IXYS

HiPerFET™ Power MOSFETs ISOPLUS247™

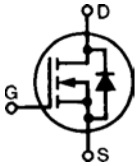
(Electrically Isolated Back Surface)

IXFR 21N100Q

V_{DSS} = 1000 V
I_{D25} = 18 A
$R_{DS(on)}$ = 0.50 Ω

$t_{rr} \leq$ 250 ns

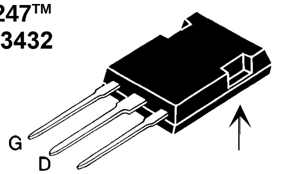
N-Channel Enhancement Mode, Low Q_g,
High dv/dt, Low t_{rr}, HDMOS™ Family



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	18	A
I_{DM}	T_C = 25°C, Note 1	84	A
I_{AR}	T_C = 25°C	21	A
E_{AR}	T_C = 25°C	60	mJ
E_{AS}	T_C = 25°C	2.5	J
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	10	V/ns
P_D	T_C = 25°C	350	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
V_{ISOL}	50/60 Hz, RMS t = 1 min	2500	V~
Weight		5	g

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.
V_{DSS}	V_{GS} = 0 V, I_D = 1mA		1000		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4mA		3		5 V
I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0				±100 nA
I_{DSS}	V_{DS} = V_{DSS}				100 µA
	V_{GS} = 0 V	T_J = 125°C			2 mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = I_T Notes 2, 3				0.5 Ω

ISOPLUS 247™
E153432



G = Gate D = Drain
S = Source

* Patent pending

Features

- Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- IXYS advanced low Q_g process
- Low gate charge and capacitances
  - easier to drive
  - faster switching
- Low drain to tab capacitance(<30pF)
- Low $R_{DS\,(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Rated for Unclamped Inductive Load Switching (UIS)
- Fast intrinsic Rectifier

Applications

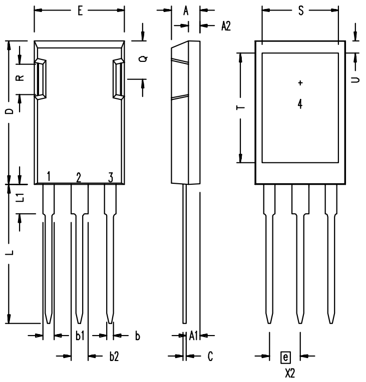
- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control

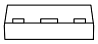
Advantages

- Easy assembly
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	V_{DS} = 10 V; I_D = I_T Notes 2, 3	16	22		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		5900		pF
C_{oss}			550		pF
C_{rss}			90		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = I_T R_G = 1 Ω (External), Notes 2, 3		21		ns
t_r			18		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 = I_T Notes 2, 3		170		nC
Q_{GS}			38		nC
Q_{GD}			75		nC
R_{thJC}				0.35	K/W
R_{thCK}			0.15		K/W

ISOPLUS 247 OUTLINE





1 Gate, 2 Drain (Collector)
3 Source (Emitter)
4 no connection

Dim.	Millimeter Min.	Max.	Inches Min.	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	.244
R	4.32	4.83	.170	.190

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
I_S	V_{GS} = 0 V			21	A
I_{SM}	Repetitive; Note 1			84	A
V_{SD}	I_F = I_T, V_{GS} = 0 V, Notes 2, 3			1.5	V
t_{rr}	I_F = I_S,-di/dt = 100 A/µs, V_R = 100 V			250	ns
Q_{RM}			1.4		µC
I_{RM}			8		A

Note: 1. Pulse width limited by T_{JM}
2. Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %
3. I_T = 10.5A

