

# HiPerFET™ Power MOSFETs

**IXFK / IXFN 44 N50**  
**IXFK / IXFN 48 N50**

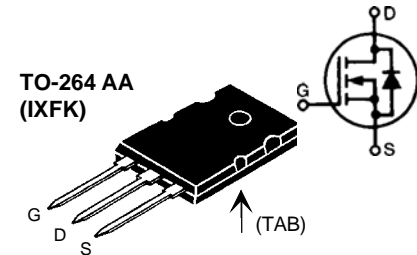
$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
<b>500 V</b>	<b>44 A</b>	<b>0.12 <math>\Omega</math></b>
<b>500 V</b>	<b>48 A</b>	<b>0.10 <math>\Omega</math></b>

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

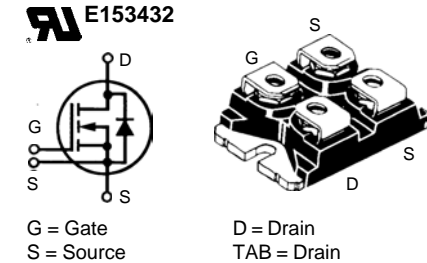
N-Channel Enhancement Mode  
Avalanche Rated, High dv/dt, Low  $t_{rr}$

Symbol	Test Conditions	Maximum Ratings		
		IXFK	IXFN	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	500	500	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1$ M $\Omega$	500	500	V
$V_{GS}$	Continuous	$\pm 20$	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	44N50	44	A
		48N50	48	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	44N50	176	A
		48N50	192	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	24	24	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	30	30	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	5	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	500	520	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	-	$^\circ\text{C}$
$V_{ISOL}$	50/60 Hz, RMS $t = 1$ min $I_{ISOL} \leq 1$ mA $t = 1$ s	-	2500	V~
		-	3000	V~
$M_d$	Mounting torque Terminal connection torque	0.9/6	1.5/13	Nm/lb.in.
		-	1.5/13	Nm/lb.in.
<b>Weight</b>		10	30	g

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	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 8$ mA	2		V
$I_{GSS}$	$V_{GS} = \pm 20$ V <sub>DC</sub> , $V_{DS} = 0$			$\pm 200$ nA
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ $V_{GS} = 0$ V	$T_J = 25^\circ\text{C}$		400 $\mu\text{A}$
		$T_J = 125^\circ\text{C}$		2 mA
$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 0.5 \cdot I_{D25}$	44N50		0.12 $\Omega$
		48N50		0.10 $\Omega$
	Pulse test, $t \leq 300$ $\mu\text{s}$ , duty cycle $d \leq 2$ %			



miniBLOC, SOT-227 B (IXFN)



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

### Features

- International standard packages
- Molding epoxies meet UL 94 V-0 flammability classification
- SOT-227B miniBLOC with aluminium nitride isolation
- Low  $R_{DS(on)}$  HDMOS™ process
- Unclamped Inductive Switching (UIS) rated
- Fast intrinsic rectifier

### Applications

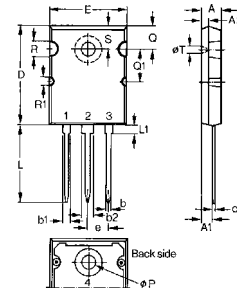
- DC-DC converters
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls

### Advantages

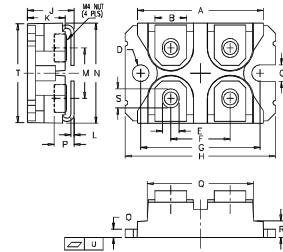
- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values		
		(T <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	22	42	S
<b>C<sub>iss</sub></b> <b>C<sub>oss</sub></b> <b>C<sub>rss</sub></b>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		8400	pF
			900	pF
			280	pF
<b>t<sub>d(on)</sub></b> <b>t<sub>r</sub></b> <b>t<sub>d(off)</sub></b> <b>t<sub>f</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),		30	ns
			60	ns
			100	ns
			30	ns
<b>Q<sub>g(on)</sub></b> <b>Q<sub>gs</sub></b> <b>Q<sub>gd</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>		270	nC
			60	nC
			135	nC
<b>R<sub>thJC</sub></b> <b>R<sub>thCK</sub></b>	TO-264 AA		0.15	0.25 K/W
<b>R<sub>thJC</sub></b> <b>R<sub>thCK</sub></b>	miniBLOC, SOT-227 B		0.05	0.24 K/W
<b>R<sub>thJC</sub></b> <b>R<sub>thCK</sub></b>	miniBLOC, SOT-227 B		0.05	0.24 K/W

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			48 A
<b>I<sub>SM</sub></b>	Repetitive; pulse width limited by T <sub>JM</sub>			192 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> <b>Q<sub>RM</sub></b> <b>I<sub>RM</sub></b>	I <sub>F</sub> = I <sub>S</sub> , -di/dt = 100 A/μs, V <sub>R</sub> = 100 V		TBD	250 ns
			20	μC

