

HiPerFET™ Power MOSFET

IXFN170N10
IXFK170N10

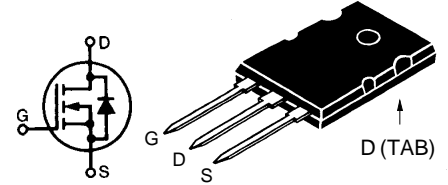
Single MOSFET Die

Preliminary data

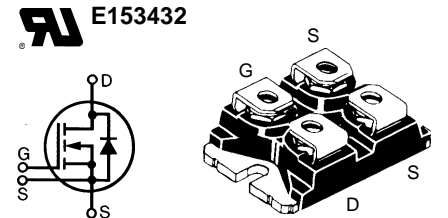
V_{DSS}	I_{D25}	$R_{DS(on)}$	t_{rr}
100V	170A	10mΩ	200ns
100V	170A	10mΩ	200ns

Symbol	Test Conditions	Maximum Ratings		
		IXFK 170N10	IXFN 170N10	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	100	100	V
V_{DGR} ①	$T_J = 25^\circ\text{C}$ to 150°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 $t = 1 \text{ min}$	N/A	2500	V~
	$I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$	N/A	3000	V~
M_d	Mounting torque	0.9/6	1.5/13	Nm/lb.in.
	Terminal connection torque	N/A	1.5/13	Nm/lb.in.
Weight		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	Characteristic Values		
		Min.	Typ.	Max.
$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$				
g_{fs}	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}, \text{ pulse test}$		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
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\ \Omega \text{ (External)},$		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

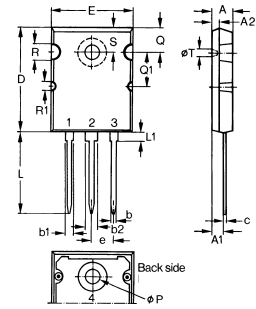
Source-Drain Diode

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

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, $t \leq 300\ \mu\text{s}, \text{ duty cycle } d \leq 2\%$			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	μC
I_{RM}			12.6	A

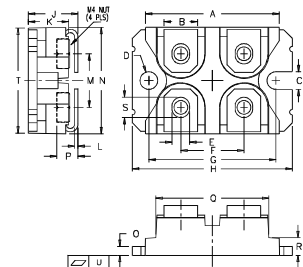
- Notes:
- $R_{GS} = 1\ \text{M}\Omega$
 - Pulse width limited by T_{JM} .
 - Chip capability
 - Current limited by external leads

