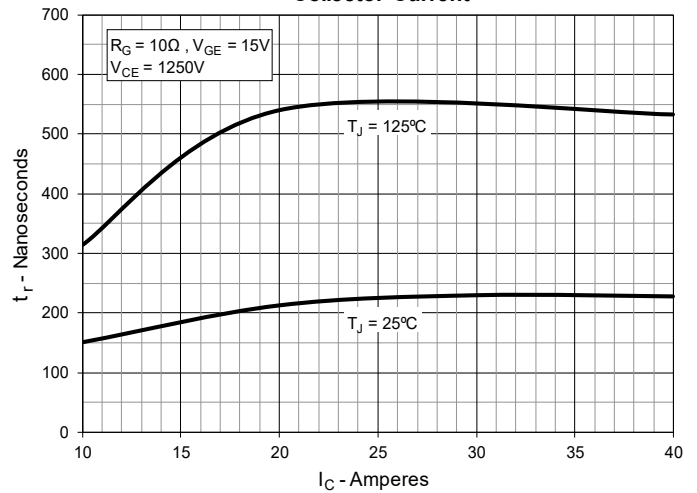


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

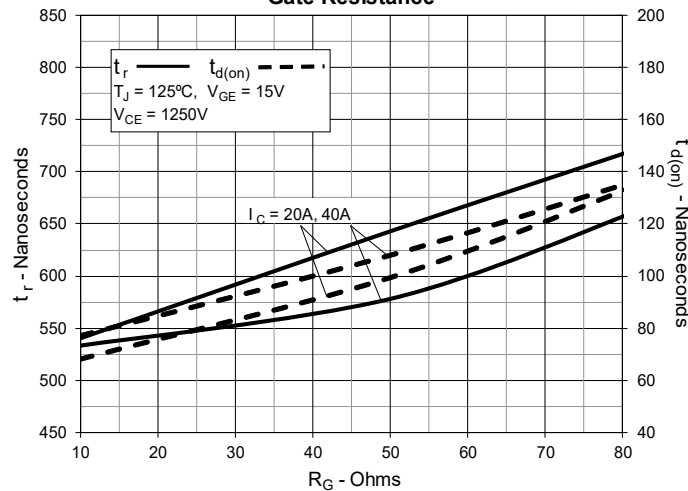


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

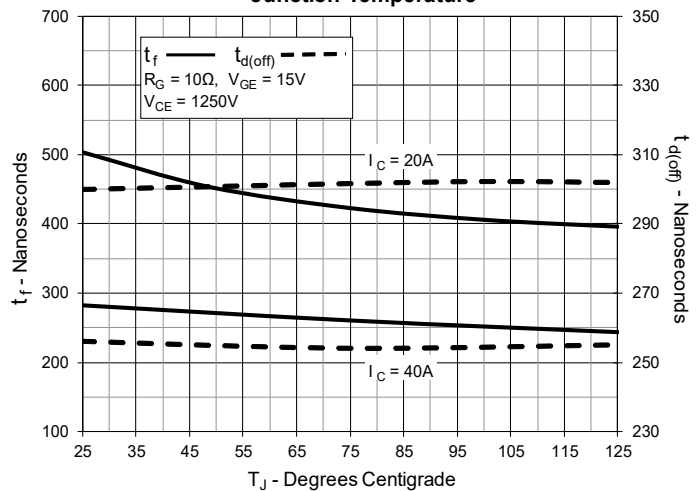


Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

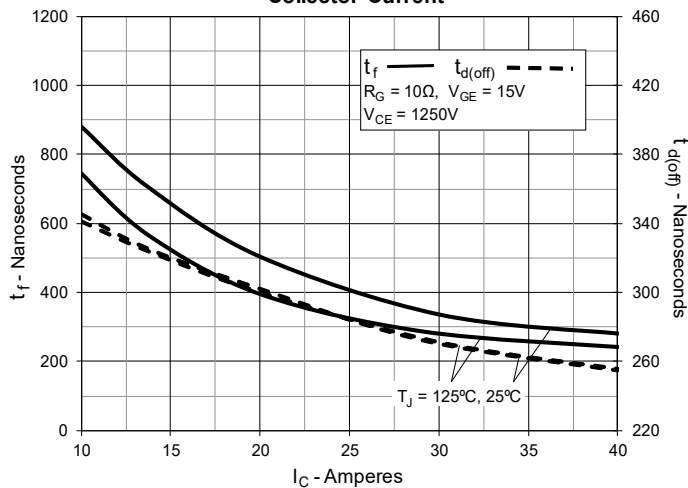
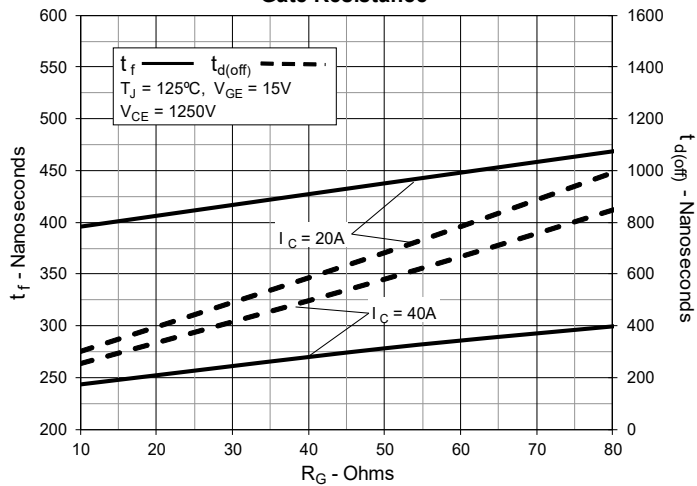
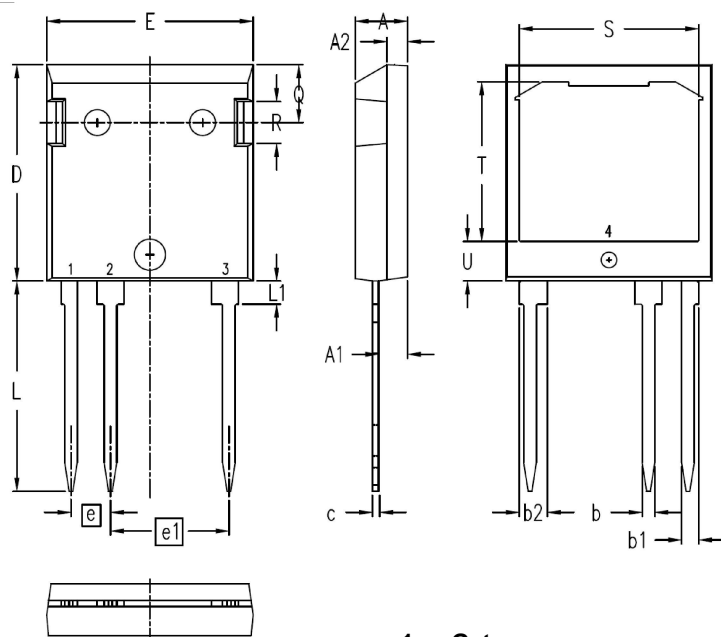


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



ISOPLUS i4-Pak Outline



1 = Gate
2 = Emitter
3,4 = Collector

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