

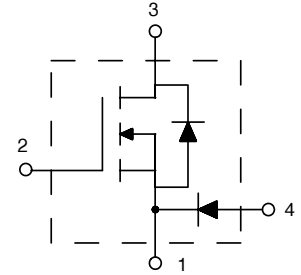
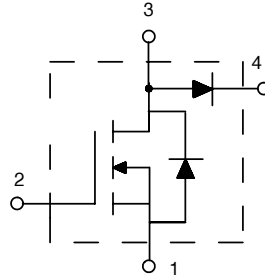
# HiPerFET™

## Power MOSFETs

	$V_{DSS}$	$I_{D(cont)}$	$R_{DS(on)}$	$t_r$
IXFE44N50QD2 IXFE44N50QD3	500 V	39 A	0.12 $\Omega$	35 ns
IXFE48N50QD2 IXFE48N50QD3	500 V	41 A	0.11 $\Omega$	35 ns

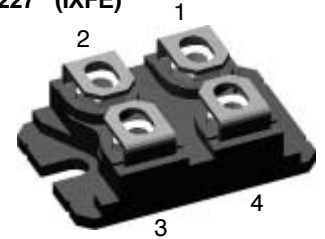
Buck & Boost Configurations for PFC & Motor Control Circuits

Preliminary data sheet



Symbol	Test Conditions	Maximum Ratings
HiPerFET MOSFET	$V_{DSS}$ $T_J = 25^\circ\text{C}$ 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
	$I_{D25}$ $T_C = 25^\circ\text{C}$	44N50Q: 39 A 48N50Q: 41 A
	$I_{DM}$ $T_C = 25^\circ\text{C}$ , pulse width limited by max. $T_{JM}$	44N50Q: 176 A 48N50Q: 192 A
	$I_{AR}$ $T_C = 25^\circ\text{C}$	48 A
	$E_{AR}$ $T_C = 25^\circ\text{C}$	60 mJ
	$E_{AS}$ $T_C = 25^\circ\text{C}$	2.5 J
	$dv/dt$ $I_S \leq I_{DM}$ , $-di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$	5 V/ns
$P_D$ $T_C = 25^\circ\text{C}$	400 W	
DIODE	$V_{RRM}$	600 V
	$I_{FAVM}$ $T_C = 70^\circ\text{C}$ ; rectangular, $d = 0.5$	60 A
	$I_{FRM}$ $tp < 10 \mu\text{s}$ ; pulse width limited by $T_J$	800 A
	$P_D$ $T_C = 25^\circ\text{C}$	180 W
CASE	$T_J$	-40 ... +150 $^\circ\text{C}$
	$T_{JM}$	150 $^\circ\text{C}$
	$T_{stg}$	-40 ... +150 $^\circ\text{C}$
	$V_{ISOL}$ 50/60 Hz, RMS $t = 1 \text{ min}$	2500 V~
	$I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$	3000 V~
$M_d$	Mounting torque	1.5/13 Nm/lb.in.
	Terminal connection torque (M4)	1.5/13 Nm/lb.in.
Weight		19 g

### ISOPLUS227™(IXFE)



2 = Gate      3 = Drain  
1 = Source    4 = Anode/Cathode

### Features

- Popular Buck & Boost circuit topologies
- Conforms to SOT-227B outline
- Isolation voltage 3000 V~
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Low drain-to-case capacitance (<60 pF) - reduced RFI
- Ultra-fast FRED diode with soft reverse recovery

### Applications

- Power factor controls and buck regulators
- DC servo and robotic drives
- DC choppers
- Switch reluctance motor controls

### Advantages

- Easy to mount with 2 screws
- Space savings
- Tightly coupled FRED

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
$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 4\text{ mA}$	2		V
$I_{GSS}$	$V_{GS} = \pm 20 V_{DC}, V_{DS} = 0$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}, V_{GS} = 0\text{ V}$		$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	100 $\mu\text{A}$ 2 mA
$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = I_T$		44N50Q 48N50Q	0.12 $\Omega$ 0.11 $\Omega$
	Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\delta \leq 2\%$			

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$V_{DS} = 10\text{ V}, I_D = I_T$ , pulse test	30	45	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		6400	pF
$C_{oss}$			930	pF
$C_{rss}$			220	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = I_T$ $R_G = 1\ \Omega$ (External)		33	ns
$t_r$			22	ns
$t_{d(off)}$			75	ns
$t_f$			10	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = I_T$		190	nC
$Q_{gs}$			40	nC
$Q_{gd}$			86	nC
$R_{thJC}$			0.31	K/W
$R_{thCK}$		0.07		K/W

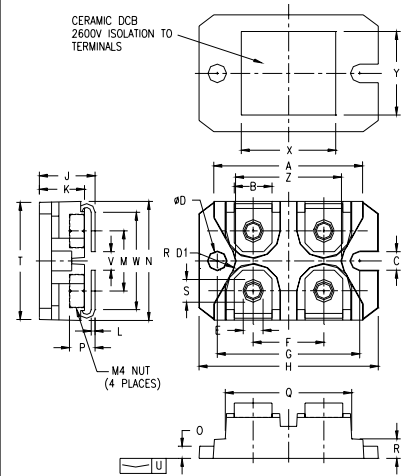
### Ultra-fast Diode

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$I_R$	$T_J = 25^\circ\text{C}; V_R = V_{RRM}$ $T_J = 150^\circ\text{C}; V_R = 0.8V_{RRM}$			200 $\mu\text{A}$ 2.5 mA
$V_F$	$I_F = 60\text{ A}, V_{GS} = 0\text{ V}$			2.05 V
	Note 1 $T_J = 150^\circ\text{C}$			1.4 V
$t_{rr}$	$I_L = 1\text{ A}, di/dt = -200\text{ A}/\mu\text{s}, V_R = 30\text{ V}, T_J = 25^\circ\text{C}$		35	50 ns
$I_{RM}$	$I_F = 60\text{ A}, di/dt = -100\text{ A}/\mu\text{s}, V_R = 100\text{ V}, T_J = 100^\circ\text{C}$			8.3 A
$R_{thJC}$				0.7 K/W
$R_{thJK}$		0.05		K/W

Note: 1. Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $d \leq 2\%$   
2. IXFE44N50  $I_T = 22\text{ A}$   
IXFE48N50  $I_T = 24\text{ A}$

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

### ISOPLUS-227 B



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.240	1.270	31.50	32.26
B	.310	.330	7.87	8.38
C	.155	.165	3.94	4.19
D	.155	.165	3.94	4.19
D1	.150	.157	3.81	3.98
E	.160	.168	4.06	4.27
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.489	1.505	37.80	38.23
J	.465	.481	11.81	12.22
K	.370	.380	9.40	9.65
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.100	.105	2.54	2.67
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.160	.170	4.06	4.32
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.001	.002	-0.03	0.05
V	.130	.160	3.30	4.06
W	.780	.830	19.81	21.08
X	.770	.810	19.56	20.57
Y	.680	.720	17.27	18.29
Z	.885	.892	22.48	22.66

Please see IXFN48N50U2/U3 for characteristic curves.