**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

**miniBLOC, SOT-227 B**


M4 screws (4x) supplied

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	38.00	38.23	1.496	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004

Fig. 1 Output Characteristics

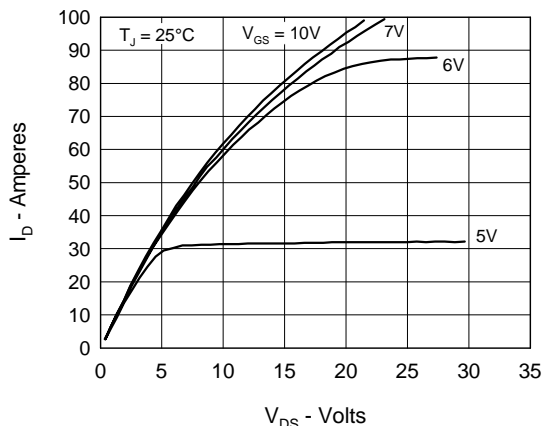


Fig. 3  $R_{DS(on)}$  vs. Drain Current

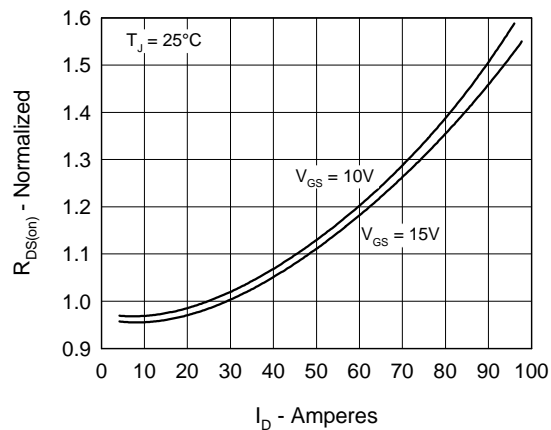


Fig. 5 Drain Current vs. Case Temperature

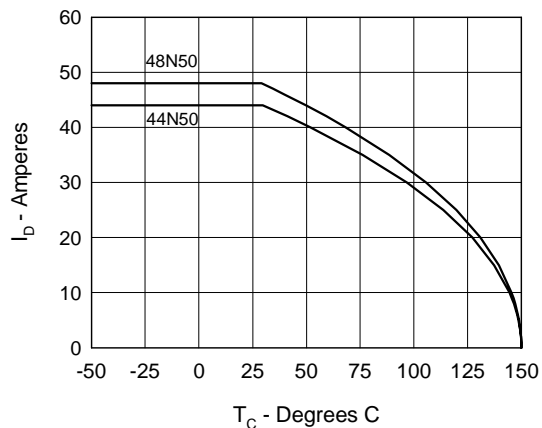


Fig. 2 Input Admittance

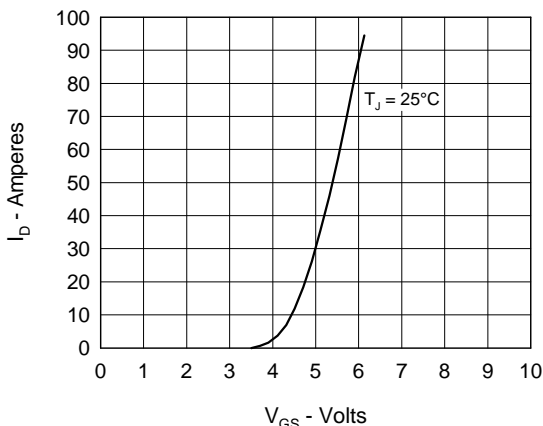


