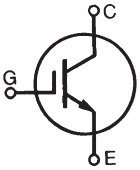
1200V XPT™ IGBT GenX3™

IXYR100N120C3

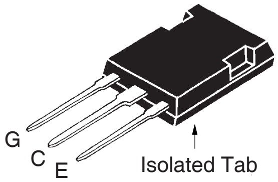
V_{CES} = 1200V
I_{C110} = 56A
$V_{CE(sat)} \leq$ 3.50V
$t_{fi(typ)}$ = 110ns

(Electrically Isolated Tab)

High-Speed IGBT
for 20-50 kHz Switching



ISOPLUS247™



G = Gate C = Collector
E = Emitter

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 175°C	1200	V
V_{CGR}	T_J = 25°C to 175°C, R_{GE} = 1MΩ	1200	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C (Chip Capability)	110	A
I_{C110}	T_C = 110°C	56	A
I_{CM}	T_C = 25°C, 1ms	450	A
I_A	T_C = 25°C	50	A
E_{AS}	T_C = 25°C	1.2	J
SSOA **(RBSOA)**	V_{GE} = 15V, T_{VJ} = 150°C, R_G = 1Ω Clamped Inductive Load	I_{CM} = 200 @$V_{CE} \leq V_{CES}$	A
P_C	T_C = 25°C	484	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
V_{ISOL}	50/60 Hz, 1 Minute	2500	V~
F_C	Mounting Force	20..120/4.5..27	N/lb.
Weight		5	g

Features

- Optimized for Low Switching Losses
- Square RBSOA
- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V~ Electrical Isolation
- Positive Thermal Coefficient of Vce(sat)
- Avalanche Rated
- High Current Handling Capability

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- High Frequency Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	 Typ.	 Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	1200			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			10	μA
	T_J = 150°C			1.25	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 100A, V_{GE} = 15V, Note 1		2.96	3.50	V
	T_J = 150°C		3.78		V

Symbol	Test Conditions	Characteristic Values		
	(T_J = 25°C Unless Otherwise Specified)	Min.	Typ.	Max.
g_{fs}	I_C = 60A, V_{CE} = 10V, Note 1	30	50	S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		4950	pF
C_{oes}			356	pF
C_{res}			120	pF
$Q_{g(on)}$	$I_C = I_{C110}$, V_{GE} = 15V, $V_{CE} = 0.5 \bullet V_{CES}$		260	nC
Q_{ge}			47	nC
Q_{gc}			102	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C** $I_C = I_{C110}$, V_{GE} = 15V $V_{CE} = 0.5 \bullet V_{CES}$, $R_G = 1\Omega$ Note 2		27	ns
t_{ri}			110	ns
E_{on}			12.00	mJ
$t_{d(off)}$			120	ns
t_{fi}			110	ns
E_{off}			4.90	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C** $I_C = I_{C110}$, V_{GE} = 15V $V_{CE} = 0.5 \bullet V_{CES}$, $R_G = 1\Omega$ Note 2		27	ns
t_{ri}			116	ns
E_{on}			15.00	mJ
$t_{d(off)}$			146	ns
t_{fi}			125	ns
E_{off}			6.15	mJ
R_{thJC}				0.31 °C/W
R_{thCS}			0.15	°C/W

Notes:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Switching times & energy losses may increase for higher V_{CE}(clamp), T_J or R_G.

