IXYS

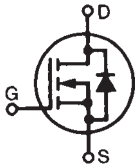
Advance Technical Information

HiPerFET™ Power MOSFETs
Q-Class

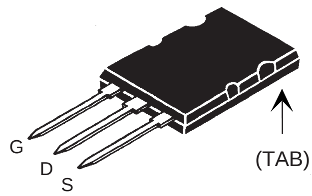
IXFB 70N60Q2

V_{DSS}	=	600	V
I_{D25}	=	70	A
$R_{DS(on)}$	=	80	mΩ
t_{rr}	≤	250	ns

N-Channel Enhancement Mode
Avalanche Rated, Low Q_g, Low Intrinsic R_g
High dV/dt, Low t_{rr}



PLUS 264™ (IXFB)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	600	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ	600	V
V_{GS}	Continuous	±30	V
V_{GSM}	Transient	±40	V
I_{D25}	T_C = 25°C	70	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	280	A
I_{AR}	T_C = 25°C	70	A
E_{AR}	T_C = 25°C	60	mJ
E_{AS}	T_C = 25°C	5.0	J
dv/dt	$I_S \le I_{DM}$, di/dt ≤ 100 A/µs, $V_{DD} \le V_{DSS}$ $T_J \le$ 150°C, R_G = 2 Ω	20	V/ns
P_D	T_C = 25°C	890	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	°C

Features

- Double metal process for low gate resistance
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect
- Fast intrinsic rectifier

Applications

- DC-DC converters
- Switched-mode and resonant-mode power supplies, >500kHz switching
- DC choppers
- Pulse generation
- Laser drivers

Advantages

- PLUS 264™ package for clip or spring mounting
- Space savings
- High power density

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.
V_{DSS}	V_{GS} = 0 V, I_D = 1mA		600		V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 8mA		3.0		5.0 V
I_{GSS}	V_{GS} = ±30 V, V_{DS} = 0				±200 nA
I_{DSS}	V_{DS} = V_{DSS} V_{GS} = 0 V	T_J = 25°C T_J = 125°C			50 µA 3 mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 • I_{D25} Note 1				80 mΩ

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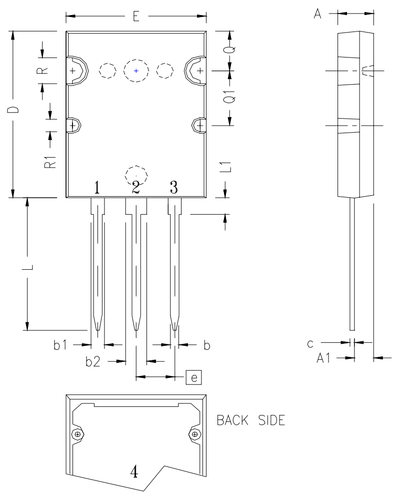
Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	V_{DS} = 10 V; I_D = 0.5 • I_{D25} Note 1	36	50		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		7200		pF
C_{oss}			1300		pF
C_{rss}			290		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}; R_G = 1 Ω (External)		26		ns
t_r			25		ns
$t_{d(off)}$			60		ns
t_f			12		ns
$Q_{G(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		265		nC
Q_{GS}			57		nC
Q_{GD}			120		nC
R_{thJC}				0.14	K/W
R_{thCK}			0.13		K/W

PLUS 264™ Outline



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

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215 BSC		5.46 BSC	
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
ØR	.155	.187	3.94	4.75
ØR1	.085	.093	2.16	2.36

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
I_S	V_{GS} = 0 V			70	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			280	A
V_{SD}	I_F = I_S, V_{GS} = 0 V, Note 1			1.5	V
t_{rr}	I_F = 25A; -di/dt = 100 A/µs; V_R = 100 V			250	ns
Q_{RM}			1.2		µC
I_{RM}			8		A

