IXYS

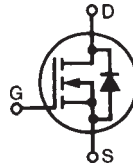## X2-Class Power MOSFET

IXTY2N65X2
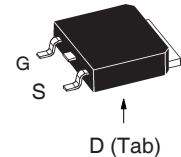**IXTP2N65X2**

V_{DSS} = 650V
I_{D25} = 2A
$R_{DS(on)}$ $\leq$ 2.3Ω

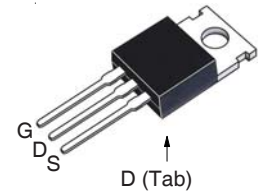N-Channel Enhancement Mode

TO-252 (IXTY)

TO-220 (IXTP)

G = Gate   D   = Drain
S = Source Tab = Drain

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	650	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	650	V
V_{GSS}	Continuous	±30	V
V_{GSM}	Transient	±40	V
I_{D25}	T_C = 25°C	2	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	4	A
I_A	T_C = 25°C	1	A
E_{AS}	T_C = 25°C	100	mJ
dv/dt	I_S $\leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq$ 150°C	15	V/ns
P_D	T_C = 25°C	55	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
M_d	Mounting Torque (TO-220)	1.13 / 10	Nm/lb.in
Weight	TO-252	0.35	g
	TO-220	3.00	g

Features

- International Standard Packages
- Low Q_G
- Avalanche Rated
- Low Package Inductance

Advantages

- High Power Density
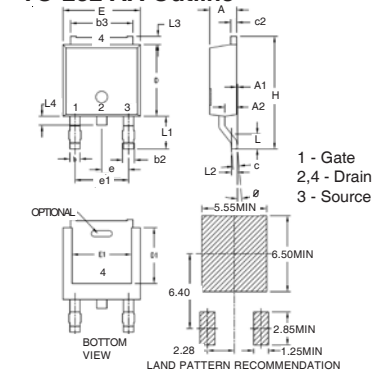- Easy to Mount
- Space Savings

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- PFC Circuits
- AC and DC Motor Drives
- Robotics and Servo Controls

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	V_{GS} = 0V, I_D = 250µA	650		V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	3.0		5.0 V
I_{GSS}	V_{GS} = ±30V, V_{DS} = 0V			±100 nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			5 µA
	T_J = 125°C			100 µA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 0.5 • I_{D25}, Note 1			2.3 Ω

IXYS

IXTY2N65X2
IXTP2N65X2

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	1.1	1.8		S
R$_{Gi}$	Gate Input Resistance		14		Ω
C$_{iss}$			180		pF
C$_{oss}$	V$_{GS}$ = 0V, V$_{DS}$ = 25V, f = 1MHz		129		pF
C$_{rss}$			0.7		pF
C$_{o(er)}$	**Effective Output Capacitance** Energy related V$_{GS}$ = 0V		22		pF
C$_{o(tr)}$	Time related V$_{DS}$ = 0.8 • V$_{DSS}$		45		pF
t$_{d(on)}$	**Resistive Switching Times**		15		ns
t$_r$	V$_{GS}$ = 10V, V$_{DS}$ = 0.5 • V$_{DSS}$, I$_D$ = 0.5 • I$_{D25}$		19		ns
t$_{d(off)}$	R$_G$ = 50Ω (External)		20		ns
t$_f$			14		ns
Q$_{g(on)}$			4.3		nC
Q$_{gs}$	V$_{GS}$ = 10V, V$_{DS}$ = 0.5 • V$_{DSS}$, I$_D$ = 0.5 • I$_{D25}$		0.8		nC
Q$_{gd}$			2.1		nC
R$_{thJC}$				2.27	°C/W
R$_{thCS}$	TO-220		0.50		°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			2	A
I$_{SM}$	Repetitive, pulse Width Limited by T$_{JM}$			8	A
V$_{SD}$	I$_F$ = I$_S$, V$_{GS}$ = 0V, Note 1			1.4	V
t$_{rr}$	I$_F$ = 1A, -di/dt = 100A/µs		137		ns
Q$_{RM}$	V$_R$ = 100V		508		nC
I$_{RM}$			7.4		A

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

TO-252 AA Outline

1 - Gate
2,4 - Drain
3 - Source

SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.086	.094	2.19	2.38
A1	0	.005	0	0.12
A2	.038	.046	0.97	1.17
b	.025	.035	0.64	0.89
b2	.030	.045	0.76	1.14
b3	.200	.215	5.08	5.46
c	.018	.024	0.46	0.61
c2	.018	.023	0.46	0.58
D	.235	.245	5.97	6.22
D1	.180	.205	4.57	5.21
E	.250	.265	6.35	6.73
E1	.170	.205	4.32	5.21
e	.090 BSC		2.28 BSC	
e1	.180 BSC		4.57 BSC	
H	.370	.410	9.40	10.42
L	.055	.070	1.40	1.78
L1	.100	.115	2.54	2.92
L2	.020 BSC		0.50 BSC	
L3	.025	.040	0.64	1.02
L4	.025	.040	0.64	1.02
θ	0°	10°	0°	10°

