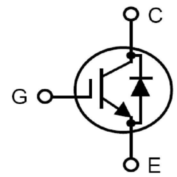
IXYS

High Voltage, High Gain BiMOSFET™

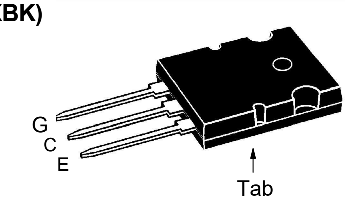
IXBK64N250
IXBX64N250

V_{CES} = 2500V
I_{C110} = 64A
$V_{CE(sat)}$ ≤ 3.0V

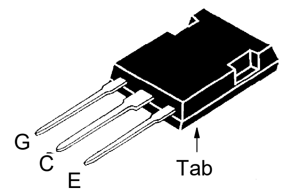
Monolithic Bipolar MOS Transistor



TO-264
(IXBK)



PLUS247™
(IXBX)



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	2500	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	2500	V
V_{GES}	Continuous	±25	V
V_{GEM}	Transient	±35	V
I_{C25}	T_C = 25°C (Chip Capability)	156	A
I_{LRMS}	Lead Current Limit, RMS	120	A
I_{C100}	T_C = 110°C	64	A
I_{CM}	T_C = 25°C, 1ms	800	A
SSOA (RBSOA)	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 1Ω Clamped Inductive Load	I_{CM} = 160 $V_{CE} \leq 0.8 \cdot V_{CES}$	A
T_{SC} (SCSOA)	V_{GE} = 15V, T_J = 125°C, R_G = 5Ω, V_{CE} = 1250V, Non-Repetitive	10	µs
P_C	T_C = 25°C	735	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering 1.6 mm (0.062 in.) from Case for 10	300	°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

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 1mA, V_{GE} = 0V	2500			V
$V_{GE(th)}$	I_C = 4mA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES}, V_{GE} = 0V			50	µA
	T_J = 125°C			6	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 25V			±200	nA
$V_{CE(sat)}$	I_C = I_{C110}, V_{GE} = 15V, Note 1		2.5	3.0	V
	T_J = 125°C		3.1		V

Features

- High Blocking Voltage
- Low Switching Losses
- High Current Handling Capability
- Anti-Parallel Diode

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

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

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fS}	$I_C = I_{C110}$, V_{CE} = 10V, Note 1	40	72		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		8900		pF
C_{oes}			345		pF
C_{res}			118		pF
Q_g	$I_C = I_{C110}$, V_{GE} = 15V, V_{CE} = 600V		400		nC
Q_{ge}			46		nC
Q_{gc}			155		nC
$t_{d(on)}$	**Resistive Switching Times, T_J = 25°C** I_C = 128A, V_{GE} = 15V, tp = 1µs V_{CE} = 1250V, R_G = 1Ω		49		ns
t_r			318		ns
$t_{d(off)}$			232		ns
t_f			170		ns
$t_{d(on)}$	**Resistive Switching Times, T_J = 125°C** I_C = 128A, V_{GE} = 15V, tp = 1µs V_{CE} = 1250V, R_G = 1Ω		54		ns
t_r			578		ns
$t_{d(off)}$			222		ns
t_f			175		ns
R_{thJC}				0.17	°C/W
R_{thCS}			0.15		°C/W

Reverse Diode

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
V_F	$I_F = I_{C110}$, V_{GE} = 0V, Note 1			3.0	V
t_{rr}	$I_F = I_{C110}$, V_{GE} = 0V, $-di_F/dt$ = 650A/µs V_R = 600V, V_{GE} = 0V		160		ns
I_{RM}			480		A

Note 1: Pulse test, t ≤ 300µs, duty cycle, d ≤ 2%.

Additional provisions for lead-to-lead isolation are required at V_{CE} >1200V.

