

# HiPerFET™ Power MOSFET

**IXFN170N10**  
**IXFK170N10**

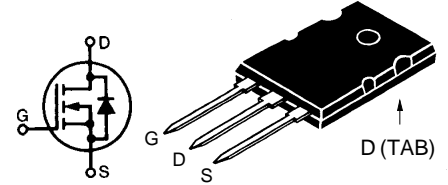
Single MOSFET Die

Preliminary data

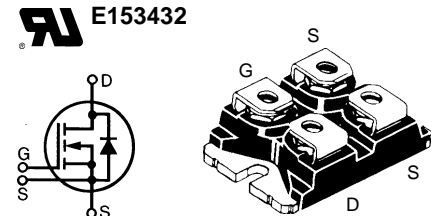
$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$	$t_{rr}$
100V	170A	10mΩ	200ns
100V	170A	10mΩ	200ns

Symbol	Test Conditions	Maximum Ratings		
		IXFK 170N10	IXFN 170N10	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	100	100	V
$V_{DGR}$ ①	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	100	100	V
$V_{GS}$	Continuous	±20	±20	V
$V_{GSM}$	Transient	±30	±30	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	170③	170	A
$I_{D125}$ ④	$T_C = 125^\circ\text{C}$	76	NA	
$I_{DM}$ ②	$T_C = 25^\circ\text{C}$	680	680	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	170	170	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	60	60	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	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	560	600	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	N/A	°C
$V_{ISOL}$	50/60 Hz, RMS $t = 1 \text{ min}$ $I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$	N/A	2500 3000	V~ V~
$M_d$	Mounting torque Terminal connection torque	0.9/6 N/A	1.5/13 1.5/13	Nm/lb.in. Nm/lb.in.
<b>Weight</b>		10	30	g

## TO-264 AA (IXFK)



## miniBLOC, SOT-227 B (IXFN)



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 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		
		Min.	Typ.	Max.
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 3 \text{ mA}$ $V_{DSS}$ temperature coefficient	100	0.077	V %/K
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$ $V_{GS(th)}$ temperature coefficient	2	-0.183	V %/K
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0 \text{ V}$			±200 nA
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ V $V_{GS} = 0 \text{ V}$			$T_J = 25^\circ\text{C}$ 400 μA $T_J = 125^\circ\text{C}$ 2 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300 \text{ ms}$ , duty cycle $d \leq 2 \%$			10 mΩ

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ , pulse test		65	S
$C_{iss}$			10,300	pF
$C_{oss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		2,200	pF
$C_{rss}$			1,200	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

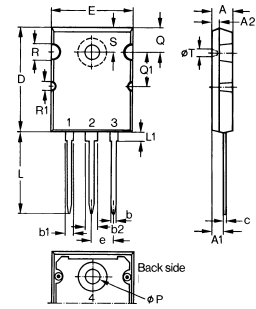
### Source-Drain Diode

( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0$			170 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$			680 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

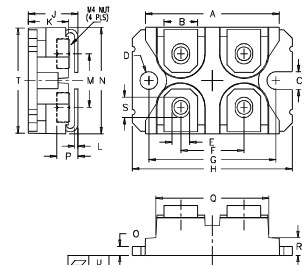
- Notes:
- $R_{GS} = 1\ \text{M}\Omega$
  - Pulse width limited by  $T_{JM}$ .
  - Chip capability
  - Current limited by external leads

