



**THE DATASHEET OF
IXBK55N300**

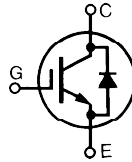


High Voltage, High Gain BiMOSFET™

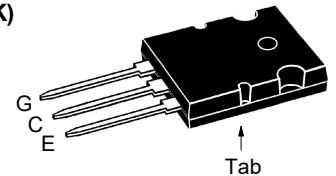
IXBK55N300 IXBX55N300

$V_{CES} = 3000V$
 $I_{C110} = 55A$
 $V_{CE(sat)} \leq 3.2V$

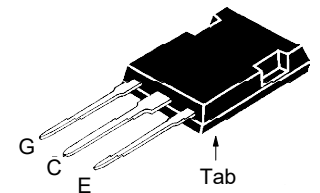
Monolithic Bipolar MOS Transistor



TO-264
(IXBK)



PLUS247
(IXBX)



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ C$ 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	± 25	V
V_{GEM}	Transient	± 35	V
I_{C25}	$T_C = 25^\circ C$ (Chip Capability)	130	A
I_{C110}	$T_C = 110^\circ C$	55	A
I_{CM}	$T_C = 25^\circ C$, 1ms	600	A
SSOA	$V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 2\Omega$	$I_{CM} = 110$	A
(RBSOA)	Clamped Inductive Load	1500	V
T_{SC} (SCSOA)	$V_{GE} = 15V$, $T_J = 125^\circ C$, $R_G = 10\Omega$, $V_{CE} = 1250V$, Non-Repetitive	10	μs
P_C	$T_C = 25^\circ C$	625	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 10	300	$^\circ C$
M_d	Mounting Torque (TO-264)	1.13/10	Nm/lb.in
F_C	Mounting Force (PLUS247)	20..120/4.5..27	N/lb
Weight	TO-264	10	g
	PLUS247	6	g

Features

- High Blocking Voltage
- International Standard Packages
- Low Conduction Losses
- High Current Handling Capability
- MOS Gate Turn-On
- Drive Simplicity

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- Uninterruptible Power Supplies (UPS)
- Switch-Mode and Resonant-Mode Power Supplies
- Capacitor Discharge Circuits
- Laser Generators

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
$V_{GE(th)}$	$I_C = 4mA$, $V_{CE} = V_{GE}$	3.0		5.0 V
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ C$			50 μA 3 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 25V$			± 200 nA
$V_{CE(sat)}$	$I_C = 55A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$		2.7 3.3	3.2 V V

Symbol Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 55\text{A}, V_{CE} = 10\text{V}$, Note 1	32	50	S
C_{ies}	} $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		7300	pF
C_{oes}			275	pF
C_{res}			83	pF
Q_g	} $I_C = 55\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$		335	nC
Q_{ge}			47	nC
Q_{gc}			130	nC
$t_{d(on)}$	} Resistive Switching Times, $T_J = 25^\circ\text{C}$ $I_C = 110\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 2\Omega$		54	ns
t_r			307	ns
$t_{d(off)}$			230	ns
t_f			268	ns
$t_{d(on)}$	} Resistive Switching Times, $T_J = 125^\circ\text{C}$ $I_C = 110\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 1250\text{V}, R_G = 2\Omega$		52	ns
t_r			585	ns
$t_{d(off)}$			215	ns
t_f			260	ns
R_{thJC}				0.20 °C/W
R_{thCS}		0.15		°C/W

Reverse Diode

Symbol Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
V_F	$I_F = 55\text{A}, V_{GE} = 0\text{V}$, Note 1			2.5 V
t_{rr}	} $I_F = 28\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}, V_{GE} = 0\text{V}$		1.9	μs
I_{RM}			54	A

Note 1: Pulse Test, $t \leq 300\mu\text{s}$, Duty Cycle, $d \leq 2\%$.

Additional provisions for lead-to-lead isolation are required at $V_{CE} > 1250\text{V}$.