Fig. 1. Output Characteristics @ T_J = 25ºC

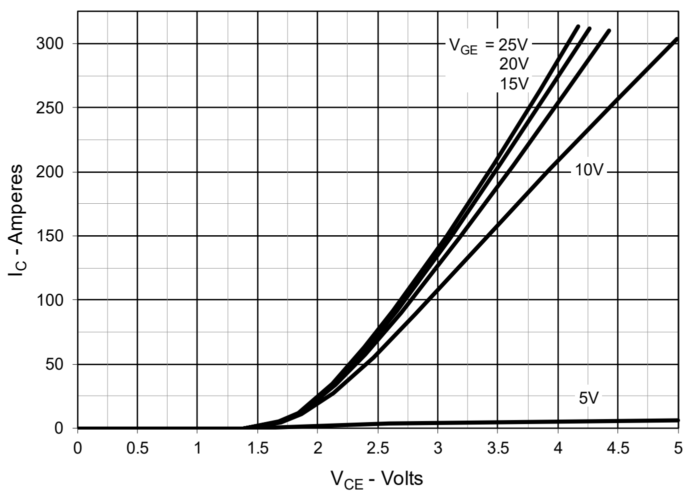


Fig. 2. Output Characteristics @ T_J = 125ºC

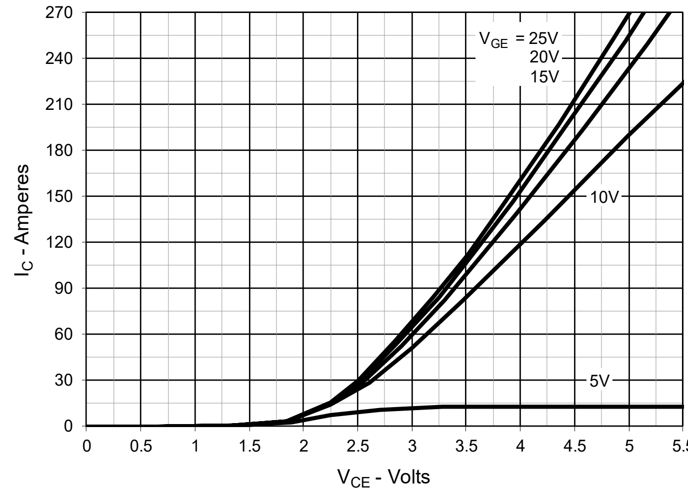


Fig. 3. Dependence of $V_{CE(sat)}$ on Junction Temperature

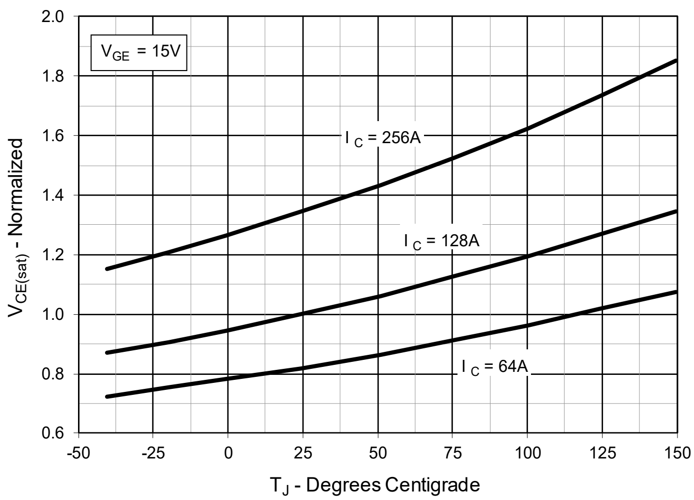


Fig. 4. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

