

Preliminary data

# HiPerFET™ Power MOSFETs

	$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
IXFK72N20	200 V	72 A	35 mΩ
IXFK80N20	200 V	80 A	30 mΩ

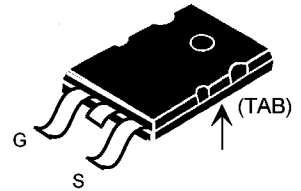
$t_{rr} \leq 200$  ns

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

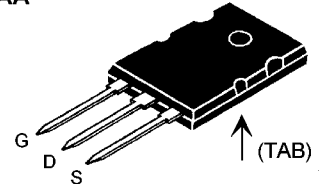


Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	200	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1$ MΩ	200	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	72N20 80N20	72 80 A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	72N20 80N20	288 320 A
$I_{AR}$	$T_C = 25^\circ\text{C}$	74	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	45	mJ
dv/dt	$I_S \leq I_{DM}$ , $di/dt \leq 100$ A/μs, $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 2$ Ω	5	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	416	W
$T_J$		-55 ... +150	°C
$T_{JM}$		150	°C
$T_{stg}$		-55 ... +150	°C
$T_L$	1.6 mm (0.063 in) from case for 10 s	300	- °C
$M_d$	Mounting torque	0.9/6	Nm/lb.in.
Weight		10	g

TO-264 AA  
(IXFK-S)



TO-264 AA  
(IXFK)



G = Gate  
S = Source

D = Drain  
TAB = Drain

### Features

- International standard packages
- Molding epoxies meet UL 94 V-0 flammability classification
- Low  $R_{DS(on)}$  HDMOST™ 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

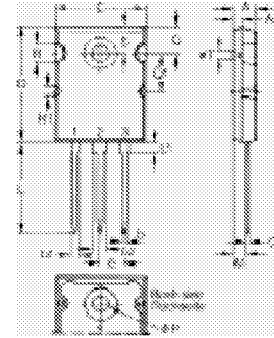
### Advantages

- Easy to mount
- Space savings
- High power density
- S version suitable for surface mounting

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	200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4$ mA	2		V
$I_{GSS}$	$V_{GS} = \pm 20$ V <sub>DC</sub> , $V_{DS} = 0$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ , $T_J = 25^\circ\text{C}$ $V_{GS} = 0$ V, $T_J = 125^\circ\text{C}$			200 μA 1 mA
$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300$ μs, duty cycle $d \leq 2$ %	72N20 80N20		35 mΩ 30 mΩ

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	35	42	S
<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		5900	pF
<b>C<sub>oss</sub></b>			1140	pF
<b>C<sub>rss</sub></b>			480	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> = (External),		40	ns
<b>t<sub>r</sub></b>			55	ns
<b>t<sub>d(off)</sub></b>			120	ns
<b>t<sub>f</sub></b>			26	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>		280	nC
<b>Q<sub>gs</sub></b>			39	nC
<b>Q<sub>gd</sub></b>			120	nC
<b>R<sub>thJC</sub></b>	TO-264 AA; SMD-264		0.15	0.3 KW
<b>R<sub>thCK</sub></b>	TO-264 AA			KW

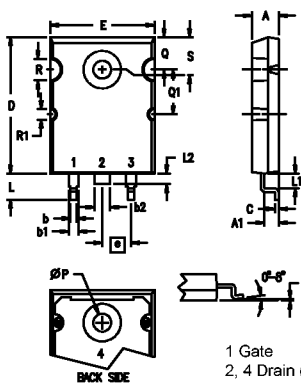
### TO-264 AA Outline



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

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	72N20 80N20		72 80	A A
<b>I<sub>SM</sub></b>	Repetitive; pulse width limited by T <sub>JM</sub>	72N20 80N20		288 320	A A
<b>V<sub>SD</sub></b>	I <sub>F</sub> = I <sub>S</sub> , 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		TBD	200	ns
<b>Q<sub>RM</sub></b>			TBD		μC
<b>I<sub>RM</sub></b>					A

### TO-264 SMD Outline



- Gate
- 2, 4 Drain (collector)
- 3 Source (emitter)

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.70	5.31	.185	.209
A1	2.59	3.00	.102	.118
b	0.94	1.40	.037	.055
b1	2.21	2.59	.087	.102
b2	2.79	3.20	.110	.126
C	0.43	0.74	.017	.029
D	25.58	26.59	1.007	1.047
E	19.30	20.29	.760	.799
e	5.46 BSC		.215 BSC	
L	4.90	5.10	.193	.201
L1	2.24	2.44	.088	.096
L2	1.90	2.10	.075	.083
L3	0.00	0.10	.000	.004
ØP	3.10	3.51	.122	.138
Q	6.10	6.50	.240	.256
Q1	8.38	8.79	.330	.346
ØR	3.94	4.75	.155	.187
ØR1	2.16	2.36	.085	.093
S	6.17	6.43	.243	.253

Note:  
1. This drawing meets dimensions requirement of JEDEC outlines TO-264AA except L, L1, L2, L3. 2. All metal surface are solder plated except trimmed area.

