



# HiPerFET™ Power MOSFET

Single MOSFET Die

IXFN 120N20  
IXFN 110N20  
IXFK 120N20  
IXFK 110N20

V <sub>DSS</sub>	I <sub>D25</sub>	R <sub>DS(on)</sub>
200 V	120 A	17 mΩ
200 V	110 A	20 mΩ
200 V	120 A	17 mΩ
200 V	110 A	20 mΩ

t<sub>rr</sub> ≤ 200 ns

Symbol	Test Conditions	Maximum Ratings			
		IXFK 110	IXFK 120	IXFN 110	IXFN 120
V <sub>DSS</sub>	T <sub>J</sub> = 25°C to 150°C	200		200	V
V <sub>DGR</sub> ①	T <sub>J</sub> = 25°C to 150°C	200		200	V
V <sub>GS</sub>	Continuous	±20		±20	V
V <sub>GSM</sub>	Transient	±30		±30	V
I <sub>D25</sub>	T <sub>C</sub> = 25°C	110	120	110	120
I <sub>DM</sub> ②	T <sub>C</sub> = 25°C	440	480	440	480
I <sub>AR</sub>	T <sub>C</sub> = 25°C	110	120	110	120
E <sub>AR</sub>	T <sub>C</sub> = 25°C	60		60	mJ
dv/dt	I <sub>S</sub> ≤ I <sub>DM</sub> , di/dt ≤ 100 A/μs, V <sub>DD</sub> ≤ V <sub>DSS</sub> T <sub>J</sub> ≤ 150°C, R <sub>G</sub> = 2 Ω	5		5	V/ns
P <sub>D</sub>	T <sub>C</sub> = 25°C	560		600	W
T <sub>J</sub>			-55 ... +150		°C
T <sub>JM</sub>			150		°C
T <sub>stg</sub>			-55 ... +150		°C
T <sub>L</sub>	1.6 mm (0.063 in) from case for 10 s	300		-	°C
V <sub>ISOL</sub>	50/60 Hz, RMS t = 1 min I <sub>ISOL</sub> ≤ 1 mA t = 1 s	-		2500 3000	V~ V~
M <sub>d</sub>	Mounting torque Terminal connection torque	0.9/6		1.5/13 1.5/13	Nm/lb.in. Nm/lb.in.
Weight		10		30	g

Symbol	Test Conditions	Characteristic Values (T <sub>J</sub> = 25°C, unless otherwise specified)		
		min.	typ.	max.
V <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 3 mA V <sub>DSS</sub> temperature coefficient	200	0.078	V %/K
V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 8 mA V <sub>GS(th)</sub> temperature coefficient	2	-0.187	V %/K
I <sub>GSS</sub>	V <sub>GS</sub> = ±20 V, V <sub>GE</sub> = 0			±200 nA
I <sub>DSS</sub>	V <sub>DS</sub> = 0.8 • V <sub>DSS</sub> V <sub>GS</sub> = 0 V	T <sub>J</sub> = 25°C T <sub>J</sub> = 125°C		400 μA 2 mA
R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 0.5 • I <sub>D25</sub> Pulse test, t ≤ 300 ms, duty cycle d ≤ 2 %	120N20 110N20		17 mΩ 20 mΩ

Notes: 1. R<sub>GS</sub> = 1 MΩ  
2. Pulse width limited by T<sub>JM</sub>.

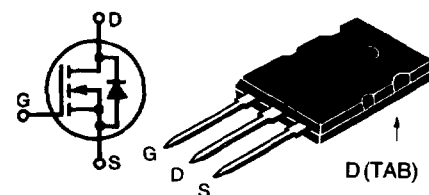
IXYS reserves the right to change any test conditions and dimensions.

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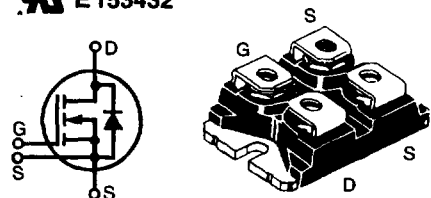
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### TO-264 AA (IXFK)



### miniBLOC, SOT-227 B (IXFN)

E 153432



G = Gate  
S = Source  
D = Drain  
TAB = Drain  
Either Source terminal at miniBLOC can be used as Main or Kelvin Source

### Features

- International standard packages
- Encapsulating epoxy meets UL 94 V-0, flammability classification
- miniBLOC with Aluminium nitride isolation
- Low R<sub>DS(on)</sub> HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- Fast intrinsic Rectifier

### Applications

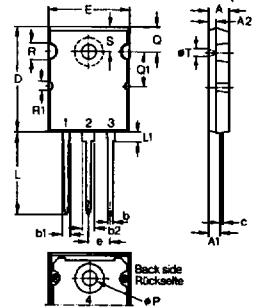
- DC-DC converters
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls
- Low voltage relays