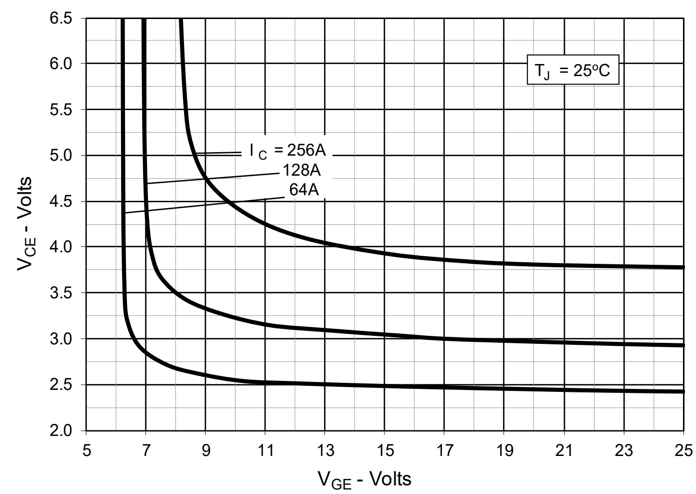


Fig. 5. Breakdown & Threshold Voltages vs. Junction Temperature

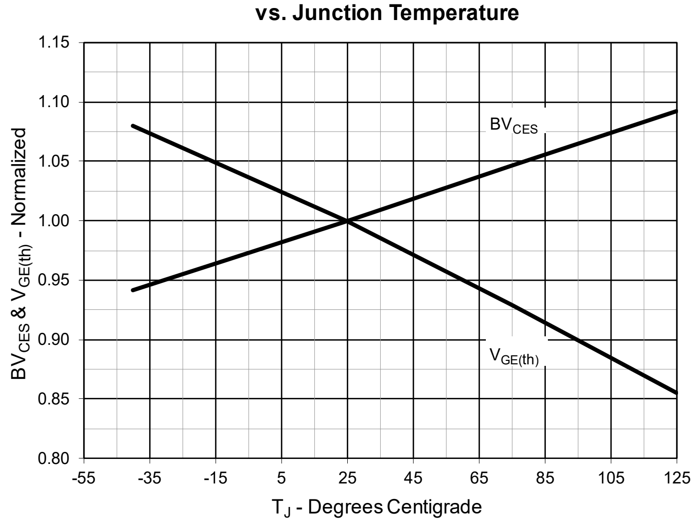


Fig. 6. Input Admittance

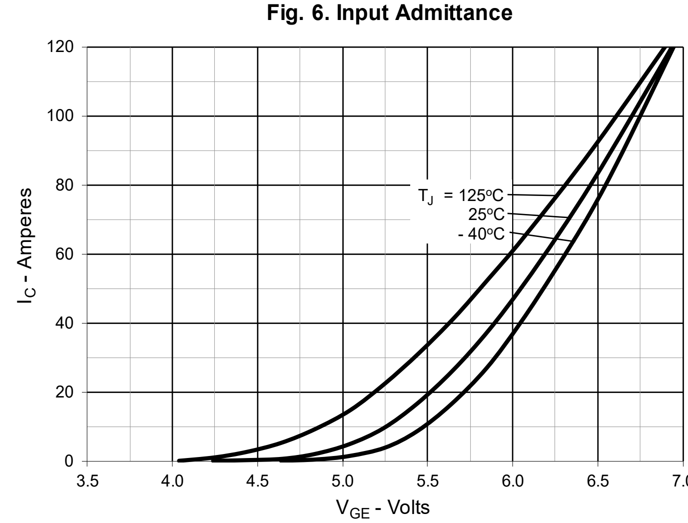


Fig. 7. Transconductance

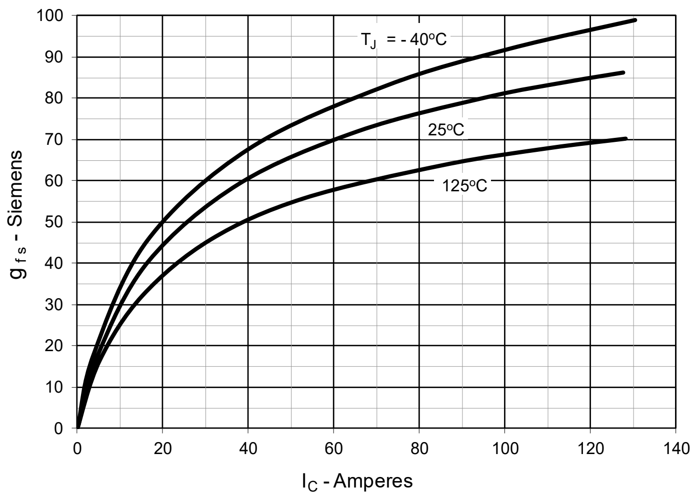


Fig. 8. Forward Voltage Drop of Intrinsic Diode