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

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

Fig. 1. Output Characteristics @ 25 Deg. C

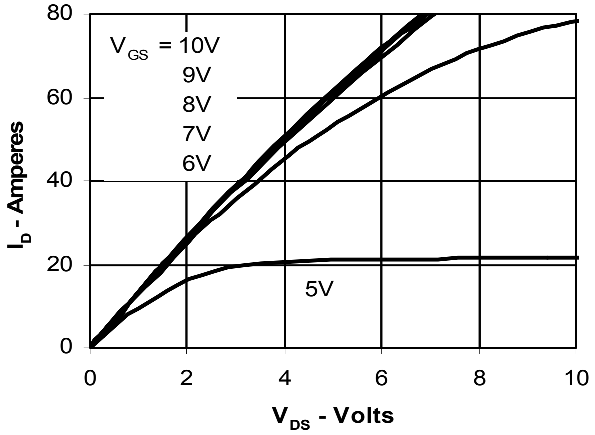


Fig. 2. Extended Output Characteristics @ 25 deg. C

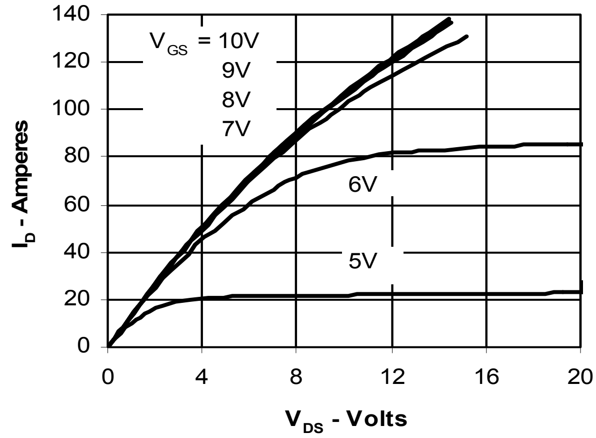


Fig. 3. Output Characteristics @ 125 Deg. C

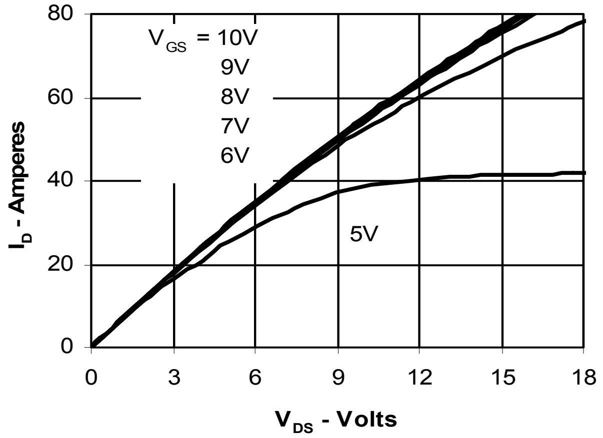


