

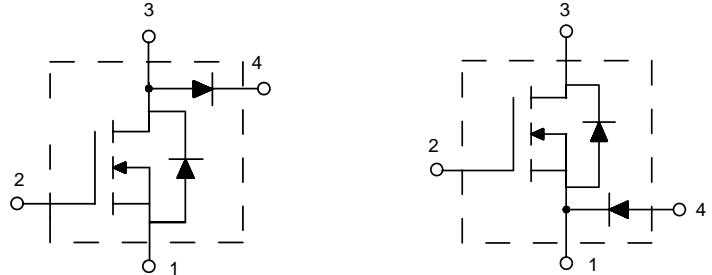
HiPerFET™

Power MOSFETs

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

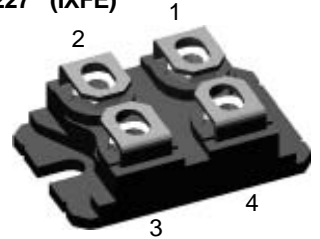
Buck & Boost Configurations for PFC & Motor Control Circuits

Preliminary data sheet



Symbol	Test Conditions	Maximum Ratings			
HiPerFET MOSFET	V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	500	V	
	V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1 \text{ M}\Omega$	500	V	
	V_{GS}	Continuous	± 20	V	
	V_{GSM}	Transient	± 30	V	
	I_{D25}	$T_C = 25^\circ\text{C}$	44N50Q 48N50Q	39 41	A
	I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by max. T_{JM}	44N50Q 48N50Q	176 192	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	$I_S \leq I_{DM}$, $-di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 2 \Omega$		15	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 $t = 1 \text{ min}$ $I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$	2500 3000	V~ V~	
	M_d	Mounting torque Terminal connection torque (M4)	1.5/13 1.5/13	Nm/lb.in. 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}	$V_{GS} = \pm 20\text{ V}_{DC}, V_{DS} = 0$			± 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 μA 2 mA
$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = I_T$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\delta \leq 2\%$			44N50Q 48N50Q 0.12 Ω 0.11 Ω

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	36	S
C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		8000	pF
C_{oss}			930	pF
C_{rss}			220	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5\text{ V}_{DSS}, I_D = I_T$ $R_G = 1\ \Omega$ (External)		33	ns
t_r			22	ns
$t_{d(off)}$			75	ns
t_f			10	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5\text{ V}_{DSS}, I_D = I_T$		190	nC
Q_{gs}			40	nC
Q_{gd}			86	nC
R_{thJC}				0.31 K/W
R_{thCK}				0.07 K/W

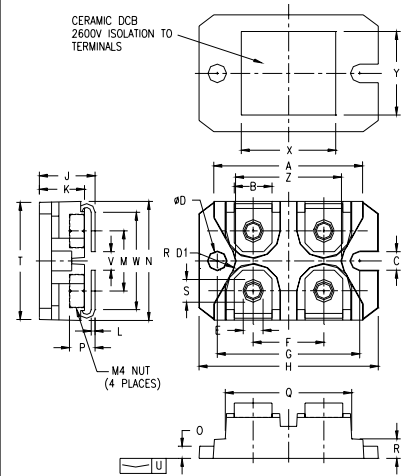
Ultra-fast Diode

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 μA 2.5 mA
V_F	$I_F = 60\text{ A}, V_{GS} = 0\text{ V}$ Note 1 $T_J = 150^\circ\text{C}$			2.05 V 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 note:

For characteristic curves please see IXFK48N50Q