

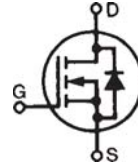
# HiPerRF™

## Power MOSFETs

F-Class: MegaHertz Switching

# IXFH21N50F IXFT21N50F

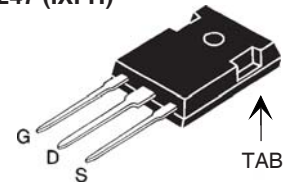
N-Channel Enhancement Mode  
Avalanche Rated, Low  $Q_g$ , Low  
Intrinsic  $R_g$ , High  $dV/dt$ , Low  $t_{rr}$



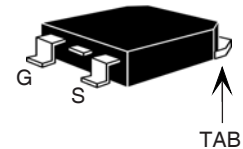
$$\begin{aligned} V_{DSS} &= 500V \\ I_{D25} &= 21A \\ R_{DS(on)} &\leq 250m\Omega \\ t_{rr} &\leq 250ns \end{aligned}$$

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	500	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$	500	V
$V_{GSS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	21	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$	84	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	21	A
$E_{AS}$	$T_C = 25^\circ\text{C}$	1.5	J
$dV/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100A/\mu s$ , $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$ , $R_G = 2\Omega$	10	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	$^\circ\text{C}$
$T_L$	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
$T_{SOLD}$	Plastic Body for 10s	260	$^\circ\text{C}$
$M_d$	Mounting Torque (TO-247)	1.13/10	Nm/lb.in.
Weight	TO-247	6	g
	TO-268	4	g

TO-247 (IXFH)



TO-268 (IXFT)



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

### Features

- RF capable MOSFETs
- Double metal process for low gate resistance
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- Fast intrinsic rectifier

### Applications

- DC-DC converters
- Switched-mode and resonant-mode power supplies, >500kHz switching
- DC choppers
- 13.5 MHz industrial applications
- Pulse generation
- Laser drivers
- RF amplifiers

### Advantages

- Space savings
- High power density

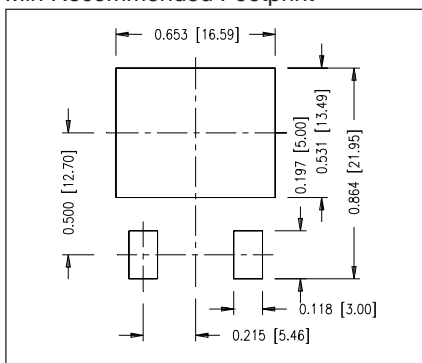
Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = 1mA$	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4mA$	3.0		5.5 V
$I_{GSS}$	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$			50 $\mu A$
	$V_{GS} = 0V$ $T_J = 125^\circ\text{C}$			1.5 mA
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1			250 m $\Omega$

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 10\text{V}, I_D = 0.5 \cdot I_{D25}$ , Note 1	12	17	S
$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$		2600	pF
$C_{oss}$			470	pF
$C_{rss}$			160	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 2\Omega$ (External)		16	ns
$t_r$			12	ns
$t_{d(off)}$			36	ns
$t_f$			7.7	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		77	nC
$Q_{gs}$			21	nC
$Q_{gd}$			40	nC
$R_{thJC}$	(TO-247)			0.42 $^\circ\text{C/W}$
$R_{thCS}$			0.21	$^\circ\text{C/W}$

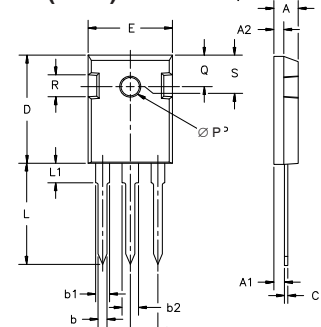
Source-Drain Diode		Characteristic Values		
$T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{V}$			21 A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			84 A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{V}$ , Note 1			1.5 V
$t_{rr}$	$I_F = 21\text{A}, -di/dt = 100\text{A}/\mu\text{s}$			250 ns
$Q_{RM}$			1.2	$\mu\text{C}$
$I_{RM}$	$V_R = 100\text{V}, V_{GS} = 0\text{V}$		10	A

Note: 1. Pulse test,  $t \leq 300 \mu\text{s}$ , duty cycle  $d \leq 2\%$

### Min Recommended Footprint

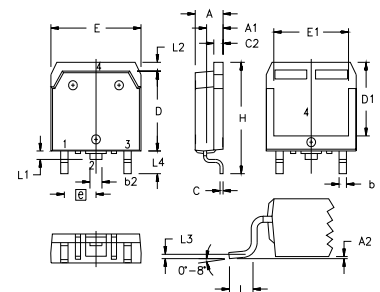


### TO-247 (IXFH) Outline



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
ØP	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



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.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	