Fig. 1. Output Characteristics @ $T_J = 25^oC$

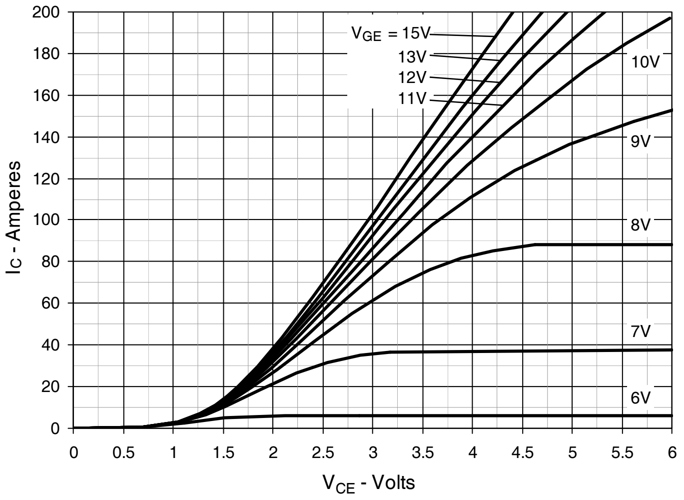


Fig. 2. Extended Output Characteristics @ $T_J = 25^oC$

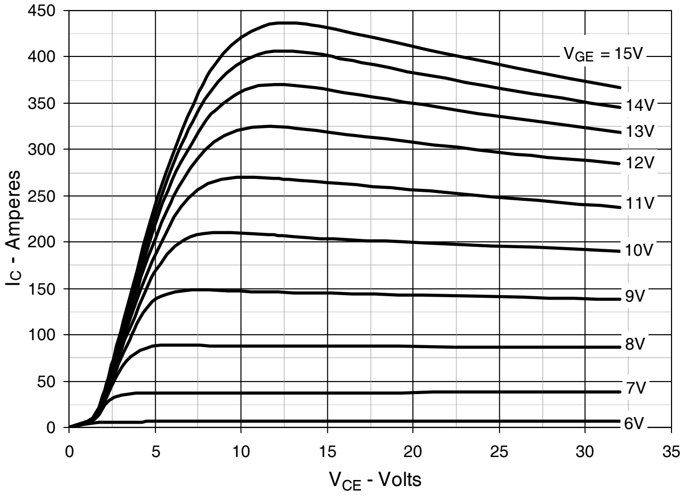


Fig. 3. Output Characteristics @ $T_J = 150^oC$

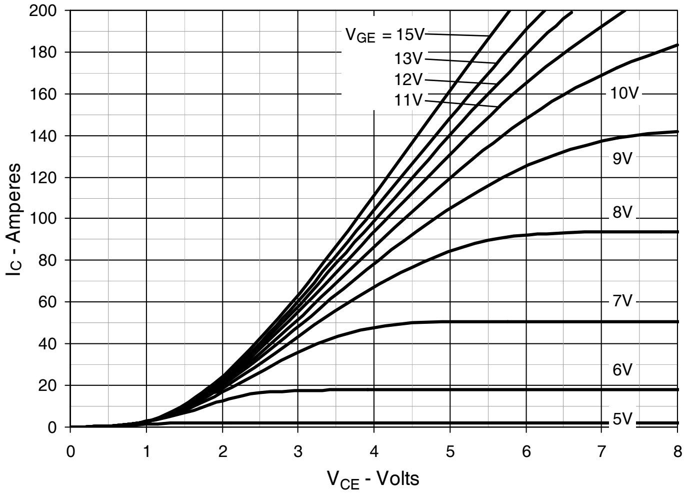


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

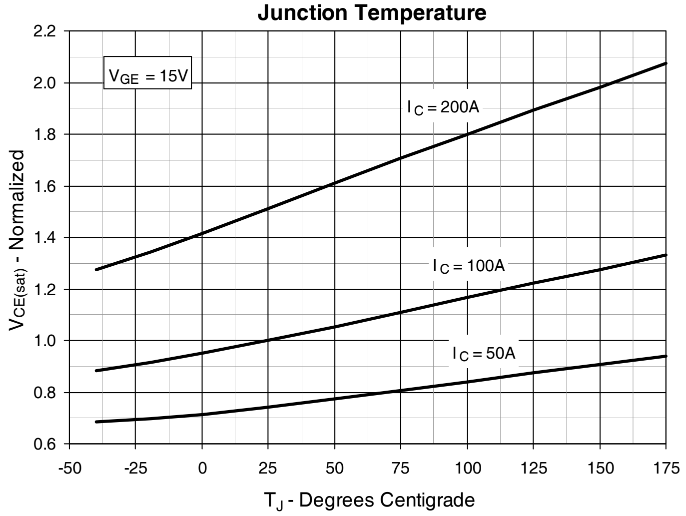


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

