IXYS

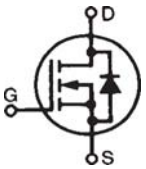
High Voltage Power MOSFET

IXTF1N400

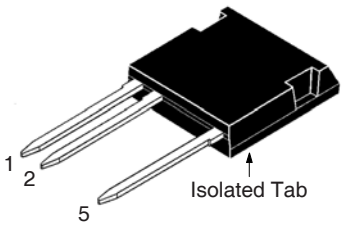
V_{DSS} = 4000V
I_{D25} = 1A
$R_{DS(on)}$ ≤ 60Ω

(Electrically Isolated Tab)

N-Channel Enhancement Mode



ISOPLUS i4-Pak™



1 = Gate 5 = Drain
2 = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	4000	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	4000	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	1	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	3	A
P_D	T_C = 25°C	160	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
F_C	Mounting Force	20..120 / 4.5..27	N/lb.
V_{ISOL}	50/60Hz, 1 Minute	4000	V~
Weight		5	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0		4.0	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
I_{DSS}	V_{DS} = 3.2kV, V_{GS} = 0V			50	μA
	V_{DS} = 4.0kV			250	μA
	V_{DS} = 3.2kV Note 2, T_J = 100°C		250		μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 0.5 • I_{D25}, Note 1			60	Ω

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 4000V~ Electrical Isolation
- Molding Epoxies meet UL 94 V-0 Flammability Classification

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

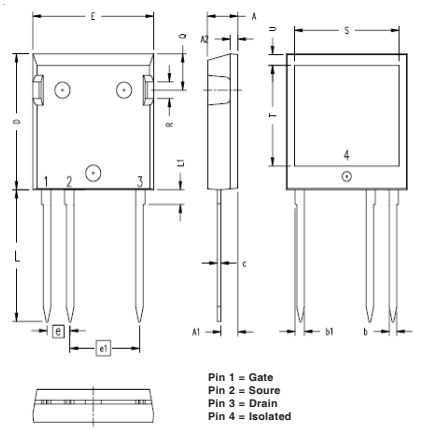
- High Voltage Power Supplies
- Capacitor Discharge Applications
- Pulse Circuits
- Laser and X-Ray Generation Systems

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 50V, I_D = 0.5 • I_{D25}, Note 1	0.55	0.95		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		2530		pF
C_{oss}			93		pF
C_{rss}			30		pF
$t_{d(on)}$	**Resistive Switching Times**		28		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 1A		24		ns
$t_{d(off)}$	R_G = 2Ω (External)		81		ns
t_f			90		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 1kV, I_D = 0.5 • I_{D25}		78		nC
Q_{gs}			10		nC
Q_{gd}			35		nC
R_{thJC}				0.78	°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			1	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			5	A
V_{SD}	I_F = 1A, V_{GS} = 0V, Note 1			4	V
t_{rr}	I_F = 1A, -di/dt = 100A/μs, V_R = 200V		3.5		μs

ISOPLUS i4-Pak™ (HV) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.190	.205	4.83	5.21
A1	.102	.118	2.59	3.00
A2	.046	.085	1.17	2.16
b	.045	.055	1.14	1.40
b1	.058	.068	1.47	1.73
C	.020	.029	0.51	0.74
D	.819	.840	20.80	21.34
E	.770	.799	19.56	20.29
e	.150 BSC		3.81 BSC	
e1	.450 BSC		11.43 BSC	
L	.780	.840	19.81	21.34
L1	.083	.102	2.11	2.59
Q	.210	.244	5.33	6.20
R	.100	.180	2.54	4.57
S	.660	.690	16.76	17.53
T	.590	.620	14.99	15.75
U	.065	.080	1.65	2.03

Notes: 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Part must be heatsunk for high-temp Idss measurement.