TO-220 Outline

1 - Gate
2,4 - Drain
3 - Source

SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.169	.185	4.30	4.70
A1	.047	.055	1.20	1.40
A2	.079	.106	2.00	2.70
b	.024	.039	0.60	1.00
b2	.045	.057	1.15	1.45
c	.014	.026	0.35	0.65
D	.587	.626	14.90	15.90
D1	.335	.370	8.50	9.40
(D2)	.500	.531	12.70	13.50
E	.382	.406	9.70	10.30
(E1)	.283	.323	7.20	8.20
e	.100 BSC		2.54 BSC	
e1	.200 BSC		5.08 BSC	
H1	.244	.268	6.20	6.80
L	.492	.547	12.50	13.90
L1	.110	.154	2.80	3.90
ØP	.134	.150	3.40	3.80
Q	.106	.126	2.70	3.20

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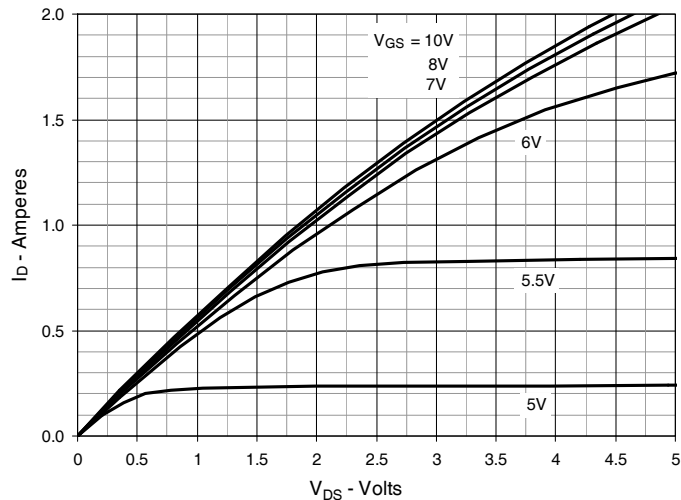
Fig. 1. Output Characteristics @ T_J = 25°C

Fig. 2. Extended Output Characteristics @ T_J = 25°C

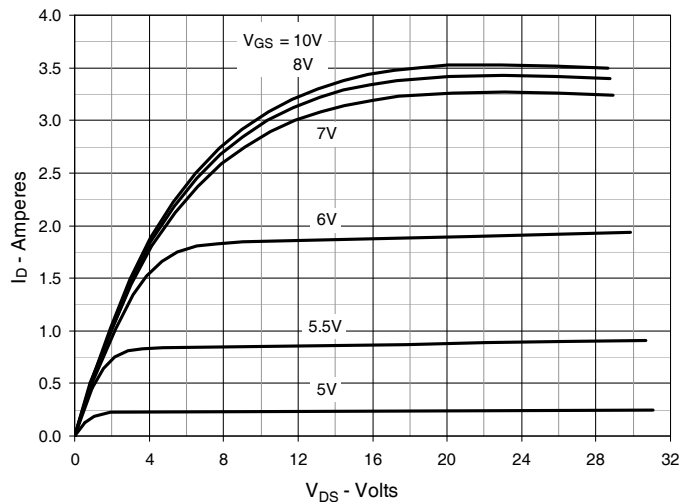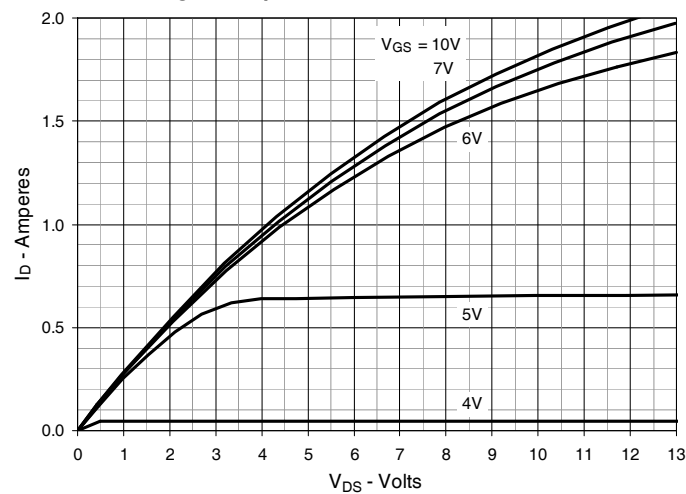**Fig. 3. Output Characteristics @ T_J = 125°C**

