

# HiPerFET™ Power MOSFETs ISOPLUS247™

(Electrically Isolated Backside)

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

Preliminary Data

IXFR 4N100Q

$V_{DSS} = 1000 \text{ V}$

$I_{D25} = 3.5 \text{ A}$

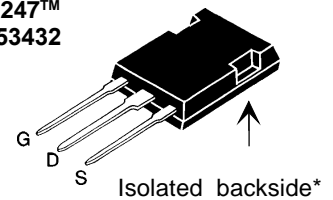
$R_{DS(on)} = 3.0 \Omega$

$t_{rr} \leq 200 \text{ ns}$



Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1000	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	1000	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	3.5	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , Note 1	16	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	4	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	20	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	700	mJ
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$	5	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	80	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	$^\circ\text{C}$
$V_{ISOL}$	50/60 Hz, RMS $t = 1 \text{ min}$	2500	V~
<b>Weight</b>		5	g

ISOPLUS247™  
E153432



G = Gate      D = Drain  
S = Source

\* Patent pending

### Features

- Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- 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

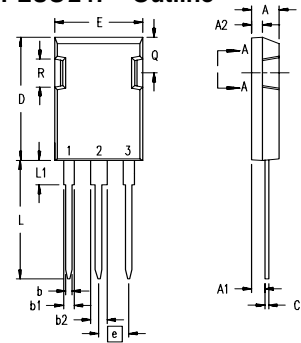
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 1 \text{ mA}$	1000		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 1.5 \text{ mA}$	3.0		5.0 V
$I_{GSS}$	$V_{GS} = \pm 20 V_{DC}$ , $V_{DS} = 0$			$\pm 100 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$		$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	50 $\mu\text{A}$ 1 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = I_T$ Notes 2, 3			3.0 $\Omega$

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	Characteristic Values		
			min.	typ.	max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = I_T$	Notes 2, 3	1.5	2.5	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$			1050	pF
$C_{oss}$				120	pF
$C_{rss}$				30	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$ $R_G = 2\ \Omega$ (External), Notes 2, 3			17	ns
$t_r$				15	ns
$t_{d(off)}$				32	ns
$t_f$				18	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$ Notes 2, 3			39	nC
$Q_{gs}$				9	nC
$Q_{gd}$				22	nC
$R_{thJC}$				1.57	K/W
$R_{thCK}$			0.15		K/W

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$I_S$	$V_{GS} = 0\text{ V}$			4 A	
$I_{SM}$	Repetitive; Note 1			16 A	
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{ V}$ , Notes 2, 3			1.5 V	
$t_{rr}$	$I_F = 50\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$			250 ns	
$Q_{RM}$				0.52	$\mu\text{C}$
$I_{RM}$				1.8	A

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

### ISOPLUS 247™ Outline



Terminals: 1 - Gate  
 2 - Drain (Collector)  
 3 - Source (Emitter)  
 4 - Drain (Collector)

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	0.244
R	4.32	4.83	.170	.190

See IXFH4N100Q data sheet for Characteristic curves.