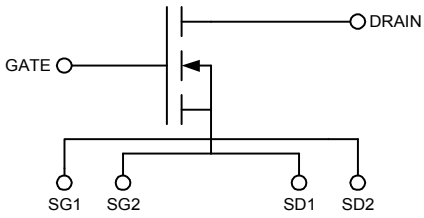
DE275-101N30A
RF Power MOSFET

N-Channel Enhancement Mode
Low Q_g and R_g
High dv/dt
Nanosecond Switching

V_{DSS} = 100 V
I_{D25} = 30.0 A
$R_{DS(on)}$ ≤ 0.06 Ω
P_{DC} = 550 W

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	100	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ	100	V
V_{GS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_c = 25°C	30.0	A
I_{DM}	T_c = 25°C, pulse width limited by T_{JM}	240	A
I_{AR}	T_c = 25°C	TBD	A
E_{AR}	T_c = 25°C	TBD	mJ
dv/dt	$I_S \le I_{DM}$, di/dt ≤~ 100A/µs, $V_{DD} \le V_{DSS}$, $T_j \le 150°C$, R_G = 0.2Ω	5.5	V/ns
	I_S = 0	>200	V/ns
P_{DC}		550	W
P_{DHS}	T_c = 25°C Derate 4.4W/°C above 25°C	270	W
P_{DAMB}	T_c = 25°C	3.5	W
R_{thJC}		0.25	C/W
R_{thJHS}		0.53	C/W



Characteristic Values
T_J = 25°C unless otherwise specified

Symbol	Test Conditions	min.	typ.	max.	
V_{DSS}	V_{GS} = 0 V, I_D = 3 ma			100	V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 µa	2	2.5	4	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0			±100	nA
I_{DSS}	V_{DS} = 0.8 V_{DSS} T_J = 25°C V_{GS} = 0 T_J = 125°C			25 250	µA µA
$R_{DS(on)}$	V_{GS} = 15 V, $I_D = 0.5I_{D25}$ Pulse test, t ≤ 300µS, duty cycle d ≤ 2%			0.06	Ω
g_{fs}	V_{DS} = 15 V, $I_D = 0.5I_{D25}$, pulse test		9.7		S
T_J		-55		+175	°C
T_{JM}			175		°C
T_{stg}		-55		+175	°C
T_L	1.6mm(0.063 in) from case for 10 s		300		°C
Weight			2		g

Features

- Isolated Substrate
  - high isolation voltage (>2500V)
  - excellent thermal transfer
  - Increased temperature and power cycling capability
- IXYS advanced low Q_g process
- Low gate charge and capacitances
  - easier to drive
  - faster switching
- Low $R_{DS(on)}$
- Very low insertion inductance (<2nH)
- No beryllium oxide (BeO) or other hazardous materials

Advantages

- Optimized for RF and high speed switching
- Easy to mount—no insulators needed
- High power density

Symbol	Test Conditions	Characteristic Values (T_J = 25°C unless otherwise specified) min.	typ.	max.	
R_G				5	Ω
C_{iss}			2500		pF
C_{oss}	V_{GS} = 0 V, V_{DS} = 0.8 $V_{DSS(max)}$, f = 1 MHz		700		pF
C_{rss}			145		pF
C_{stray}	Back Metal to any Pin		16		pF
$T_{d(on)}$			5		ns
T_{on}	V_{GS} = 15 V, V_{DS} = 0.8 V_{DSS}		5		ns
$T_{d(off)}$	I_D = 0.5 I_{DM} R_G = 0.2 Ω (External)		8		ns
T_{off}			8		ns
$Q_{g(on)}$			94		nC
Q_{gs}	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS} I_D = 0.5 I_{D25}		11		nC
Q_{gd}			42		nC

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values (T_J = 25°C unless otherwise specified) min.	typ.	max.	
I_S	V_{GS} = 0 V			30.0	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			240	A
V_{SD}	I_F = I_S, V_{GS} = 0 V, Pulse test, t ≤ 300 μs, duty cycle ≤ 2%			2.5	V
T_{rr}			600		ns

CAUTION: Operation at or above the Maximum Ratings values may impact device reliability or cause permanent damage to the device.

Information in this document is believed to be accurate and reliable. IXYSRF reserves the right to make changes to information published in this document at any time and without notice.

For detailed device mounting and installation instructions, see the "*Device Installation & Mounting Instructions*" technical note on the IXYSRF web site at;

http://www.ixysrf.com/pdf/switch_mode/appnotes/7de_series_mosfet_installation_instructions.pdf

IXYS RF reserves the right to change limits, test conditions and dimensions.

IXYS RF MOSFETS are covered by one or more of the following U.S. patents:

4,835,592	4,860,072	4,881,106	4,891,686	4,931,844	5,017,508
5,034,796	5,049,961	5,063,307	5,187,117	5,237,481	5,486,715
5,381,025	5,640,045				

