IXYS

HiPerFET™ Power MOSFETs Q-Class

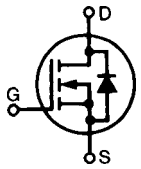
IXFA 4N100Q
IXFP 4N100Q

V_{DSS} = 1000 V
I_{D25} = 4 A
$R_{DS(on)}$ = 3.0 Ω

$t_{rr} \leq$ 250 ns

N-Channel Enhancement Mode
Avalanche Rated, Low Q_g, High dv/dt

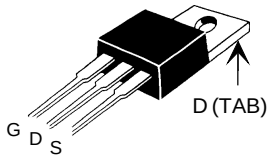
Preliminary Data Sheet



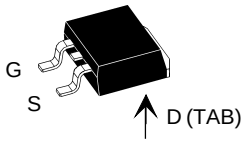
Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	1000	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ	1000	V
V_{GS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	4	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	16	A
I_{AR}	T_C = 25°C	4	A
E_{AR}	T_C = 25°C	20	mJ
E_{AS}		700	mJ
dv/dt	$I_S \leq I_{DM}$, di/dt ≤ 100 A/μs, $V_{DD} \leq V_{DSS}$, $T_J \leq$ 150°C, R_G = 2 Ω	5	V/ns
P_D	T_C = 25°C	150	W
T_J		-55 to +150	°C
T_{JM}		150	°C
T_{stg}		-55 to +150	°C
T_L	1.6 mm (0.063 in) from case for 10 s	300	°C
M_d	Mounting torque (TO-220)	1.13/10	Nm/lb.in.
Weight	TO-220	4	g
	TO-263	2	g

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_{DSS}	V_{GS} = 0 V, I_D = 1 mA	1000			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 1.5 mA	3.0		5.0	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$, T_J = 25°C			50	μA
	V_{GS} = 0 V, T_J = 125°C			1	mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 I_{D25} Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			3.0	Ω

TO-220 (IXFP)



TO-263 (IXFA)



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

Features

- IXYS advanced low Q_g process
- Low gate charge and capacitances
  - easier to drive
  - faster switching
- International standard packages
- Low $R_{DS\ (on)}$
- Rated for unclamped Inductive load Switching (UIS)
- Molding epoxies meet UL 94 V-0 flammability classification

Advantages

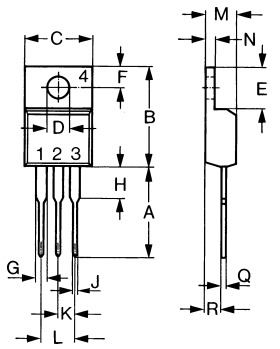
- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values min.	typ.	max.	
g_{fs}	V_{DS} = 20 V; I_D = 0.5 • I_{D25}, pulse test	1.5	2.5		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		1050		pF
C_{oss}			120		pF
C_{rss}			30		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25} R_G = 4.7 Ω (External),		17		ns
t_r			15		ns
$t_{d(off)}$			32		ns
t_f			18		ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		39		nC
Q_{gs}			9		nC
Q_{gd}			22		nC
R_{thJC}				0.8	K/W
R_{thCK}	(TO-220)		0.25		K/W

Source-Drain Diode

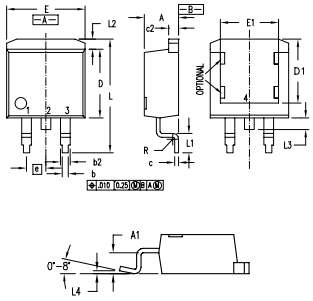
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values min.	typ.	max.	
I_S	V_{GS} = 0 V			4	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			16	A
V_{SD}	I_F = I_S, V_{GS} = 0 V, Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			1.5	V
t_{rr}	I_F = I_S, -di/dt = 100 A/μs, V_R = 100 V			250	ns
Q_{RM}			0.52		μC
I_{RM}			1.8		A