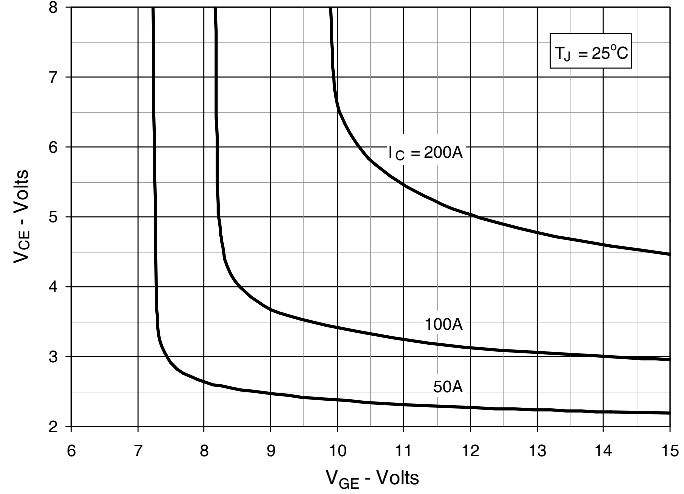


Fig. 6. Input Admittance

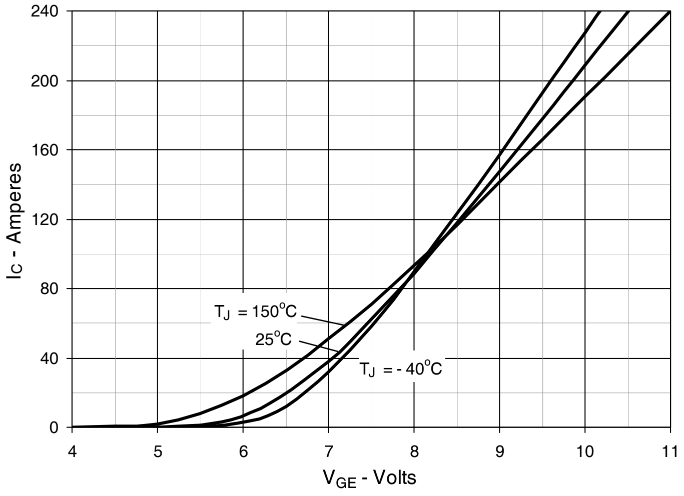


Fig. 7. Transconductance

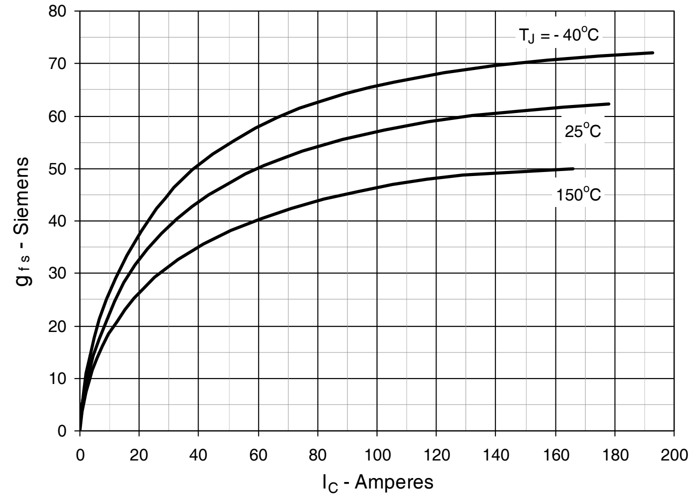


Fig. 8. Gate Charge

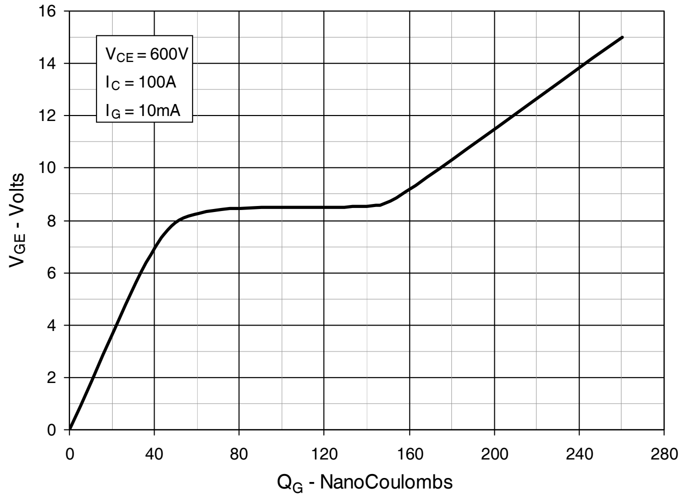


Fig. 9. Capacitance

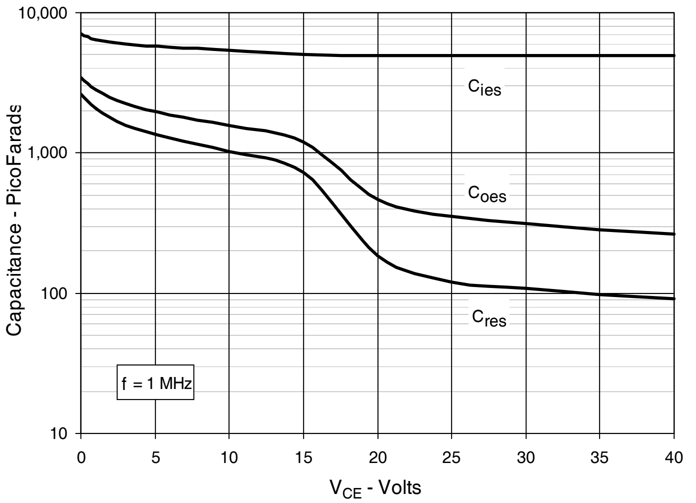


Fig. 10. Reverse-Bias Safe Operating Area

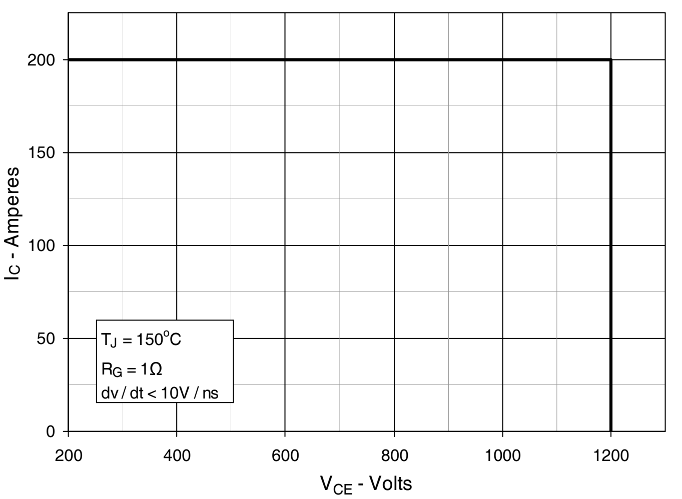


