IXYS

HiPerFET™ Power MOSFETs ISOPLUS247™

(Electrically Isolated Back Surface)

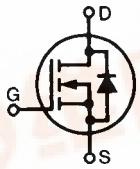
IXFR 30N50Q
IXFR 32N50Q

V_{DSS}	I_{D25}	$R_{DS(on)}$
500 V	29 A	0.16 Ω
500 V	30 A	0.15 Ω

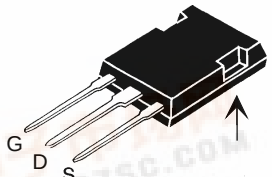
$t_{rr} \leq 250$ ns

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

Preliminary data



ISOPLUS 247™
E 153432



Isolated back surface*

G = Gate D = Drain
S = Source

*Patent pending

Symbol	Test Conditions		Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C		500	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ		500	V
V_{GS}	Continuous		±20	V
V_{GSM}	Transient		±30	V
I_{D25}	T_C = 25°C	30N50 32N50	30	A
I_{DM}	T_C = 25°C, Pulse width limited by T_{JM}	30N50 32N50	120	A
I_{AR}	T_C = 25°C	30N50 32N50	30	A
E_{AS}	T_C = 25°C		1.5	J
E_{AR}	T_C = 25°C		45	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		310	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
T_L	1.6 mm (0.062 in.) from case for 10 s		300	°C
V_{ISOL}	50/60 Hz, RMS t = 1 minute leads-to-tab		2500	V~
Weight			6	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		500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4mA		2		4	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0				±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$ V_{GS} = 0 V	T_J = 25°C T_J = 125°C			100 1	µA mA
$R_{DS(on)}$	V_{GS} = 10 V, $I_D = I_T$ Notes 1, 2	30N50 32N50			0.16 0.15	Ω Ω

Features

- Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- Low drain to tab capacitance(<50pF)
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- 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; $I_D = I_T$	Note 2	18	28		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz			3950		pF
C_{oss}				640		pF
C_{rss}				210		pF
$t_{d(on)}$	V_{GS} = 10 V, $V_{DS} = 0.5 \bullet V_{DSS}$, $I_D = I_T$; R_G = 1 Ω (External),			35		ns
t_r				42		ns
$t_{d(off)}$				75		ns
t_f				20		ns
$Q_{g(on)}$	V_{GS} = 10 V, $V_{DS} = 0.5 \bullet V_{DSS}$, $I_D = I_T$			150		nC
Q_{gs}				26		nC
Q_{gd}				85		nC
R_{thJC}					0.40	K/W
R_{thCK}				0.15		K/W

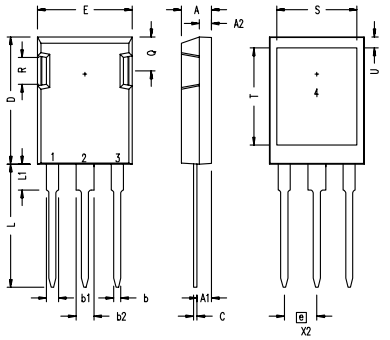
Source-Drain Diode

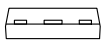
Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
I_S	V_{GS} = 0 V			32	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			128	A
V_{SD}	$I_F = I_S$, V_{GS} = 0 V, Note 1			1.5	V
t_{rr}	$I_F = I_S$, -di/dt = 100 A/ms, V_R = 100 V			250	ns
Q_{RM}			0.75		µC
I_{RM}			7.5		A

Note: 1. I_T test condition:
IXFR30N50: I_T = 15A
IXFR32N50: I_T = 16A

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

ISOPLUS 247 (IXFR) 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
S	13.21	13.72	.520	.540
T	15.75	16.26	.620	.640
U	1.65	3.03	.065	.080

