

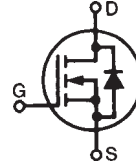
# HiPerFET™ Power MOSFETs Q-Class

**IXFK 52N60Q2**  
**IXFX 52N60Q2**

**V<sub>DSS</sub> = 600 V**  
**I<sub>D25</sub> = 52 A**  
**R<sub>DS(on)</sub> = 115 mΩ**

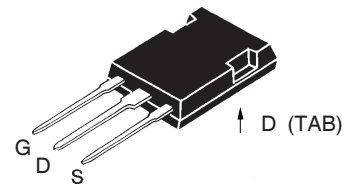
**t<sub>rr</sub> ≤ 250 ns**

N-Channel Enhancement Mode  
Avalanche Rated, High dv/dt, Low Q<sub>g</sub>  
Low intrinsic R<sub>g</sub>, low t<sub>rr</sub>

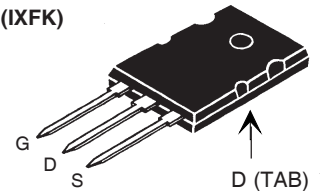


Symbol	Test Conditions	Maximum Ratings	
V <sub>DSS</sub>	T <sub>J</sub> = 25°C to 150°C	600	V
V <sub>DGR</sub>	T <sub>J</sub> = 25°C to 150°C; R <sub>GS</sub> = 1 MΩ	600	V
V <sub>GS</sub>	Continuous	±30	V
V <sub>GSM</sub>	Transient	±40	V
I <sub>D25</sub>	T <sub>C</sub> = 25°C	52	A
I <sub>DM</sub>	T <sub>C</sub> = 25°C, pulse width limited by T <sub>JM</sub>	208	A
I <sub>AR</sub>	T <sub>C</sub> = 25°C	52	A
E <sub>AR</sub>	T <sub>C</sub> = 25°C	75	mJ
E <sub>AS</sub>	T <sub>C</sub> = 25°C	4.0	J
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	20	V/ns
P <sub>D</sub>	T <sub>C</sub> = 25°C	735	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
M <sub>d</sub>	Mounting torque	TO-264	0.9/6 Nm/lb.in.
Weight		PLUS-247	6 g
		TO-264	10 g

## PLUS247™ (IXFX)



## TO-264 AA (IXFK)



G = Gate  
S = Source

D = Drain  
TAB = Drain

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> = 3mA	600		V
V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 8 mA	2.0		4.5 V
I <sub>GSS</sub>	V <sub>GS</sub> = ±30 V <sub>DC</sub> , V <sub>DS</sub> = 0			±200 nA
I <sub>DSS</sub>	V <sub>DS</sub> = V <sub>DSS</sub> V <sub>GS</sub> = 0 V	T <sub>J</sub> = 25°C		50 μA
		T <sub>J</sub> = 125°C		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 μs, duty cycle d ≤ 2 %			115 mΩ

## Features

- Double metal process for low gate resistance
- International standard packages
- Epoxy meet UL 94 V-0, flammability classification
- Avalanche energy and current rated
- Fast intrinsic Rectifier

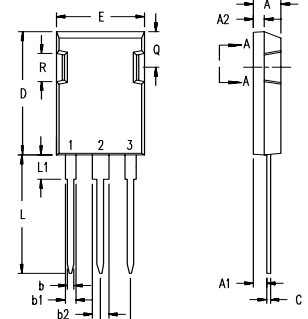
## Advantages

- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values		
		$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$		
		min.	typ.	max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}, \text{ pulse test}$	30	40	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		6800	pF
$C_{oss}$			1000	pF
$C_{rss}$			225	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1.0\ \Omega \text{ (External)},$		23	ns
$t_r$			13	ns
$t_{d(off)}$			56	ns
$t_f$			8.5	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		198	nC
$Q_{gs}$			43	nC
$Q_{gd}$			94	nC
$R_{thJC}$	TO-264			0.17 K/W
$R_{thCK}$			0.15	K/W

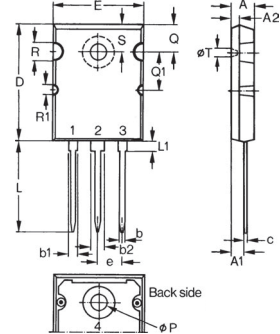
**Source-Drain Diode**

Symbol	Test Conditions	Characteristic Values		
		$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$		
		min.	typ.	max.
$I_S$	$V_{GS} = 0\text{ V}$			52 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$			208 A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{ V},$ Pulse test, $t \leq 300\ \mu\text{s}, \text{ duty cycle } d \leq 2\%$			1.5 V
$t_{rr}$	$I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		1	250 ns
$Q_{RM}$			10	$\mu\text{C}$
$I_{RM}$				

**PLUS 247™ Outline**


Terminals: 1 - Gate  
 2 - Drain (Collector)  
 3 - Source (Emitter)  
 4 - Drain (Collector)

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A <sub>1</sub>	2.29	2.54	.090	.100
A <sub>2</sub>	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b <sub>1</sub>	1.91	2.13	.075	.084
b <sub>2</sub>	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

**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

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	6,306,728B1
4,850,072	4,931,844	5,034,796	5,063,307	5,237,481	5,381,025	