

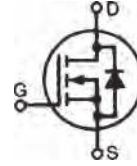
# HiPerFET™ Power MOSFETs

**IXFX 120N20**  
**IXFK 120N20**

$V_{DSS} = 200\text{ V}$   
 $I_{D25} = 120\text{ A}$   
 $R_{DS(on)} = 17\text{ m}\Omega$

Single MOSFET Die

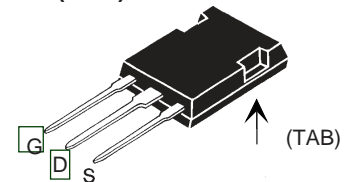
Preliminary data sheet



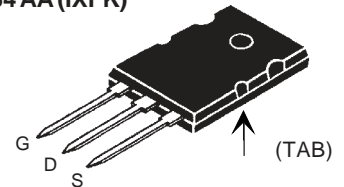
$t_{rr} \leq 250\text{ ns}$

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	200	V
$V_{DGR}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GS} = 1\text{ M}\Omega$	200	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$ (MOSFET chip capability)	120	A
$I_{D104}$	$T_C = 104^\circ\text{C}$ (External lead capability)	76	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	480	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	120	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	64	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	3	J
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100\text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$ , $R_G = 2\ \Omega$	15	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	560	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	TO-264	0.9/6 Nm/b.in.
Weight		PLUS 247	6 g
		TO-264	10 g

PLUS 247™ (IXFX)



TO-264 AA (IXFK)



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

### Features

- International standard packages
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance  
- easy to drive and to protect
- Fast intrinsic rectifier

### Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control
- Temperature and lighting controls

### Advantages

- PLUS 247™ package for clip or spring mounting
- Space savings
- High power density

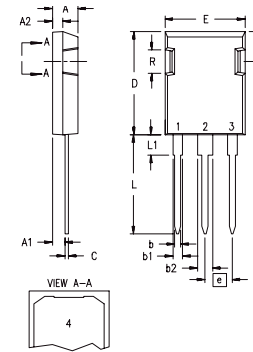
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0\text{ V}$ , $I_D = 3\text{ mA}$	200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 8\text{ mA}$	2.0		4.0 V
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}$ , $V_{DS} = 0$			$\pm 200\text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0\text{ V}$	$T_J = 25^\circ\text{C}$		100 $\infty\text{ A}$
		$T_J = 125^\circ\text{C}$		2 mA
$R_{DS(on)}$	$V_{GS} = 10\text{ V}$ , $I_D = 0.5 \cdot I_{D25}$ Note 1			17 m $\Omega$

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

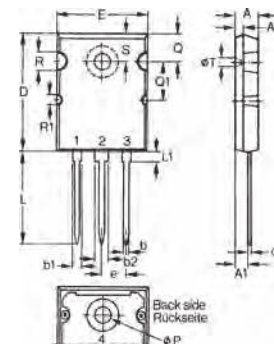
Symbol	Test Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C, unless otherwise specified)		
		min.	typ.	max.
<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 10 V; I <sub>D</sub> = 0.5 • I <sub>D25</sub> Note 1	40	77	S
<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		9100	pF
<b>C<sub>oss</sub></b>			2200	pF
<b>C<sub>rss</sub></b>			1000	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),		40	ns
<b>t<sub>r</sub></b>			65	ns
<b>t<sub>d(off)</sub></b>			110	ns
<b>t<sub>f</sub></b>			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>		300	nC
<b>Q<sub>gs</sub></b>			50	nC
<b>Q<sub>gd</sub></b>			170	nC
<b>R<sub>thJC</sub></b>			0.22	K/W
<b>R<sub>thCK</sub></b>		0.15		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			120 A
<b>I<sub>SM</sub></b>	Repetitive; pulse width limited by T <sub>JM</sub>			480 A
<b>V<sub>SD</sub></b>	I <sub>F</sub> = I <sub>S</sub> ; V <sub>GS</sub> = 0 V, Note 1			1.5 V
<b>t<sub>rr</sub></b>	I <sub>F</sub> = 50A, -di/dt = 100 A/∞s, V <sub>R</sub> = 100 V			250 ns
<b>Q<sub>RM</sub></b>			0.8	∞C
<b>I<sub>RM</sub></b>			8	A

Note: 1. Pulse test, t ≤ 300 ∞s, duty cycle d ≤ 2 %

**PLUS247™ (IXFX) Outline**


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A <sub>1</sub>	2.29	2.54	.090	.100
A <sub>2</sub>	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b <sub>1</sub>	1.91	2.13	.075	.084
b <sub>2</sub>	2.92	3.12	.115	.123
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	19.81	20.32	.780	.800
L <sub>1</sub>	3.81	4.32	.150	.170
Q	5.59	6.20	.220	.244
R	4.32	4.83	.170	.190

