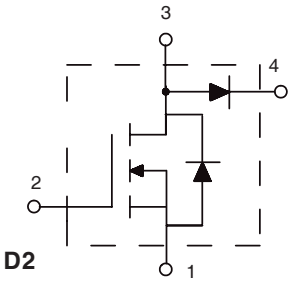
IXYS

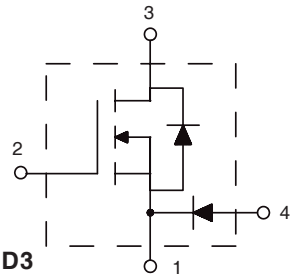
HiPerFET™ Power MOSFETs

	V_{DSS}	$I_{D(cont)}$	$R_{DS(on)}$	t_{rr}
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



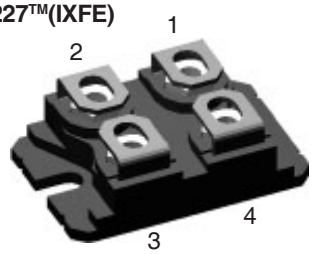
D2



D3

Symbol	Test Conditions		Maximum Ratings	
HiPerFET MOSFET				
V_{DSS}	T_J = 25°C to 150°C		500	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ		500	V
V_{GS}	Continuous		±20	V
V_{GSM}	Transient		±30	V
I_{D25}	T_C = 25°C	44N50Q	39	A
		48N50Q	41	A
I_{DM}	T_C = 25°C, pulse width limited by max. T_{JM}	44N50Q	176	A
		48N50Q	192	A
I_{AR}	T_C = 25°C		48	A
E_{AR}	T_C = 25°C		60	mJ
E_{AS}	T_C = 25°C		2.5	J
dv/dt	$I_S \le I_{DM}$, -di/dt ≤ 100 A/µs, $V_{DD} \le V_{DSS}$, $T_J \le$150°C, R_G = 2 Ω		15	V/ns
P_D	T_C = 25°C		400	W
DIODE				
V_{RRM}			600	V
I_{FAVM}	T_C = 70°C; rectangular, d = 0.5		60	A
I_{FRM}	tp <10 µs; pulse width limited by T_J		800	A
P_D	T_C = 25°C		180	W
CASE				
T_J			-40 ... +150	°C
T_{JM}			150	°C
T_{stg}			-40 ... +150	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	2500	V~
	$I_{ISOL} \le$ 1 mA	t = 1 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

ISOPLUS 227™(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

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

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_{DSS}	V_{GS} = 0 V, I_D = 1 mA		500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4 mA		2		4	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0				±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$	T_J = 25°C			100	µA
	V_{GS} = 0 V	T_J = 125°C			2	mA
$R_{DS(on)}$	V_{GS} = 10 V, $I_D = I_T$	44N50Q			0.12	Ω
		48N50Q			0.11	Ω
	Pulse test, t ≤ 300 µs, duty cycle δ ≤ 2 %					

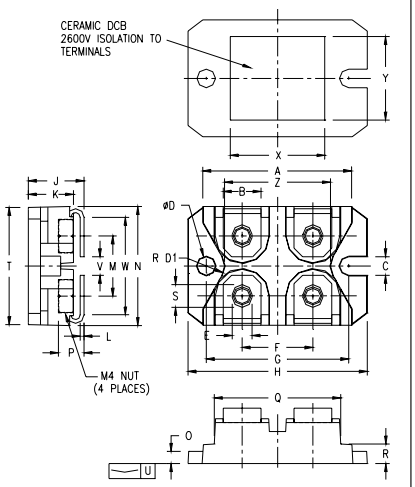
Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	V_{DS} = 10 V, $I_D = I_T$, pulse test	30	36		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		8000		pF
C_{oss}			930		pF
C_{rss}			220		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, $I_D = I_T$		33		ns
t_r			22		ns
$t_{d(off)}$	R_G = 1Ω (External)		75		ns
t_f			10		ns
$Q_{g(on)}$	V_{GS} = 10 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°C, unless otherwise specified) min.	typ.	max.	
I_R	T_J = 25°C; $V_R = V_{RRM}$			200	µA
	T_J = 150°C; V_R = 0.8V_{RRM}			2.5	mA
V_F	I_F = 60A, V_{GS} = 0 V			2.05	V
	Note1 T_J = 150°C			1.4	V
t_{rr}	I_I = 1A, di/dt = -200 A/µs, V_R = 30 V, T_J = 25°C		35	50	ns
I_{RM}	I_F = 60A, di/dt = -100 A/µs, V_R = 100 V, T_J = 100°C			8.3	A
R_{thJC}				0.7	K/W
R_{thJK}			0.05		K/W

Note: 1. Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %
2. IXFE44N50 I_T = 22A
IXFE48N50 I_T = 24A

ISOPLUS-227 B



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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