Fig. 11. Maximum Transient Thermal Impedance

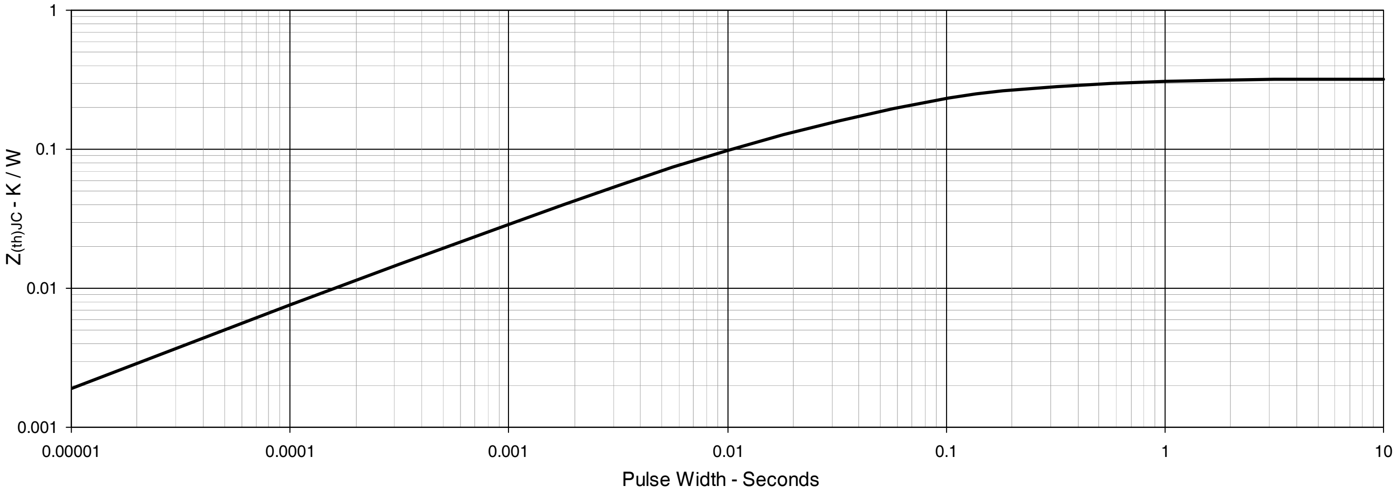


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

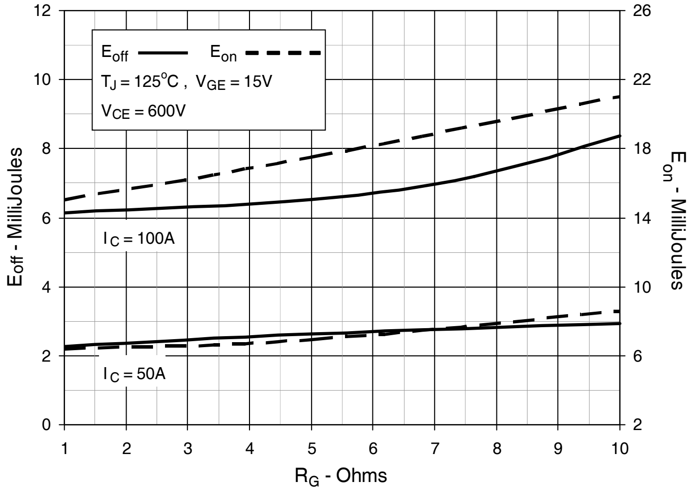


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

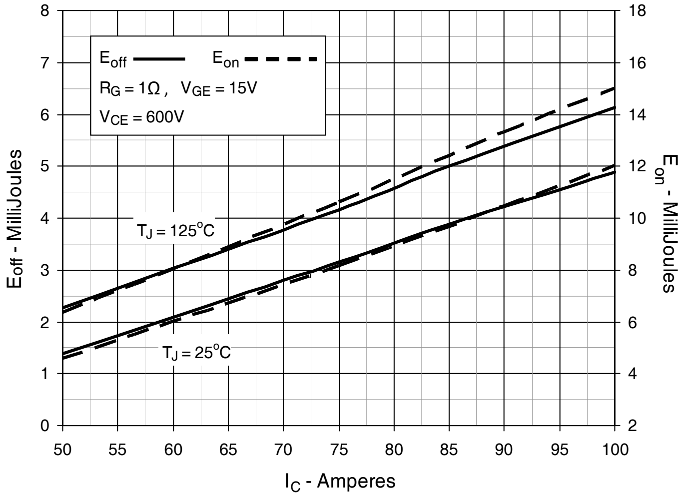


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

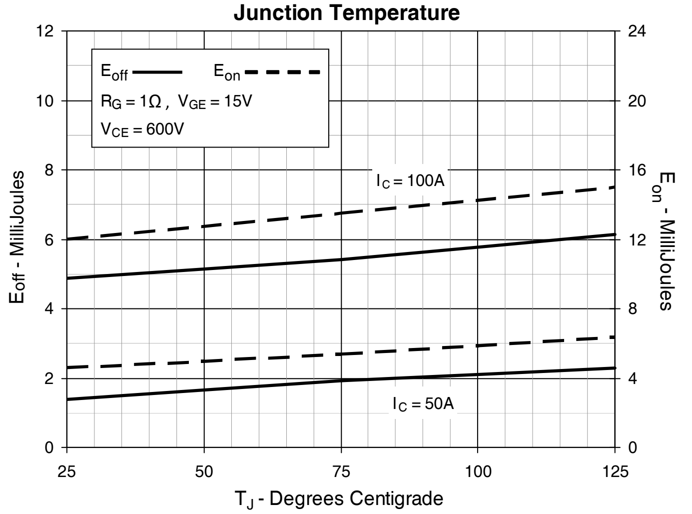


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