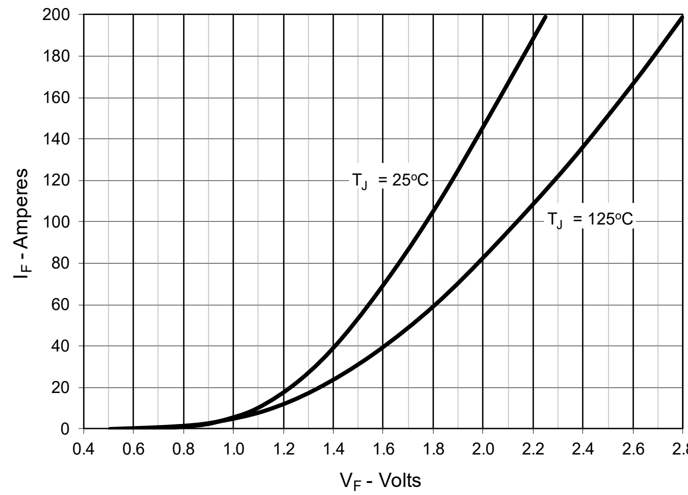


Fig. 9. Gate Charge

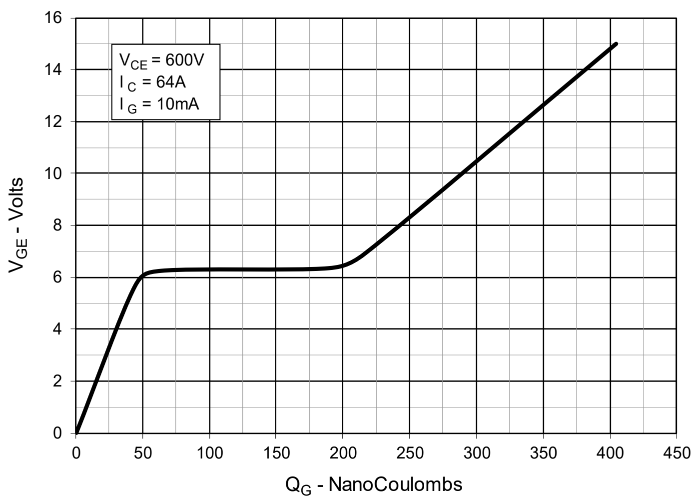


Fig. 10. Capacitance

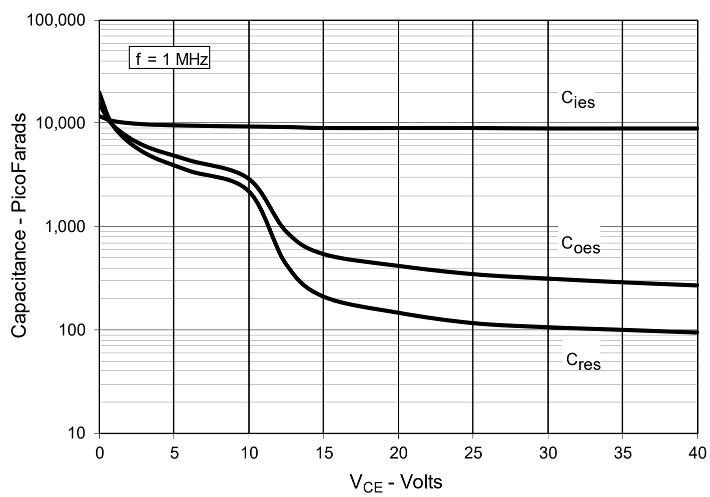


Fig. 11. Reverse-Bias Safe Operating Area

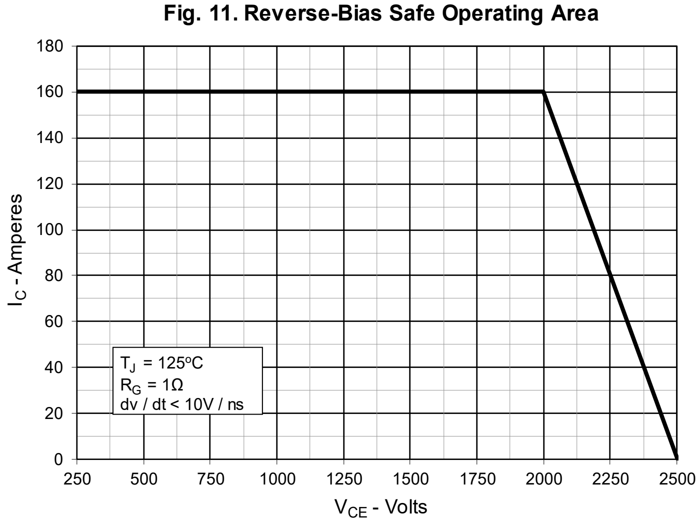


Fig. 12. Forward-Bias Safe Operating Area

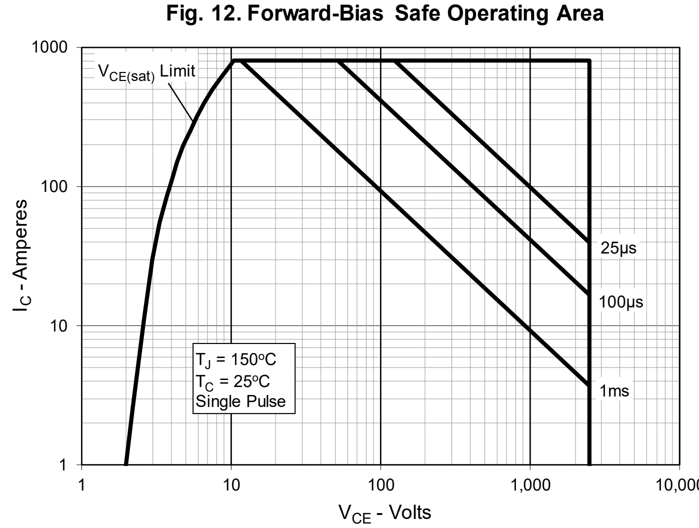


