

HiPerFET™

Power MOSFETs

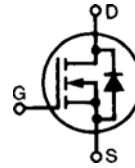
Q Class

IXFH 12N90Q
IXFT 12N90Q
IXFX 12N90Q

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

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

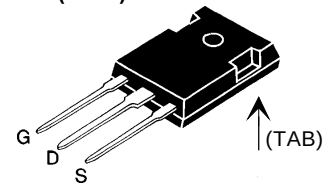
Preliminary data sheet



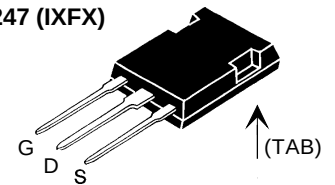
t_{rr} ≤ 200 ns

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 ≤ I _{DM} , di/dt ≤ 100 A/μs, V _{DD} ≤ V _{DSS} , T _J ≤ 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...27N/lbs	
Weight	TO-247, PLUS 247	6	g
	TO-268	4	g

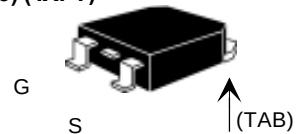
TO-247 AD (IXFH)



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

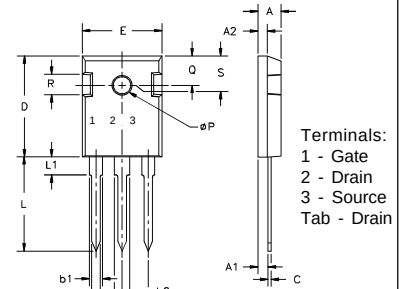
Advantages

- Easy to mount
- Space savings
- High power density

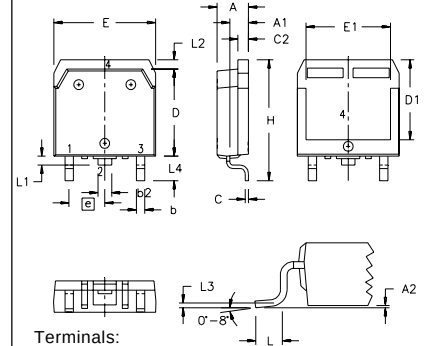
Symbol	Test Conditions	Characteristic Values (T _J = 25°C, unless otherwise specified)		
		min.	typ.	max.
V _{DSS}	V _{GS} = 0 V, I _D = 3 mA	900		V
V _{GS(th)}	V _{DS} = V _{GS} , I _D = 4 mA	2.5		5.5 V
I _{GSS}	V _{GS} = ±20 V _{DC} , V _{DS} = 0			±100 nA
I _{DSS}	V _{DS} = 0.8 • V _{DSS} V _{GS} = 0 V			50 μA 1 mA
R _{DS(on)}	V _{GS} = 10 V, I _D = 0.5 I _{D25} Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			0.9 Ω

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
g_{fs}	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$, pulse test	6	10	S
C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		2900	pF
C_{oss}			315	pF
C_{rss}			50	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 2\ \Omega$ (External),		20	ns
t_r			23	ns
$t_{d(off)}$			40	ns
t_f			15	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		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		Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
Symbol	Test Conditions	min.	typ.	max.
I_S	$V_{GS} = 0\text{ V}$			12 A
I_{SM}	Repetitive; pulse width limited by T_{JM}			48 A
V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$			1.3 V
t_{rr}	$I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		200	ns
Q_{RM}			0.6	μC
I_{RM}			7	A

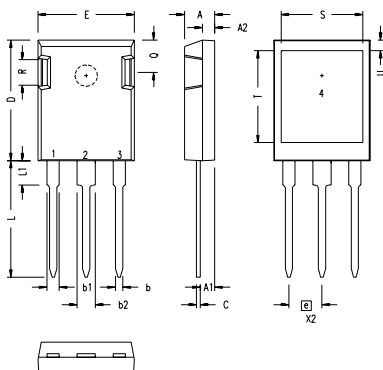
TO-247 AD (IXFH) Outline


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	.087	.102
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	.205	.225
L	19.81	20.32	.780	.800
L ₁		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	.232	.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
A ₁	.106	.114	2.70	2.90
A ₂	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b ₂	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C ₂	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D ₁	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E ₁	.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
L ₁	.047	.055	1.20	1.40
L ₂	.039	.045	1.00	1.15
L ₃	.010 BSC		0.25 BSC	
L ₄	.150	.161	3.80	4.10

PLUS-247 (IXFX) Outline


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A ₁	.090	.100	2.29	2.54
A ₂	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b ₁	.075	.084	1.91	2.13
b ₂	.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
L ₁	.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.

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