IXYS

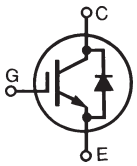
Advance Technical Information

GenX3™ 1400V IGBTs w/ Diode

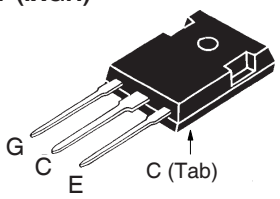
IXGH20N140C3H1
IXGT20N140C3H1

V_{CES} = 1400V
I_{C100} = 20A
$V_{CE(sat)}$ ≤ 5.0V
$t_{fi(typ)}$ = 32ns

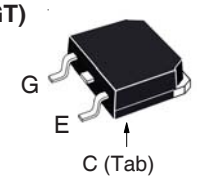
High-Speed PT IGBTs for 20 - 50 kHz Switching



TO-247 (IXGH)



TO-268 (IXGT)



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	1400	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	1400	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	42	A
I_{C100}	T_C = 100°C	20	A
I_{CM}	T_C = 25°C, 1ms	108	A
I_A	T_C = 25°C	20	A
E_{AS}	T_C = 25°C	400	mJ
SSOA (RBSOA)	V_{GE} = 15V, T_J = 125°C, R_G = 5Ω Clamped Inductive Load	I_{CM} = 40 $V_{CE} \leq V_{CES}$	A
P_C	T_C = 25°C	250	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10 seconds	260	°C
M_d	Mounting Torque (TO-247)	1.13/10	Nm/lb.in.
Weight	TO-247	6	g
	TO-268	4	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			100	μA
	T_J = 125°C, Note 1			2.0	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = I_{C100}, V_{GE} = 15V, Note 1		4.0	5.0	V
	T_J = 125°C		3.5		V

Features

- Optimized for Low Switching Losses
- Square RBSOA
- High Avalanche Capability
- Anti-Parallel Ultra Fast Diode
- International Standard Packages

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.	
g_{fs}	$I_C = I_{C100}$, V_{CE} = 10V, Note 1	10	17		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		1790		pF
C_{oes}			145		pF
C_{res}			50		pF
Q_g	$I_C = I_{C100}$, V_{GE} = 15V, $V_{CE} = 0.5 \bullet V_{CES}$		88		nC
Q_{ge}			18		nC
Q_{gc}			30		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		19		ns
t_{ri}	$I_C = I_{C100}$, V_{GE} = 15V		12		ns
E_{on}	$V_{CE} = 0.5 \bullet V_{CES}$, R_G = 5Ω		1.35		mJ
$t_{d(off)}$	Note 2		110		ns
t_{fi}			32		ns
E_{off}			0.44	0.80	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		22		ns
t_{ri}	$I_C = I_{C100}$, V_{GE} = 15V		13		ns
E_{on}	$V_{CE} = 0.5 \bullet V_{CES}$, R_G = 5Ω		2.33		mJ
$t_{d(off)}$	Note 2		144		ns
t_{fi}			380		ns
E_{off}			1.64		mJ
R_{thJC}				0.50	°C/W
R_{thCK}	TO-247		0.21		°C/W

Reverse Diode (FRED)

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_F	I_F = 20A, V_{GE} = 0V, Note 1			3.0	V
	T_J = 125°C		2.8		V
I_{RM}	I_F = 20A, V_{GE} = 0V,		19		A
t_{rr}	$-di_F/dt$ = 750A/μs, V_R = 800V		70		ns
R_{thJC}				0.9	°C/W

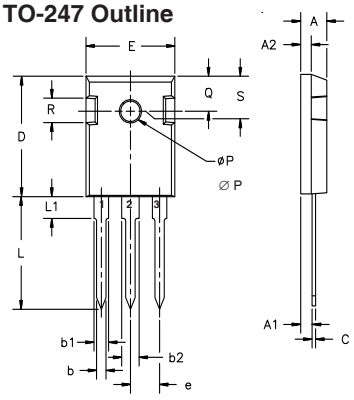
Notes:

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.

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

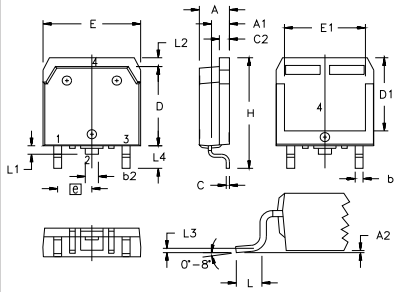
TO-247 Outline



Terminals: 1 - Gate 2 - Collector
3 - Emitter

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

TO-268 Outline



Terminals: 1 - Gate 2 & 4 - Collector
3 - Emitter

SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10