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	7,157,338 B2
	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	

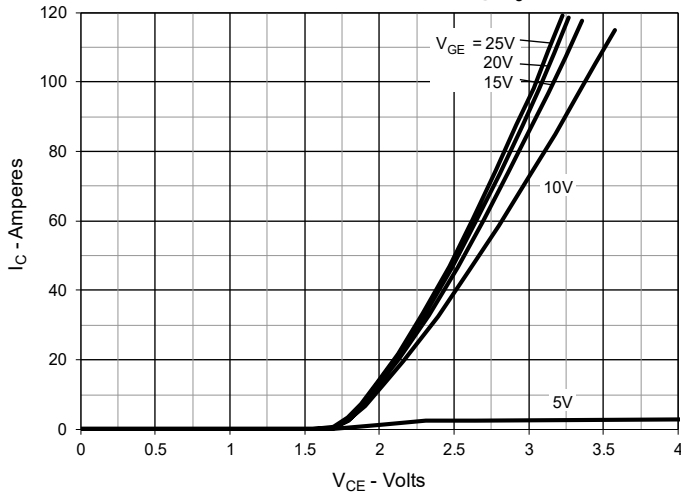
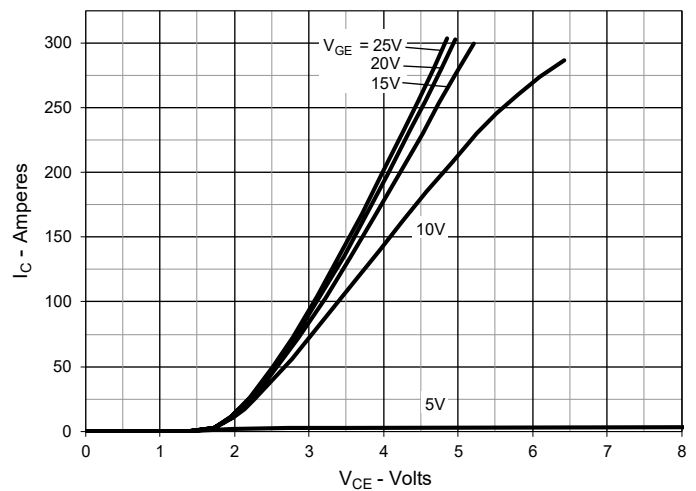
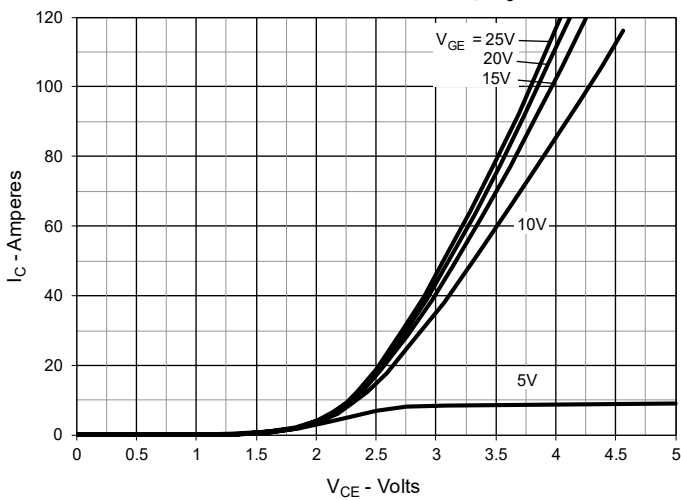
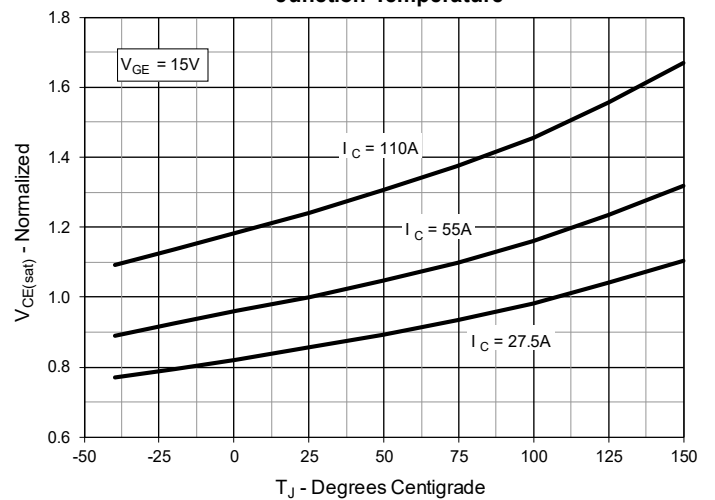
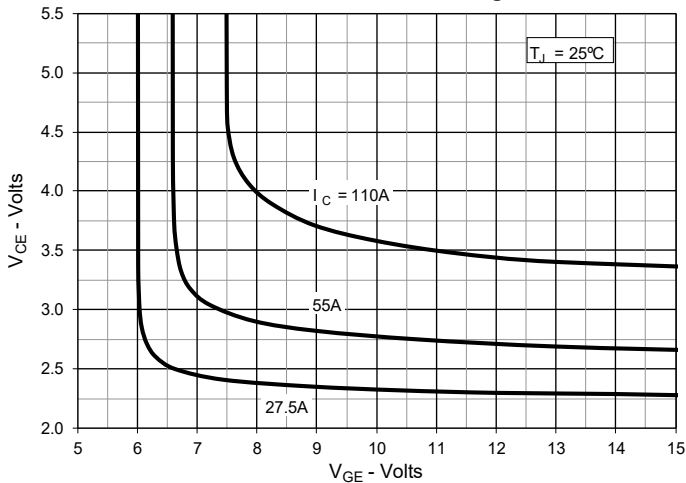
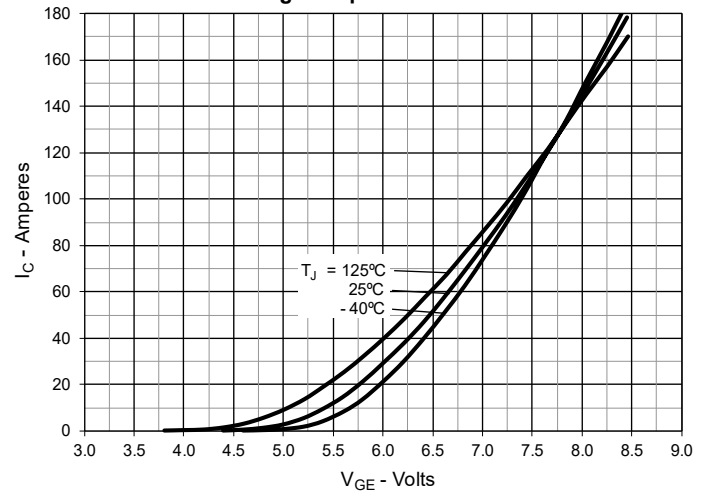
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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