### Advantages

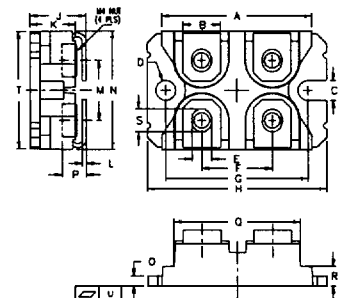
- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ , pulse test		65	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		10300	pF
$C_{oss}$			2200	pF
$C_{rss}$			1200	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\ \Omega$ (External)		40	ns
$t_r$			90	ns
$t_{d(off)}$			158	ns
$t_f$			79	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		515	nC
$Q_{gs}$			62	nC
$Q_{gd}$			276	nC
$R_{thJC}$	TO-264 AA		0.22	K/W
$R_{thCK}$	TO-264 AA		0.15	K/W
$R_{thJC}$	miniBLOC, SOT-227 B		0.21	K/W
$R_{thCK}$	miniBLOC, SOT-227 B		0.05	K/W

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$I_s$	$V_{GS} = 0\text{ V}$	110N20 120N20		110 120	A A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$	110N20 120N20		440 480	A A
$V_{SD}$	$I_F = 100\text{ A}, V_{GS} = 0\text{ V},$ Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$			1.5	V
$t_{rr}$	$I_F = 50\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		175	ns	
$Q_{RM}$			1.1	$\mu\text{C}$	
$I_{RM}$			12.6	A	

