

# HiPerFET™ Power MOSFETs IXFK 27N80

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

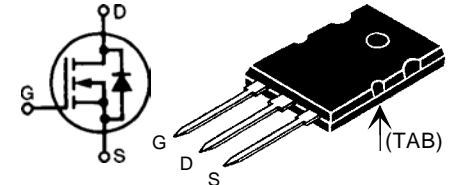
**IXFK 25N80**  
**IXFN 27N80**  
**IXFN 25N80**

$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
800 V	27 A	0.30 $\Omega$
800 V	25 A	0.35 $\Omega$
800 V	27 A	0.30 $\Omega$
800 V	25 A	0.35 $\Omega$

Symbol	Test Conditions	Maximum Ratings		
		IXFK	IXFN	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	800	800	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$	800	800	V
$V_{GS}$	Continuous	$\pm 20$	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$ , Chip capability	27N80	27	A
		25N80	25	A
		IXFK 27N80	108	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	25N80	100	A
		IXFK 27N80	14	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	25N80	13	A
		IXFK 27N80	13	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	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	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	500	520	W
$T_J$		-55 ... +150		$^\circ\text{C}$
$T_{JM}$		150		$^\circ\text{C}$
$T_{stg}$		-55 ... +150		$^\circ\text{C}$
$T_L$	1.6 mm (0.063 in) from case for 10 s	300	-	$^\circ\text{C}$
$V_{ISOL}$	50/60 Hz, RMS $t = 1\text{ min}$	-	2500	V~
	$I_{ISOL} \leq 1\text{ mA}$ $t = 1\text{ s}$	-	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

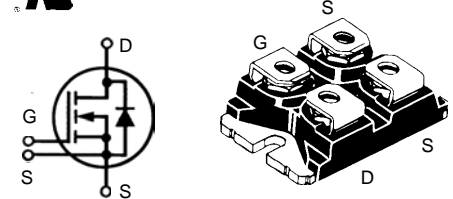
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0\text{ V}$ , $I_D = 3\text{ mA}$ $V_{DSS}$ temperature coefficient	800	0.096	V %/K
$V_{GH(th)}$	$V_{DS} = V_{GS}$ , $I_D = 8\text{ mA}$ $V_{GS(th)}$ temperature coefficient	2	-0.214	V %/K
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 200\text{ nA}$
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ , $T_J = 25^\circ\text{C}$ $V_{GS} = 0\text{ V}$ , $T_J = 125^\circ\text{C}$			500 $\mu\text{A}$ 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 $d \leq 2\%$	25N80 27N80		0.35 $\Omega$ 0.30 $\Omega$

TO-264 AA (IXFK)



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 UL 94 V-0, flammability classification
- miniBLOC, with Aluminium nitride isolation
- Low  $R_{DS(on)}$  HDMOST™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- Fast intrinsic Rectifier

## Applications

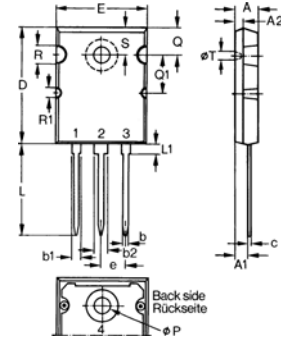
- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls

## Advantages

- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C, unless otherwise specified)		
		min.	typ.	max.
<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 10 V; I <sub>D</sub> = 0.5 • I <sub>D25</sub> , pulse test	16	28	S
<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz	7930	8400	9740
<b>C<sub>oss</sub></b>		630	712	790
<b>C<sub>rss</sub></b>		146	192	240
<b>t<sub>d(on)</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub> R <sub>G</sub> = 1 Ω (External),		30	ns
<b>t<sub>r</sub></b>			80	ns
<b>t<sub>d(off)</sub></b>			75	ns
<b>t<sub>f</sub></b>			40	ns
<b>Q<sub>g(on)</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub>	320	350	400
<b>Q<sub>gs</sub></b>		38	46	56
<b>Q<sub>gd</sub></b>		120	130	142
<b>R<sub>thJC</sub></b>	TO-264 AA			0.25
<b>R<sub>thCK</sub></b>	TO-264 AA		0.15	K/W
<b>R<sub>thJC</sub></b>	miniBLOC, SOT-227 B			0.24
<b>R<sub>thCK</sub></b>	miniBLOC, SOT-227 B		0.05	K/W

