

# HiPerRF™

## Power MOSFETs

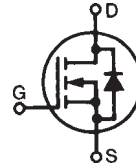
### F-Class: MegaHertz Switching

## IXFR 55N50F

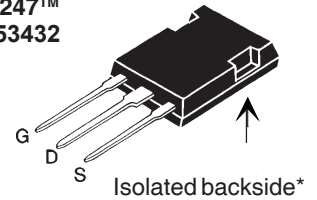
$V_{DSS} = 500 \text{ V}$   
 $I_{D25} = 55 \text{ A}$   
 $R_{DS(on)} = 90 \text{ m}\Omega$

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

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



ISOPLUS247™  
 E153432



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

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
$I_{D25}$	$T_C = 25^\circ\text{C}$	45	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	220	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	55	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	60	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	3.0	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
$P_D$	$T_C = 25^\circ\text{C}$	400	W
$T_J$		-40 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-40 ... +150	$^\circ\text{C}$
$T_L$	1.6 mm (0.063 in.) from case for 10 s	300	$^\circ\text{C}$
$V_{ISOL}$	50/60 Hz, RMS $t = 1 \text{ min}$	2500	V~
<b>Weight</b>		5	g

### Features

- Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- RF capable Mosfets
- Low gate charge and capacitances
  - easier to drive
  - faster switching
- Low drain to tab capacitance (<30pF)
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Rated for Unclamped Inductive Load Switching (UIS)
- Fast intrinsic Rectifier

### Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control

### Advantages

- Easy assembly
- 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
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$	3.0		5.5 V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$			$\pm 200 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$			100 $\mu\text{A}$ 3 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = I_T$ Notes 2, 3			90 m $\Omega$

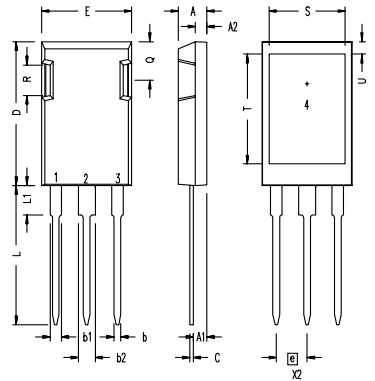
Symbol	Test Conditions		Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
			min.	typ.	max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = I_T$	Notes 2, 3	22	33	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$			6700	pF
$C_{oss}$				1250	pF
$C_{rss}$				330	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$ $R_G = 1\ \Omega$ (External)			24	ns
$t_r$				20	ns
$t_{d(off)}$				45	ns
$t_f$				9.6	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$			195	nC
$Q_{gs}$				50	nC
$Q_{gd}$				95	nC
$R_{thJC}$				0.30	K/W
$R_{thCK}$			0.15		K/W

### Source-Drain Diode

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$I_S$	$V_{GS} = 0\text{ V}$			55 A	
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$			220 A	
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{ V}$ , Note 1			1.5 V	
$t_{rr}$	$I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$			250	ns
$Q_{RM}$				1.0	$\mu\text{C}$
$I_{RM}$				10	A

- Note: 1. Pulse width limited by  $T_{JM}$   
 2. Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $d \leq 2\%$   
 3.  $I_T = 27.5\text{ A}$

### ISOPLUS 247 OUTLINE



1 Gate, 2 Drain (Collector)  
 3 Source (Emitter)  
 4 no connection

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A <sub>1</sub>	2.29	2.54	.090	.100
A <sub>2</sub>	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b <sub>1</sub>	1.91	2.13	.075	.084
b <sub>2</sub>	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	.244
R	4.32	4.83	.170	.190

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
	4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	