IXYS

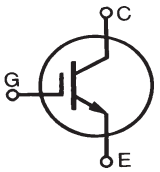
GenX3™ 300V IGBTs

IXGK400N30A3
IXGX400N30A3*

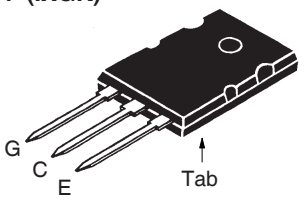
*Obsolete Part Number

V_{CES} = 300V
I_{C25} = 400A
$V_{CE(sat)}$ ≤ 1.15V

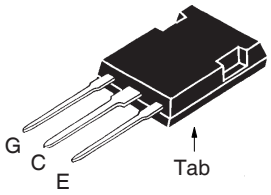
Ultra-Low Vsat PT IGBTs for
up to 10kHz Switching



TO-264 (IXGK)



PLUS247™ (IXGX)



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	300	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	300	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C (Chip Capability)	400	A
I_{C110}	T_C = 110°C	200	A
I_{LRMS}	Terminal Current Limit	160	A
I_{CM}	T_C = 25°C, 1ms	1200	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 1Ω Clamped Inductive Load	I_{CM} = 400 @ 0.8 • V_{CES}	A
P_C	T_C = 25°C	1000	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062 in.) from Case for 10	260	°C
M_d	Mounting Torque (IXGK)	1.13/10	Nm/lb.in.
F_C	Mounting Force (IXGX)	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	300			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			50	μA
	T_J = 125°C			2	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±400	nA
$V_{CE(sat)}$	I_C = 100A, V_{GE} = 15V, Note 1			1.15	V
	I_C = 400A		1.70		V

Features

- Optimized for Low Conduction Losses
- High Avalanche Capability
- International Standard Packages

Advantages

- High Power Density
- Low Gate Drive Requirement

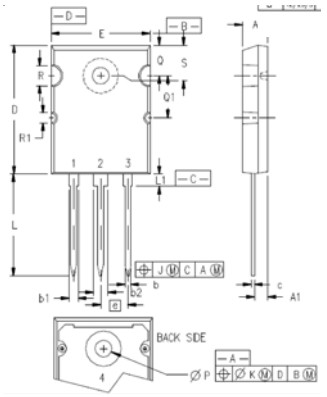
Applications

- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts
- Inrush Current Protection Circuits

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 60A, V_{CE} = 10V, Note 1	100	170		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1 MHz		19		nF
C_{oes}			1350		pF
C_{res}			190		pF
$Q_{g(on)}$	I_C = 100A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		560		nC
Q_{ge}			83		nC
Q_{gc}			185		nC
$t_{d(on)}$	**Resistive load, T_J = 25°C**		45		ns
t_r	I_C = 100A, V_{GE} = 15V		45		ns
$t_{d(off)}$	V_{CE} = 240V, R_G = 1Ω		210		ns
t_f			107		ns
$t_{d(on)}$	**Resistive load, T_J = 125°C**		47		ns
t_r	I_C = 100A, V_{GE} = 15V		53		ns
$t_{d(off)}$	V_{CE} = 240V, R_G = 1Ω		240		ns
t_f			315		ns
R_{thJC}				0.125	°C/W
R_{thCK}			0.15		°C/W

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

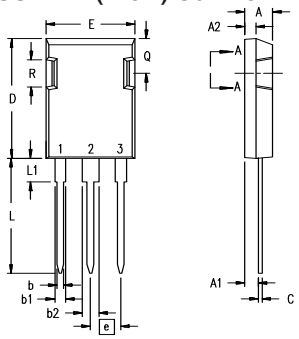
TO-264 (IXGK) Outline



1 – GATE
2, 4 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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
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™ (IXGX) Outline



Terminals: 1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.83	5.21	.190	.205
A_1	2.29	2.54	.090	.100
A_2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b_1	1.91	2.13	.075	.084
b_2	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

