IXYS

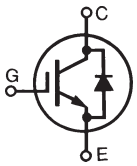
Advance Technical Information

GenX3™ 1400V IGBTs w/ Diode

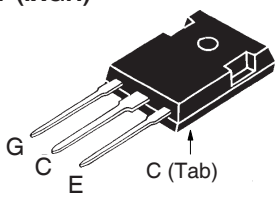
IXGH20N140C3H1
IXGT20N140C3H1

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

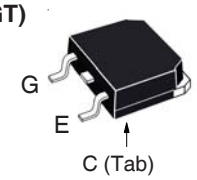
High-Speed PT IGBTs for 20 - 50 kHz Switching



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

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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

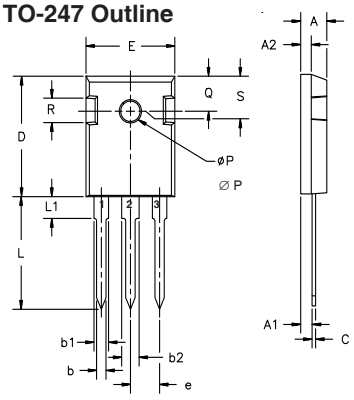
Notes:

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.

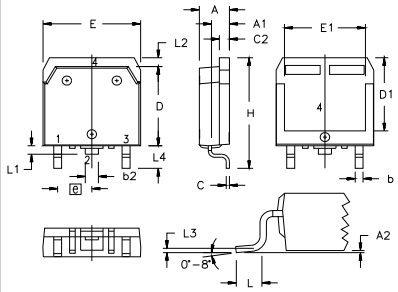
TO-247 Outline



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

IXYS 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 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2



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