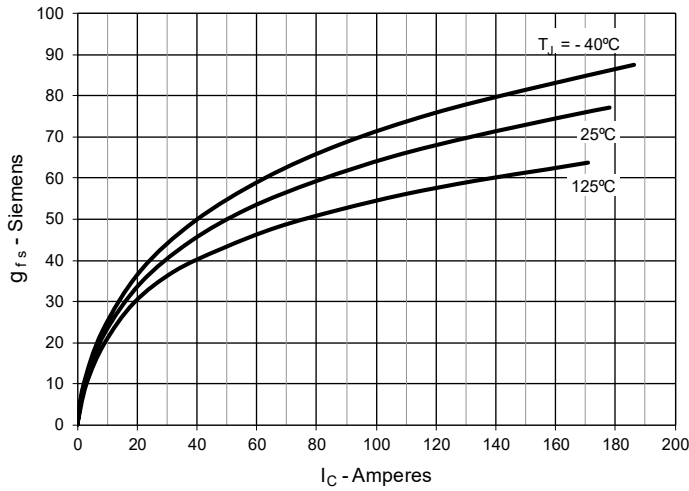
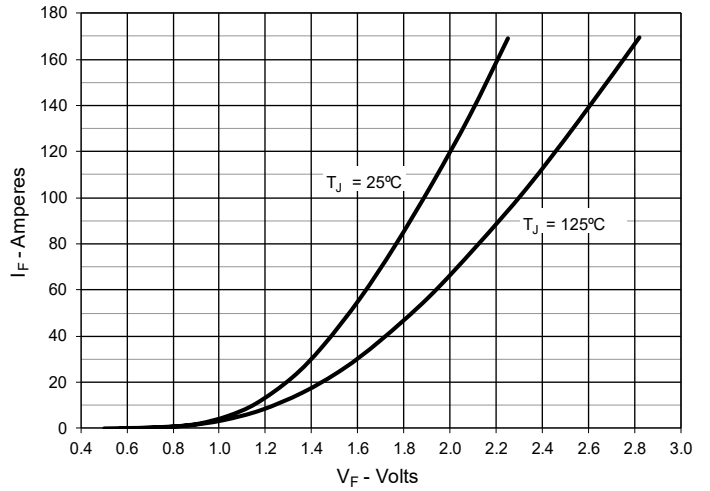
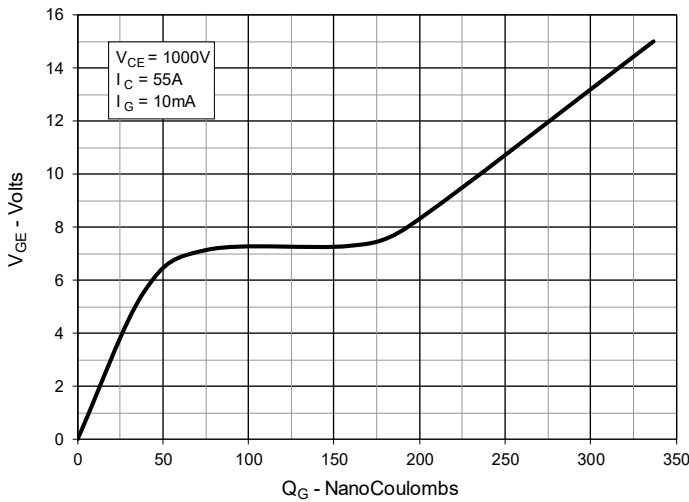