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

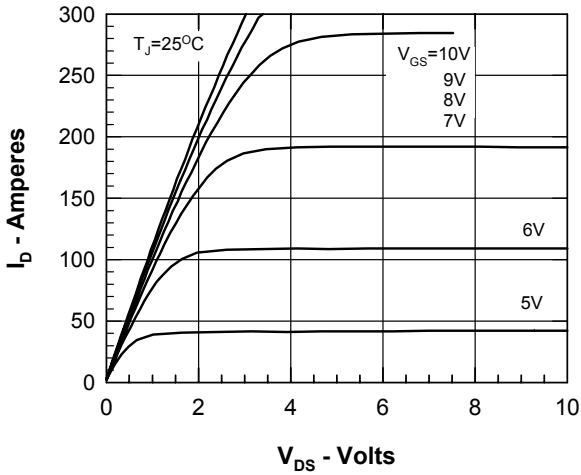


Figure 3. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. I_D

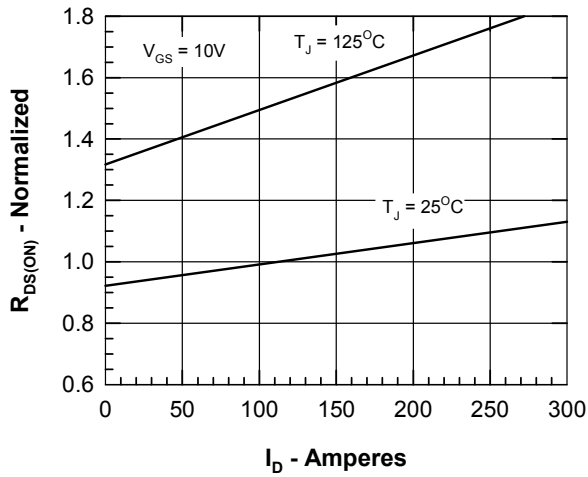


Figure 5. Drain Current vs. Case Temperature

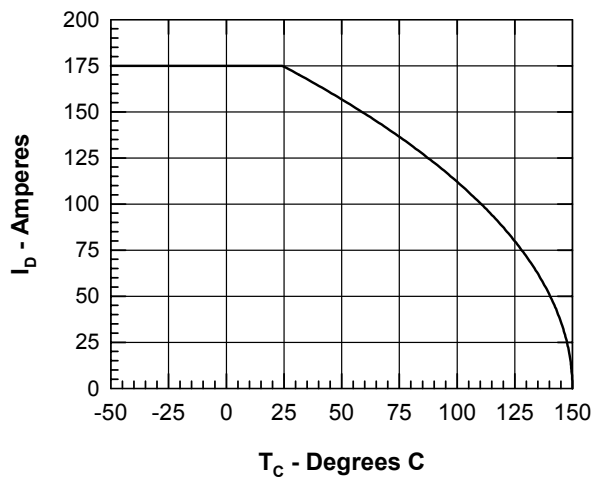


Figure 2. Output Characteristics at 125°C

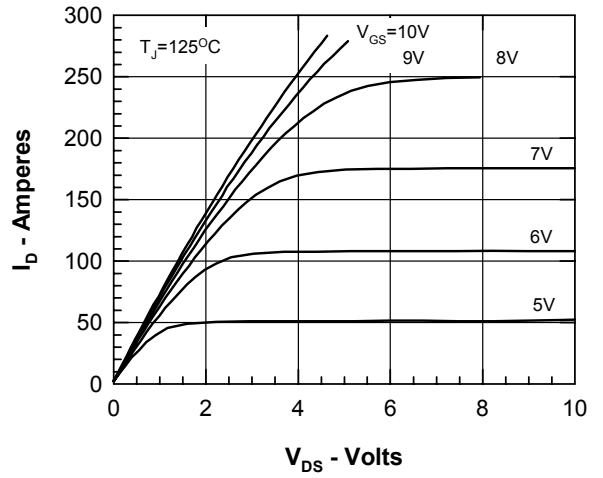


Figure 4. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. T_J

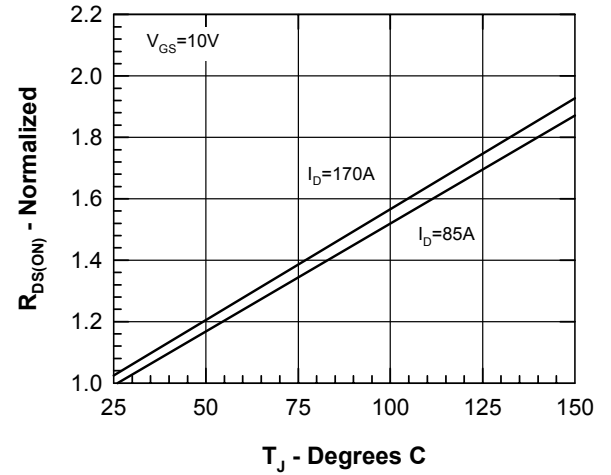


Figure 6. Admittance Curves

