

# HiPerFET™ Power MOSFETs Q Class

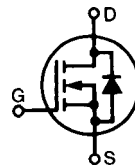
N-Channel Enhancement Mode  
Avalanche Rated  
Low  $Q_g$ , High  $dv/dt$

Preliminary data sheet

**IXFH 12N90Q**  
**IXFT 12N90Q**

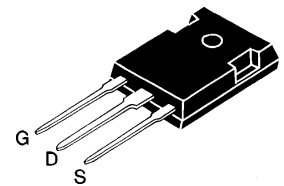
$V_{DSS} = 900 \text{ V}$   
 $I_{D25} = 12 \text{ A}$   
 $R_{DS(on)} = 0.9 \Omega$

$t_{rr} \leq 200 \text{ ns}$

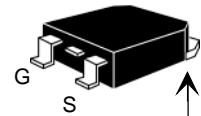


Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	900	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	900	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	12	A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

TO-247 AD (IXFH)



TO-268 (D3) (IXFT)



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

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 3 \text{ mA}$	900		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4 \text{ mA}$	2.5		V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 100 \text{ nA}$
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ $V_{GS} = 0 \text{ V}$	$T_J = 25^\circ\text{C}$		50 $\mu\text{A}$
		$T_J = 125^\circ\text{C}$		1 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$ Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$			0.9 $\Omega$

## Features

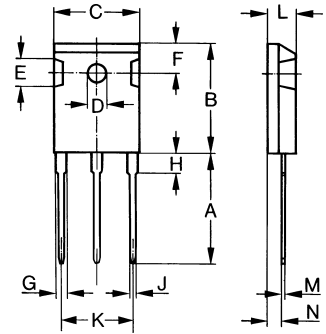
- IXYS advanced low  $Q_g$  process
- Low gate charge and capacitances  
- easier to drive  
- faster switching
- International standard packages
- Low  $R_{DS(on)}$
- Unclamped Inductive Switching (UIS) rated
- Molding epoxies meet UL 94 V-0 flammability classification

## Advantages

- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , 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
$R_{thJC}$	(TO-247)			0.42 K/W
$R_{thCK}$			0.25	K/W

TO-247 AD (IXFH) Outline

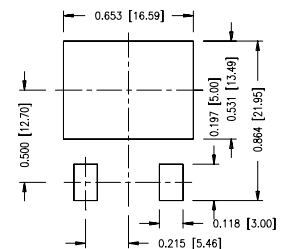


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.5	-	0.177
J	1.0	1.4	0.040	0.055
K	10.8	11.0	0.426	0.433
L	4.7	5.3	0.185	0.209
M	0.4	0.8	0.016	0.031
N	1.5	2.49	0.087	0.102

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		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	$\mu\text{C}$
$I_{RM}$			7	A

TO-268AA (D <sup>3</sup> PAK)		Dim.		Millimeter		Inches	
				Min.	Max.	Min.	Max.
	A	4.9	5.1	.193	.201		
	A <sub>1</sub>	2.7	2.9	.106	.114		
	A <sub>2</sub>	.02	.25	.001	.010		
	b	1.15	1.45	.045	.057		
	b <sub>2</sub>	1.9	2.1	.75	.83		
	C	.4	.65	.016	.026		
	D	13.80	14.00	.543	.551		
	E	15.85	16.05	.624	.632		
	E <sub>1</sub>	13.3	13.6	.524	.535		
	e	5.45 BSC		.215 BSC			
	H	18.70	19.10	.736	.752		
	L	2.40	2.70	.094	.106		
	L <sub>1</sub>	1.20	1.40	.047	.055		
	L <sub>2</sub>	1.00	1.15	.039	.045		
	L <sub>3</sub>	0.25 BSC		.010 BSC			
	L <sub>4</sub>	3.80	4.10	.150	.161		

Min. Recommended Footprint





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