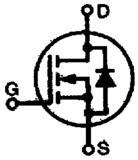
HiPerFET™ Power MOSFET

IXFH24N50S

V_{DSS} = 500 V
I_{D25} = 24 A
$R_{DS(on)}$ = 0.23 Ω
t_{rr} ≤ 250 ns

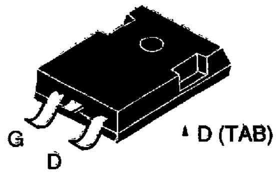
Surface Mountable
N-Channel Enhancement-Mode
Avalanche Rated, High dv/dt, Low t_{rr}

Preliminary data



Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	500	V
V_{DGR}	T_J = 25°C to 175°C; R_{GS} = 10 kΩ	500	V
V_{GS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C,	24	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	96	A
I_{AR}	T_C = 25°C	24	A
E_{AR}	T_C = 25°C	30	mJ
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	5	V/ns
P_D	T_C = 25°C	300	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	for lead and tab, 10 s for soldering	300	°C
Weight		4	g

TO-247 SMD



G = Gate, D = Drain,
S = Source, TAB = Drain

Features

- Surface mount package
- Low $R_{DS\,(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance (<5 nH)
  - easy to drive and to protect
- Fast intrinsic Rectifier

Applications

- AC Motor Control
- DC-DC converters
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls
- Low voltage relays

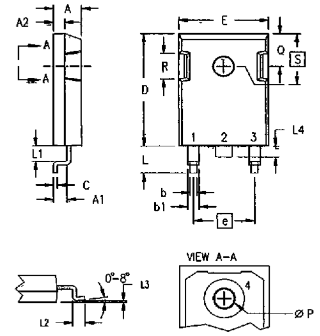
Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified)			
		min.	typ.	max.	
V_{DSS}	V_{GS} = 0 V, I_D = 250 µA	500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4 mA	2		4.5	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0			±100	nA
I_{DSS}	V_{DS} = 0.8 • V_{DSS} T_J = 25°C V_{GS} = 0 V T_J = 125°C			200 1	µA mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 • I_{D25} Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %			0.23	Ω

Advantages

- Suitable for surface mounting
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values ($T_J = 25°C$, unless otherwise specified) min.	typ.	max.	
g_{fs}	$V_{DS} = 10$ V; $I_D = 0.5 \cdot I_{D25}$, pulse test	15	21		S
C_{iss}	$V_{GS} = 0$ V, $V_{DS} = 25$ V, f = 1 MHz		4200		pF
C_{oss}			420		pF
C_{rss}			135		pF
$t_{d(on)}$	$V_{GS} = 10$ V, $V_{DS} = 50$ V, $I_D = 0.5 \cdot I_{D25}$ $R_G = 2\ \Omega$ (External)		16	25	ns
t_r			33	45	ns
$t_{d(off)}$			65	80	ns
t_f			30	40	ns
$Q_{g(on)}$	$V_{GS} = 10$ V, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$		135	120	nC
Q_{gs}			28	40	nC
Q_{gd}			62	85	nC
R_{thJC}				0.42	K/W
R_{thCK}			0.25		K/W

TO-247 SMD Outline



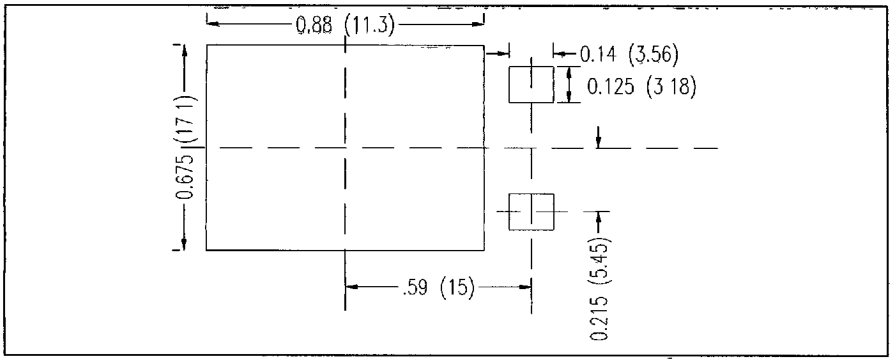
1. Gate
2. Drain
3. Source
4. Drain

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.83	5.21	.190	.205
A1	2.29	2.54	.090	.100
A2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b1	1.91	2.13	.075	.084
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	4.90	5.10	.193	.201
L1	2.70	2.90	.106	.114
L2	2.10	2.30	.083	.091
L3	0.00	0.10	.00	.004
L4	1.90	2.10	.075	.083
ØP	3.55	3.65	.140	.144
Q	5.59	6.20	.220	.244
R	4.32	4.83	.170	.190
S	6.15	BSC	.242	BSC

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values ($T_J = 25°C$, unless otherwise specified) min.	typ.	max.	
I_S	$V_{GS} = 0$			24	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			96	A
V_{SD}	$I_F = I_S$, $V_{GS} = 0$ V, Pulse test, $t \leq 300\ \mu s$, duty cycle $\delta \leq 2$ %			1.5	V
t_{rr}	$I_F = 25$ A, -di/dt = 100 A/µs $T_J = 25°C$ $V_R = 100$ V $T_J = 125°C$			250 400	ns ns

Min. Recommended Footprint (Dimensions in inches and mm)



IXFH 24N50S characteristic curves are located in the IXFH 24N50 data sheet, Publication No. D94010DE, pages 26 - 29.