

# HiPerRF™

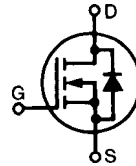
## Power MOSFETs

### F-Class: MegaHertz Switching

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

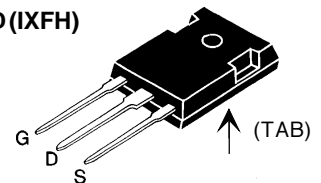
**IXFH 21N50F**  
**IXFT 21N50F**

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

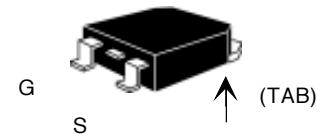


Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	500	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$	500	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	21	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	84	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	21	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	35	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	1.5	J
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100\text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$ , $R_G = 2\ \Omega$	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	$^\circ\text{C}$
$T_L$	1.6 mm (0.063 in.) from case for 10 s	300	$^\circ\text{C}$
$M_d$	Mounting torque	TO-247	1.13/10 Nm/lb.in.
Weight		TO-247	6 g
		TO-268	4 g

TO-247 AD (IXFH)



TO-268 (IXFT) Case Style



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

#### Features

- RF capable MOSFETs
- Double metal process for low gate resistance
- Unclamped Inductive Switching (UIS) rated
- Low package inductance - easy to drive and to protect
- 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

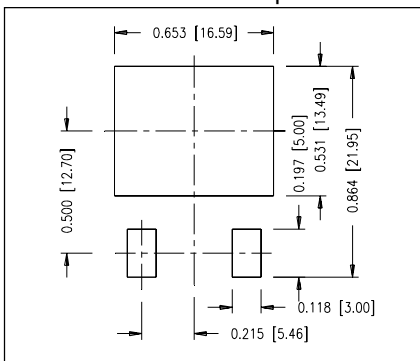
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0\text{ V}$ , $I_D = 1\text{ mA}$	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4\text{ mA}$	3.0		5.5 V
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}$ , $V_{DS} = 0$			$\pm 100\text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0\text{ V}$ $T_J = 125^\circ\text{C}$			50 $\mu\text{A}$ 1.5 mA
$R_{DS(on)}$	$V_{GS} = 10\text{ V}$ , $I_D = 0.5\ I_{D25}$ Note 1			250 m $\Omega$

Symbol	Test Conditions	Characteristic Values		
		$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$		
		min.	typ.	max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ 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
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 2.0\ \Omega$ (External)		16	ns
$t_r$			12	ns
$t_{d(off)}$			36	ns
$t_f$			7.7	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$		77	nC
$Q_{gs}$			21	nC
$Q_{gd}$			40	nC
$R_{thJC}$			0.42	K/W
$R_{thCK}$	(TO-247)		0.25	K/W

Symbol	Test Conditions	Characteristic Values		
		$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$		
		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
$t_{rr}$	$I_F = I_s, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$			250 ns
$Q_{RM}$			1.2	$\mu\text{C}$
$I_{RM}$			10	A

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

#### Min Recommended Footprint

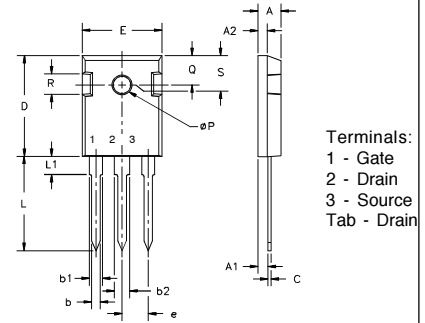


IXYS reserves the right to change limits, test conditions, and dimensions.

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

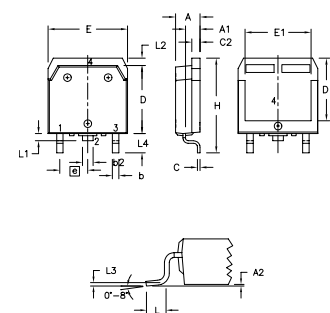
4,835,592    4,881,106    5,017,508    5,049,961    5,187,117    5,486,715    6,306,728B1  
 4,850,072    4,931,844    5,034,796    5,063,307    5,237,481    5,381,025

#### TO-247 AD 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
L1		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



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
L1	1.20	1.40	.047	.055
L2	1.00	1.15	.039	.045
L3		0.25	BSC	.010
L4	3.80	4.10	.150	.161