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

IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715  
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025

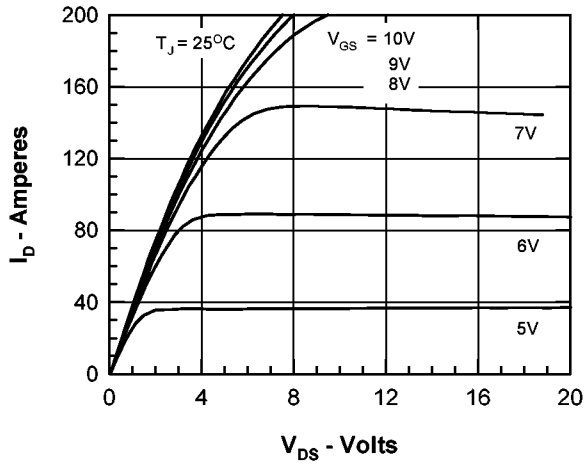


Figure 1. Output Characteristics at 25°C

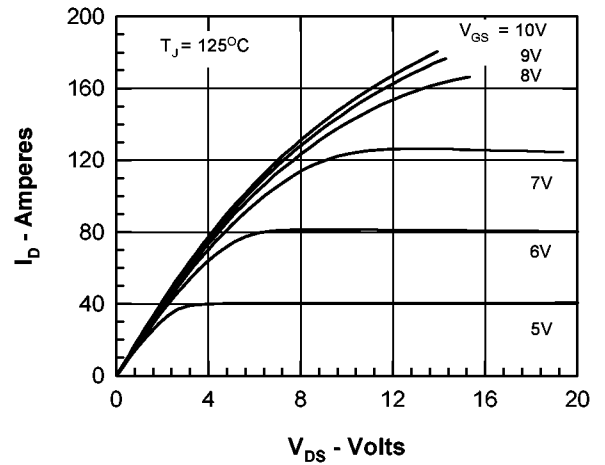


Figure 2. Output Characteristics at 125°C

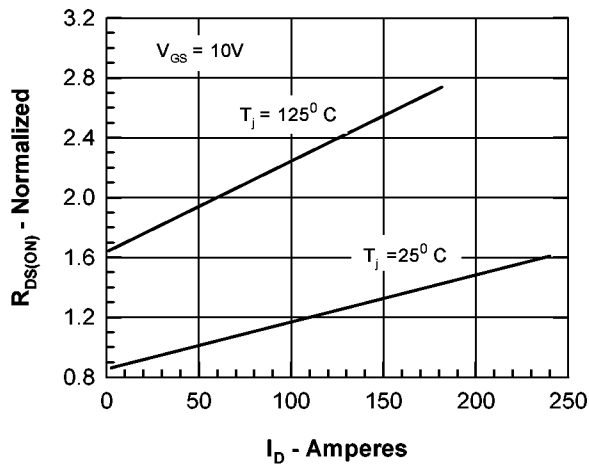
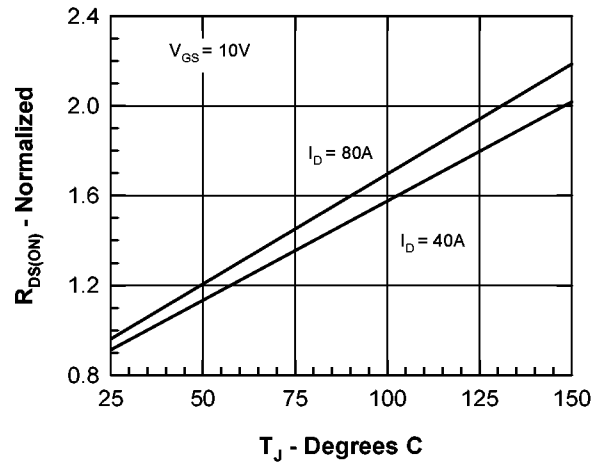
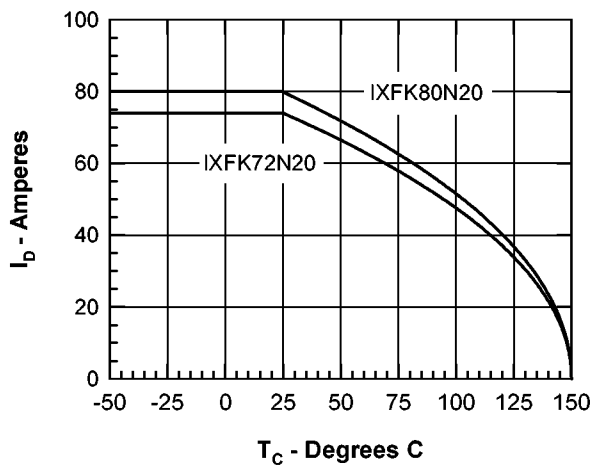

