IXYS

HiPerFET™ Power MOSFETs

IXFX 120N20
IXFK 120N20

V_{DSS} = 200 V
I_{D25} = 120 A
$R_{DS(on)}$ = 17 mΩ

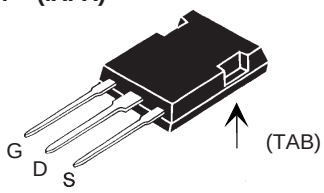
$t_{rr} \leq 250$ ns

Single MOSFET Die

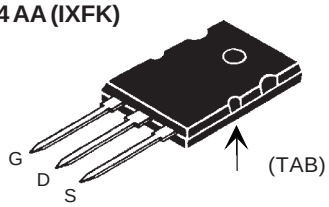
Preliminary data sheet

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	200	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ	200	V
V_{GS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C (MOSFET chip capability)	120	A
I_{D104}	T_C = 104°C (External lead capability)	76	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	480	A
I_{AR}	T_C = 25°C	120	A
E_{AR}	T_C = 25°C	64	mJ
E_{AS}	T_C = 25°C	3	J
dv/dt	$I_S \leq I_{DM}$, di/dt ≤ 100 A/µs, $V_{DD} \leq V_{DSS}$ $T_J \leq 150°C$, R_G = 2 Ω	15	V/ns
P_D	T_C = 25°C	560	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 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°C, unless otherwise specified) min.	typ.	max.	
V_{DSS}	V_{GS} = 0 V, I_D = 3mA	200			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 8mA	2.0		4.0	V
I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0			±200	nA
I_{DSS}	$V_{DS} = V_{DSS}$ V_{GS} = 0 V	T_J = 25°C		100	µA
		T_J = 125°C		2	mA
$R_{DS(on)}$	V_{GS} = 10 V, $I_D = 0.5 \bullet I_{D25}$ Note 1			17	mΩ

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

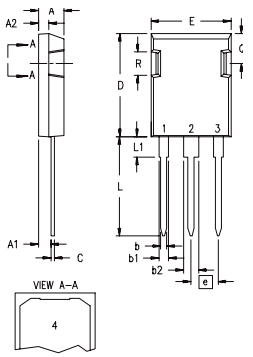
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	min.	typ.	max.	
g_{fs}	V_{DS} = 10 V; I_D = 0.5 • I_{D25} Note 1	40	77		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		9100		pF
C_{oss}			2200		pF
C_{rss}			1000		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		40		ns
t_r			65		ns
$t_{d(off)}$	R_G = 1 Ω (External),		110		ns
t_f			35		ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		300		nC
Q_{gs}			50		nC
Q_{gd}			170		nC
R_{thJC}				0.22	K/W
R_{thCK}			0.15		K/W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	min.	typ.	max.	
I_S	V_{GS} = 0 V			120	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			480	A
V_{SD}	$I_F = I_S$, V_{GS} = 0 V, Note 1			1.5	V
t_{rr}	I_F = 50A,-di/dt = 100 A/µs, V_R = 100 V			250	ns
Q_{RM}			0.8		µC
I_{RM}			8		A

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

PLUS247™ (IXFX) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.83	5.21	.190	.205
A_1	2.29	2.54	.090	.100
A_2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b_1	1.91	2.13	.075	.084
b_2	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
L1	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 Min.	Max.	Inches 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

