

# HiPerFET™ Power MOSFETs

**IXFK 90 N 20**  
**IXFN 100 N 20**  
**IXFN 106 N 20**

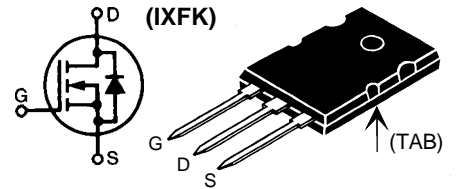
$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
<b>200 V</b>	<b>90 A</b>	<b>23 mΩ</b>
<b>200 V</b>	<b>100 A</b>	<b>23 mΩ</b>
<b>200 V</b>	<b>106 A</b>	<b>20 mΩ</b>

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

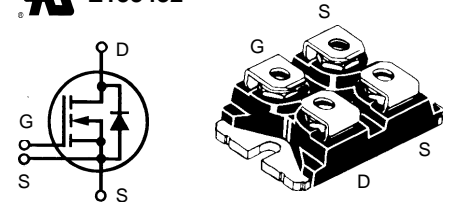
$t_{rr} \leq 200 \text{ ns}$

Symbol	Test Conditions	Maximum Ratings		
		IXFK	IXFN	IXFN
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	90N20 200	100N20 200	106N20 200 V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	200	200	200 V
$V_{GS}$	Continuous	$\pm 20$	$\pm 20$	20 V
$V_{GSM}$	Transient	$\pm 30$	$\pm 30$	20 V
$I_{D25}$	$T_C = 25^\circ\text{C}$ , Chip capability	90 ①	100	106 A
$I_{D80}$	$T_C = 80^\circ\text{C}$ , limited by external leads	76	-	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	360	400	424 A
$I_{AR}$	$T_C = 25^\circ\text{C}$	50	50	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	30	30	30 mJ
dv/dt	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$	5	5	5 V/ns
$P_D$	$T_C = 25^\circ\text{C}$	500	520	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
$V_{ISOL}$	50/60 Hz, RMS $t = 1 \text{ min}$ $I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$	-	2500	V~
		-	3000	V~
$M_d$	Mounting torque	0.9/6	1.5/13	Nm/lb.in.
	Terminal connection torque	-	1.5/13	Nm/lb.in.
Weight		10	30	g

TO-264 AA



miniBLOC, SOT-227 B (IXFN)  
E153432



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
- JEDEC TO-264 AA, epoxy meet UL94 V-0, flammability classification
- miniBLOC with Aluminium nitride isolation
- Low  $R_{DS(on)}$  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.
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 1 \text{ mA}$	200		V
$V_{GH(th)}$	$V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$	2		V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 200 \text{ nA}$
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ , $T_J = 25^\circ\text{C}$ $V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$			400 $\mu\text{A}$ 2 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$			IXFK90N20 0.023 $\Omega$ IXFN100N20 0.023 $\Omega$ IXFN106N20 0.020 $\Omega$

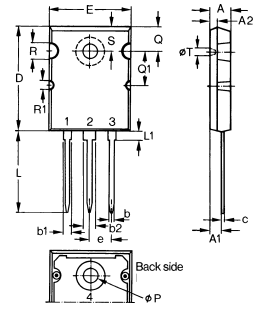
IXYS reserves the right to change limits, test conditions, and dimensions.