### 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

Figure 1. Output Characteristics at 25°C

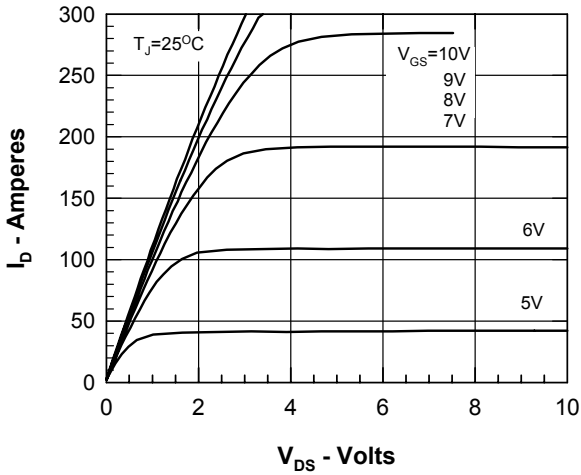


Figure 3.  $R_{DS(on)}$  normalized to 0.5  $I_{D25}$  value vs.  $I_D$

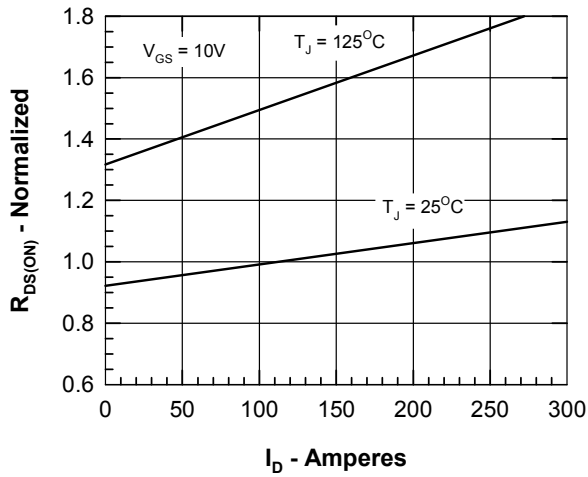


Figure 5. Drain Current vs. Case Temperature

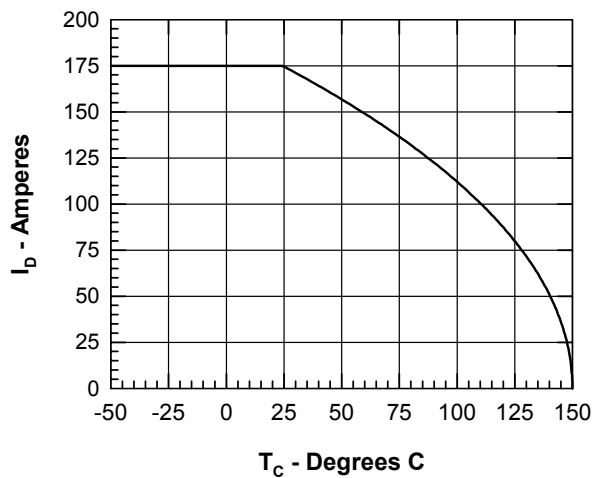