 Figure 3.  $R_{DS(on)}$  normalized to  $0.5 I_{D25}$  value

 Figure 4.  $R_{DS(on)}$  normalized to  $0.5 I_{D25}$  value


Figure 5. Drain Current vs. Case Temperature

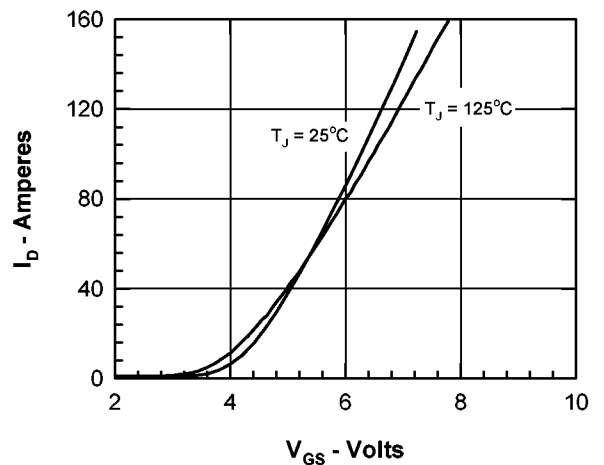


Figure 6. Admittance Curves

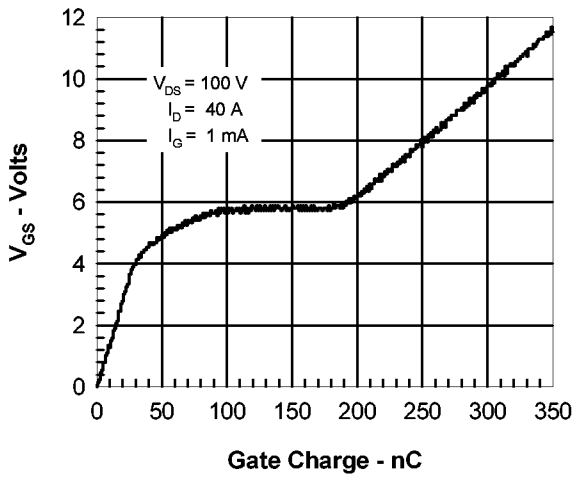


Figure 7. Gate Charge

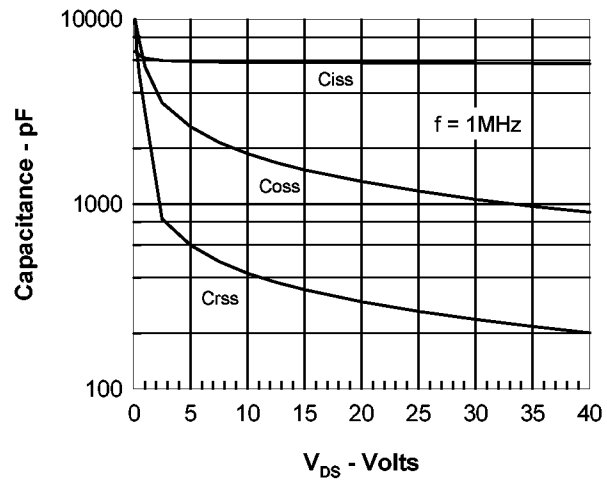


Figure 8. Capacitance Curves

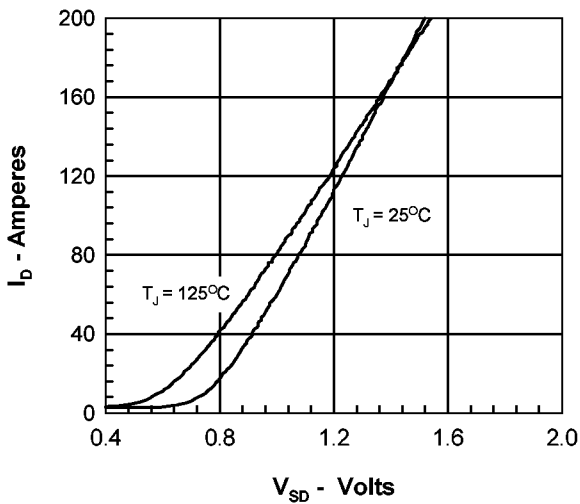


