IXYS

HiPerFET™ Power MOSFETs Q Class

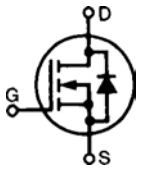
IXFH 12N90Q
IXFT 12N90Q
IXFX 12N90Q

V_{DSS} = 900 V
I_{D25} = 12 A
$R_{DS(on)}$ = 0.9 Ω

$t_{rr} \leq 200$ ns

N-Channel Enhancement Mode
Avalanche Rated
Low Q_g, High dv/dt

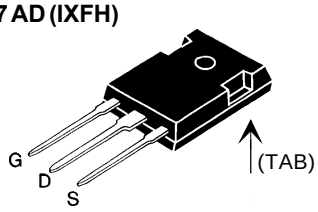
Preliminary data sheet



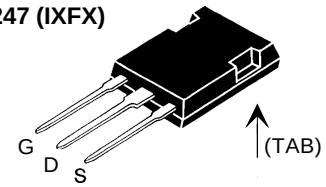
Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	900	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ	900	V
V_{GS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	12	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	48	A
I_{AR}	T_C = 25°C	12	A
E_{AR}	T_C = 25°C	30	mJ
dv/dt	$I_S \leq I_{DM}$, di/dt ≤ 100 A/∝s, $V_{DD} \leq V_{DSS}$, $T_J \leq 150°C$, R_G = 2 Ω	5	V/ns
P_D	T_C = 25°C	300	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6 mm (0.063 in) from case for 10 s	300	°C
M_d	Mounting torque (TO-247)	1.13/10	Nm/lb.in.
F_c	Mounting Force (PLUS 247)	20...120/4.5...27	N/lbs
Weight	TO-247, PLUS 247	6	g
	TO-268	4	g

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_{DSS}	V_{GS} = 0 V, I_D = 3 mA	900			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4 mA	2.5		5.5	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0			±100	nA
I_{DSS}	V_{DS} = 0.8 • V_{DSS}, T_J = 25°C			50	∝A
	V_{GS} = 0 V, T_J = 125°C			1	mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 I_{D25}, Pulse test, t ≤ 300 ∝s, duty cycle d ≤ 2 %			0.9	Ω

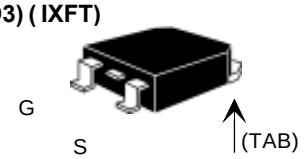
TO-247 AD (IXFH)



PLUS 247 (IXFX)



TO-268 (D3) (IXFT)



G = Gate D = Drain
S = Source TAB = Drain

Features

- IXYS advanced low Q_g process
- Low gate charge and capacitances
  - easier to drive
  - faster switching
- International standard packages
- Low $R_{DS\ (on)}$
- Unclamped Inductive Switching (UIS) rated
- Molding epoxies meet UL 94 V-0 flammability classification

Advantages

- Easy to mount
- Space savings
- High power density

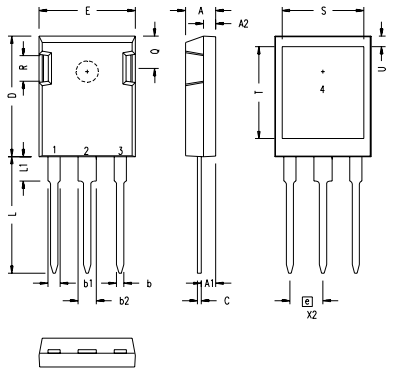
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Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	V_{DS} = 10 V; I_D = 0.5 • I_{D25}, pulse test	6	10		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		2900		pF
C_{oss}			315		pF
C_{rss}			50		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25} R_G = 2 Ω (External),		20		ns
t_r			23		ns
$t_{d(off)}$			40		ns
t_f			15		ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		90		nC
Q_{gs}			30		nC
Q_{gd}			40		nC
R_{thJC}				0.42	K/W
R_{thCK}	(TO-247)		0.25		K/W
	(PLUS 247)		0.15		K/W

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
I_S	V_{GS} = 0 V			12	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			48	A
V_{SD}	$I_F = I_S$, V_{GS} = 0 V, Pulse test, t ≤ 300 ∝s, duty cycle d ≤ 2 %			1.3	V
t_{rr}	$I_F = I_S$, -di/dt = 100 A/∝s, V_R = 100 V		200		ns
Q_{RM}			0.6		∝C
I_{RM}			7		A

PLUS-247 (IXFX) Outline

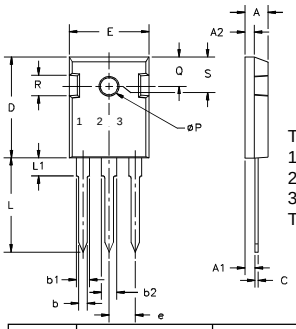


SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

1 – GATE
2 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)
4 – NO CONNECTION

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

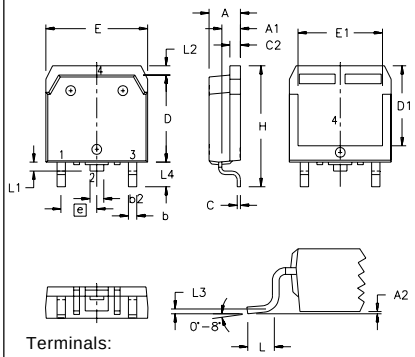
TO-247 AD (IXFH) Outline



Terminals:
1 - Gate
2 - Drain
3 - Source
Tab - Drain

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches 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 (D3) (IXFT) Outline



Terminals:
1 - Gate
2 - Drain
3 - Source
Tab - Drain

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715 6,306,728B1 6,259,123B1 6,306,728B1 4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025 6,404,065B1 6,162,665 6,534,343