Figure 2. Output Characteristics at 125°C

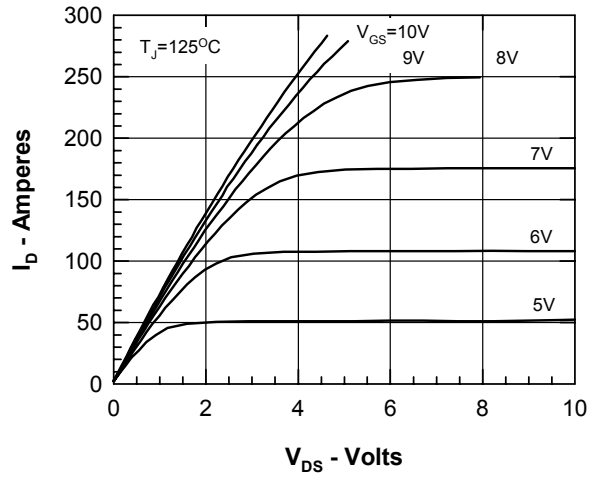


Figure 4.  $R_{DS(on)}$  normalized to 0.5  $I_{D25}$  value vs.  $T_J$

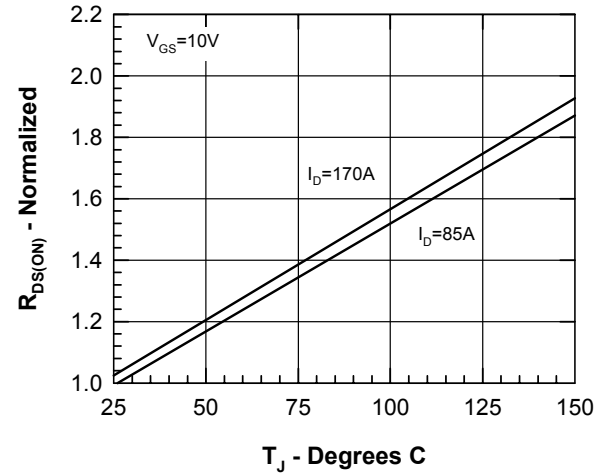


Figure 6. Admittance Curves

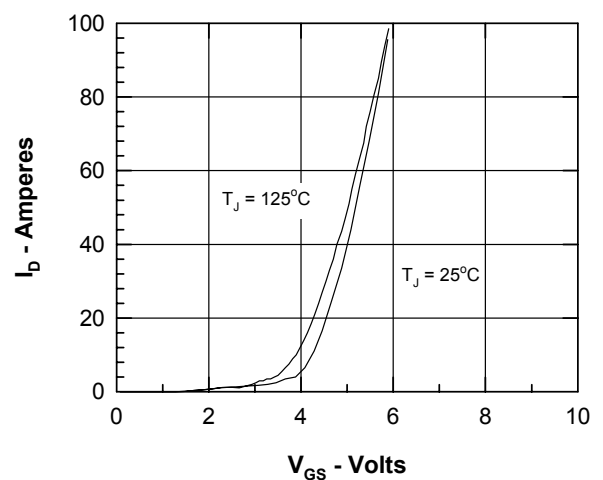


Figure 7. Gate Charge

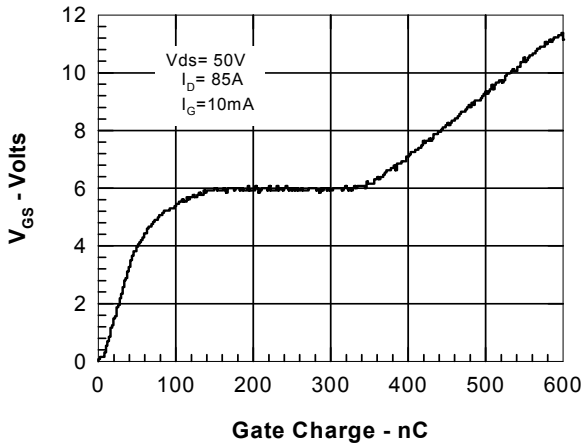


Figure 8. Capacitance Curves