### TO-264 AA Outline

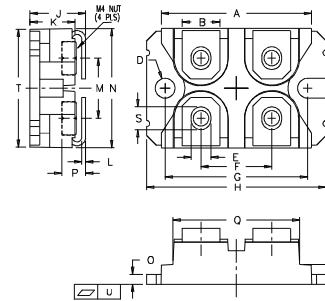


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46BSC		.215BSC	
J	0.00	0.25	.000	.010
K	0.00	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

### Source-Drain Diode

Symbol	Test Conditions	Characteristic Values			
		(T <sub>J</sub> = 25°C, unless otherwise specified)			
		min.	typ.	max.	
<b>I<sub>S</sub></b>	V <sub>GS</sub> = 0 V	27N80 25N80		27 25	A A
<b>I<sub>SM</sub></b>	Repetitive; pulse width limited by T <sub>JM</sub>	27N80 25N80		108 100	A A
<b>V<sub>SD</sub></b>	I <sub>F</sub> = 100 A, V <sub>GS</sub> = 0 V, Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			1.5	V
<b>t<sub>rr</sub></b>	I <sub>F</sub> = I <sub>S</sub> , -di/dt = 100 A/μs, V <sub>R</sub> = 100 V	T <sub>J</sub> = 25°C T <sub>J</sub> = 125°C		250 400	ns ns
<b>Q<sub>RM</sub></b>		T <sub>J</sub> = 25°C	2		μC
<b>I<sub>RM</sub></b>			17		A

