

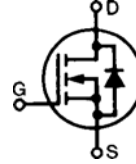
# HiPerFET™ Power MOSFETs Q-Class

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

**IXFH20N80Q**  
**IXFK20N80Q**  
**IXFT20N80Q**

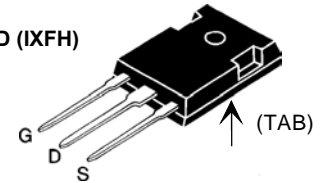
$V_{DSS} = 800 \text{ V}$   
 $I_{D25} = 20 \text{ A}$   
 $R_{DS(on)} = 0.42 \text{ } \Omega$

$t_{rr} \leq 250 \text{ ns}$

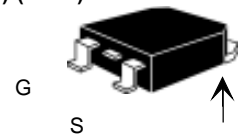


Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	800	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	800	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	20	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	80	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	20	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	45	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	1.5	J
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 2 \text{ } \Omega$	5	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	360	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	TO-247 TO-264	1.13/10 Nm/lb.in. 0.9/6 Nm/lb.in.
<b>Weight</b>		TO-247 TO-268 TO-264	6 4 10 g

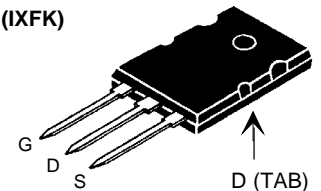
TO-247 AD (IXFH)



TO-268 (D3) (IXFT)



TO-264 AA (IXFK)



G = Gate  
S = Source

TAB = Drain

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \text{ } \mu\text{A}$	800		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4 \text{ mA}$	2.5		V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 200 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0 \text{ V}$			25 $\mu\text{A}$ 1 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300 \text{ } \mu\text{s}$ , duty cycle $d \leq 2 \%$			0.42 $\Omega$

## Features

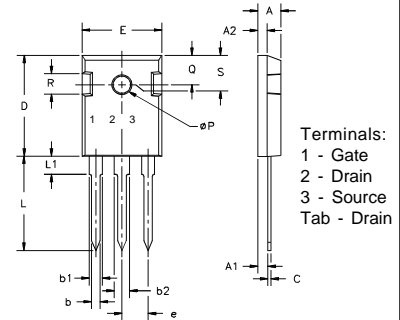
- IXYS advanced low  $Q_g$  process
- International standard packages
- Epoxy meet UL 94 V-0, flammability classification
- Low  $R_{DS(on)}$  low  $Q_g$
- Avalanche energy and current rated
- Fast intrinsic rectifier

## 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	11	19	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		5100	pF
$C_{oss}$			500	pF
$C_{rss}$			170	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1.5\ \Omega$ (External),		28	ns
$t_r$			27	ns
$t_{d(off)}$			74	ns
$t_f$			14	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		150	nC
$Q_{gs}$			34	nC
$Q_{gd}$			80	nC
$R_{thJC}$			0.35	K/W
$R_{thCK}$	TO-247		0.25	K/W
	TO-264		0.15	K/W

### TO-247 AD (IXFH) Outline



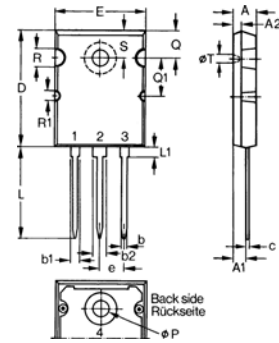
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L <sub>1</sub>		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

### Source-Drain Diode

Characteristic Values  
( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

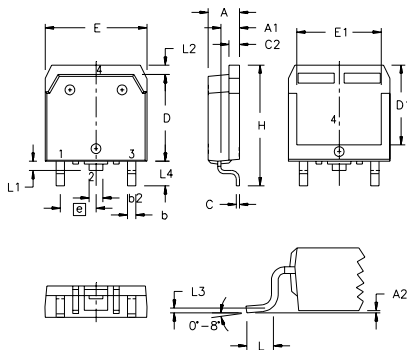
Symbol	Test Conditions	min.	typ.	max.
$I_S$	$V_{GS} = 0\text{ V}$			20 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$			80 A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$			1.5 V
$t_{rr}$	$I_F = I_S - di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		1	250 ns
$Q_{RM}$			9	$\mu\text{C}$
$I_{RM}$				A

### TO-264 AA Outline



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.82	5.13	.190	.202
A <sub>1</sub>	2.54	2.89	.100	.114
A <sub>2</sub>	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b <sub>1</sub>	2.39	2.69	.094	.106
b <sub>2</sub>	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e		5.46 BSC		.215 BSC
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L <sub>1</sub>	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q <sub>1</sub>	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R <sub>1</sub>	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

### TO-268 Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A <sub>1</sub>	.106	.114	2.70	2.90
A <sub>2</sub>	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b <sub>2</sub>	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C <sub>2</sub>	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D <sub>1</sub>	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E <sub>1</sub>	.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 <sub>1</sub>	.047	.055	1.20	1.40
L <sub>2</sub>	.039	.045	1.00	1.15
L <sub>3</sub>		.010 BSC		0.25 BSC
L <sub>4</sub>	.150	.161	3.80	4.10

IXYS reserves the right to change limits, test conditions, and dimensions.



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