Fig. 1. Output Characteristics @ T_J = 25ºC

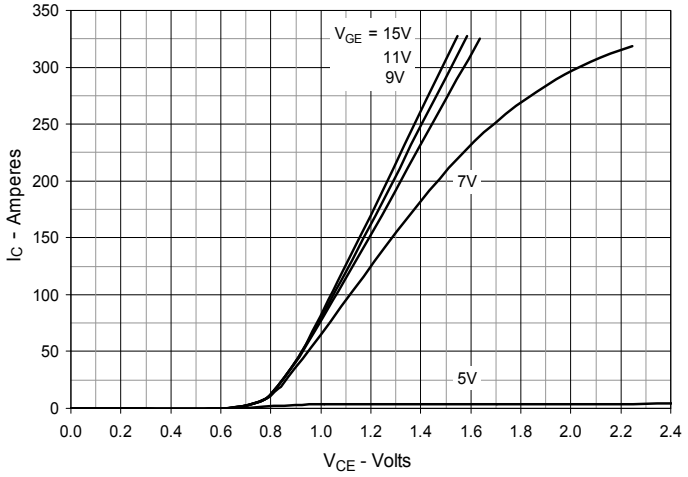


Fig. 2. Output Characteristics @ T_J = 125ºC

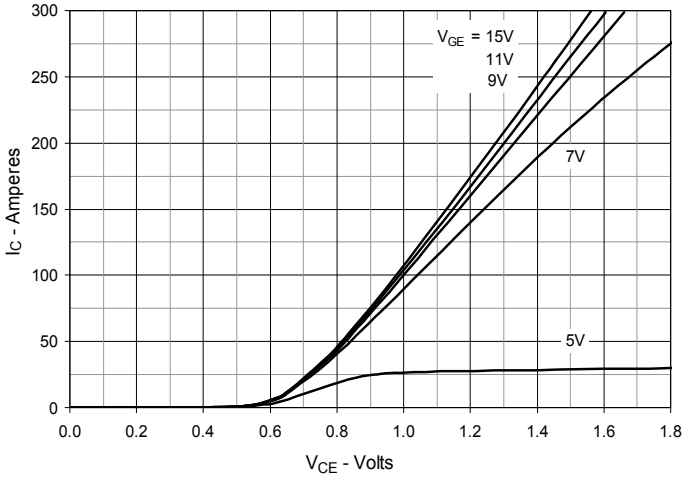


Fig. 3. Dependence of $V_{CE(sat)}$ on Junction Temperature

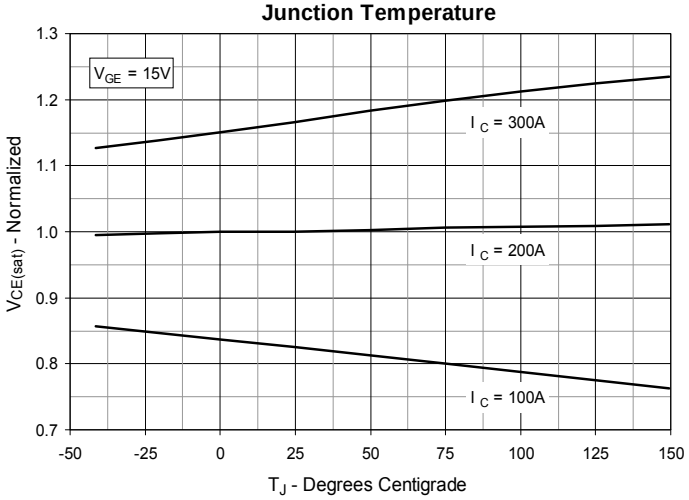


Fig. 4. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