Figure 9. Source Current vs. Source to Drain Voltage

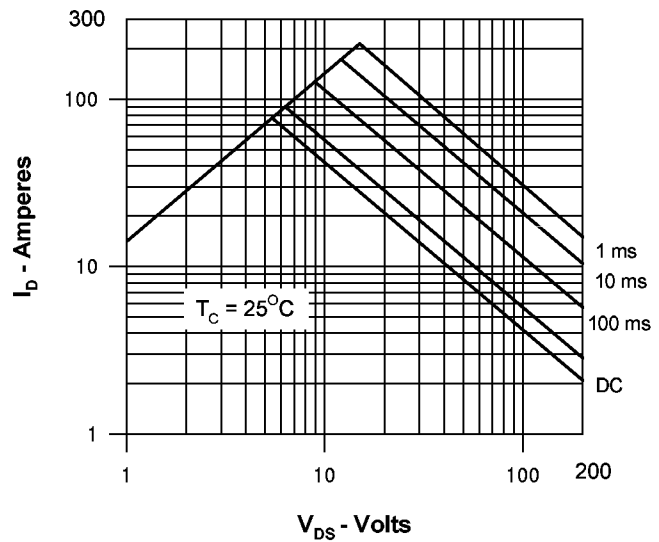


Figure 10. Forward Bias Safe Operating Area

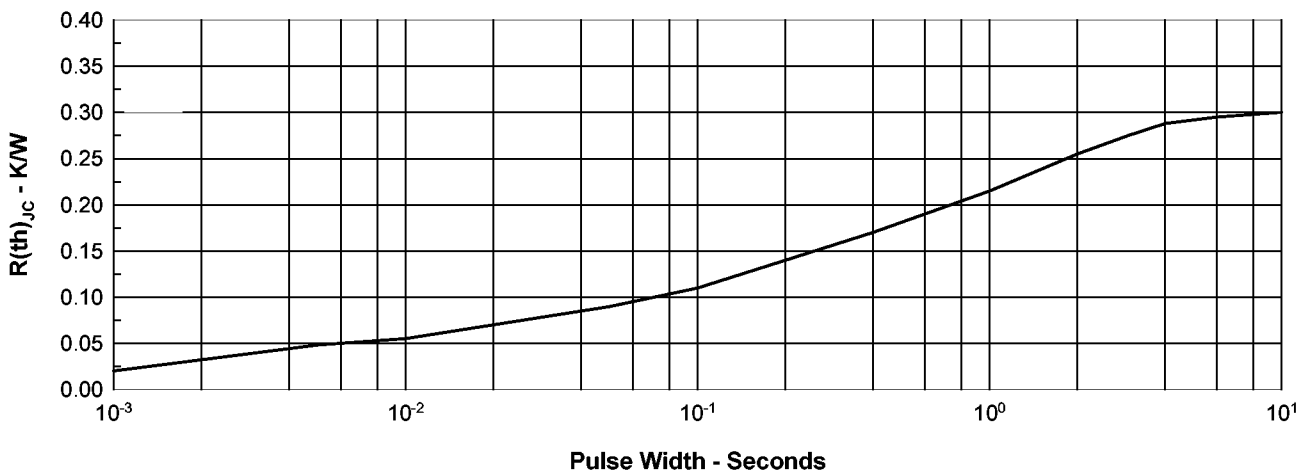


Figure 11. Transient Thermal Resistance

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

IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents:

4,835,592	4,881,106	5,017,508	5,049,961	5,187,117	5,486,715
4,850,072	4,931,844	5,034,796	5,063,307	5,237,481	5,381,025