

# HiPerFET™ Power MOSFETs

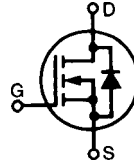
N-Channel Enhancement Mode  
Avalanche Rated, High dv/dt, Low  $t_{rr}$

**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>

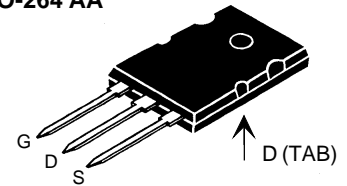
**$t_{rr} \leq 250$  ns**

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                      D = Drain  
S = Source                    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

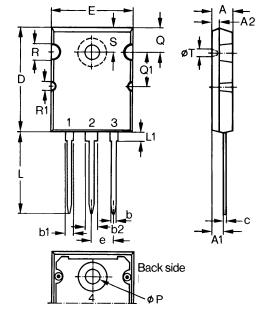
- Easy to mount
- Space savings
- High power density

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 $_{DC}$ , $V_{DS} = 0$			$\pm 200$ 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 <sub>J</sub> = 25°C, unless otherwise specified)			
		min.	typ.	max.	
<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 10 V; I <sub>D</sub> = 0.5 • I <sub>D25</sub> , pulse test	18	28		S
<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		5200	5700	pF
<b>C<sub>oss</sub></b>			640	750	pF
<b>C<sub>rss</sub></b>			240	310	pF
<b>t<sub>d(on)</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub> R <sub>G</sub> = 1 Ω (External),		35	45	ns
<b>t<sub>r</sub></b>			42	50	ns
<b>t<sub>d(off)</sub></b>			110	140	ns
<b>t<sub>f</sub></b>			23	35	ns
<b>Q<sub>g(on)</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub>		227		nC
<b>Q<sub>gs</sub></b>			29		nC
<b>Q<sub>gd</sub></b>			110		nC
<b>R<sub>thJC</sub></b>				0.3	K/W
<b>R<sub>thCK</sub></b>			0.15		K/W

**Source-Drain Diode**

Symbol	Test Conditions	Characteristic Values			
		(T <sub>J</sub> = 25°C, unless otherwise specified)			
		min.	typ.	max.	
<b>I<sub>S</sub></b>	V <sub>GS</sub> = 0 V			33	A
<b>I<sub>SM</sub></b>	Repetitive; pulse width limited by T <sub>JM</sub>			132	A
<b>V<sub>SD</sub></b>	I <sub>F</sub> = 100 A, V <sub>GS</sub> = 0 V, Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			1.5	V
<b>t<sub>rr</sub></b>	I <sub>F</sub> = I <sub>S</sub> , -di/dt = 100 A/μs, V <sub>R</sub> = 100 V		0.75	250	ns
<b>Q<sub>RM</sub></b>			7		μC
<b>I<sub>RM</sub></b>					

**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