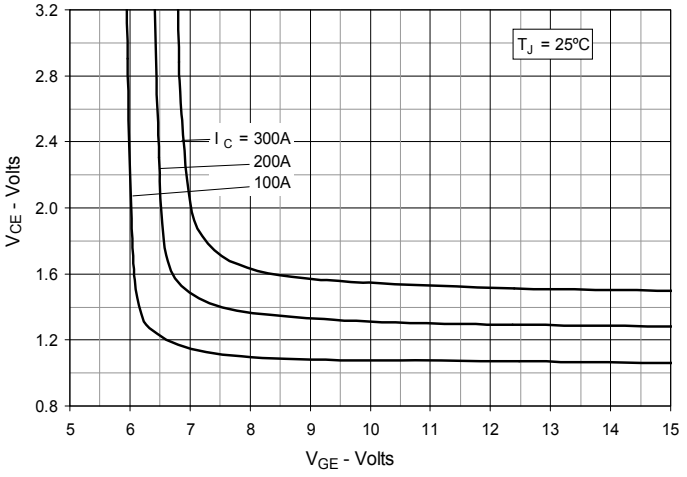


Fig. 5. Input Admittance

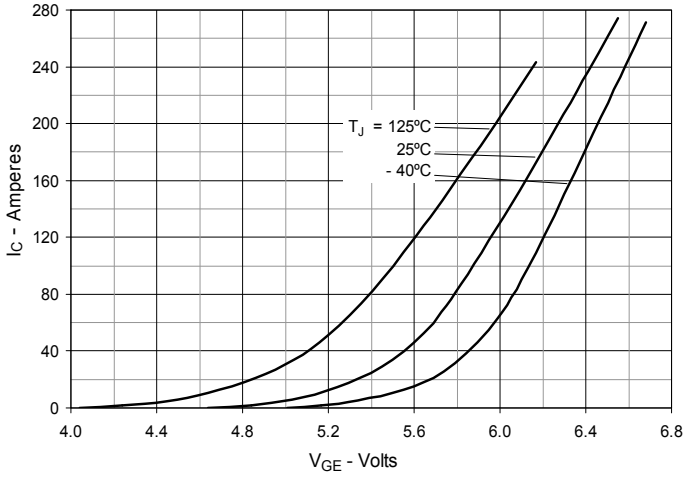


Fig. 6. Transconductance

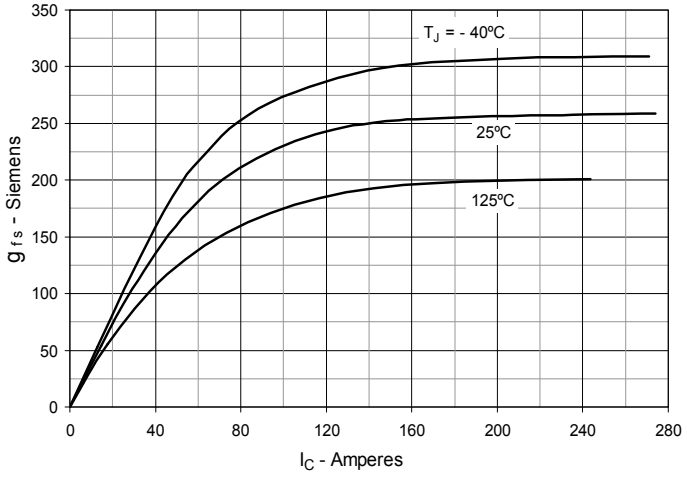


Fig. 7. Gate Charge

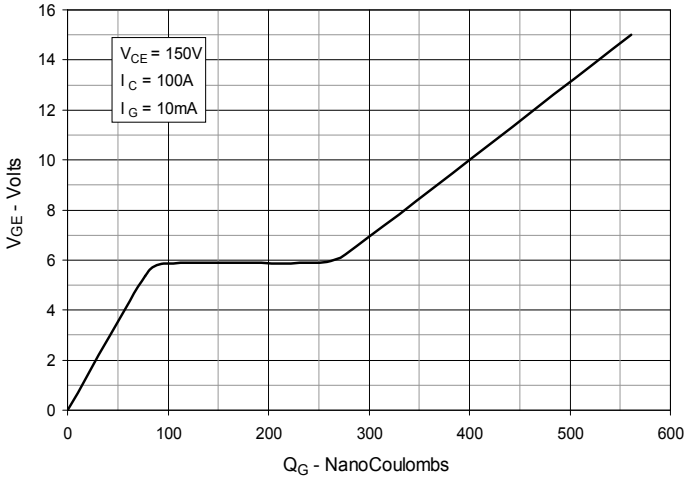


Fig. 8. Capacitance

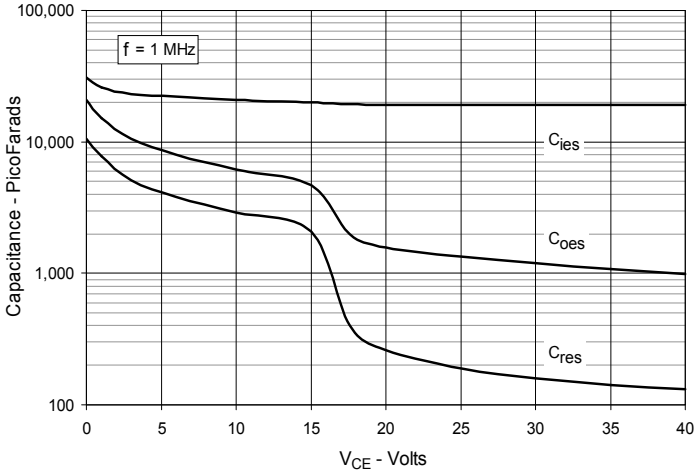


Fig. 9. Reverse-Bias Safe Operating Area