**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
O	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

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

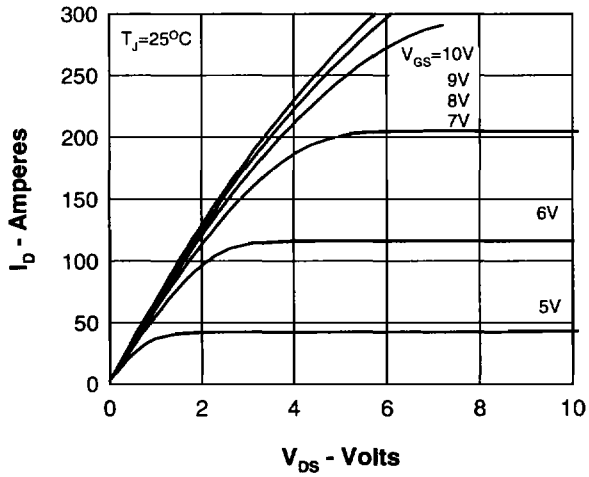


Figure 1. Output Characteristics at 25°C

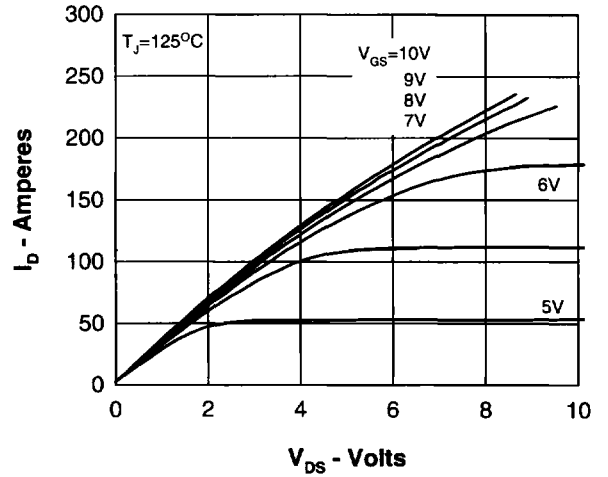


Figure 2. Output Characteristics at 125°C

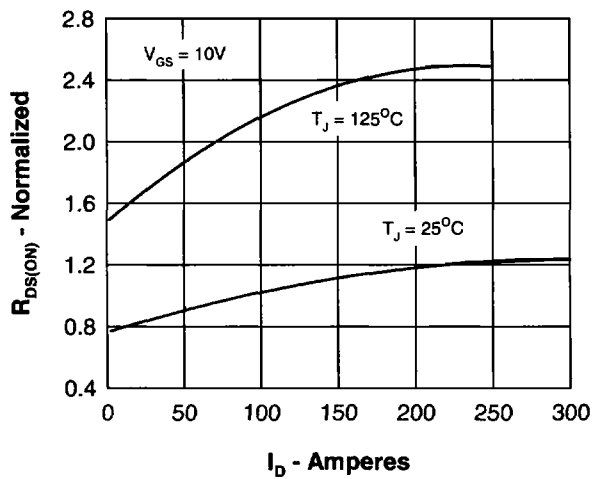


Figure 3.  $R_{DS(on)}$  normalized to 15A/25°C vs.  $I_D$

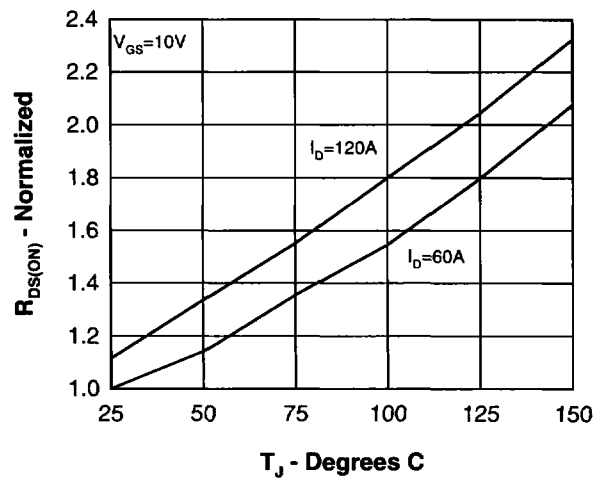


Figure 4.  $R_{DS(on)}$  normalized to 15A/25°C vs.  $T_J$