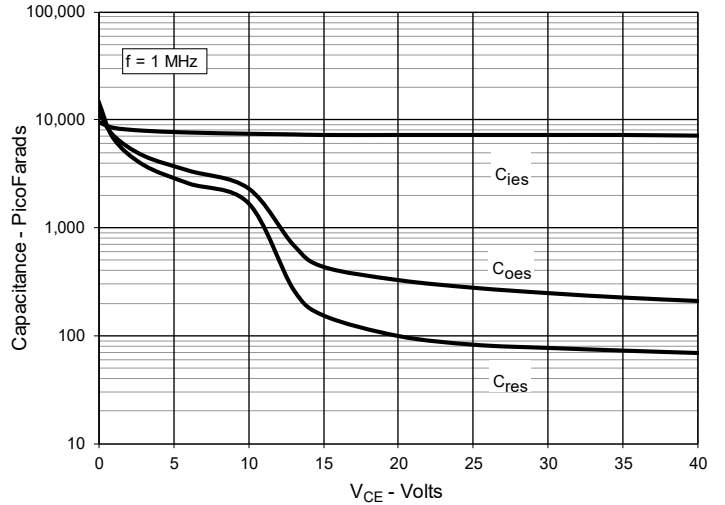
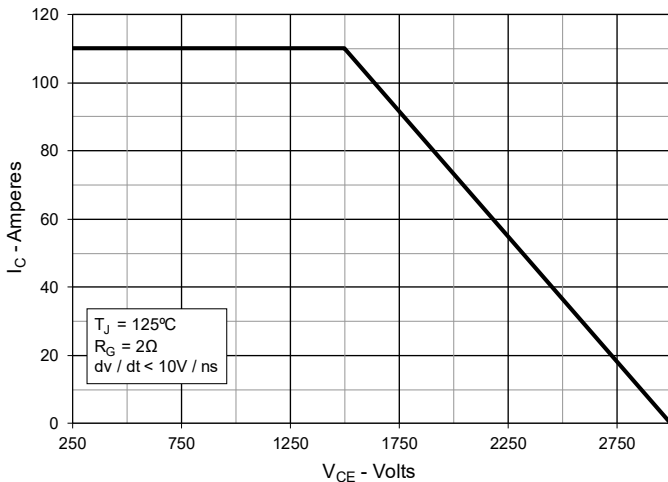
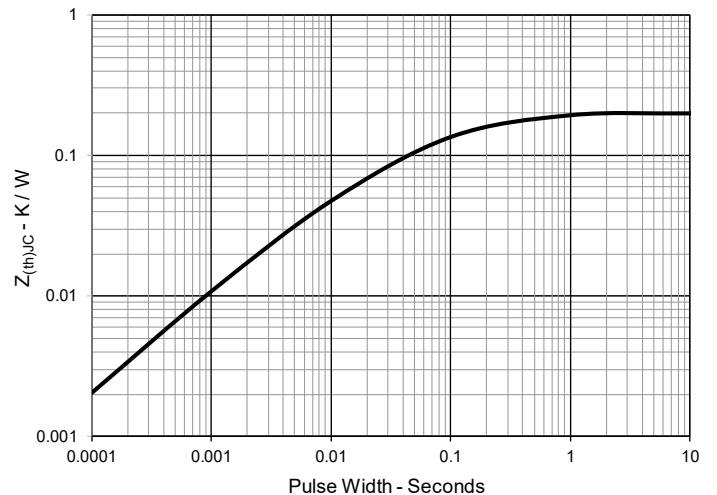
Fig. 7. Transconductance