Fig. 4. $R_{DS(on)}$ Normalized to I_D = 1A Value vs. Junction Temperature

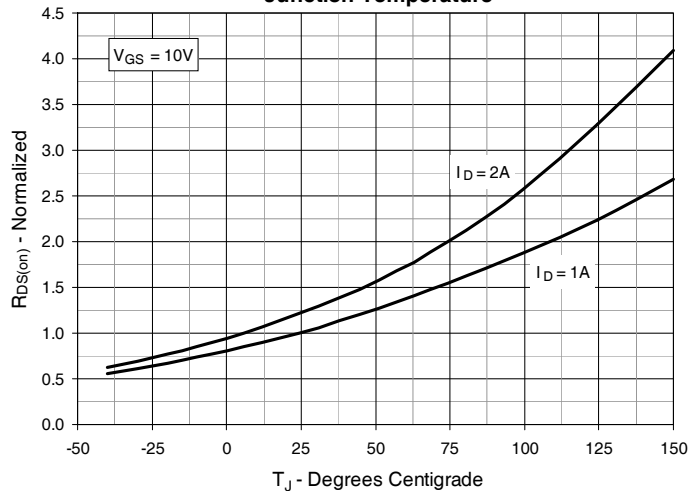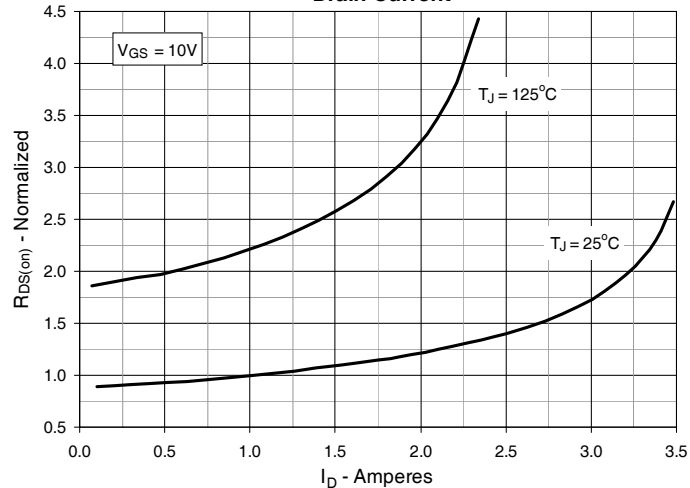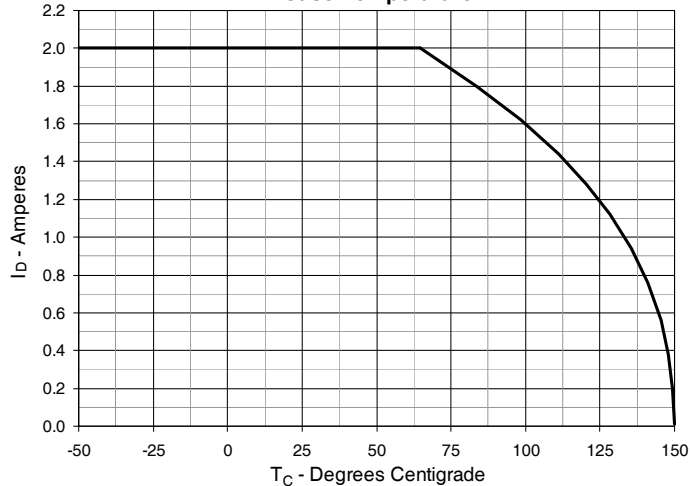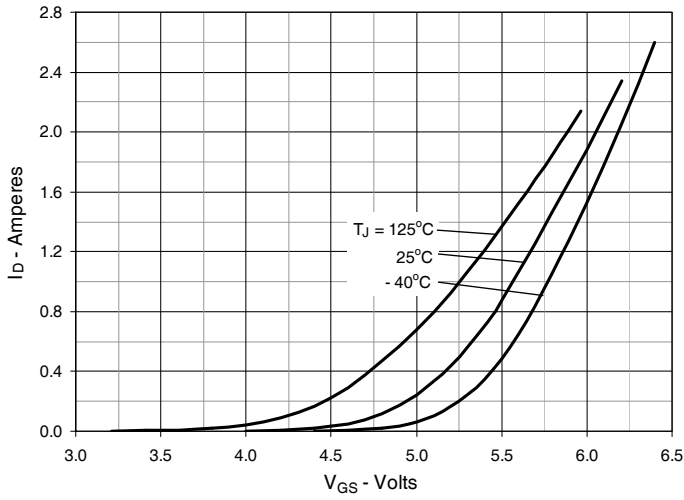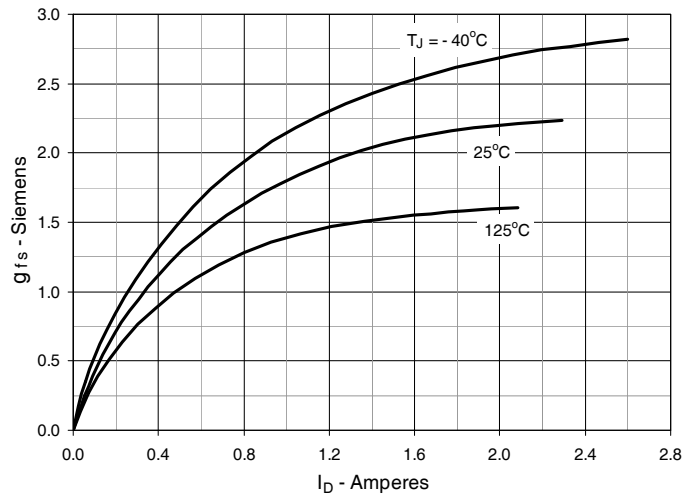**Fig. 5. $R_{DS(on)}$ Normalized to I_D = 1A Value vs. Drain Current**
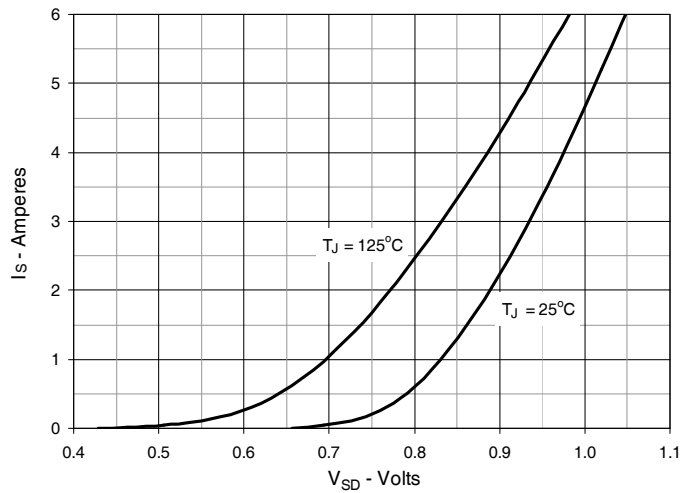