TO-220 AB (IXFP) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	12.70	13.97	0.500	0.550
B	14.73	16.00	0.580	0.630
C	9.91	10.66	0.390	0.420
D	3.54	4.08	0.139	0.161
E	5.85	6.85	0.230	0.270
F	2.54	3.18	0.100	0.125
G	1.15	1.65	0.045	0.065
H	2.79	5.84	0.110	0.230
J	0.64	1.01	0.025	0.040
K	2.54	BSC	0.100	BSC
M	4.32	4.82	0.170	0.190
N	1.14	1.39	0.045	0.055
Q	0.35	0.56	0.014	0.022
R	2.29	2.79	0.090	0.110

TO-263 AA (IXFA) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.06	4.83	.160	.190
A1	2.03	2.79	.080	.110
b	0.51	0.99	.020	.039
b2	1.14	1.40	.045	.055
c	0.46	0.74	.018	.029
c2	1.14	1.40	.045	.055
D	8.64	9.65	.340	.380
D1	7.11	8.13	.280	.320
E	9.65	10.29	.380	.405
E1	6.86	8.13	.270	.320
e	2.54	BSC	.100	BSC
L	14.61	15.88	.575	.625
L1	2.29	2.79	.090	.110
L2	1.02	1.40	.040	.055
L3	1.27	1.78	.050	.070
L4	0	0.38	0	.015
R	0.46	0.74	.018	.029

