

# HiPerRF™

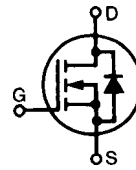
## Power MOSFETs

### F-Class: MegaHertz Switching

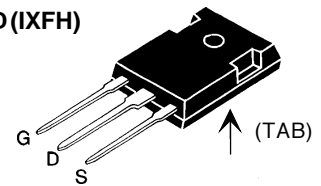
N-Channel Enhancement Mode  
 Avalanche Rated, Low  $Q_g$ , Low Intrinsic  $R_g$   
 High  $dV/dt$ , Low  $t_{rr}$

IXFH 60N20F  
 IXFT 60N20F

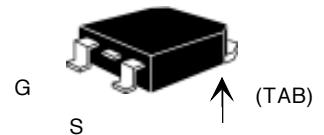
$V_{DSS} = 200V$   
 $I_{D25} = 60A$   
 $R_{DS(on)} = 38m\Omega$   
 $t_{rr} \leq 200 ns$



TO-247 AD (IXFH)



TO-268 (IXFT) Case Style



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

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ C$ to $150^\circ C$	200	V
$V_{DGR}$	$T_J = 25^\circ C$ to $150^\circ C$ ; $R_{GS} = 1 M\Omega$	200	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ C$	60	A
$I_{DM}$	$T_C = 25^\circ C$ , pulse width limited by $T_{JM}$	240	A
$I_{AR}$	$T_C = 25^\circ C$	60	A
$E_{AR}$	$T_C = 25^\circ C$	35	mJ
$E_{AS}$	$T_C = 25^\circ C$	1.5	J
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100 A/\mu s$ , $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ C$ , $R_G = 2 \Omega$	10	V/ns
$P_D$	$T_C = 25^\circ C$	315	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$T_L$	1.6 mm (0.063 in.) from case for 10 s	300	$^\circ C$
$M_d$	Mounting torque	TO-247	1.13/10 Nm/lb.in.
Weight		TO-247	6 g
		TO-268	4 g

#### 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 ( $T_J = 25^\circ C$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0 V$ , $I_D = 1 mA$	200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4 mA$	2.0		4.0 V
$I_{GSS}$	$V_{GS} = \pm 20 V$ , $V_{DS} = 0$			$\pm 100 nA$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 V$			50 $\mu A$ 1.5 mA
$R_{DS(on)}$	$V_{GS} = 10 V$ , $I_D = 0.5 I_{D25}$ Note 1			38 m $\Omega$

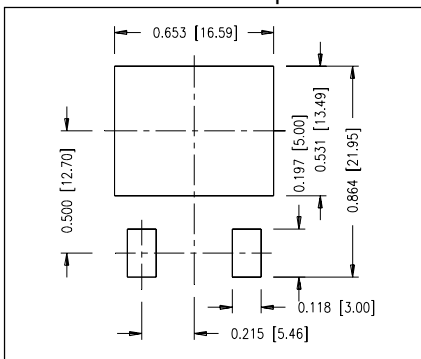
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ Note 1	18	26	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		2930	pF
$C_{oss}$			940	pF
$C_{rss}$			320	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)		15	ns
$t_r$			14	ns
$t_{d(off)}$			42	ns
$t_f$			7.0	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$		100	nC
$Q_{gs}$			25	nC
$Q_{gd}$			46	nC
$R_{thJC}$			0.39	K/W
$R_{thCK}$	(TO-247)		0.25	K/W

### Source-Drain Diode

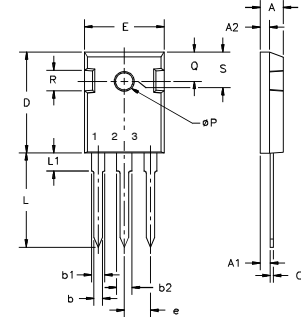
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$I_S$	$V_{GS} = 0\text{ V}$			60 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$			240 A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{ V}$ , Note 1			1.5 V
$t_{rr}$	$I_F = 25\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$			200 ns
$Q_{RM}$			0.8	$\mu\text{C}$
$I_{RM}$			10	A

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

### Min Recommended Footprint



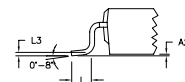
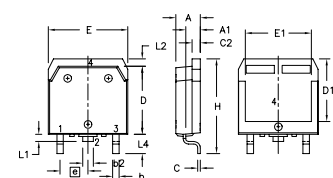
### TO-247 AD Outline



Terminals:  
1 - Gate  
2 - Drain  
3 - Source  
Tab - Drain

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	BSC
L4	3.80	4.10	.150	.161

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