Fig. 6. Maximum Drain Current vs. Case Temperature
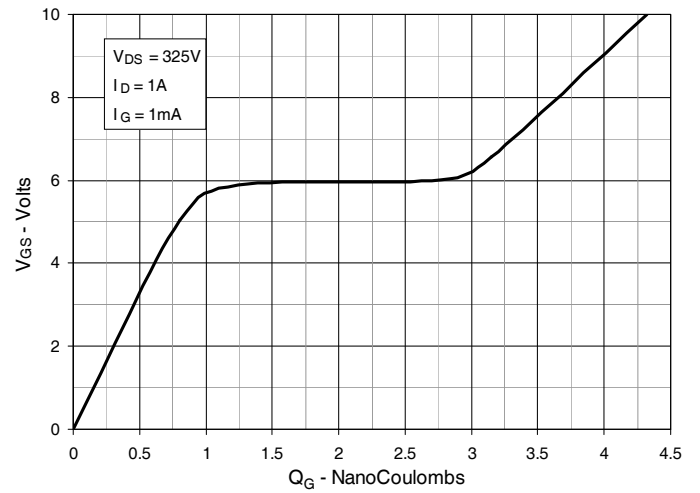
Fig. 7. Input Admittance
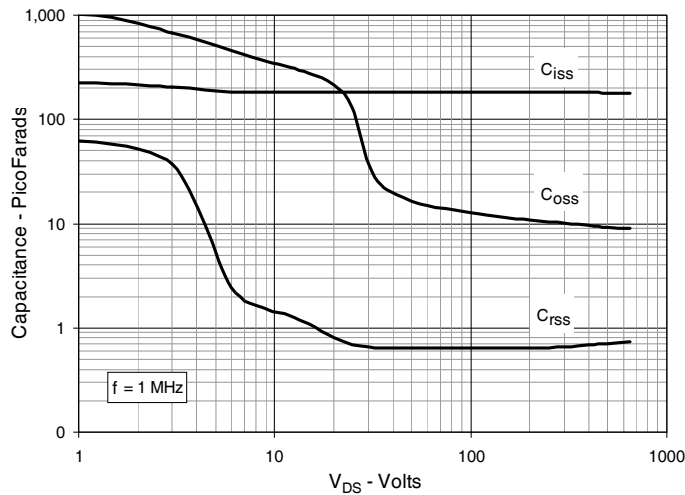

