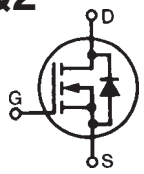
IXYS

HiPerFET™ Power MOSFETs Q2-Class

IXFK38N80Q2
IXFN38N80Q2
IXFX38N80Q2

V_{DSS} = 800V
I_{D25} = 38A
$R_{DS(on)}$ ≤ 220mΩ
t_{rr} ≤ 250ns

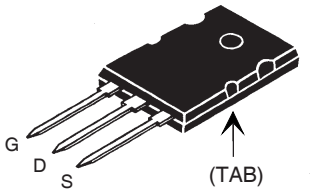
N-Channel Enhancement Mode
Avalanche Rated, High dv/dt, Low Q_g
Low intrinsic R_g, low t_{rr}



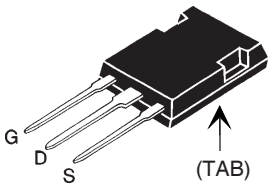
Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	800	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	800	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	T_C = 25°C	38	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	150	A
I_A	T_C = 25°C	38	A
E_{AS}	T_C = 25°C	4	J
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	20	V/ns
P_D	T_C = 25°C	735	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062 in.) from case for 10s	300	°C
T_{SOLD}	Plastic body for 10s	260	°C
V_{ISOL}	50/60 Hz, RMS t = 1min	2500	V~
	$I_{ISOL} \le$ 1mA t = 1s	3000	V~
M_d	Mounting torque (TO-264)	1.5/13	Nm/lb.in.
	Terminal connection torque (SOT-227B)	1.3/11.5	Nm/lb.in.
F_C	Mounting force (PLUS247)	20..120 /4.5..27	N/lb.
Weight	TO-264	10	g
	PLUS247	6	g
	SOT-227B	30	g

Symbol	Test Conditions	Characteristic Values (T_J = 25°C unless otherwise specified)			
		Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 3mA	800			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 8mA	3.0		5.5	V
I_{GSS}	V_{GS} = ± 30V, V_{DS} = 0V			± 200	nA
I_{DSS}	$V_{DS} = V_{DSS}$			50	μA
	V_{GS} = 0V T_J = 125°C			2	mA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			220	mΩ

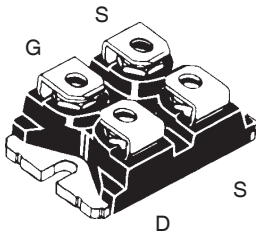
TO-264 (IXFK)



PLUS247 (IXFX)



miniBLOC, SOT-227 B (IXFN)
E153432



Either Source terminal S can be used as the Source terminal or the Kelvin Source (gate return) terminal.

G = Gate D = Drain
S = Source TAB = Drain

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
- miniBLOCK package version with Aluminum Nitrate isolation

Advantages

- Easy to mount
- Space savings
- High power density

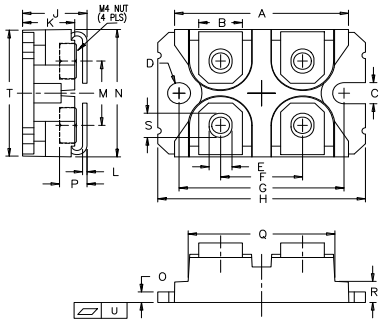
Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS}= 10V, I_D = 0.5 • I_{D25}, Note 1	25	37		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		9500		pF
C_{oss}			888		pF
C_{rss}			185		pF
$t_{d(on)}$	**Resistive Switching Times**		20		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		16		ns
$t_{d(off)}$	R_G = 1Ω (External)		60		ns
t_f			12		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		190		nC
Q_{gs}			44		nC
Q_{gd}			88		nC
R_{thJC}				0.17	°C/W
R_{thCS}			0.15		°C/W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			38	A
I_{SM}	Repetitive, pulse width limited by T_{JM}			150	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 25A, -di/dt = 100A/μs			250	ns
Q_{RM}	V_R = 100V, V_{GS} = 0V		1		μC
I_{RM}			10		A

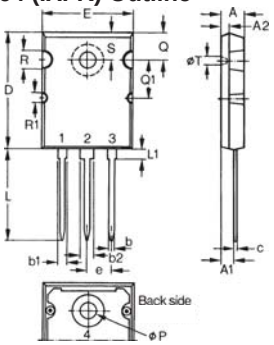
Note 1: Pulse test, t ≤ 300μs; duty cycle, d ≤ 2%.