Fig. 1. Output Characteristics at 25°C

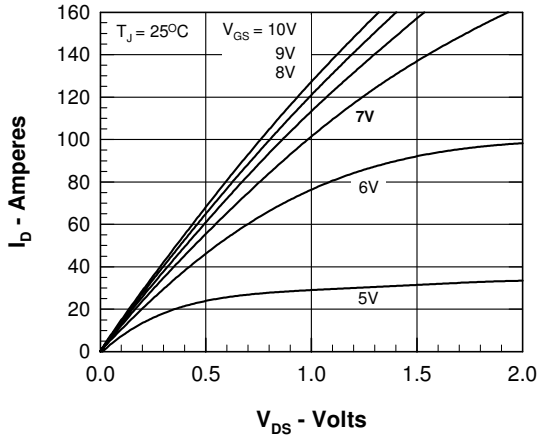


Fig. 2. Output Characteristics at 125°C

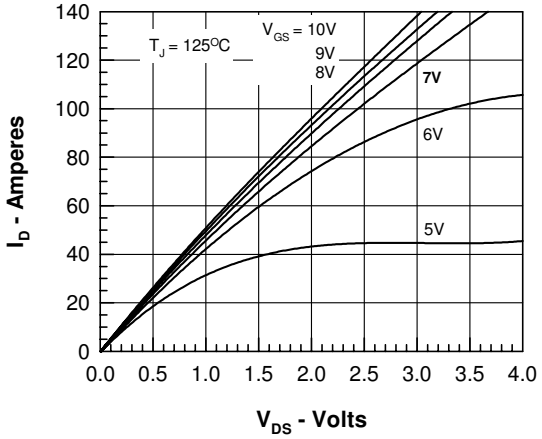


Fig. 3. $R_{DS(ON)}$ vs. Drain Current

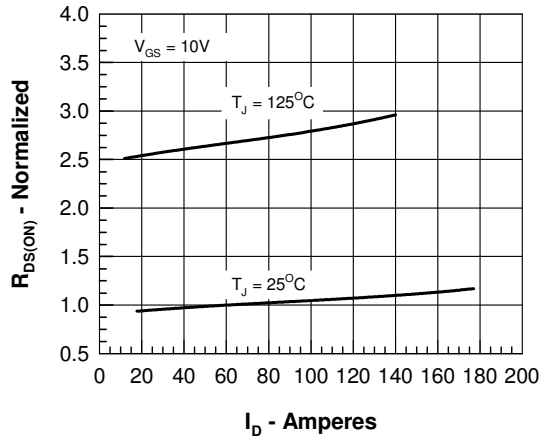


Fig. 4. $R_{DS(ON)}$ vs. T_J

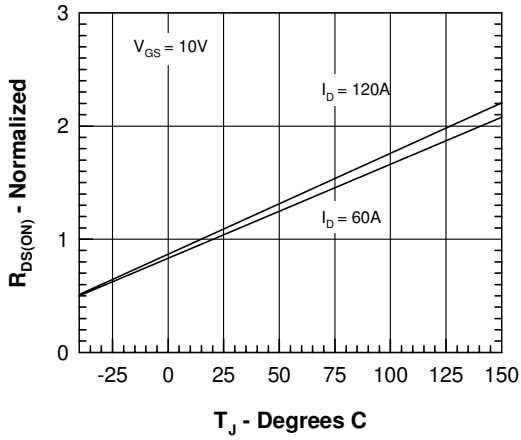


Fig. 5. Drain vs. Case Temperature

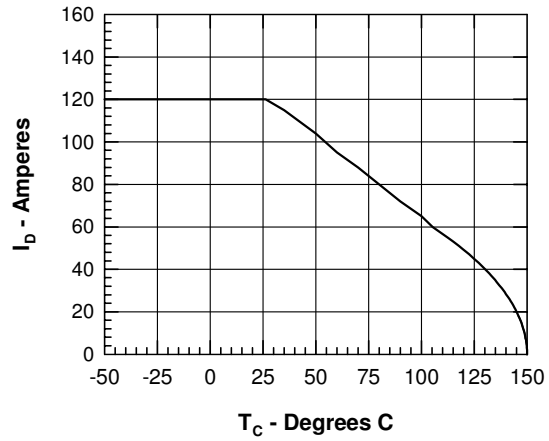


Fig. 6. Admittance Curves

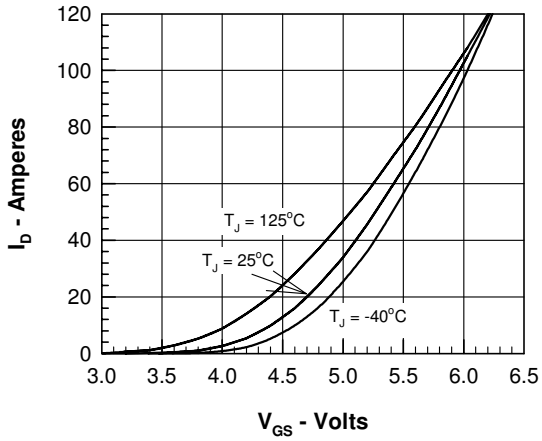


Fig. 7. Gate Charge Characteristic Curve

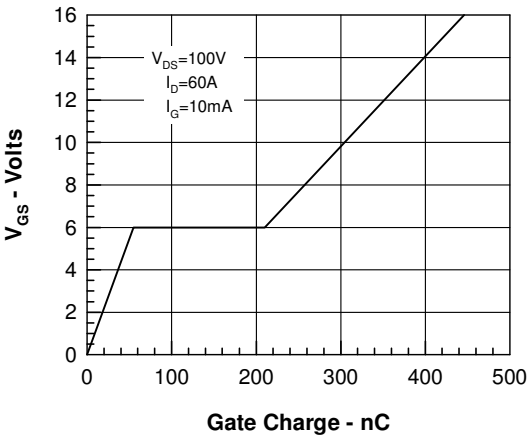


Fig. 8. Capacitance Curves

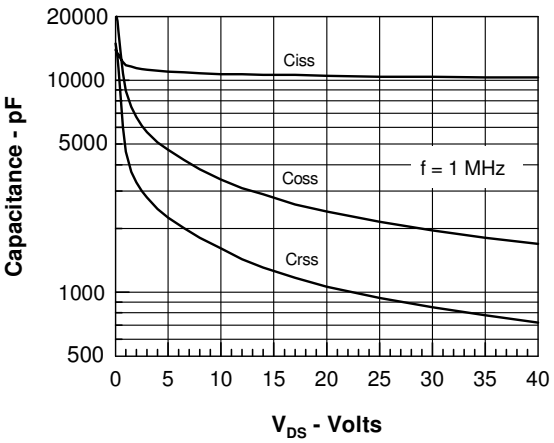


Fig. 9. Source Current vs. Source to Drain Voltage

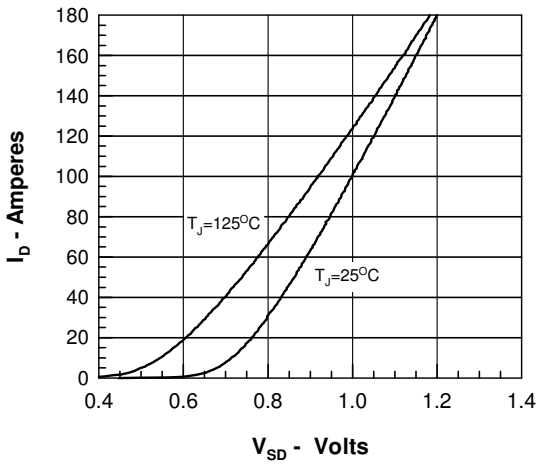


Fig. 10. Maximum Thermal Impedance