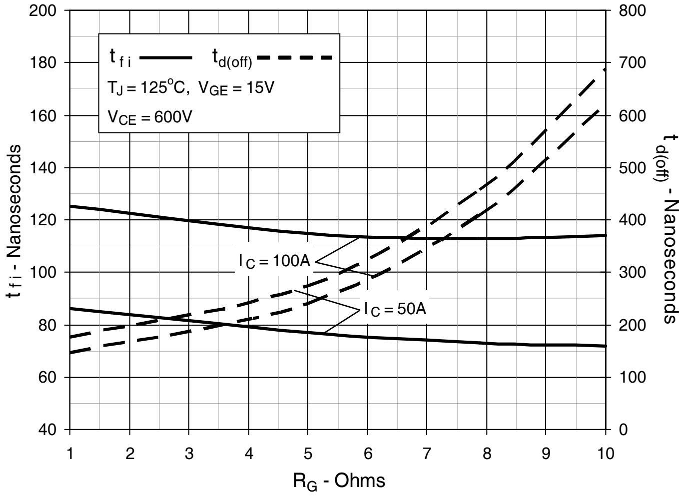


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

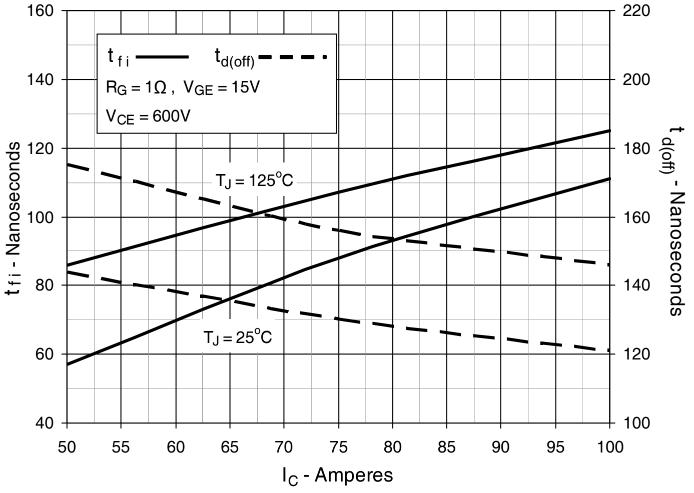


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

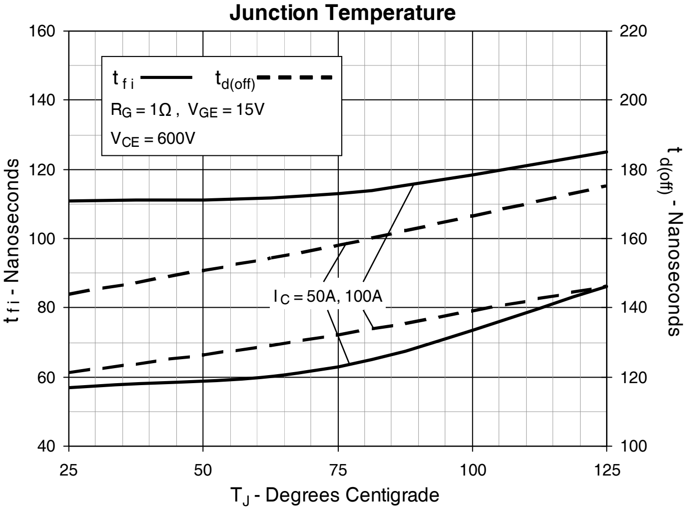


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

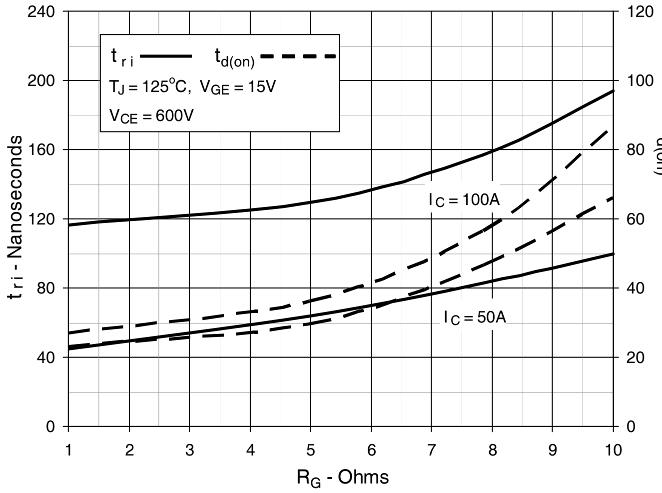


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