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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		60	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		9000	pF
$C_{oss}$			1600	pF
$C_{rss}$			590	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),		30	ns
$t_r$			80	ns
$t_{d(off)}$			75	ns
$t_f$			30	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		380	nC
$Q_{gs}$			70	nC
$Q_{gd}$			190	nC
$R_{thJC}$	TO-264 AA		0.25	K/W
$R_{thCK}$	TO-264 AA		0.15	K/W
$R_{thJC}$	miniBLOC, SOT-227 B		0.24	K/W
$R_{thCK}$	miniBLOC, SOT-227 B		0.05	K/W

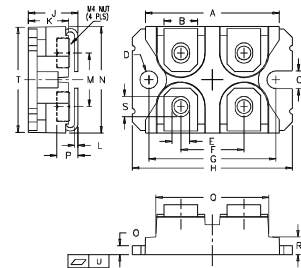
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$I_S$	$V_{GS} = 0\text{ V}$			90 A IXFK90N20 IXFN100N20 IXFN106N20
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$			360 A IXFK90N20 IXFN100N20 424 A IXFN106N20
$V_{SD}$	$I_F = 100\text{ A}, V_{GS} = 0\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$			1.5 V
$t_{rr}$	$I_F = 50\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		3	200 ns
$Q_{RM}$			38	$\mu\text{C}$
$I_{RM}$				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
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