**TO-264 AA Outline**


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.82	5.13	.190	.202
A <sub>1</sub>	2.54	2.89	.100	.114
A <sub>2</sub>	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b <sub>1</sub>	2.39	2.69	.094	.106
b <sub>2</sub>	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
L <sub>1</sub>	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q <sub>1</sub>	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R <sub>1</sub>	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

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  
 4,850,072    4,931,844    5,034,796

5,049,961    5,187,117    5,486,715    6,306,728B1  
 5,063,307    5,237,481    5,381,025

Fig. 1. Output Characteristics at 25°C

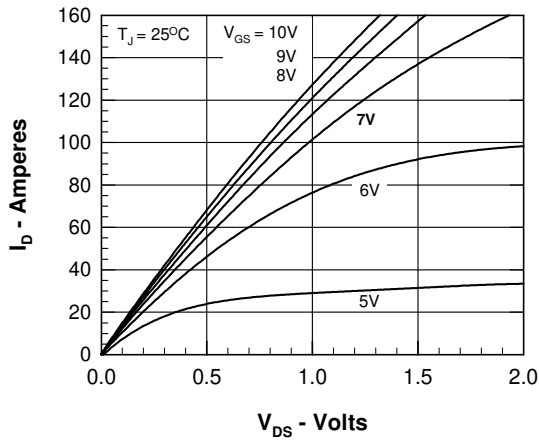