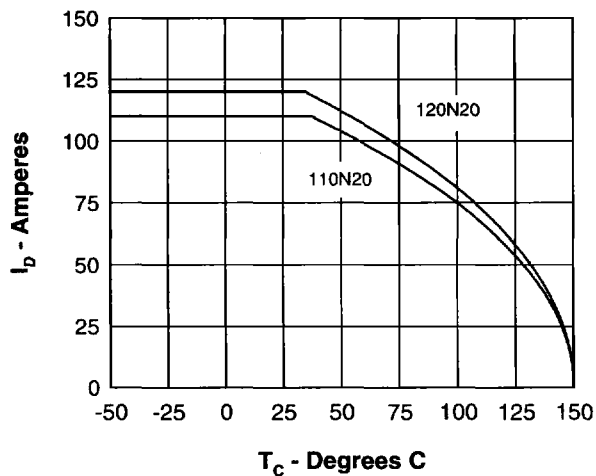


Figure 5. Drain Current vs. Case Temperature

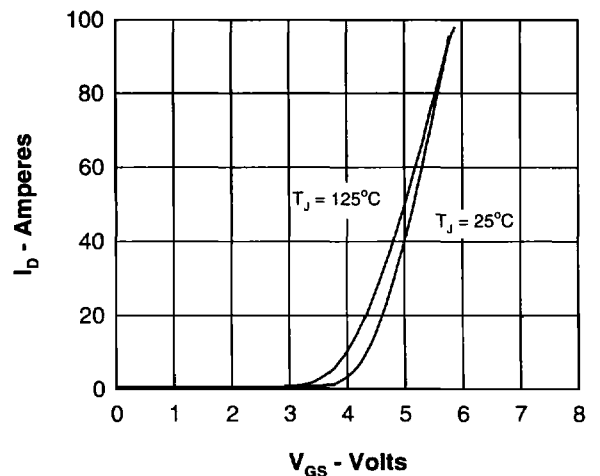


Figure 6. Admittance Curves

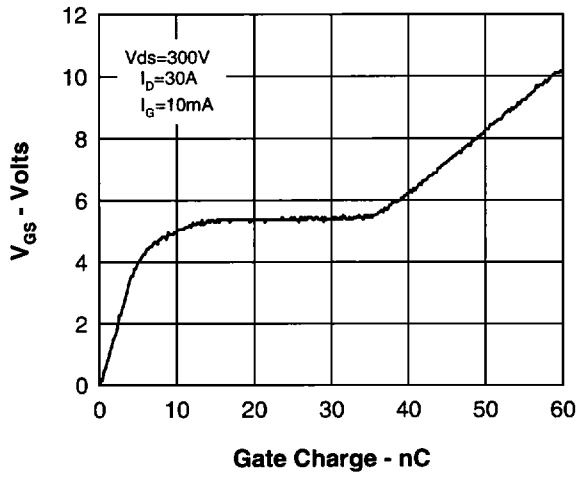


Figure 7. Gate Charge

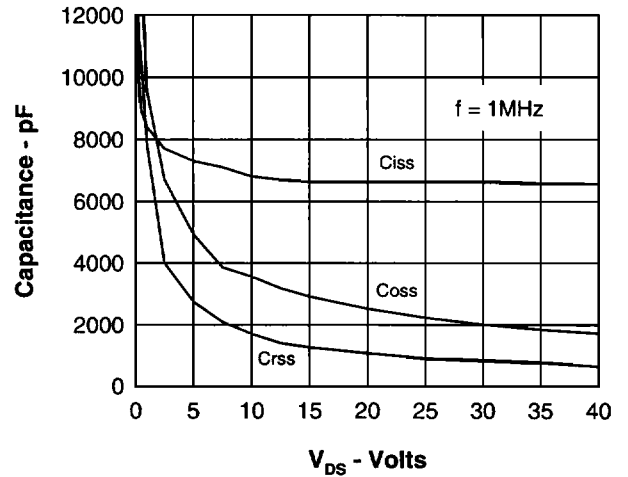


Figure 8. Capacitance Curves

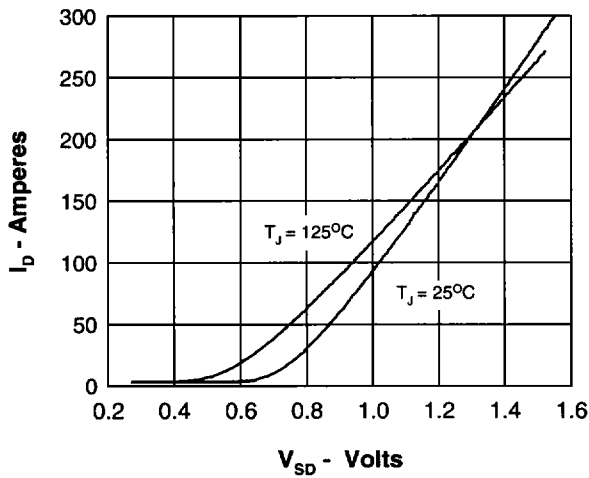


Figure 9. Forward Voltage Drop of the Intrinsic Diode

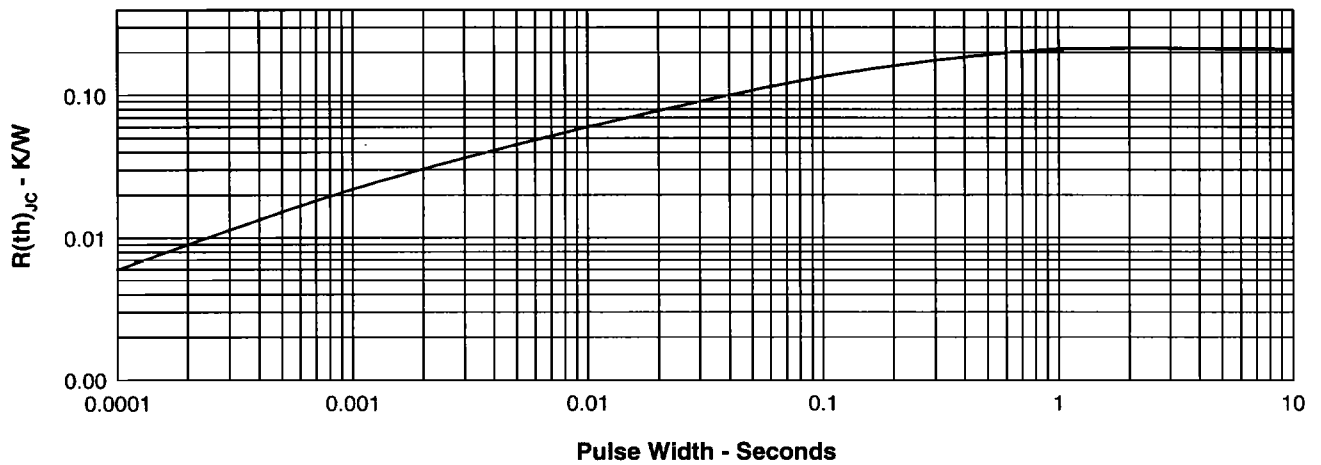
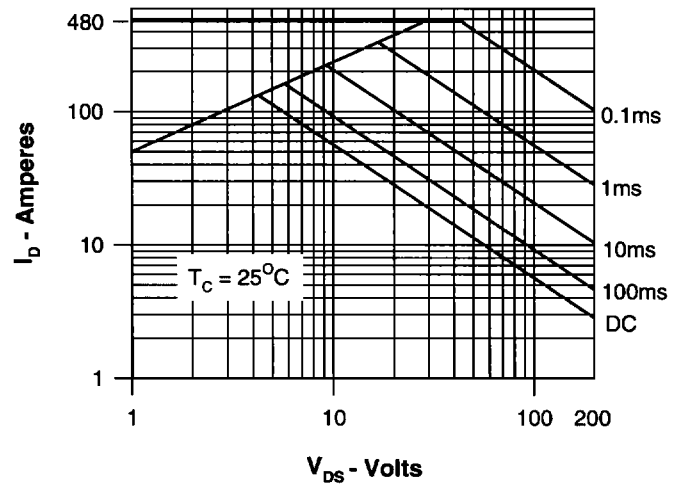


Figure 11. Transient Thermal Resistance