SOT-227B Outline



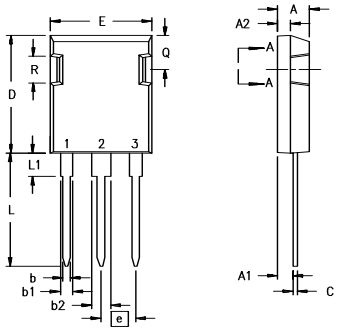
SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

TO-264 (IXFK) Outline



Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches 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

PLUS247™ (IXFX) Outline



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

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.83	5.21	.190	.205
A_1	2.29	2.54	.090	.100
A_2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b_1	1.91	2.13	.075	.084
b_2	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

Fig. 1. Output Characteristics @ 25ºC

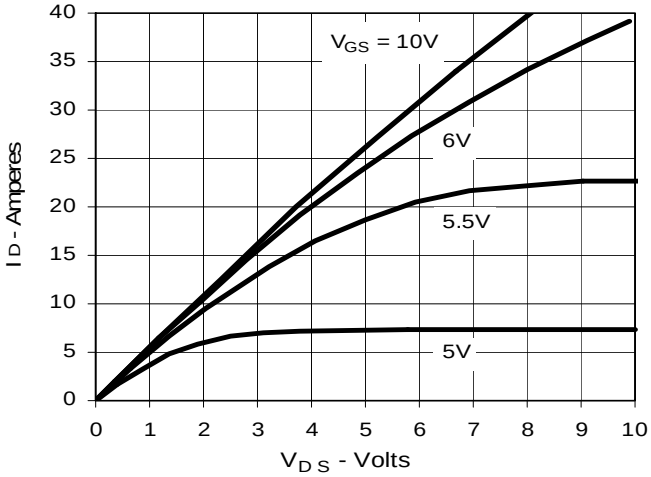


Fig. 2. Extended Output Characteristics @ 25ºC

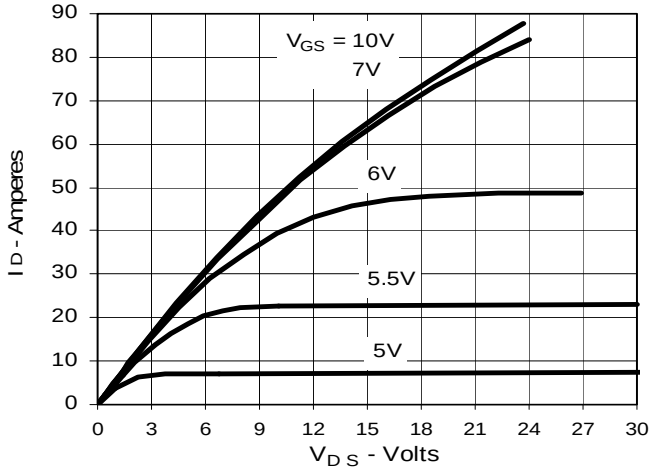


Fig. 3. Output Characteristics @ 125ºC

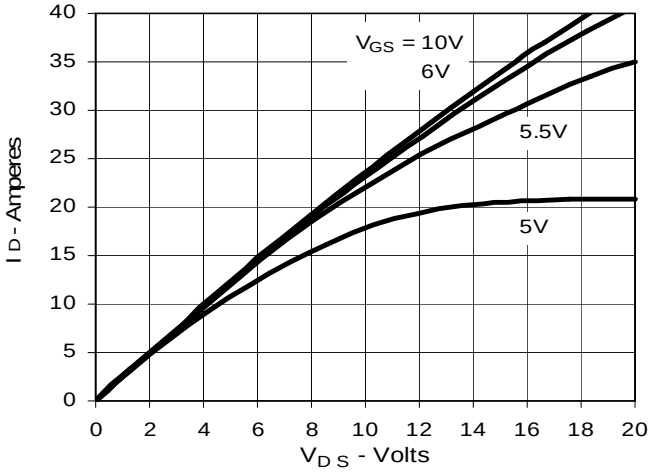


Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

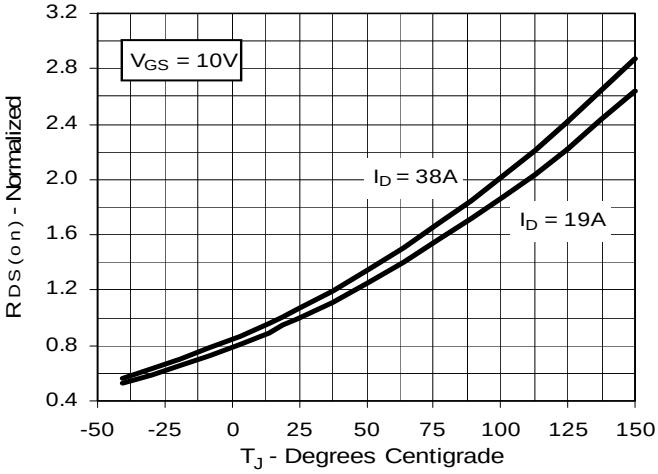


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. I_D

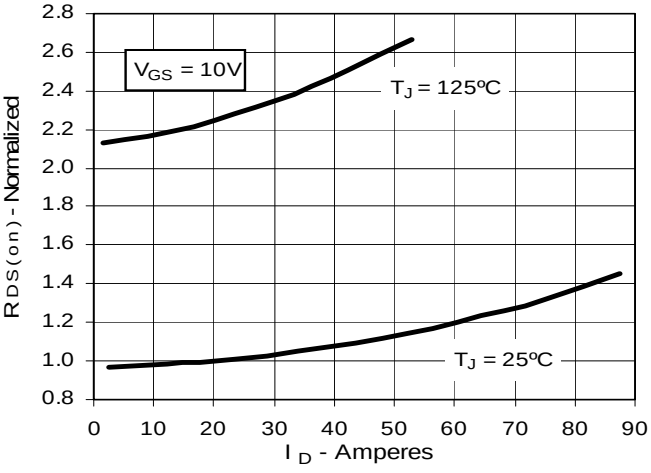


Fig. 6. Drain Current vs. Case Temperature