### 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.

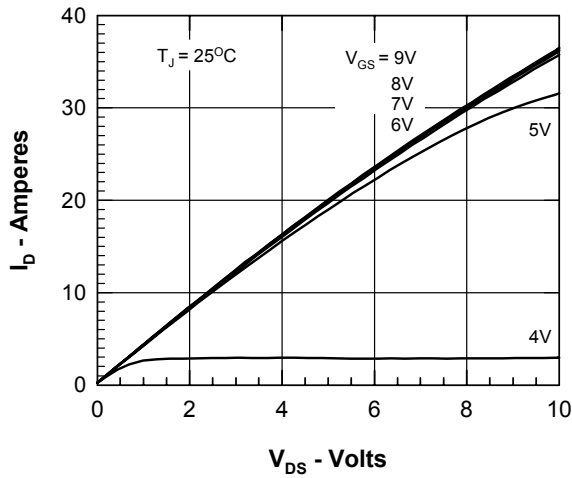


Figure 1. Output Characteristics at 25°C

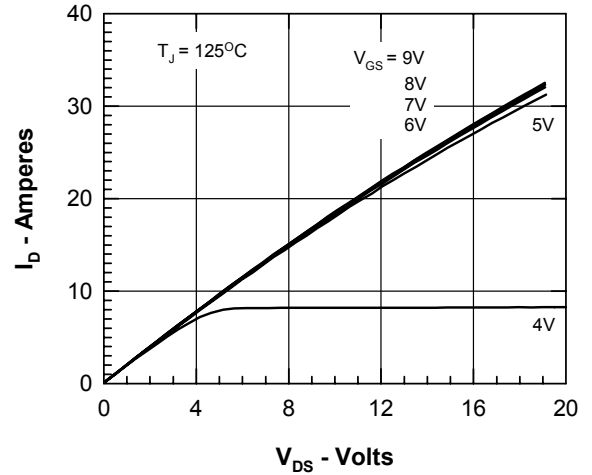


Figure 2. Output Characteristics at 125°C

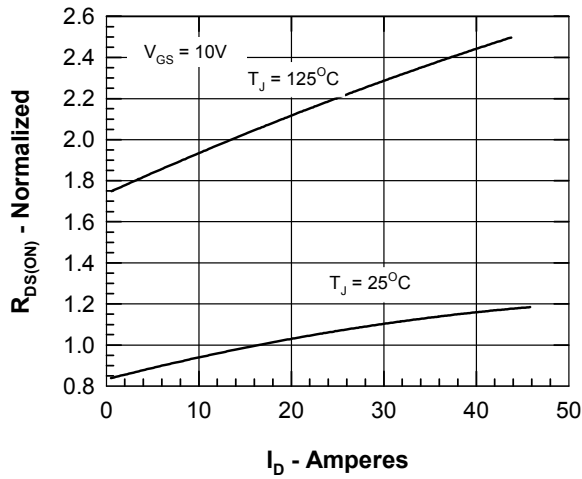


Figure 3.  $R_{DS(on)}$  normalized to  $0.5 I_{D25}$  value vs.  $I_D$

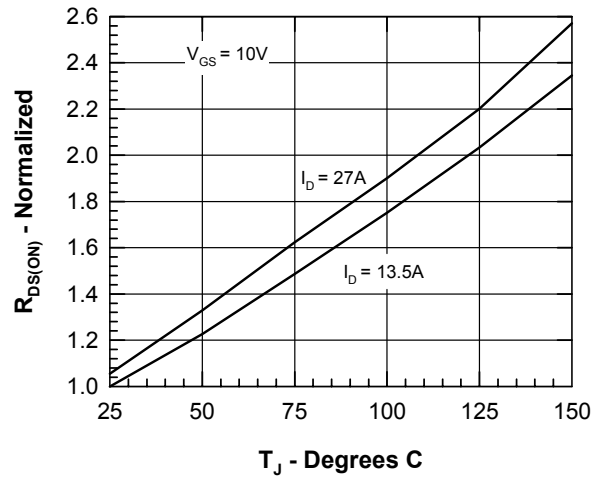


Figure 4.  $R_{DS(on)}$  normalized to  $0.5 I_{D25}$  value vs.  $T_J$

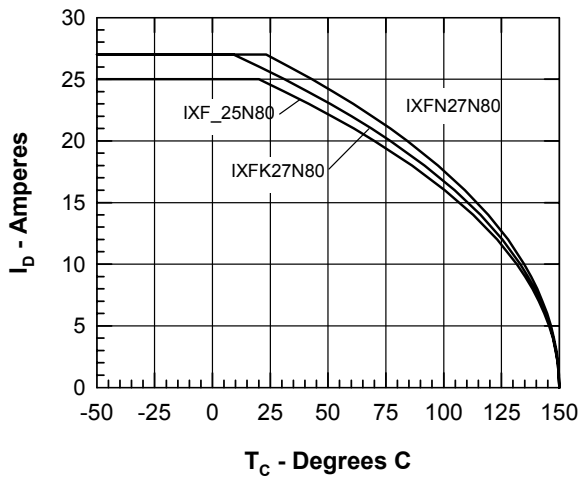