Fig. 4 Temperature Dependence of Drain to Source Resistance

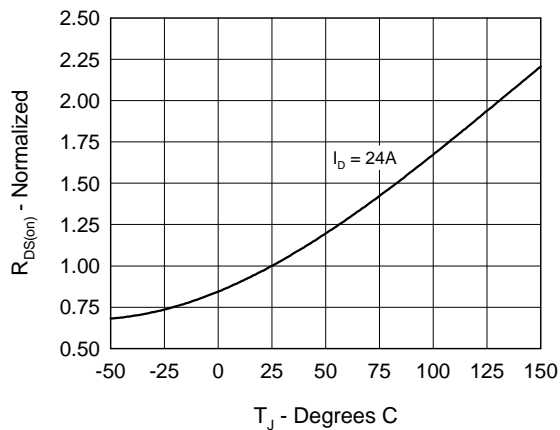


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage

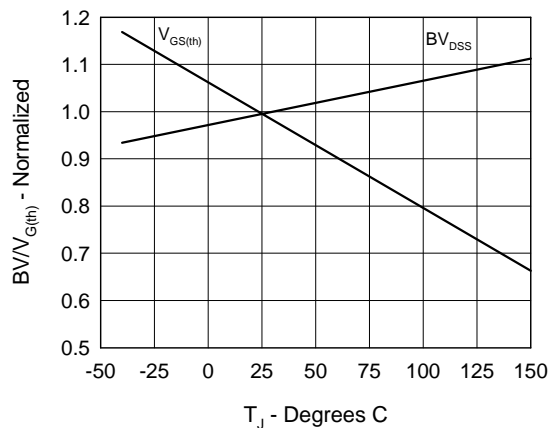


Fig.7 Gate Charge Characteristic Curve

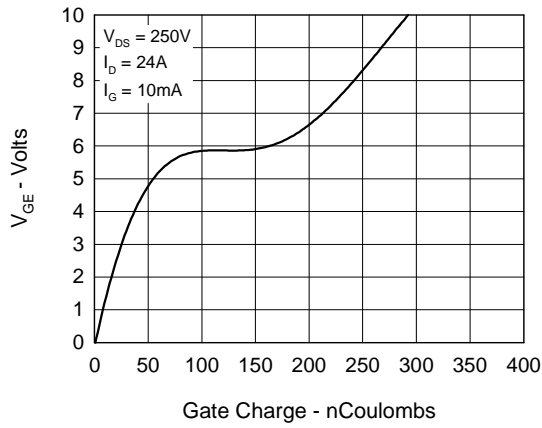


Fig.8 Capacitance Curves

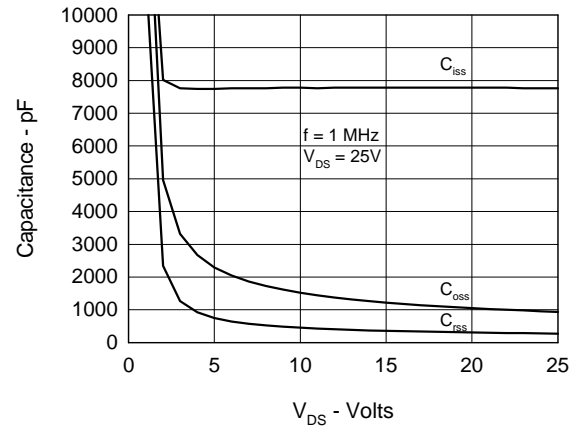


Fig.9 Source Current vs. Source to Drain Voltage

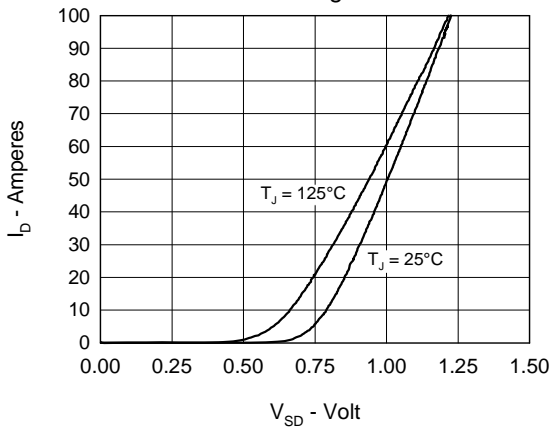
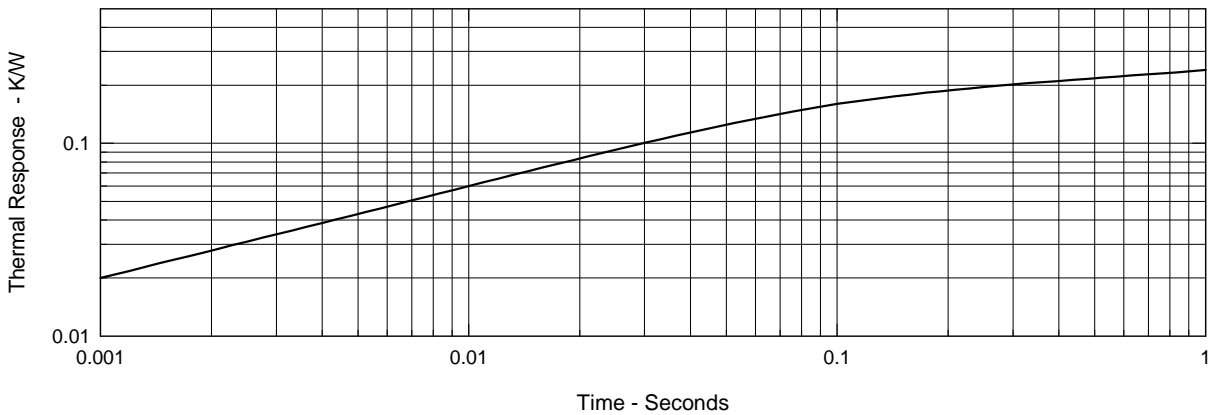


Fig.10 Transient Thermal Impedance





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