Fig. 8. Transconductance

Fig. 9. Forward Voltage Drop of Intrinsic Diode

Fig. 10. Gate Charge

Fig. 11. Capacitance

Fig. 12. Output Capacitance Stored Energy

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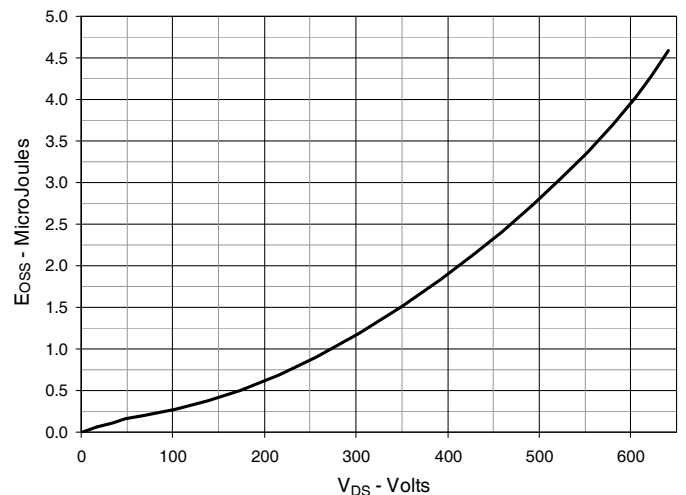
Fig. 13. Forward-Bias Safe Operating Area
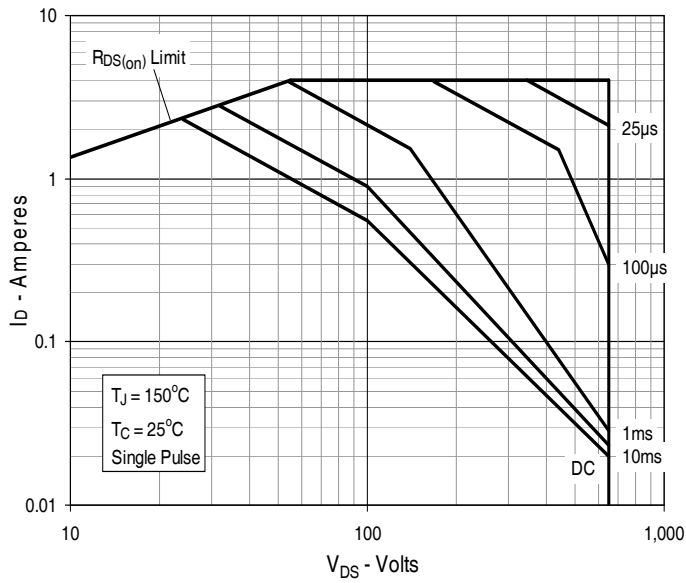
Fig. 14. Maximum Transient Thermal Impedance
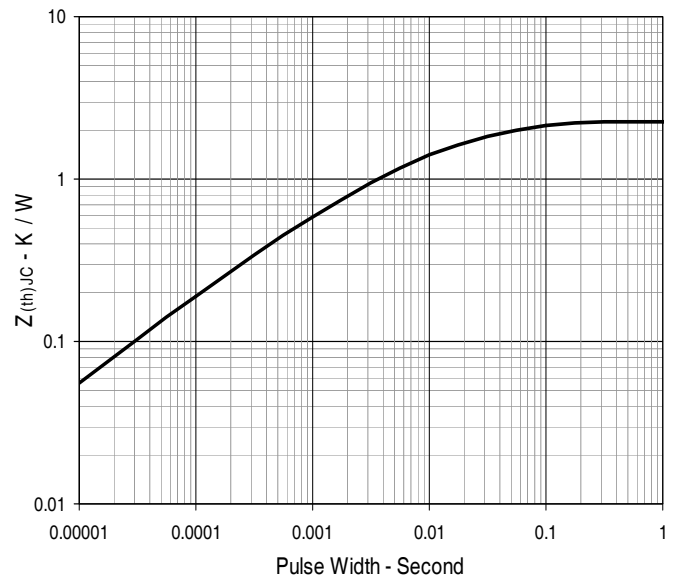
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