Figure 1. Output Characteristics at 25°C

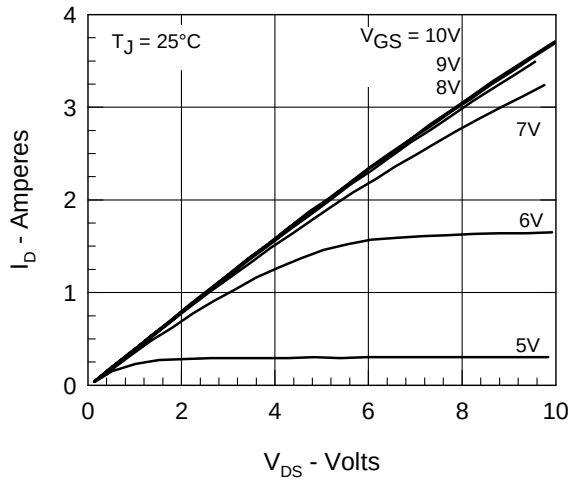


Figure 2. Extended Output Characteristics at 125°C

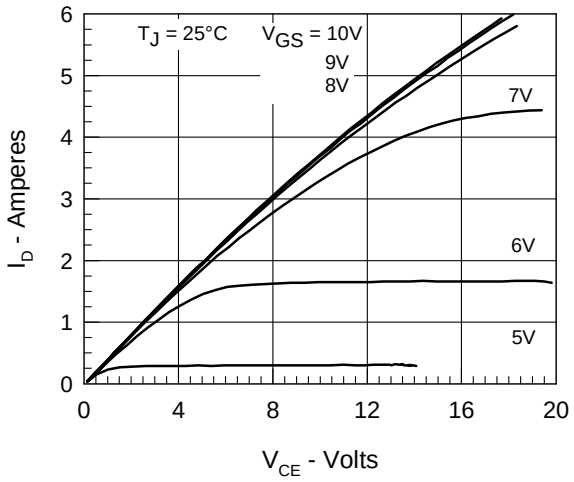


Figure 3. Output characteristics at 125°C

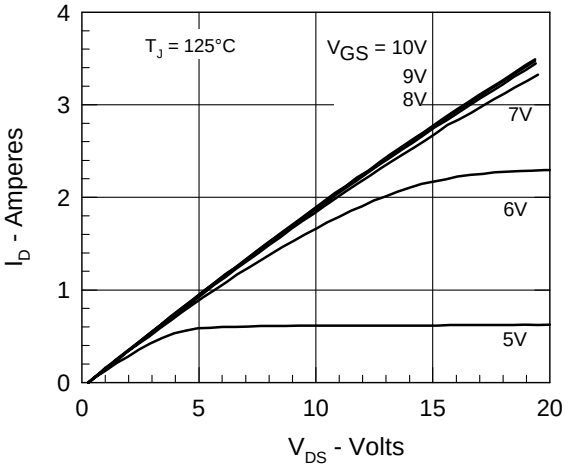


Figure 4. Admittance Curves

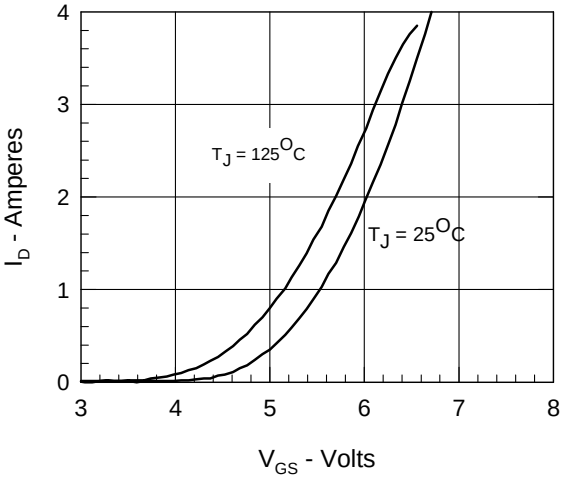


Figure 5. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. I_D

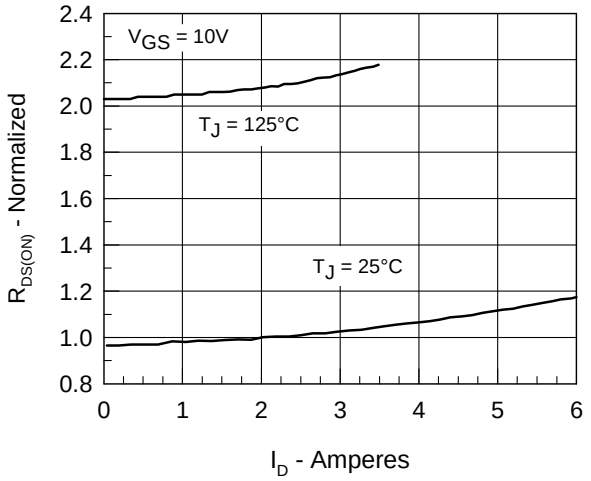