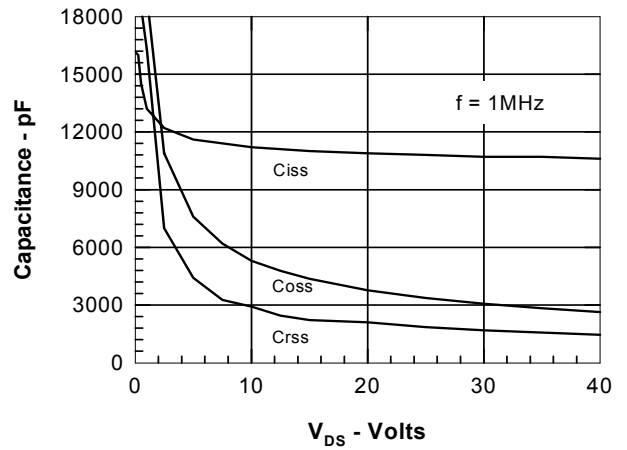


Figure 9. Forward Voltage Drop of the Intrinsic Diode

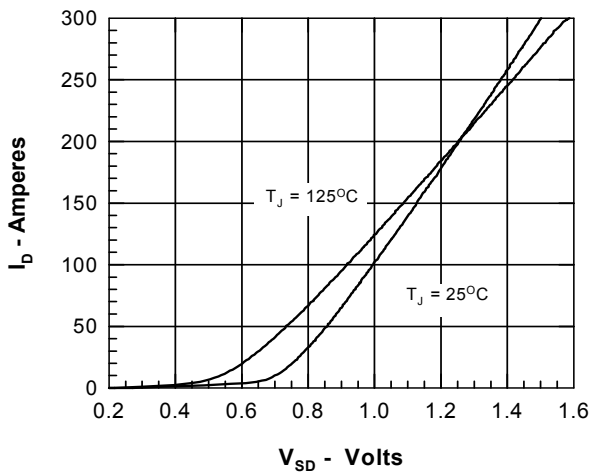


Figure 10. Forward Bias Safe Operating Area

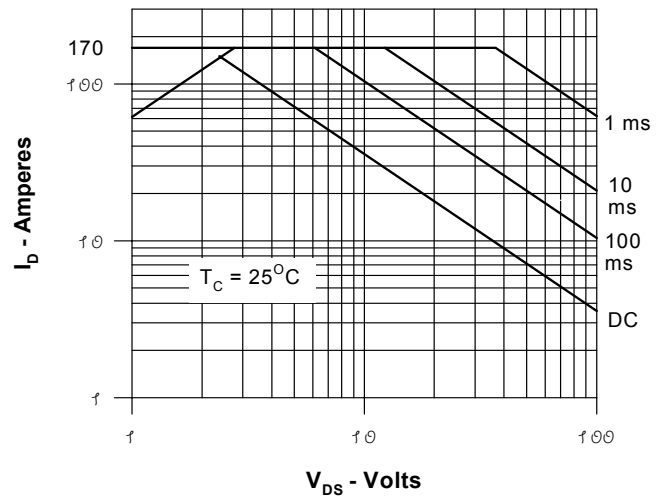
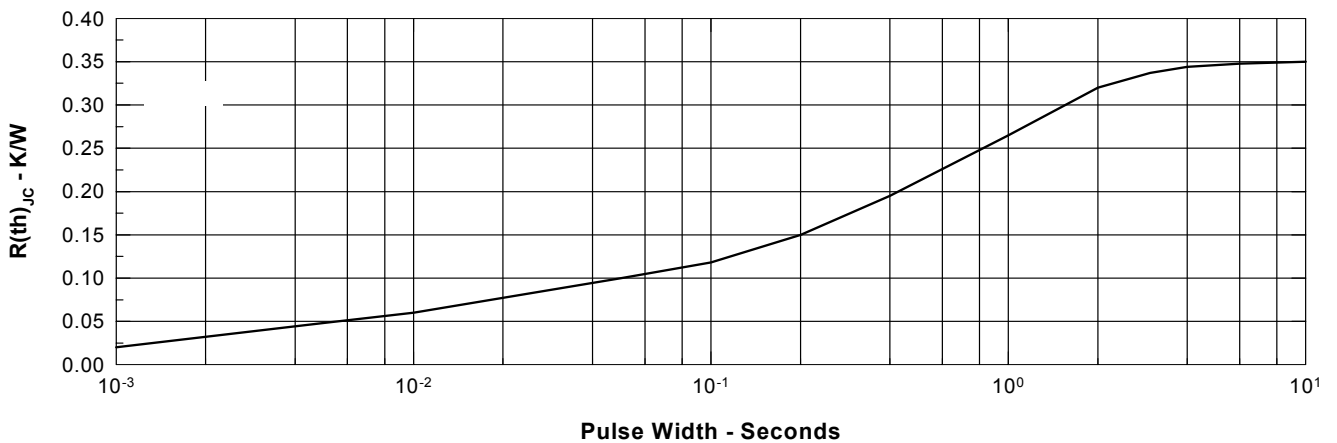


Figure 11. Transient Thermal Resistance





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