Fig. 1. Output Characteristics @ T_J = 25ºC

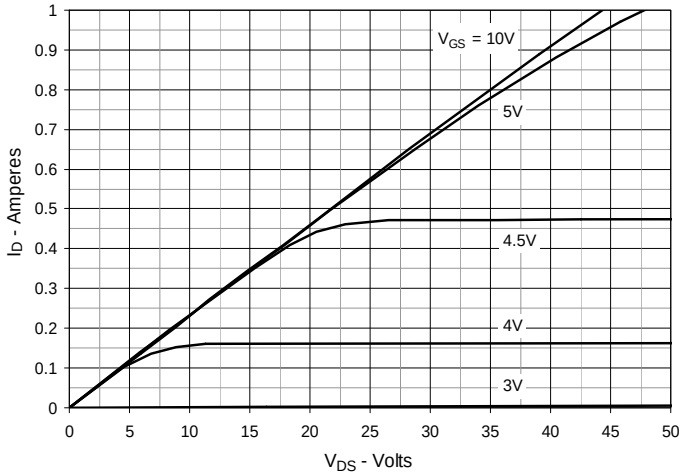


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

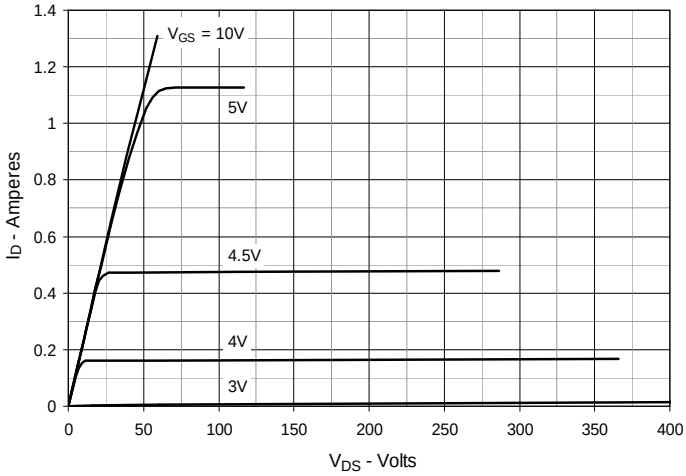


Fig. 3. Output Characteristics @ T_J = 125ºC

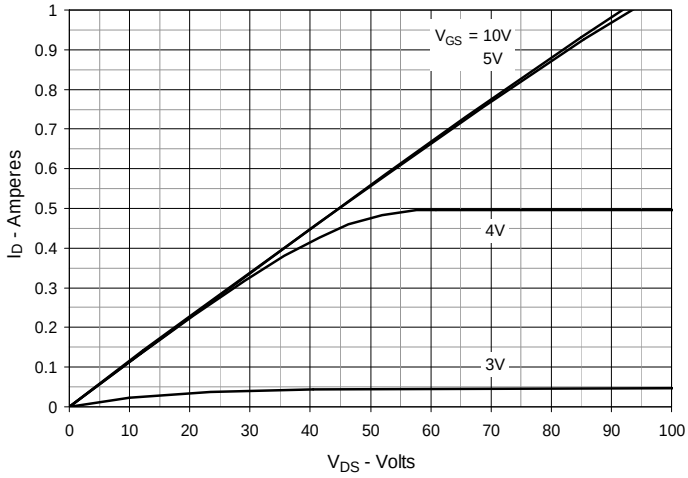


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 0.5A Value vs. Junction Temperature

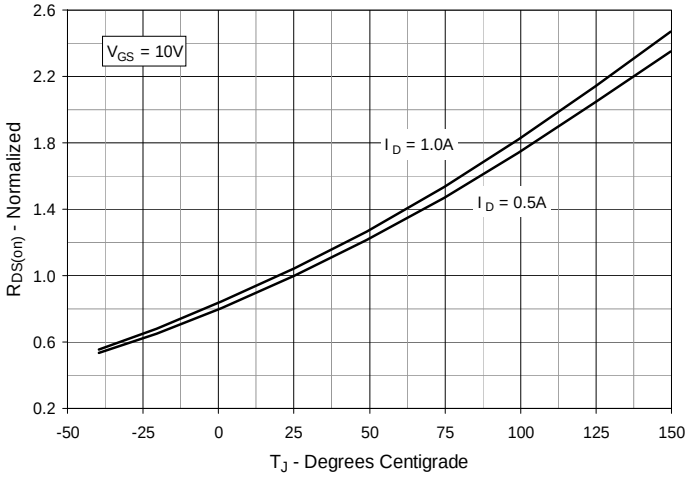


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 0.5A Value vs. Drain Current