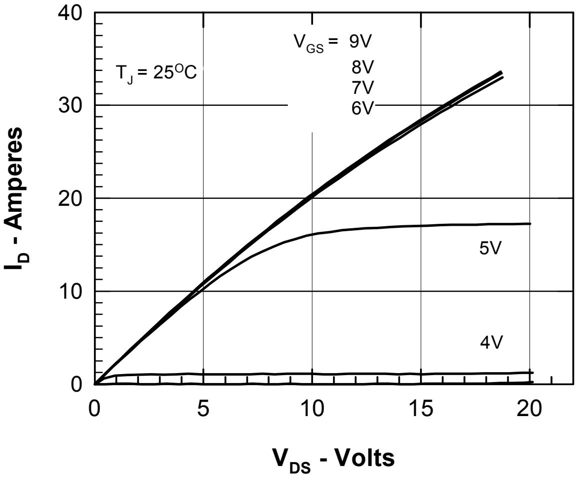


Fig.1 Output Characteristics @ T_j = 25°C

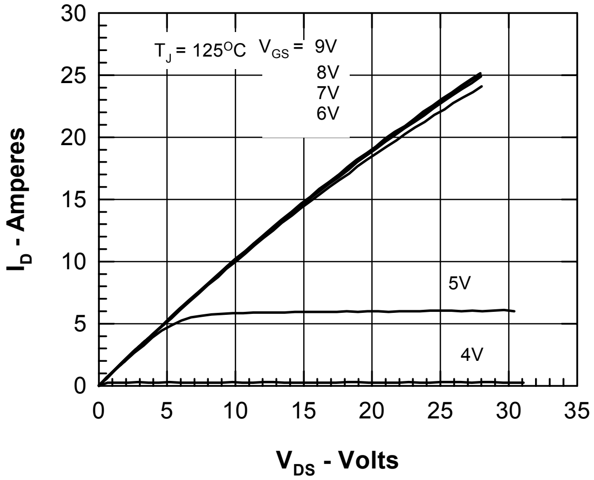


Fig.2 Output Characteristics @ T_j = 125°C

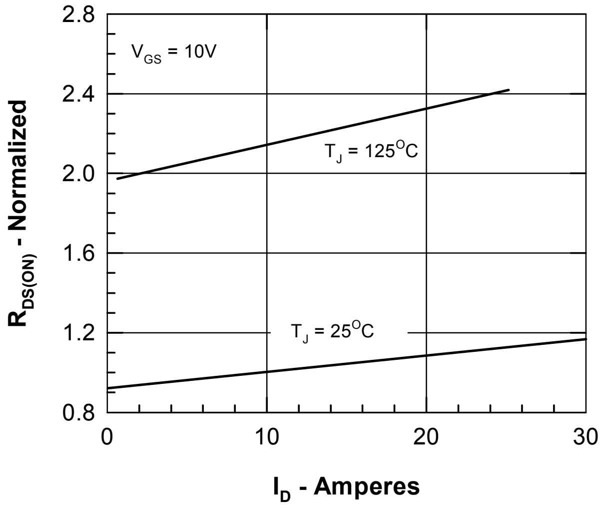


Fig.3 $R_{DS(on)}$ vs. Drain Current

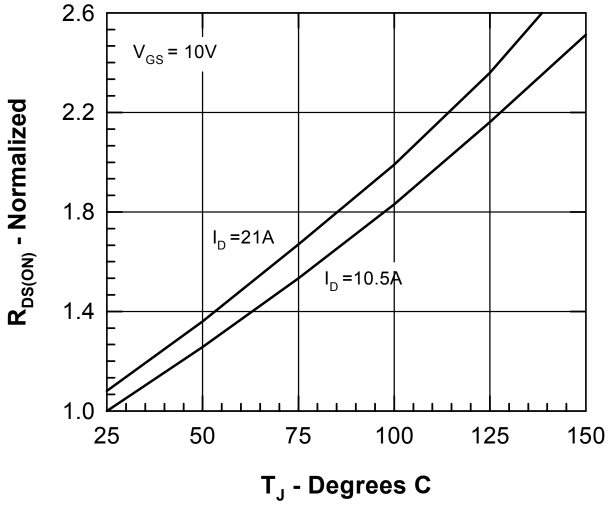


Fig.4 Temperature Dependence of Drain to Source Resistance

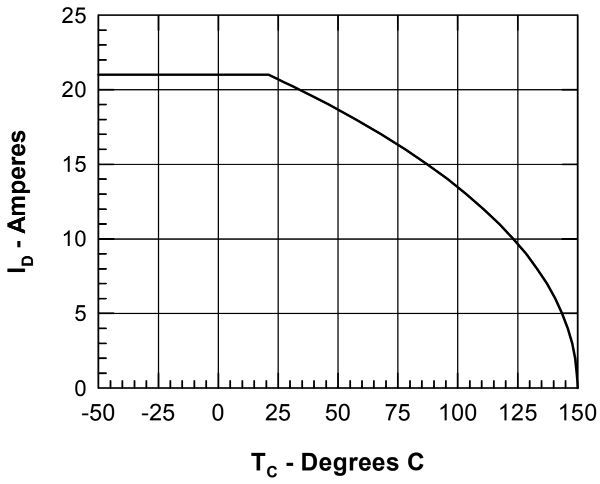


Fig.5 Drain Current vs. Case Temperature