Figure 1. Output Characteristics at 25°C

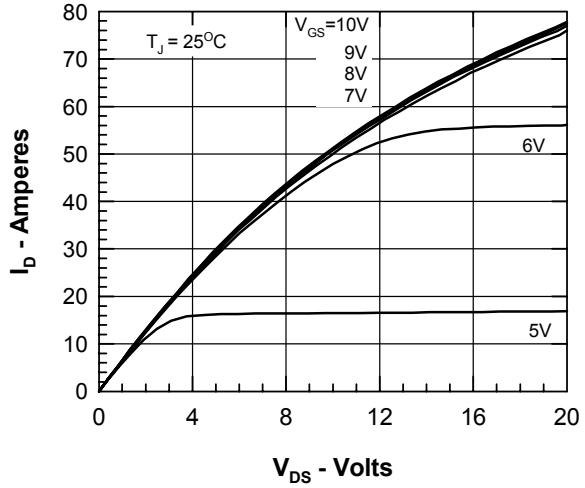


Figure 2. Output Characteristics at 125°C

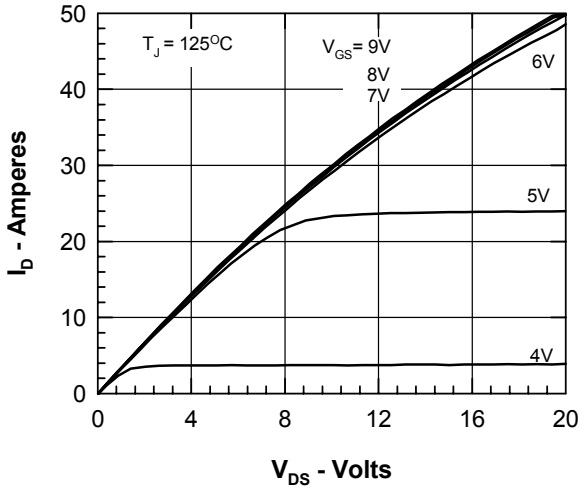


Figure 3. $R_{DS(on)}$ normalized to 15A/25°C vs. I_D

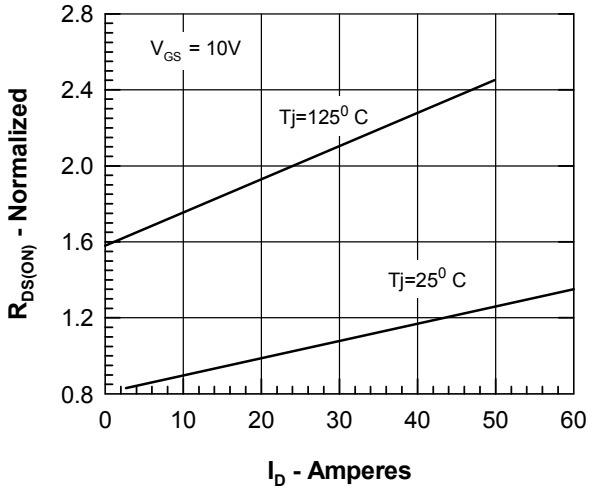


Figure 4. $R_{DS(on)}$ normalized to 15A/25°C vs. T_J

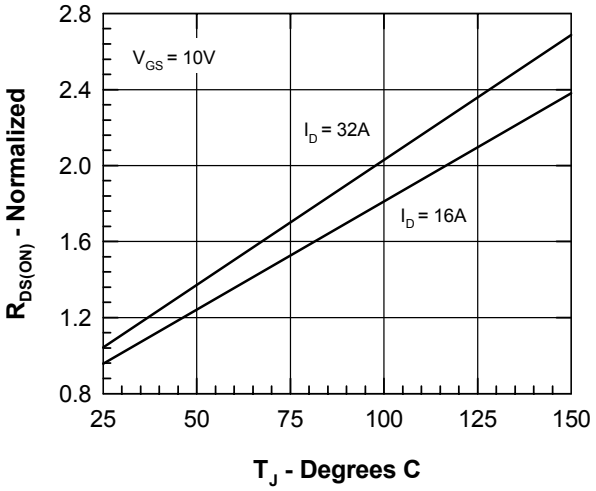


Figure 5. Drain Current vs. Case Temperature