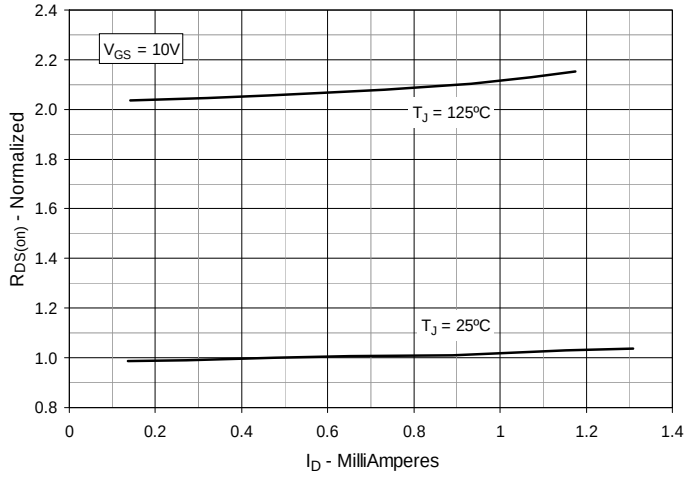


Fig. 6. Maximum Drain Current vs. Case Temperature

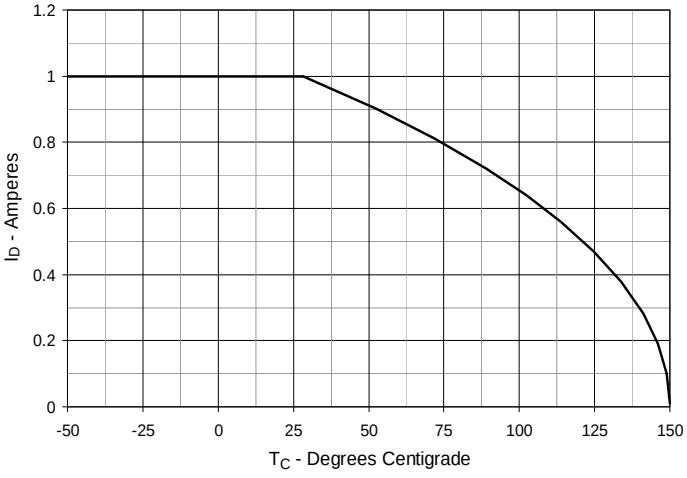


Fig. 7. Input Admittance

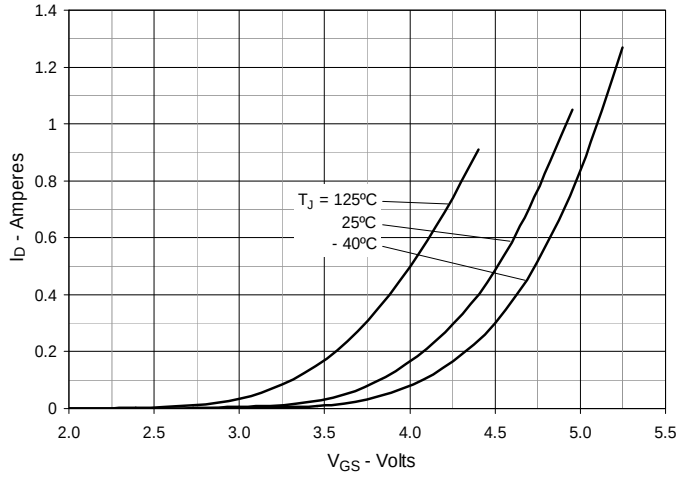


Fig. 8. Transconductance

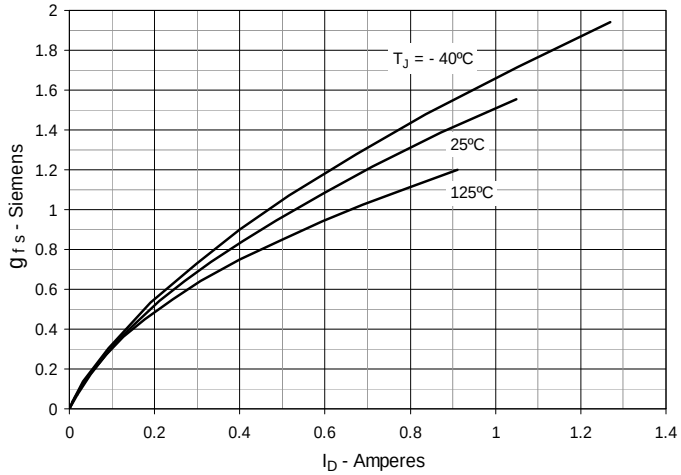