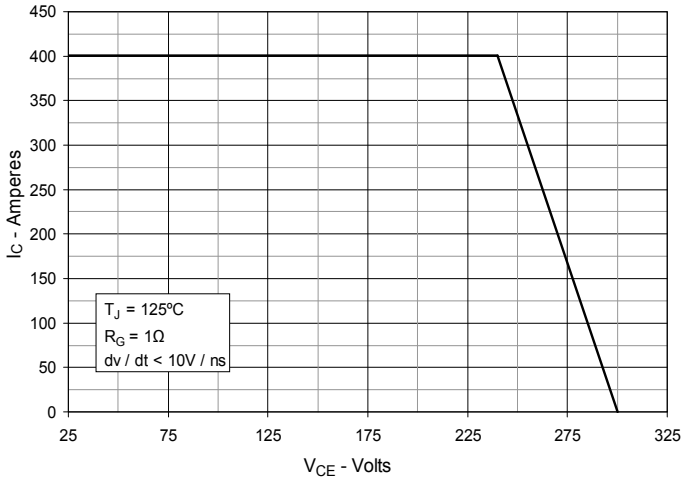


Fig. 10. Maximum Transient Thermal Impedance

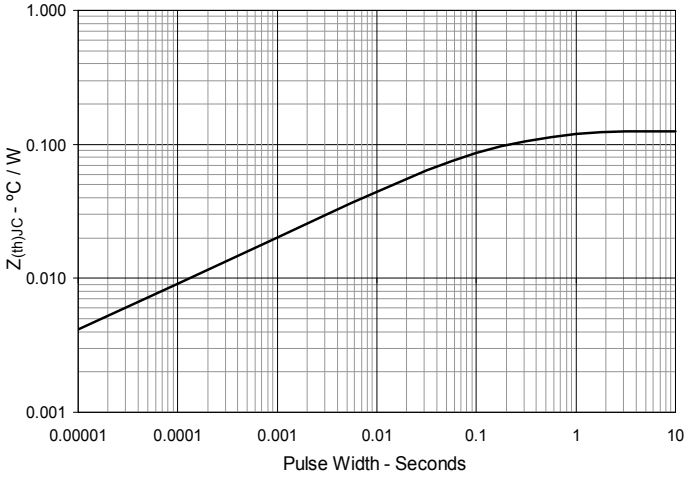


Fig. 11. Resistive Turn-on Rise Time vs. Junction Temperature

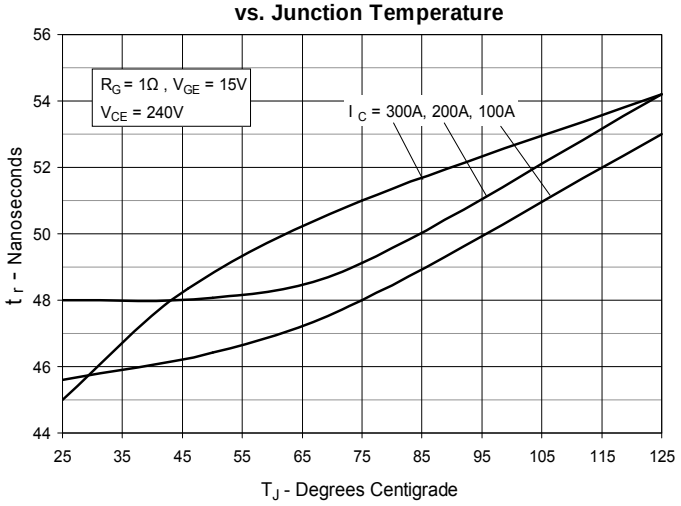


Fig. 12. Resistive Turn-on Rise Time vs. Collector Current

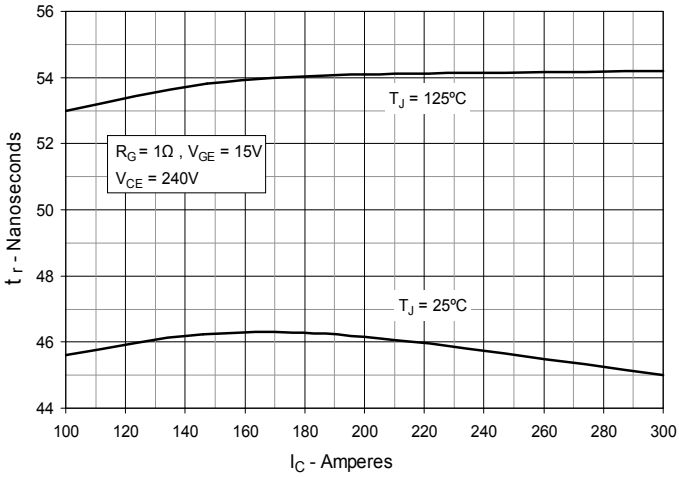


Fig. 13. Resistive Turn-on Switching Times vs. Gate Resistance