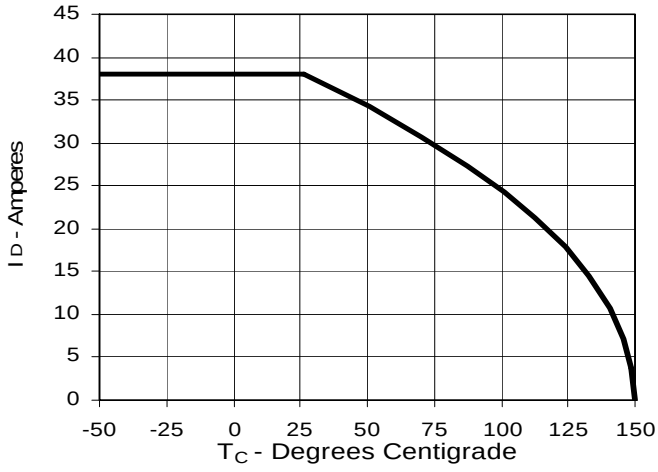


Fig. 7. Input Admittance

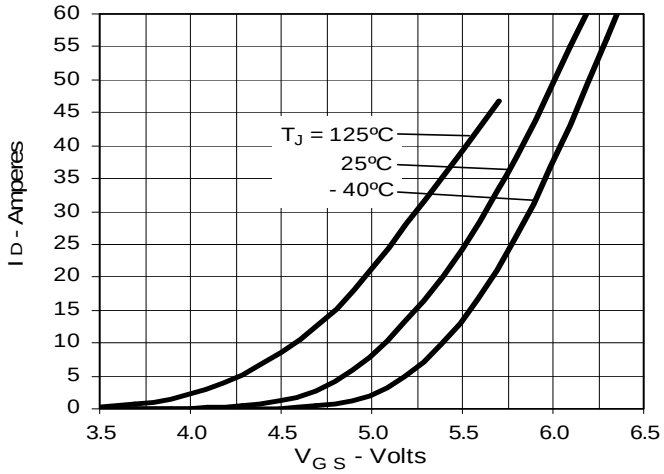


Fig. 8. Transconductance

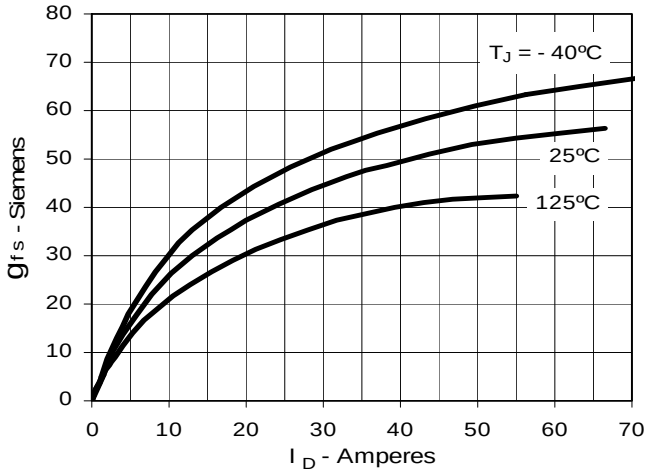


Fig. 9. Source Current vs. Source-To-Drain Voltage

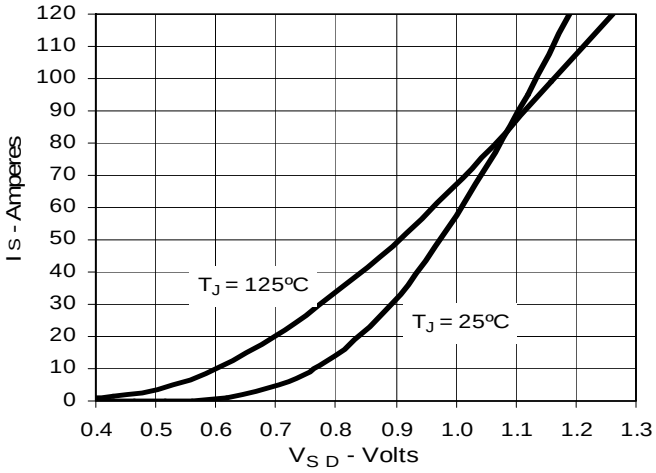


Fig. 10. Gate Charge

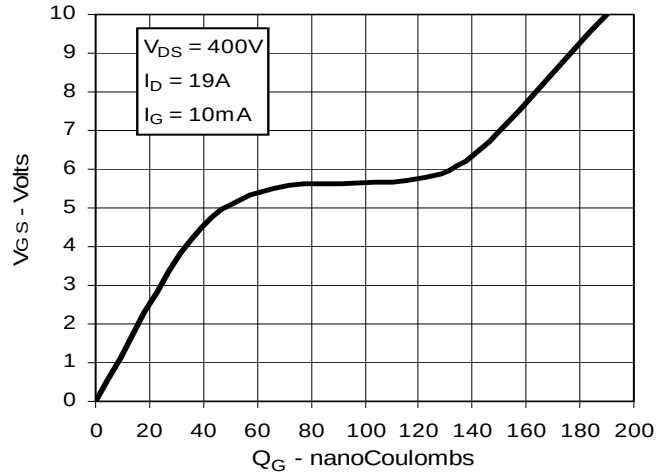


Fig. 11. Capacitance

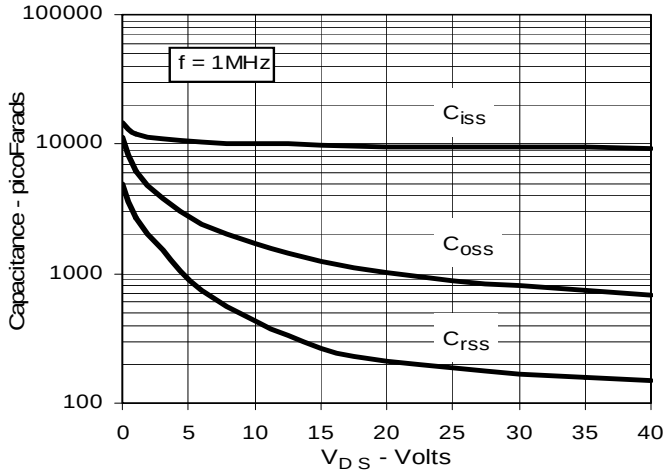


Fig. 12. Forward-Bias Safe Operating Area

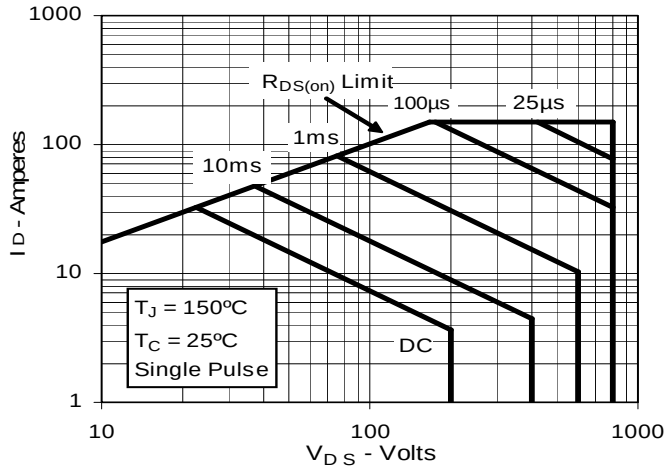


Fig. 13. Maximum Transient Thermal Impedance