

# HiPerFET™ Power MOSFETs

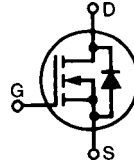
N-Channel Enhancement Mode  
Avalanche Rated, High dv/dt, Low  $t_{rr}$

**IXFK33N50**  
**IXFK35N50**

$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
<b>500 V</b>	<b>33 A</b>	<b>0.16 <math>\Omega</math></b>
<b>500 V</b>	<b>35 A</b>	<b>0.15 <math>\Omega</math></b>

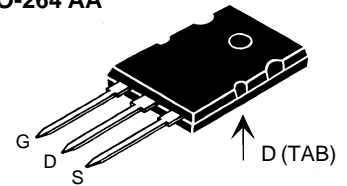
**$t_{rr} \leq 250$  ns**

Preliminary data



Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	500	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1$ M $\Omega$	500	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	33N50	33 A
		35N50	35 A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	33N50	132 A
		35N50	140 A
$I_{AR}$	$T_C = 25^\circ\text{C}$	33N50	30 A
		35N50	35 A
$E_{AS}$	$I_D = 32$ A	2.5	J
$E_{AR}$	$T_C = 25^\circ\text{C}$	45	mJ
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100$ A/ $\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 2$ $\Omega$	5	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	416	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	$^\circ\text{C}$
$M_d$	Mounting torque	0.9/6	Nm/lb.in.
<b>Weight</b>		10	g

TO-264 AA



G = Gate  
S = Source

D = Drain  
TAB = Drain

## Features

- International standard packages
- Molding epoxies meet UL 94 V-0 flammability classification
- Low  $R_{DS(on)}$  HDMOS™ process
- Unclamped Inductive Switching (UIS) rated
- Fast intrinsic rectifier

## Applications

- DC-DC converters
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls

## Advantages

- Easy to mount
- Space savings
- High power density

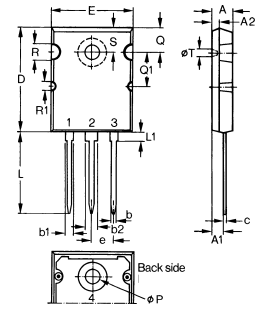
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0$ V, $I_D = 1$ mA $V_{DSS}$ temperature coefficient	500	0.102	V %/K
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4$ mA $V_{GS(th)}$ temperature coefficient	2	-0.206	V %/K
$I_{GSS}$	$V_{GS} = \pm 20$ V <sub>DC</sub> , $V_{DS} = 0$			$\pm 200$ nA
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ $V_{GS} = 0$ V	$T_J = 25^\circ\text{C}$		200 $\mu\text{A}$
		$T_J = 125^\circ\text{C}$		2 mA
$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 16.5$ A Pulse test, $t \leq 300$ $\mu\text{s}$ , duty cycle $d \leq 2$ %	33N50		0.16 $\Omega$
		35N50		0.15 $\Omega$

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ , pulse test	18	28	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		5200	5700
$C_{oss}$			640	750
$C_{rss}$			240	310
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\ \Omega$ (External),		35	45
$t_r$			42	50
$t_{d(off)}$			110	140
$t_f$			23	35
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		227	nC
$Q_{gs}$			29	nC
$Q_{gd}$			110	nC
$R_{thJC}$			0.3	K/W
$R_{thCK}$		0.15		K/W

### Source-Drain Diode

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$I_S$	$V_{GS} = 0\text{ V}$		33	A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$		132	A
$V_{SD}$	$I_F = 100\text{ A}, V_{GS} = 0\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$		1.5	V
$t_{rr}$	$I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		0.75	250
$Q_{RM}$			7	$\mu\text{C}$
$I_{RM}$				A

### TO-264 AA Outline



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46	BSC	.215	BSC
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072