Fig. 9. Forward Voltage Drop of Intrinsic Diode

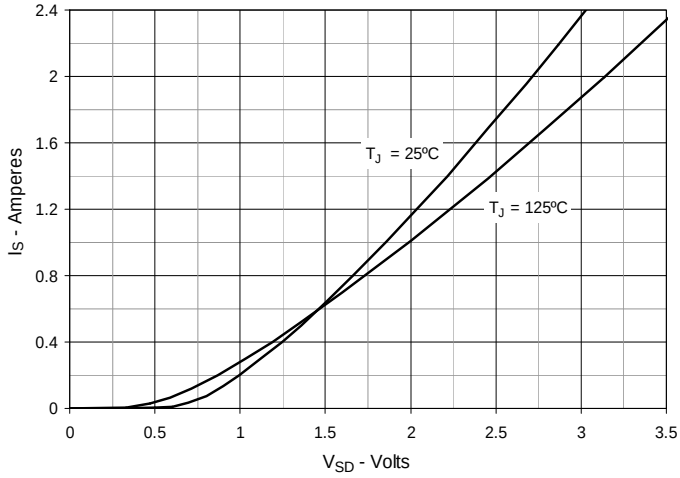


Fig. 10. Gate Charge

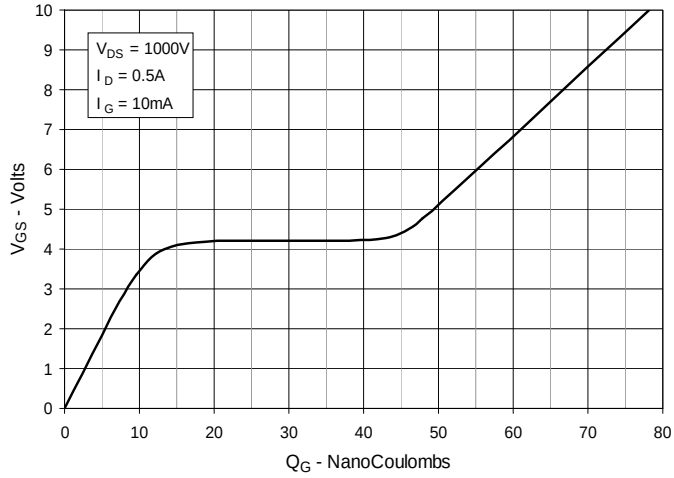


Fig. 11. Capacitance

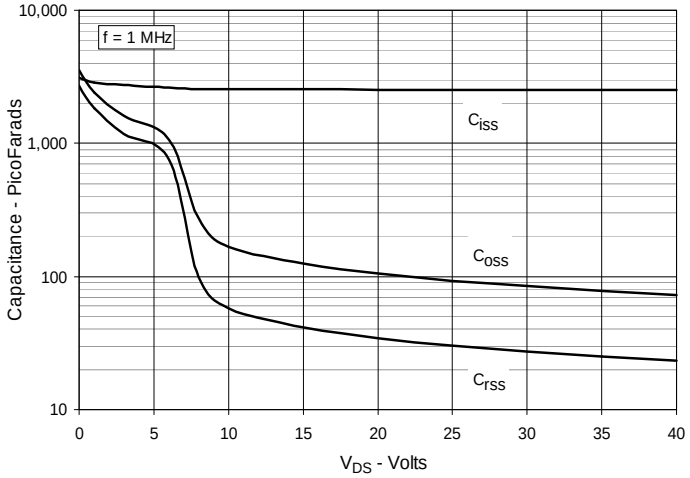


Fig. 12. Maximum Transient Thermal Impedance