Figure 5. Drain Current vs. Case Temperature

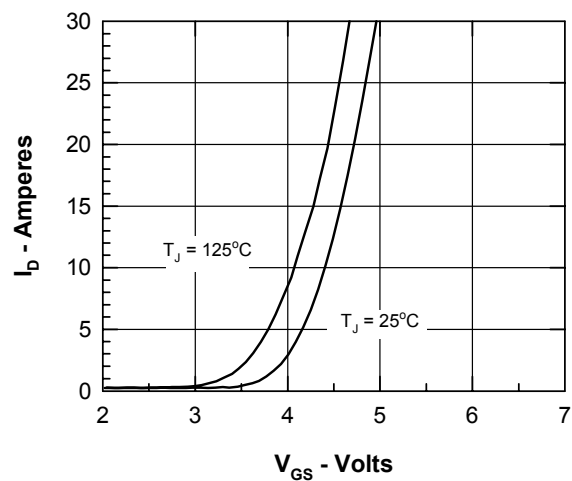


Figure 6. Admittance Curves

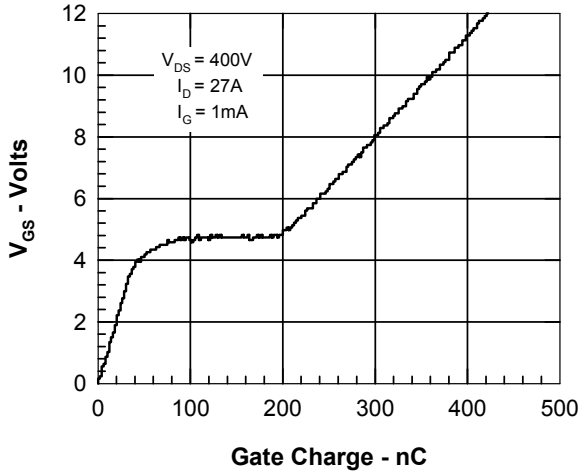


Figure 7. Gate Charge

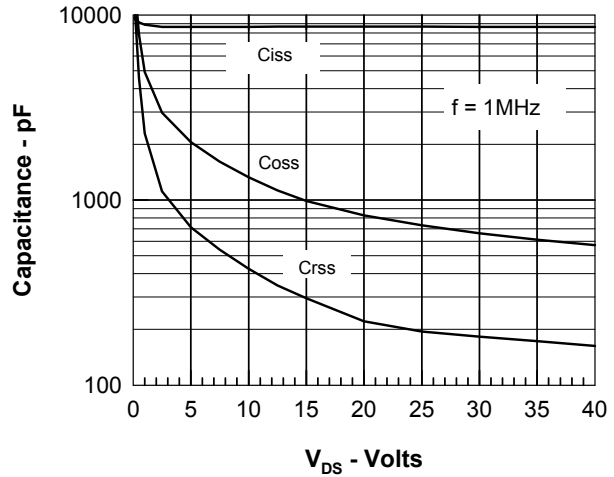


Figure 8. Capacitance Curves

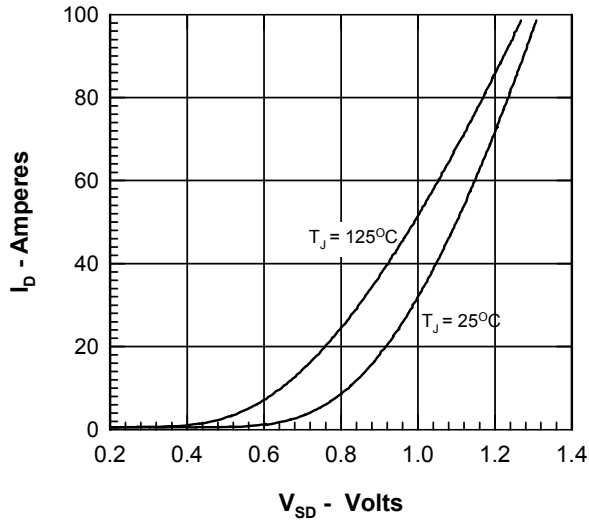


Figure 9. Forward Voltage Drop of the Intrinsic Diode

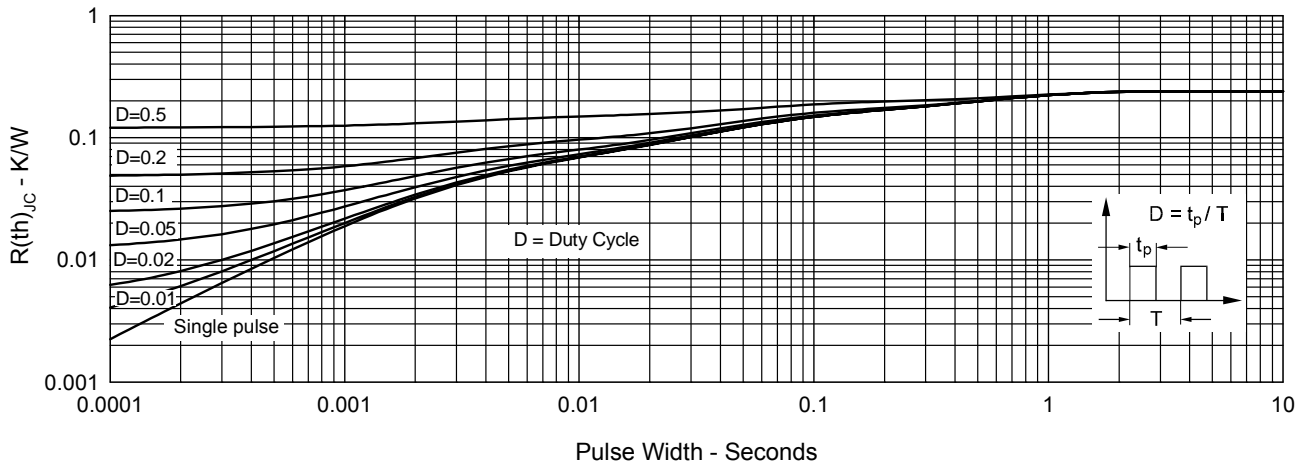


Figure 10. Transient Thermal Resistance



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