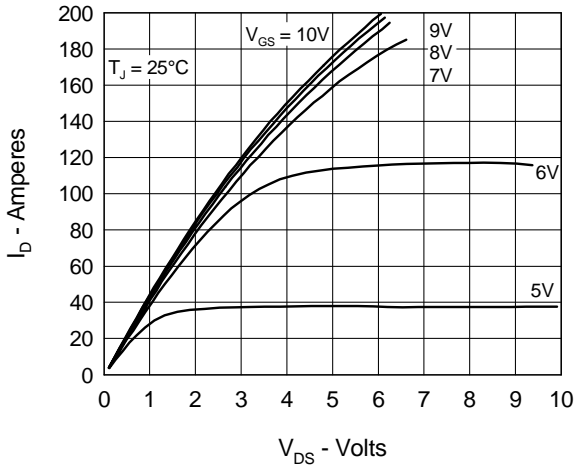
### miniBLOC, SOT-227 B



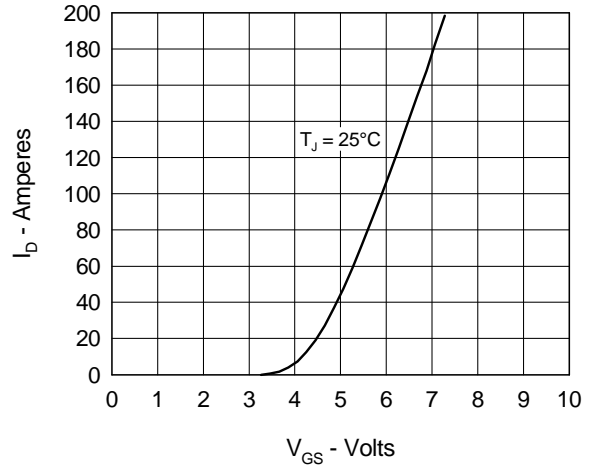
M4 screws (4x) supplied

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

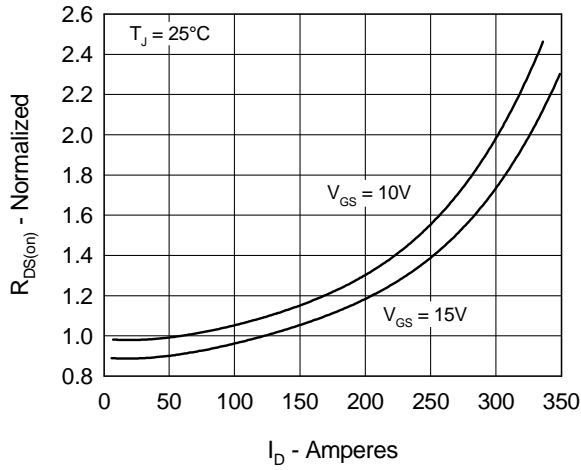
**Fig. 1 Output Characteristics**



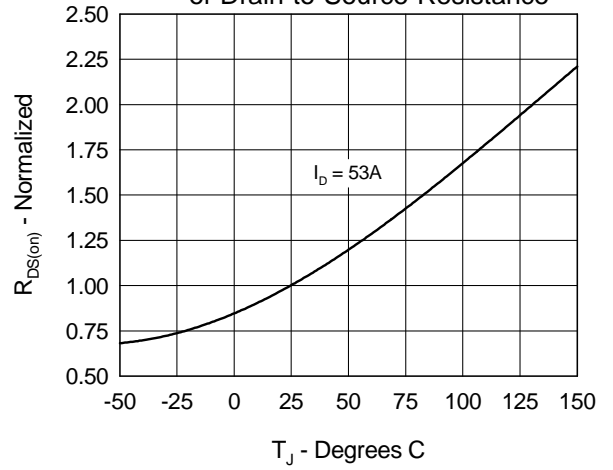
**Fig. 2 Input Admittance**



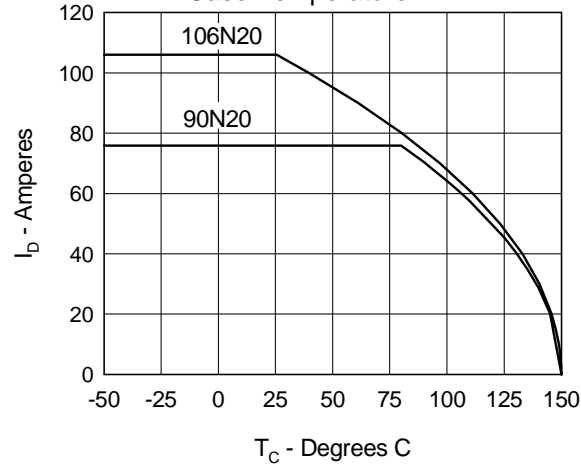
**Fig. 3  $R_{DS(on)}$  vs. Drain Current**