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

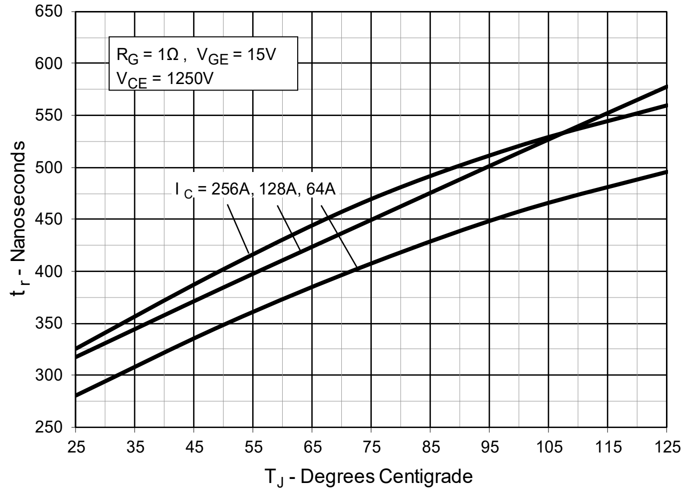


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

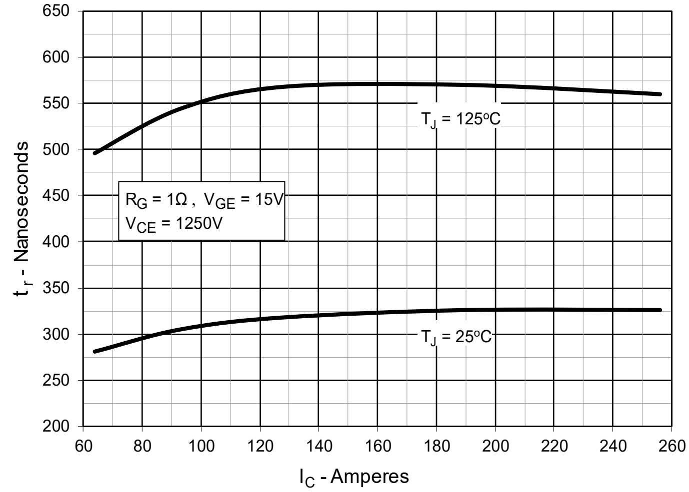


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

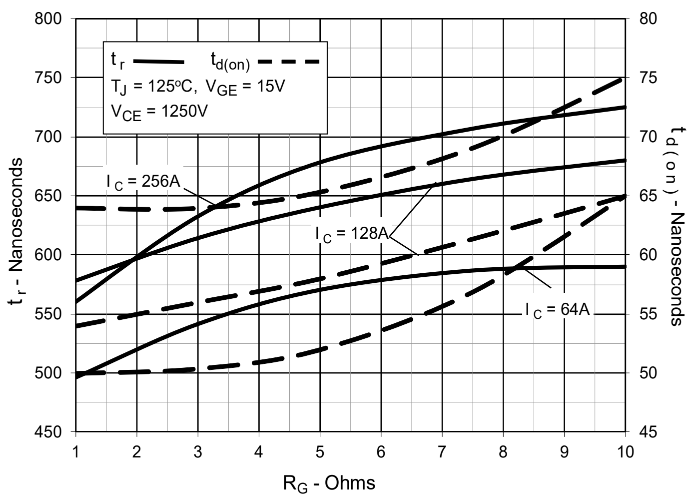


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