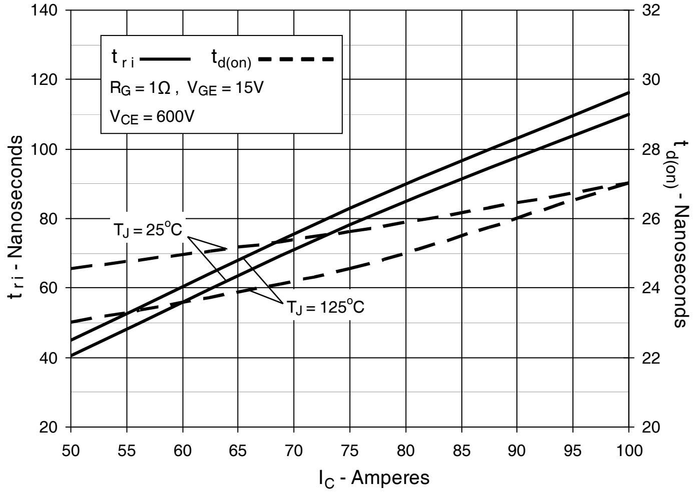
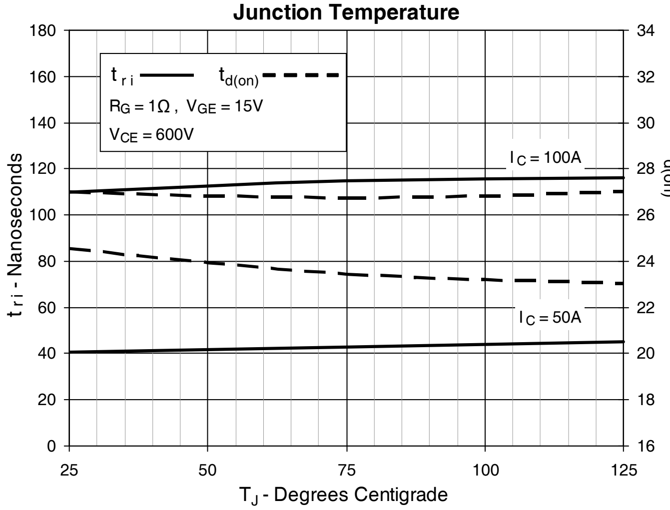
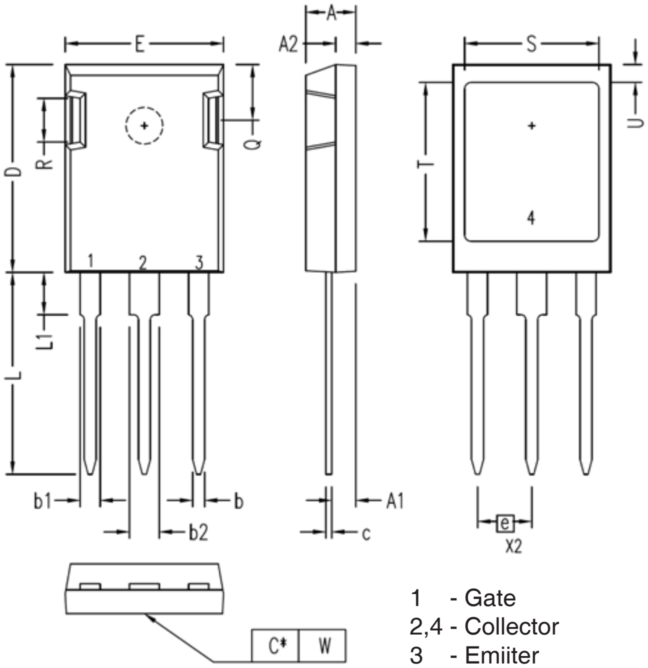


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



IXYS REF: IXY_100N120C3(9T-RY92)4-06-18

ISOPLUS247 (IXYR) Outline



1 - Gate
2,4 - Collector
3 - Emiiter

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
b1	.075	.085	1.91	2.15
b2	.115	.126	2.92	3.20
C	.024	.033	0.61	0.83
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.811	19.81	20.60
L1	.150	.172	3.81	4.38
Q	.220	.244	5.59	6.20
R	.170	.191	4.32	4.85
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03
W	0	.004	0	0.10

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

C* – Convex bow of substrate is typ<0.04mm over plastic surface level of device bottom side.

LEAD FINISH – External leads are Pb free solder dip.