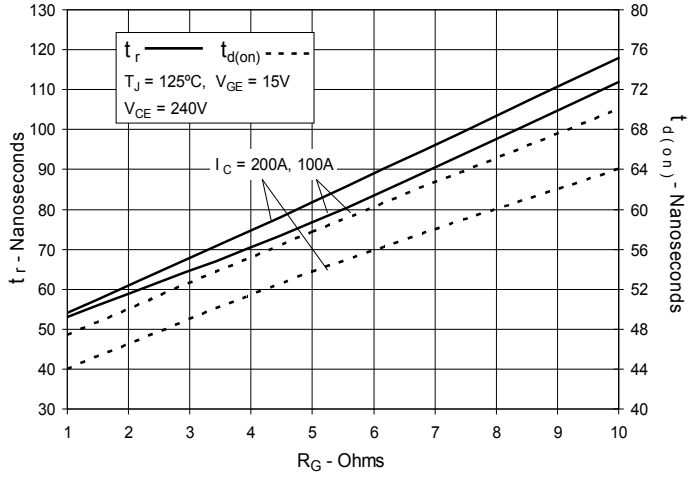


Fig. 14. Resistive Turn-off Switching Times vs. Junction Temperature

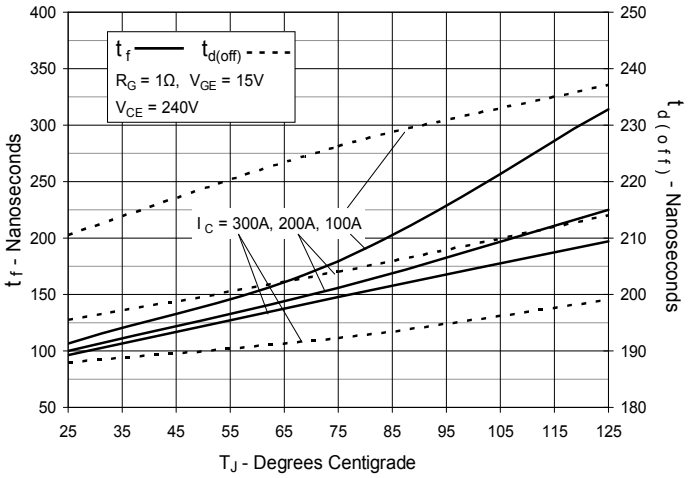


Fig. 15. Resistive Turn-off Switching Times vs. Gate Resistance

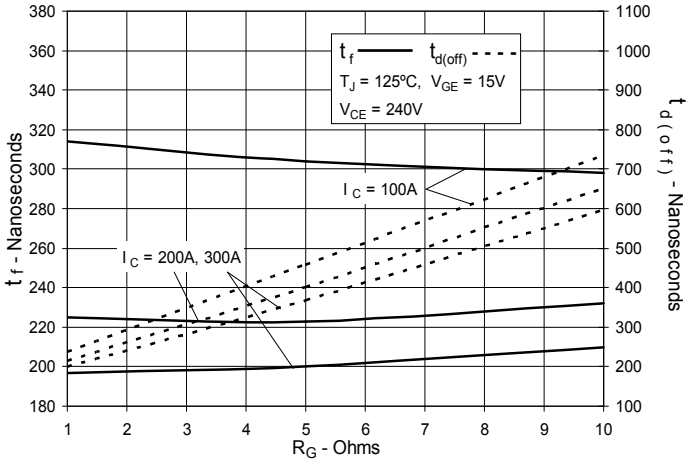


Fig. 16. Resistive Turn-off Switching Times vs. Collector Current