Fig. 2. Output Characteristics at 125°C

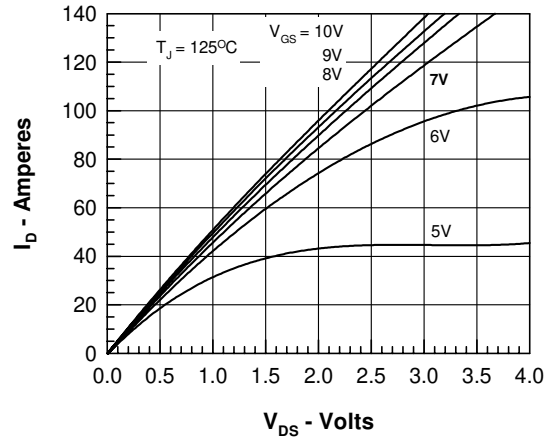


Fig. 3.  $R_{DS(ON)}$  vs. Drain Current

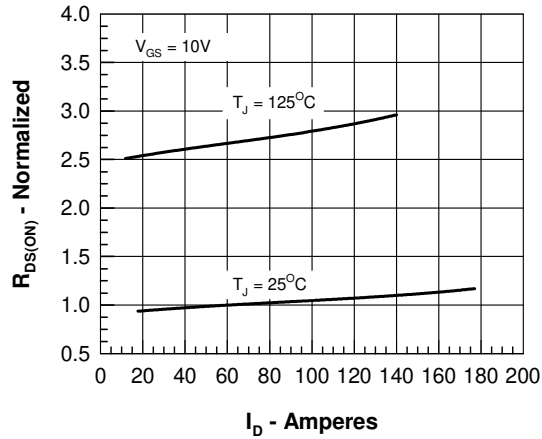


Fig. 4.  $R_{DS(ON)}$  vs.  $T_J$

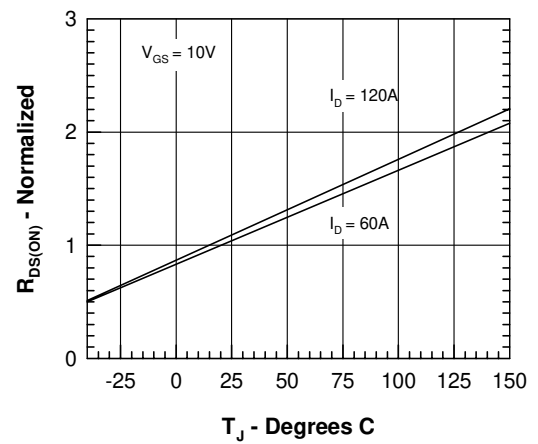


Fig. 5. Drain vs. Case Temperature

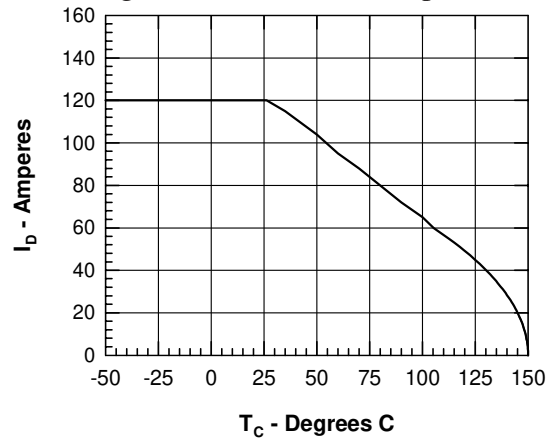


Fig. 6. Admittance Curves

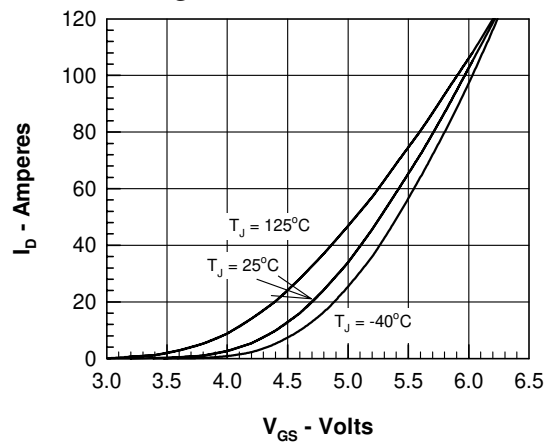


Fig. 7. Gate Charge Characteristic Curve

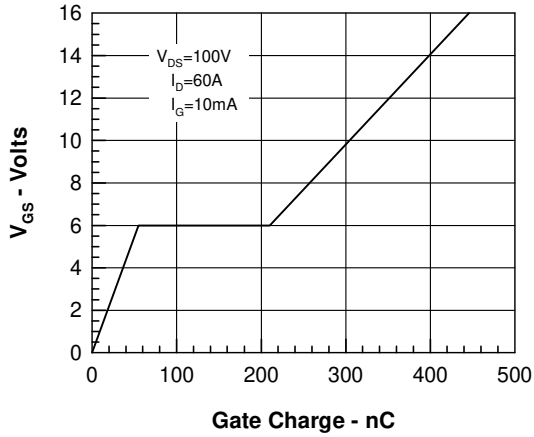


Fig. 8. Capacitance Curves

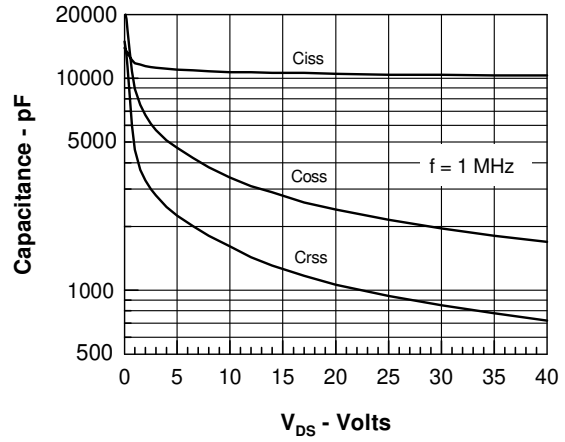


Fig. 9. Source Current vs. Source to Drain Voltage

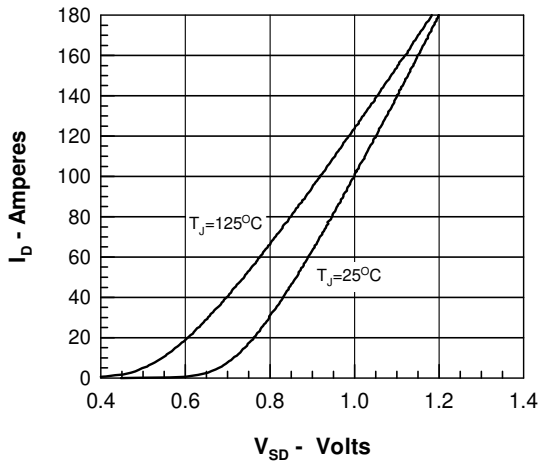
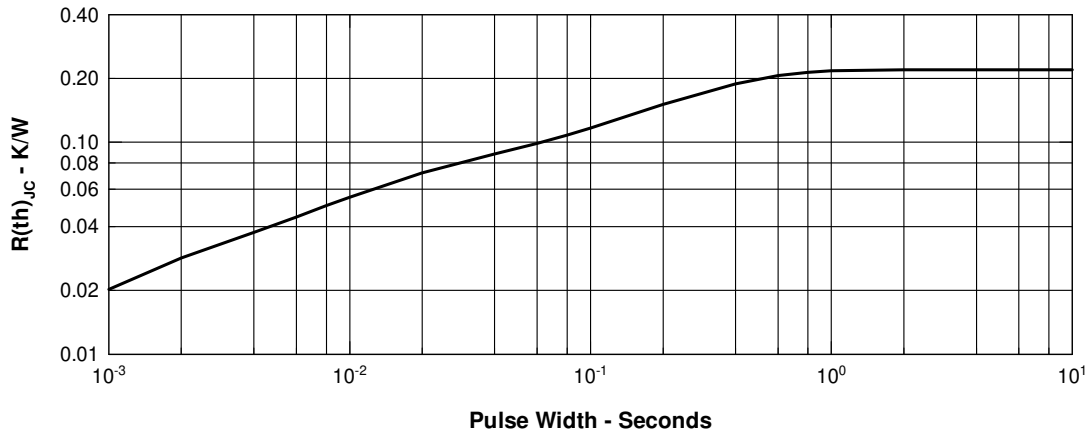


Fig. 10. Maximum Thermal Impedance





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