Fig. 4. $R_{DS(on)}$ Normalized to I_{D25} Value vs. Junction Temperature

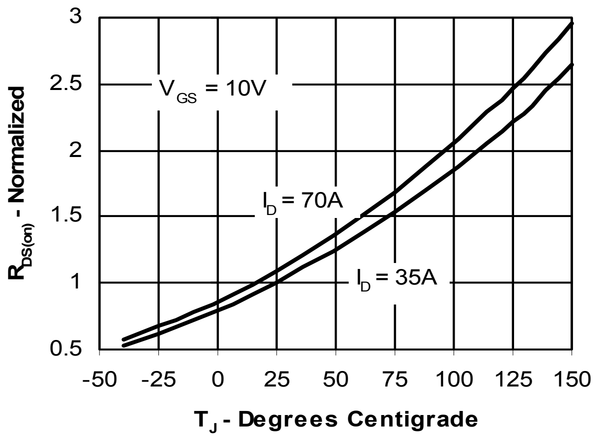


Fig. 5. $R_{DS(on)}$ Normalized to I_{D25} Value vs. I_D

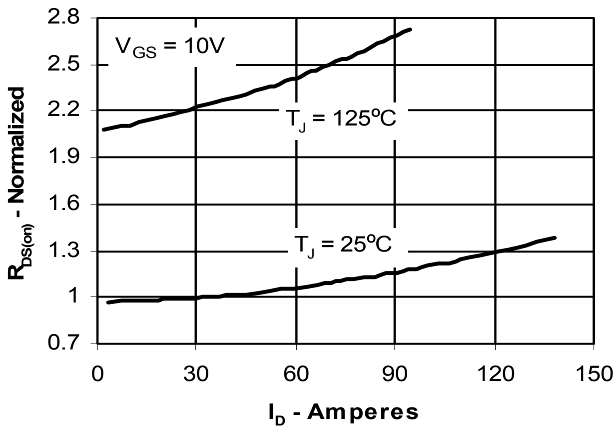


Fig. 6. Drain Current vs. Case Temperature

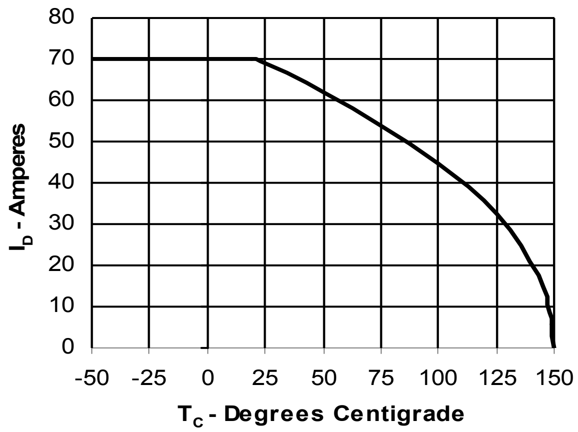


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Fig. 7. Input Admittance

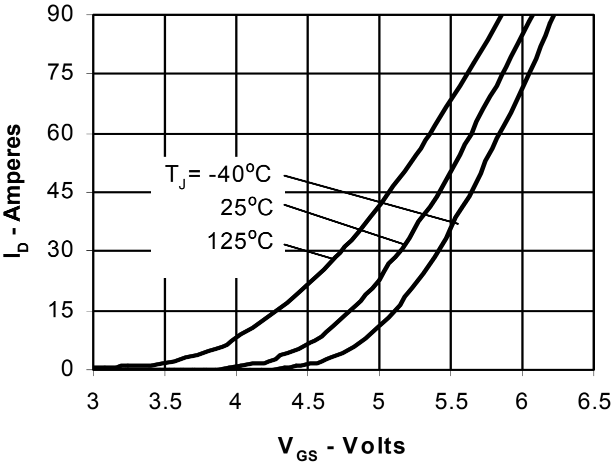


Fig. 8. Transconductance