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

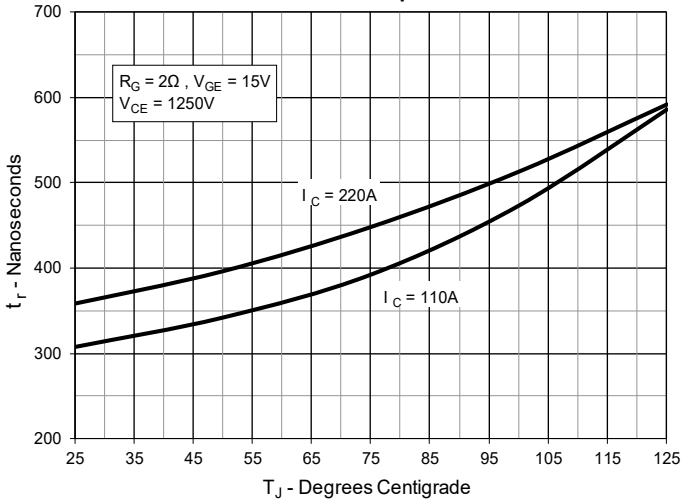


Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

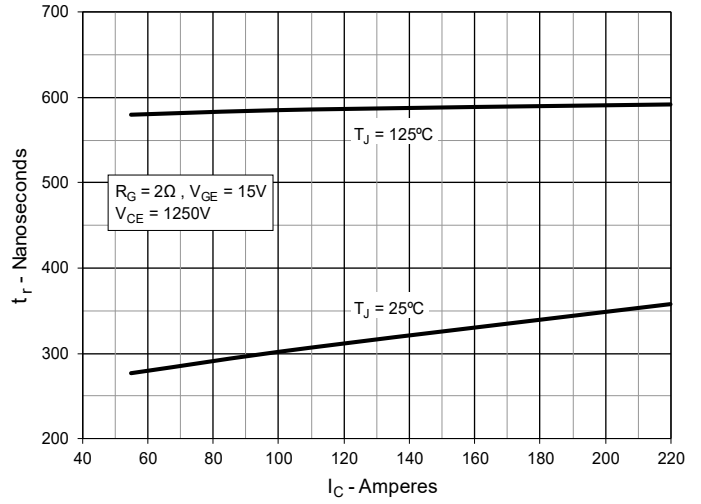


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

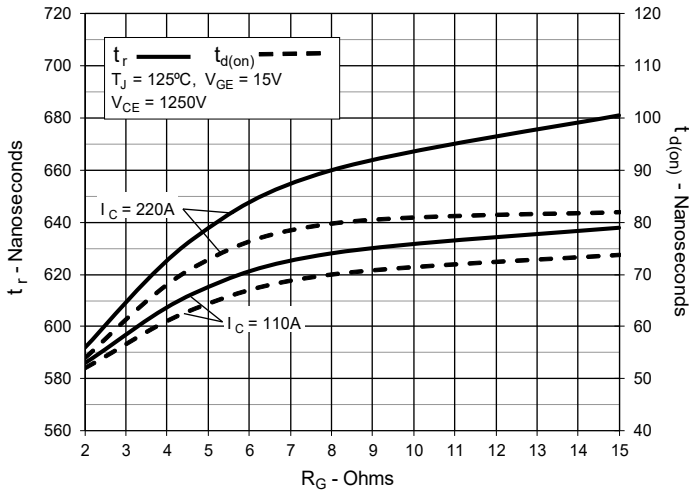


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

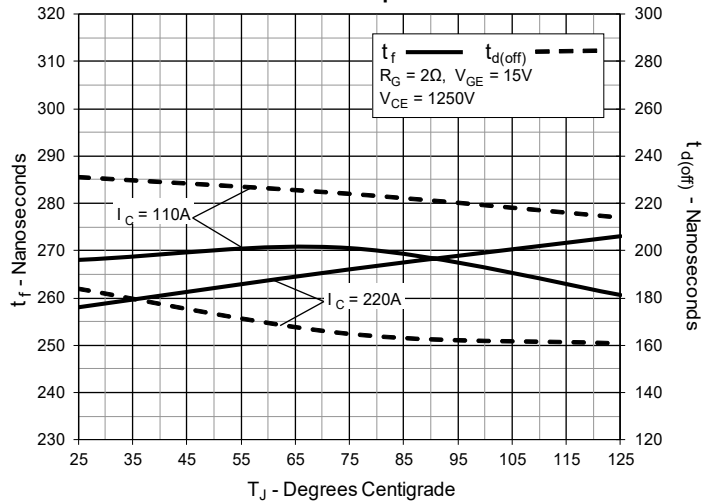


Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

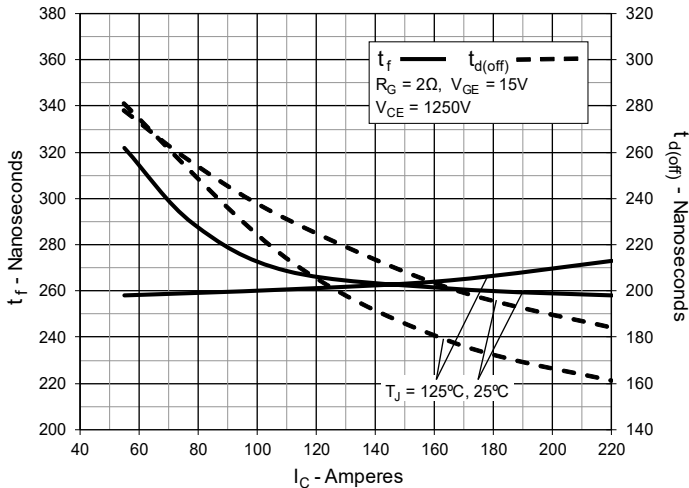


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