**Fig. 4 Temperature Dependence of Drain to Source Resistance**



**Fig. 5 Drain Current vs. Case Temperature**



**Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage**

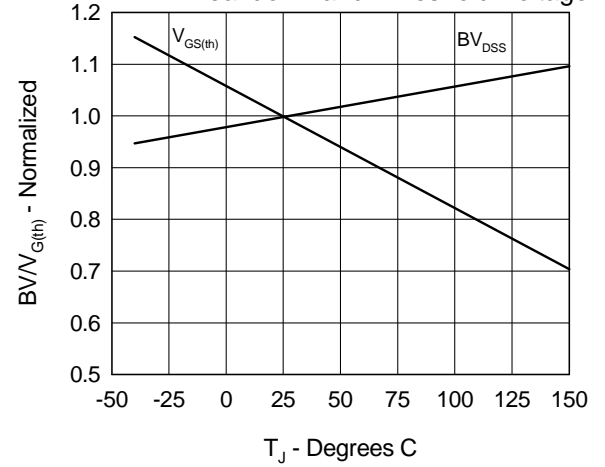


Fig.7 Gate Charge Characteristic Curve

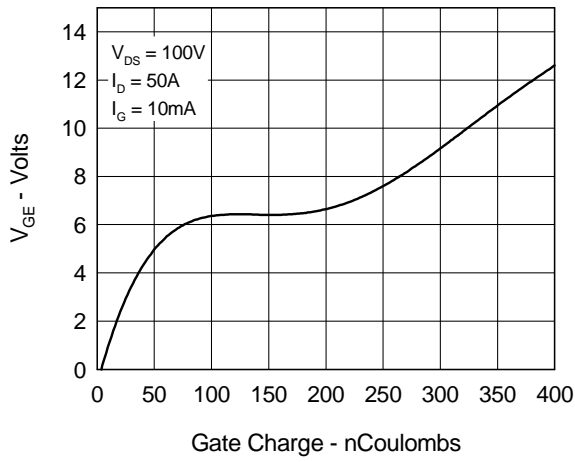


Fig.8 Capacitance Curves

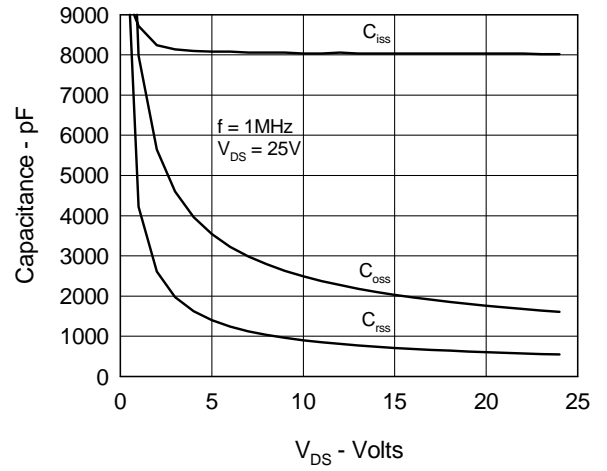


Fig.9 Source Current vs. Source to Drain Voltage

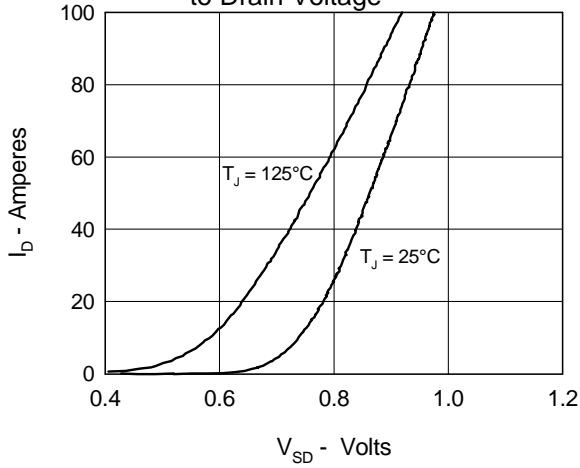
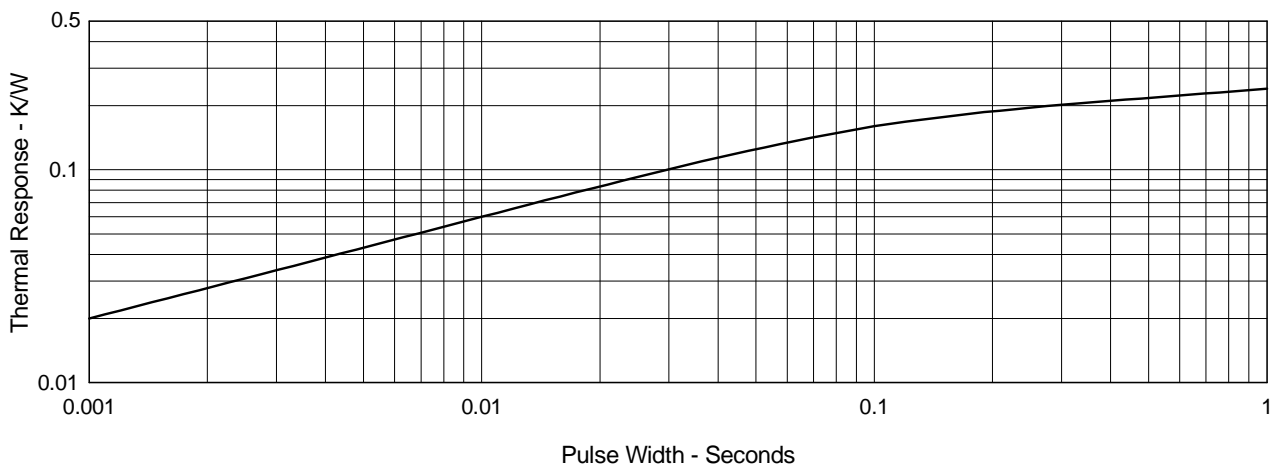


Fig.10 Transient Thermal Impedance





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