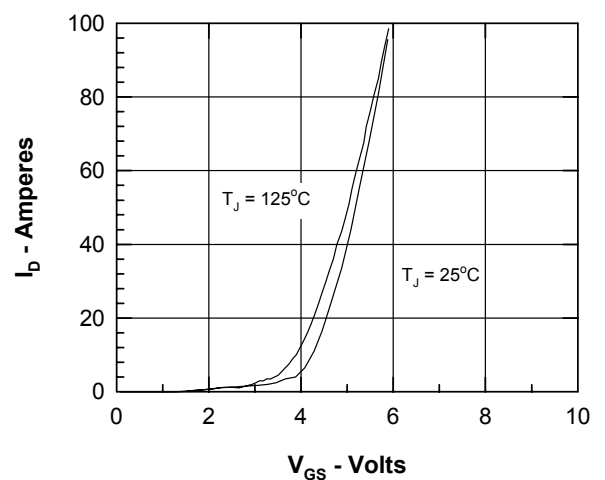


Figure 7. Gate Charge

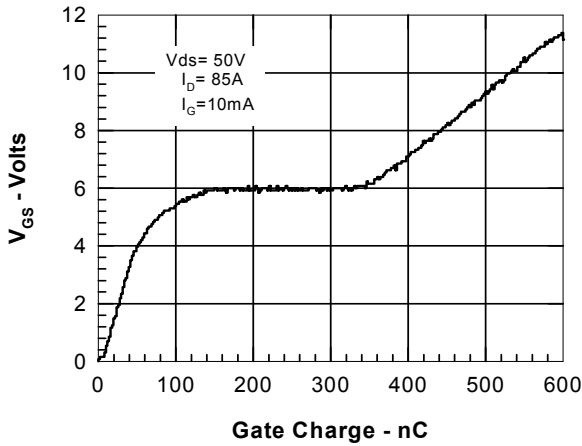


Figure 8. Capacitance Curves

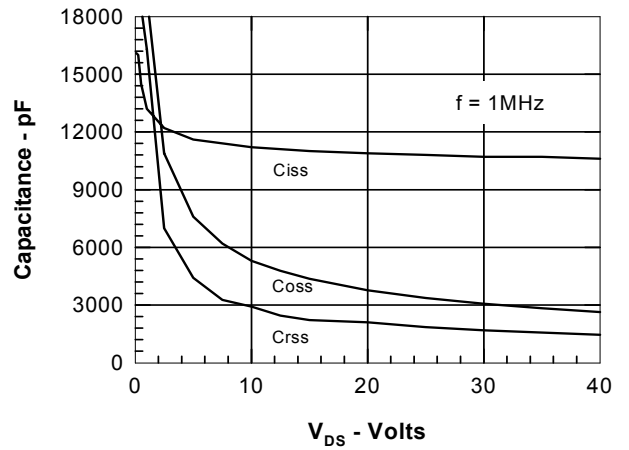


Figure 9. Forward Voltage Drop of the Intrinsic Diode

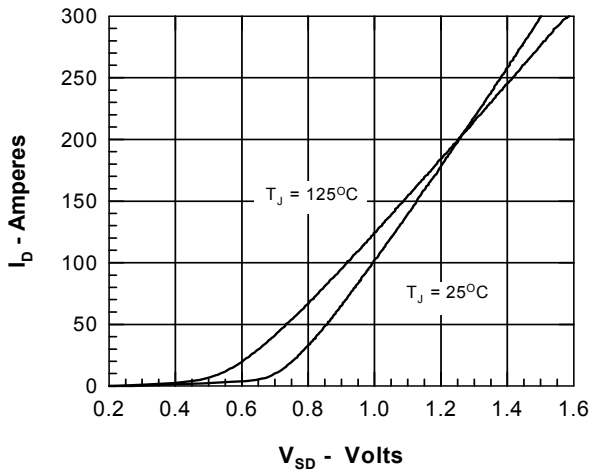


Figure 10. Forward Bias Safe Operating Area

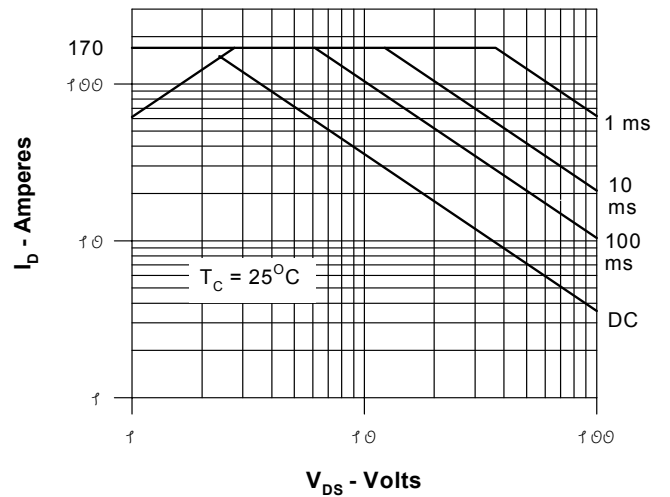
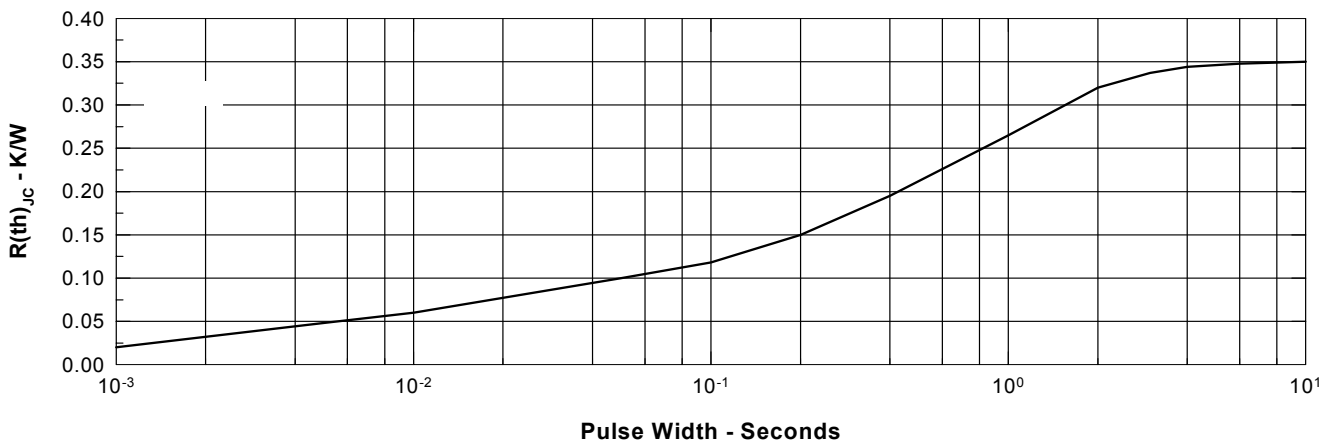


Figure 11. Transient Thermal Resistance



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