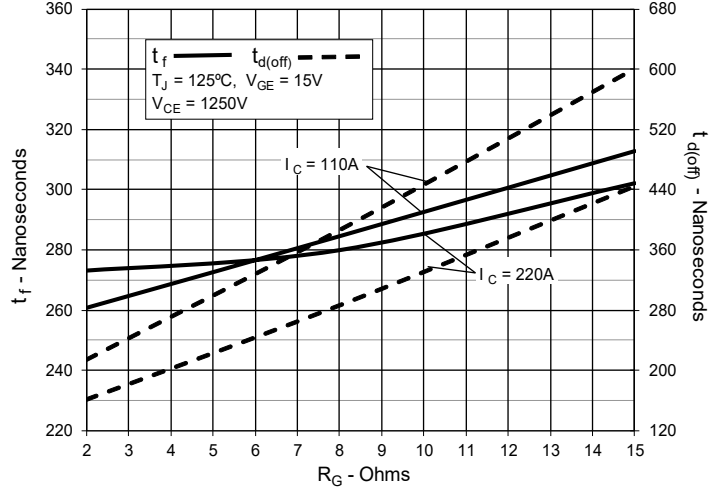


Fig. 19. Forward-Bias Safe Operating Area
@ $T_C = 25^\circ\text{C}$

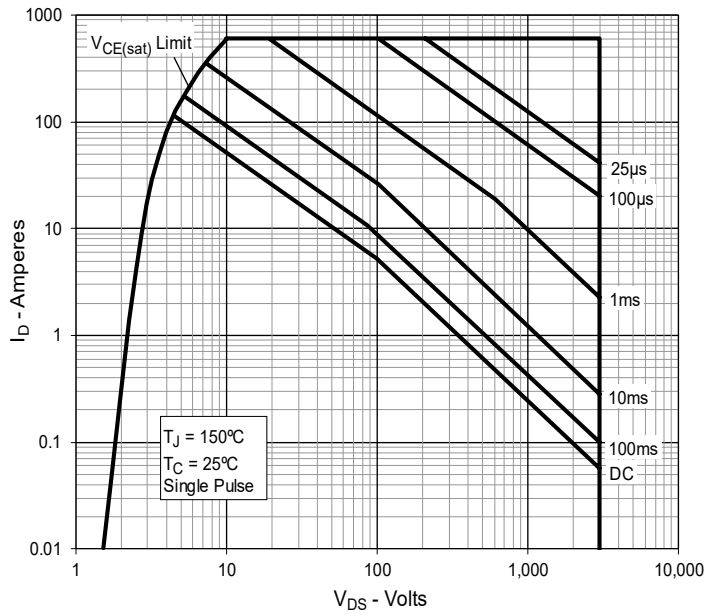
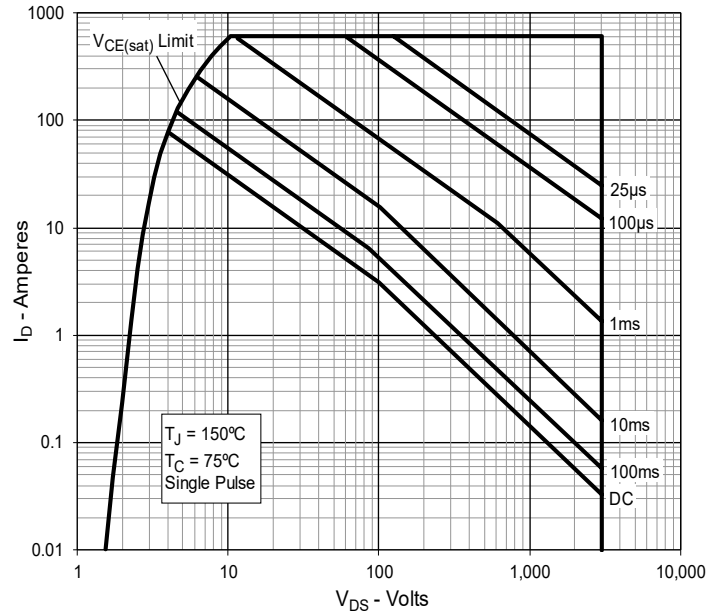
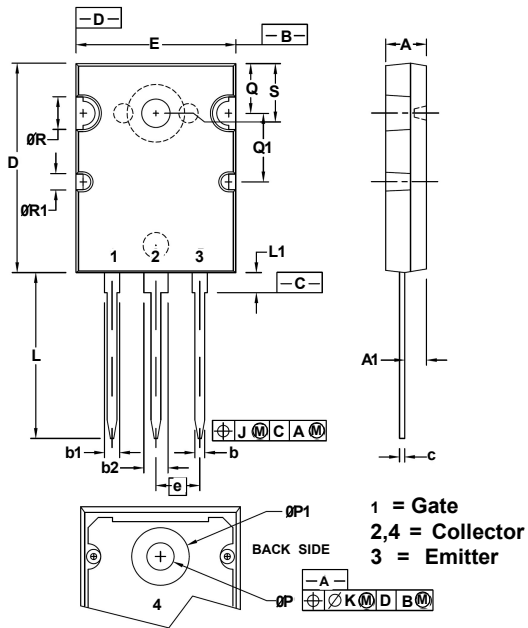
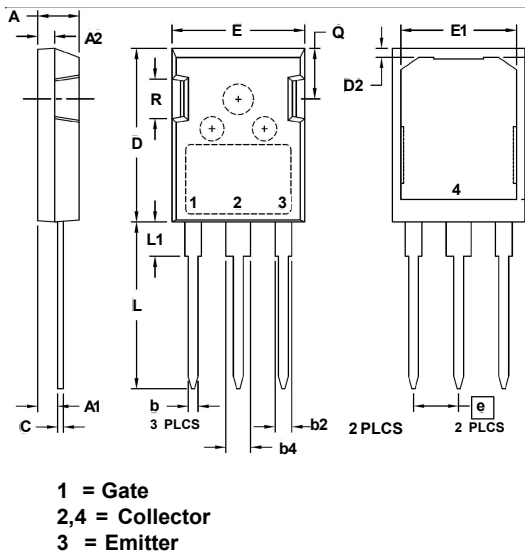


Fig. 20. Forward-Bias Safe Operating Area
@ $T_C = 75^\circ\text{C}$



TO-264 Outline


SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215 BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
ØP	.122	.138	3.10	3.51
ØP1	.270	.290	6.86	7.37
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
ØR	.155	.187	3.94	4.75
ØR1	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

PLUS247™ Outline


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b2	.075	.087	1.91	2.20
b4	.115	.126	2.92	3.20
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
D1	.650	.690	16.51	17.53
D2	.035	.050	0.89	1.27
E	.620	.635	15.75	16.13
E1	.520	.560	13.08	14.22
e	.215 BSC		5.45 BSC	
L	.780	.810	19.81	20.57
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83



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

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