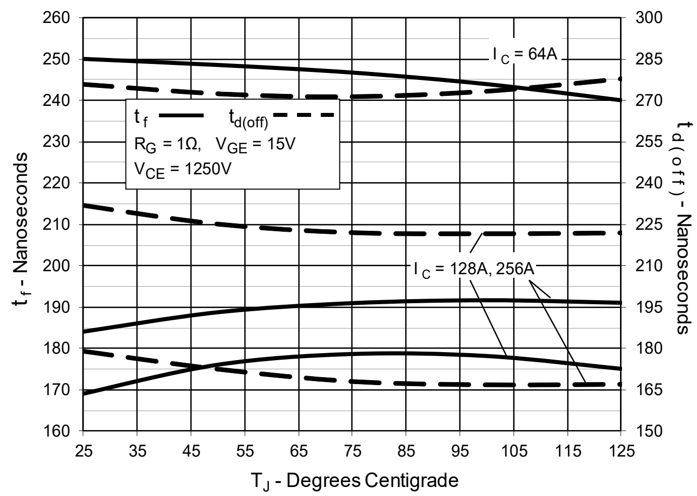


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

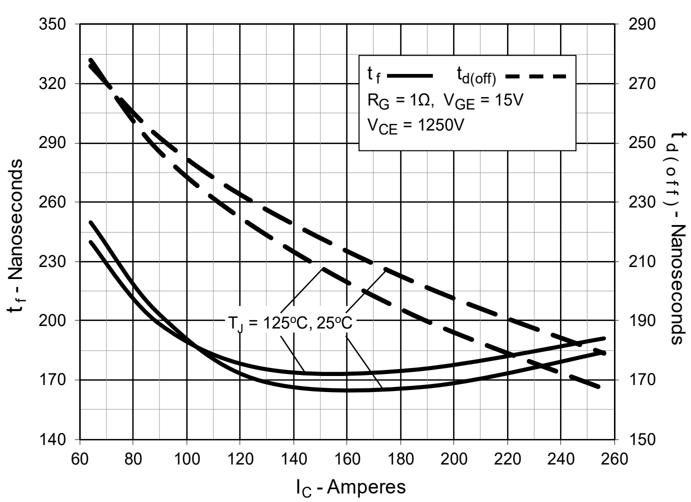


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

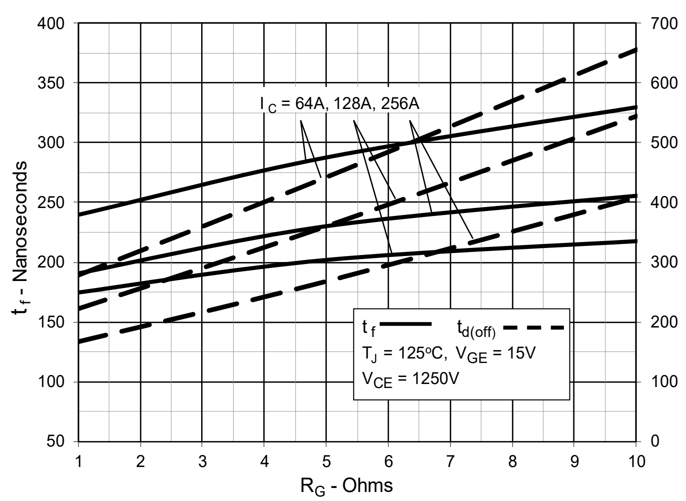
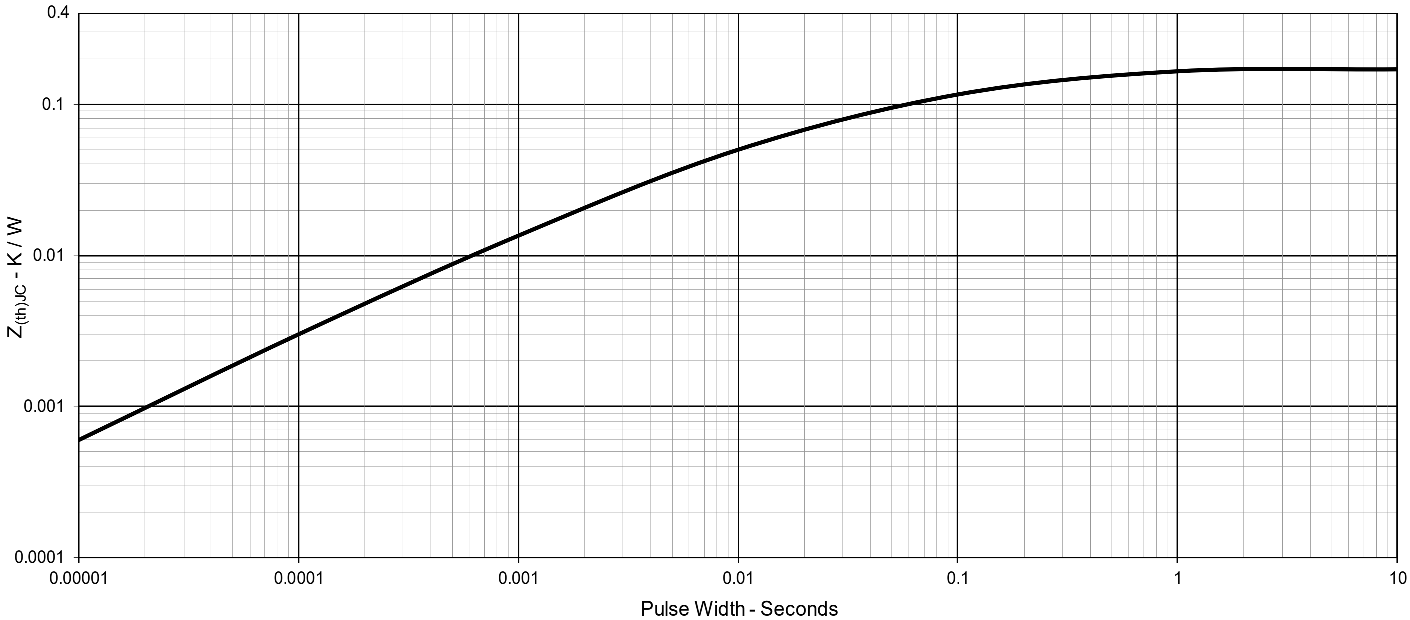
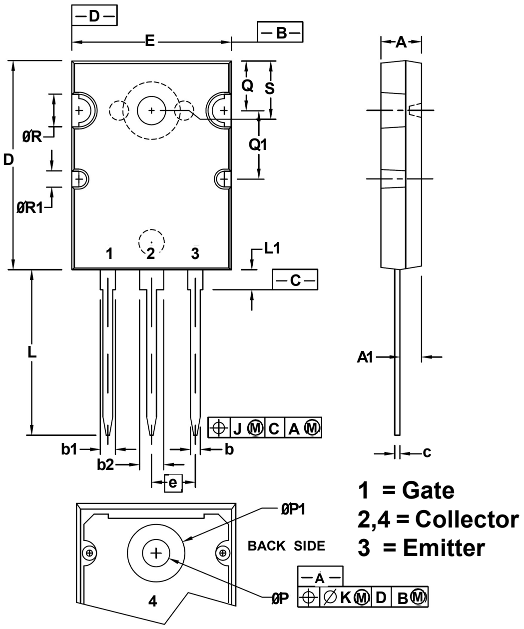


Fig. 19. Maximum Transient Thermal Impedance



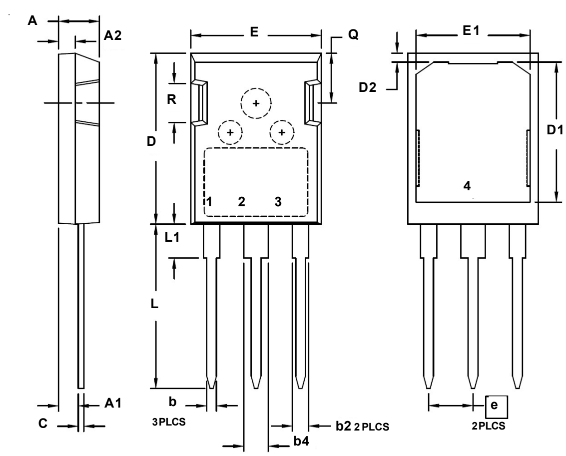
TO-264 Outline



1 = Gate
2,4 = Collector
3 = Emitter

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	.215BSC		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



1 - Gate
2,4 - Collector
3 - Emitter

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

IXYS
A Littelfuse Technology