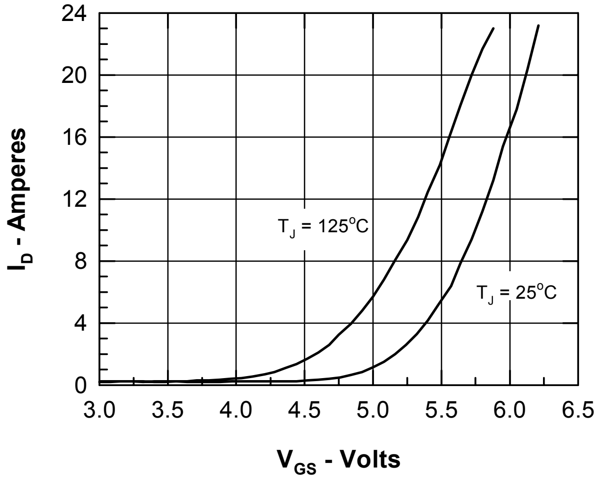


Fig.6 Drain Current vs Gate Source Voltage

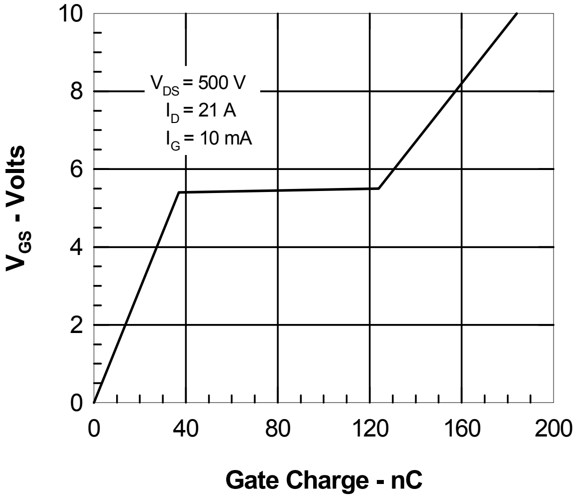


Fig. 7 Gate Charge Characteristic Curve

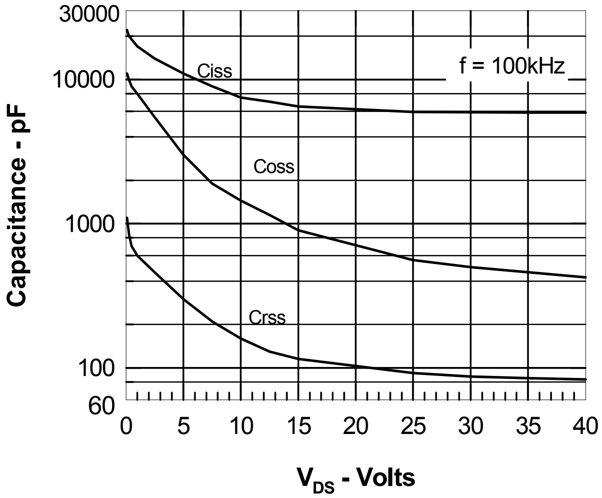


Fig. 8 Capacitance Curves

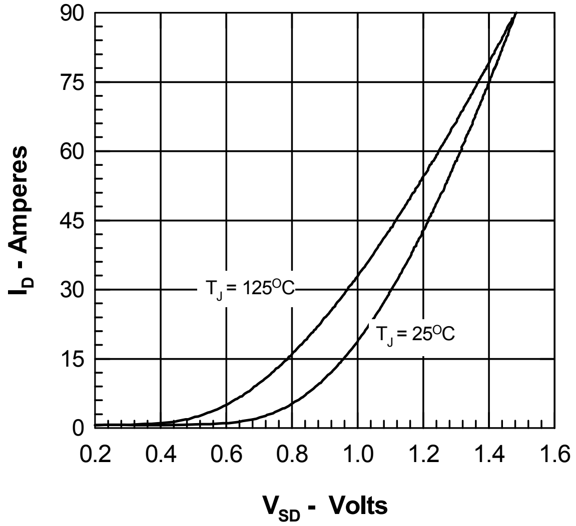


Fig. 9 Drain Current vs Drain Source Voltage

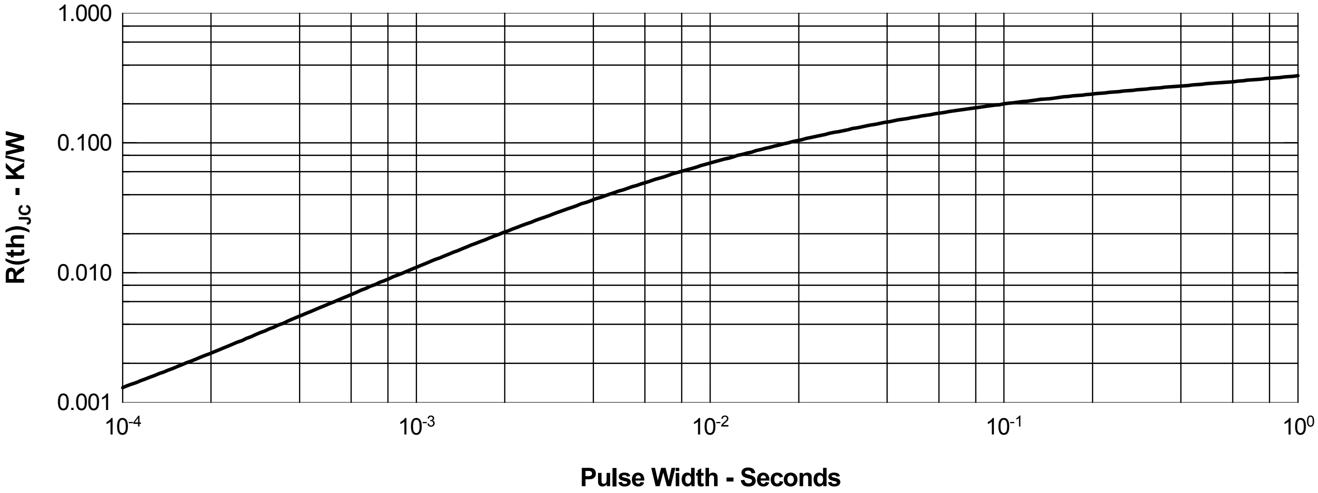


Fig. 10 Transient Thermal Impedance