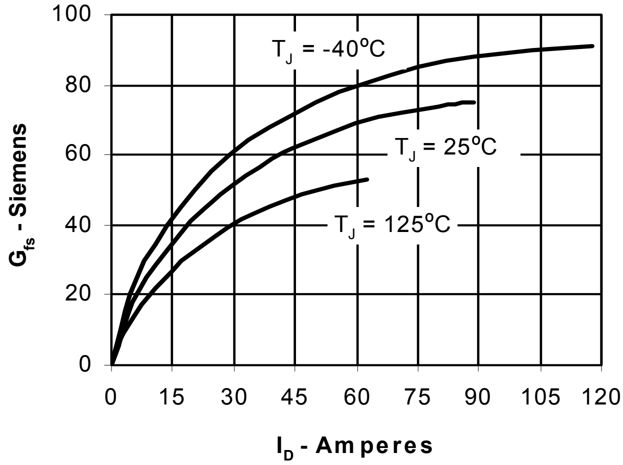


Fig. 9. Source Current vs. Source-To-Drain Voltage

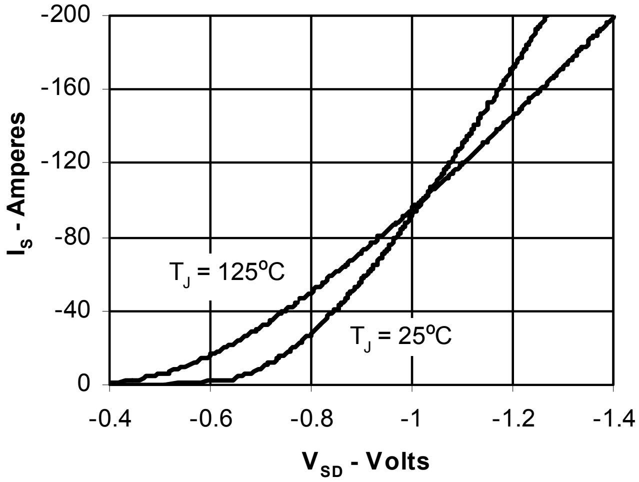


Fig. 10. Gate Charge

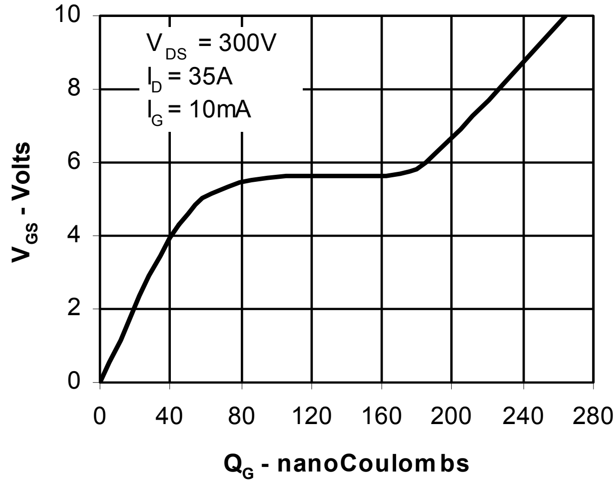


Fig. 11. Capacitance

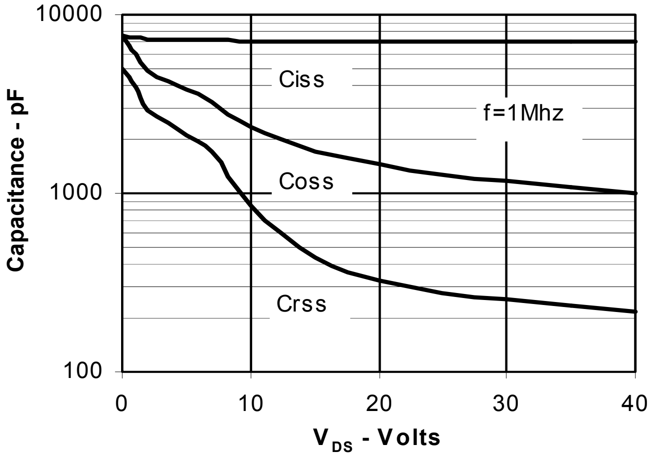
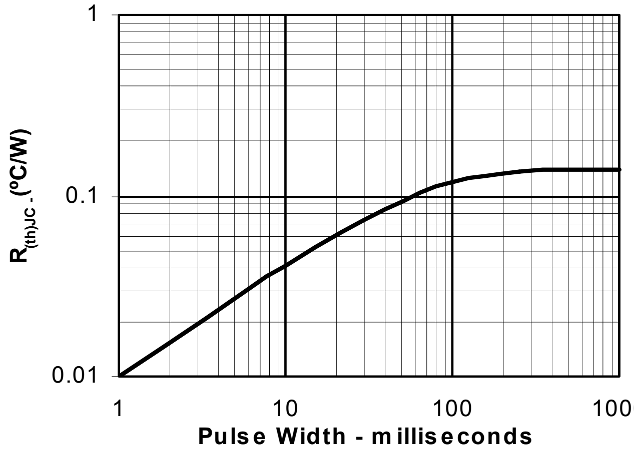


Fig. 12. Maximum Transient Thermal Resistance



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