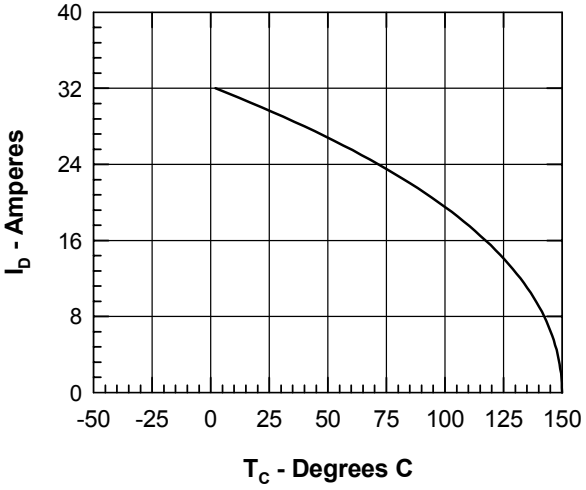


Figure 6. Admittance Curves

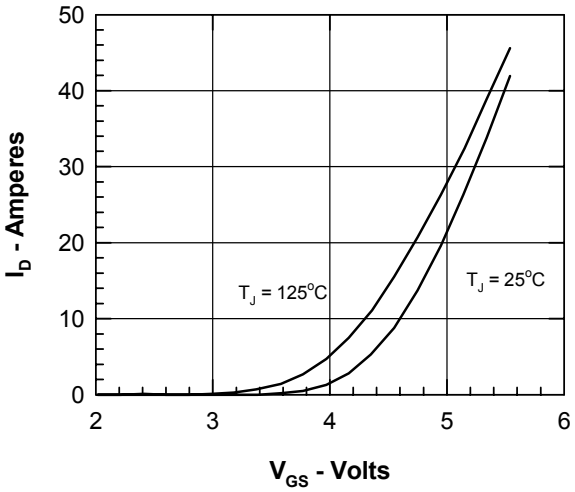


Figure 7. Gate Charge

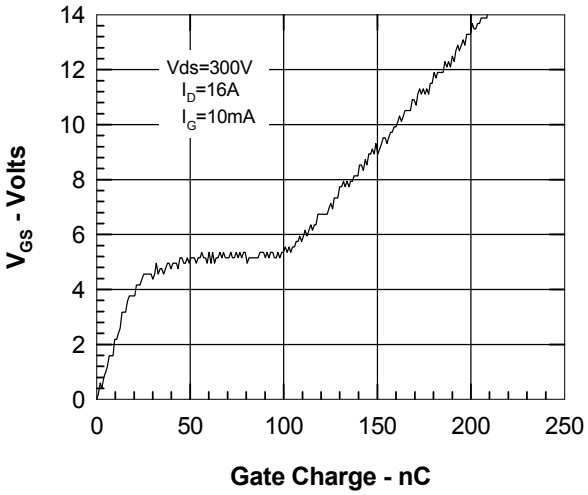


Figure 8. Capacitance Curves

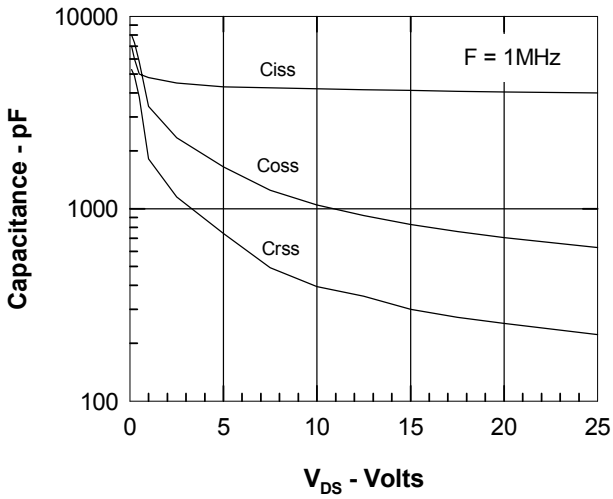


Figure 9. Forward Voltage Drop of the Intrinsic Diode

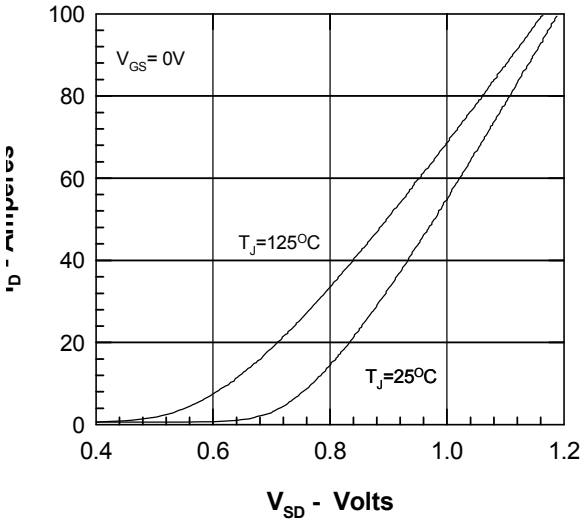


Figure 10. Transient Thermal Resistance