Figure 6. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. T_J

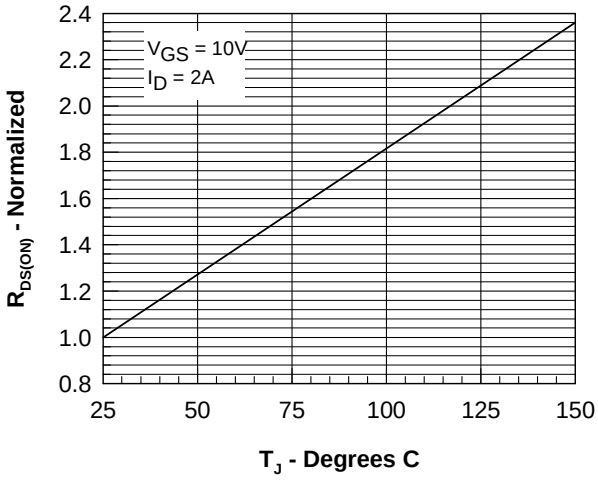


Figure 7. Gate Charge

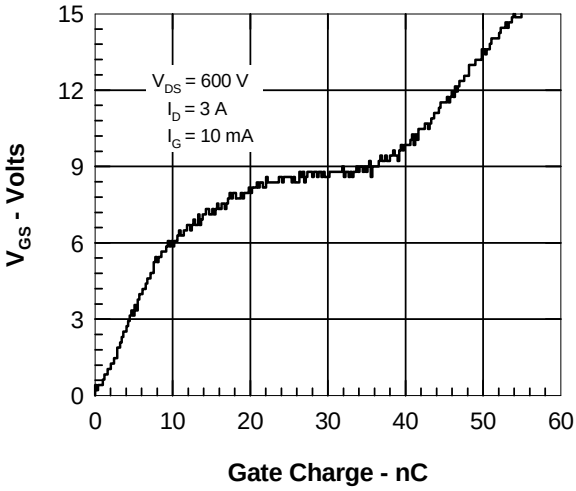


Figure 8. Capacitance Curves

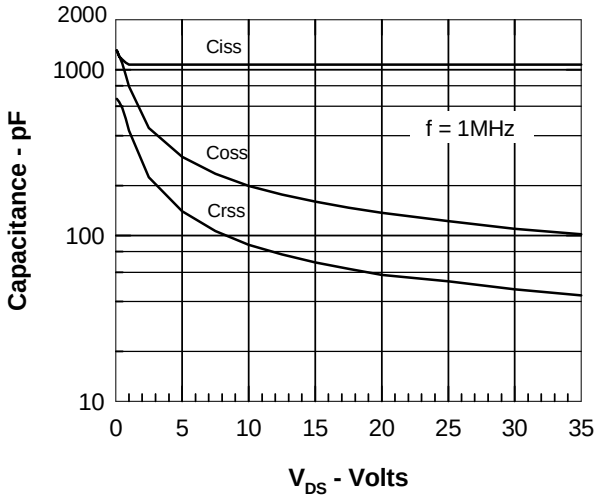


Figure 9. Forward Voltage Drop of the Intrinsic Diode

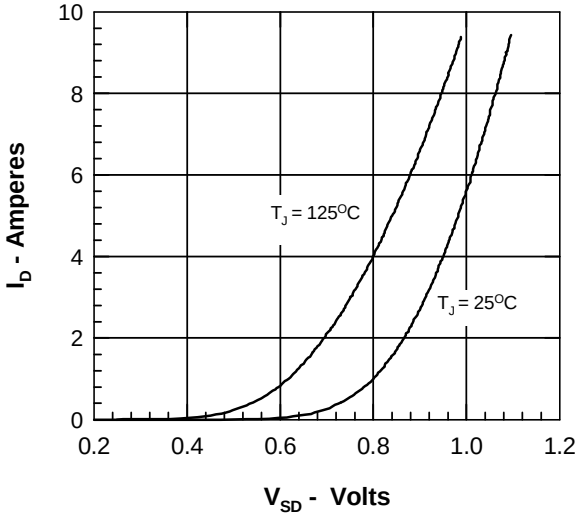


Figure10. Drain Current vs. Case Temperature

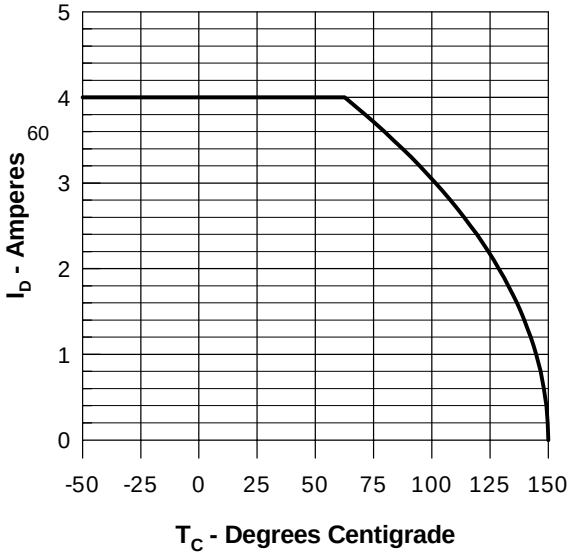


Figure 11. Transient Thermal Resistance