Fig. 1

Typical Transfer Characteristics
V_{DS} = 15V I_D = 15A

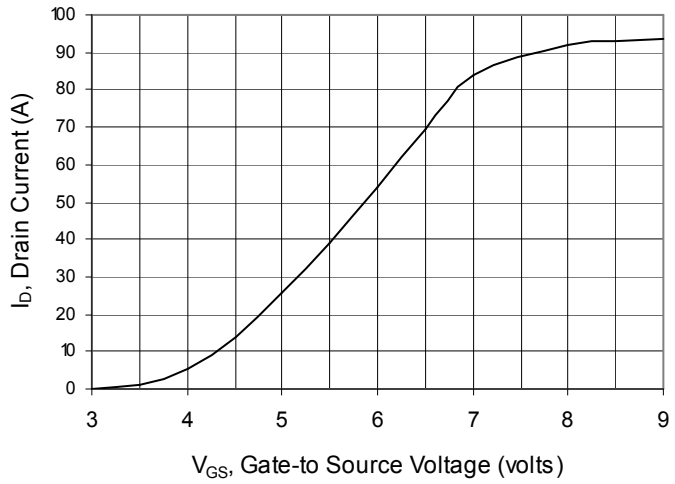


Fig. 2

Typical Output Characteristics
PW = 10µS

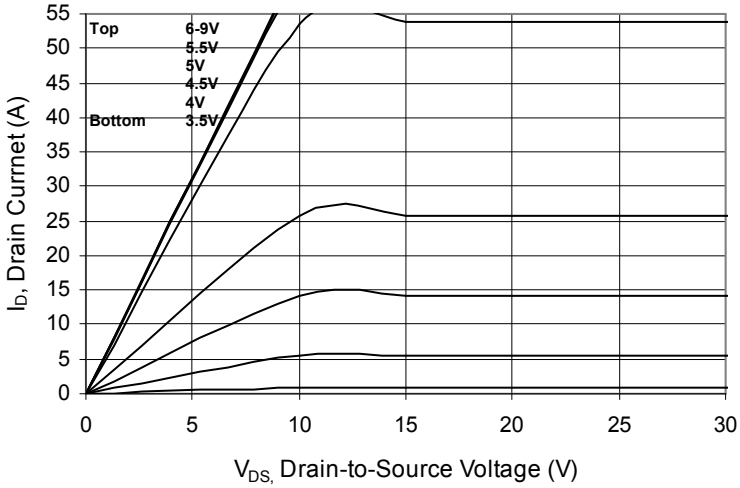


Fig. 3

Gate Charge vs. Gate-to-Source Voltage
V_{DS} = 50V I_D = 15A

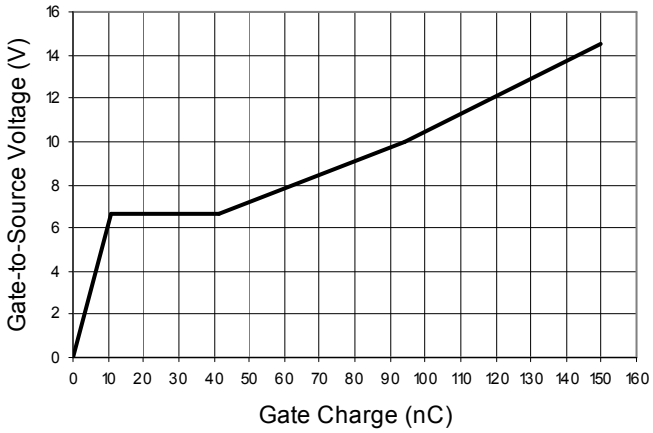


Fig. 4

Extended Typical Output Characteristics

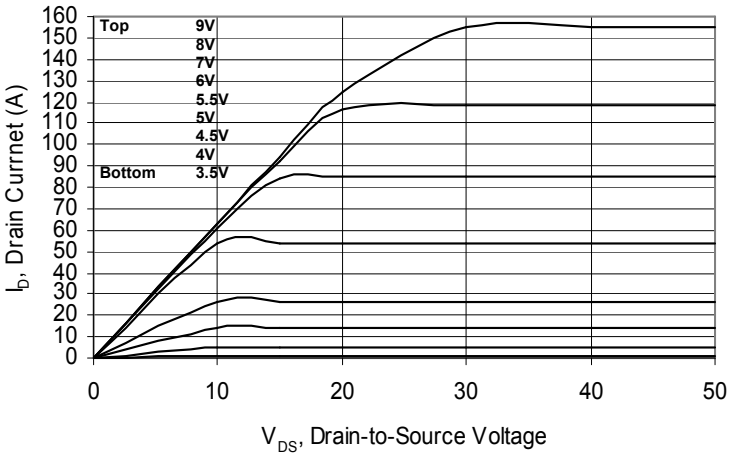


Fig. 5

V_{DS} vs. Capacitance

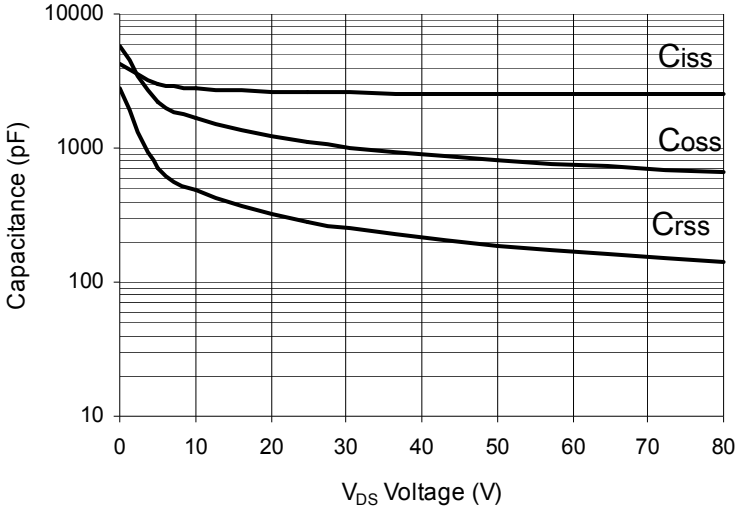
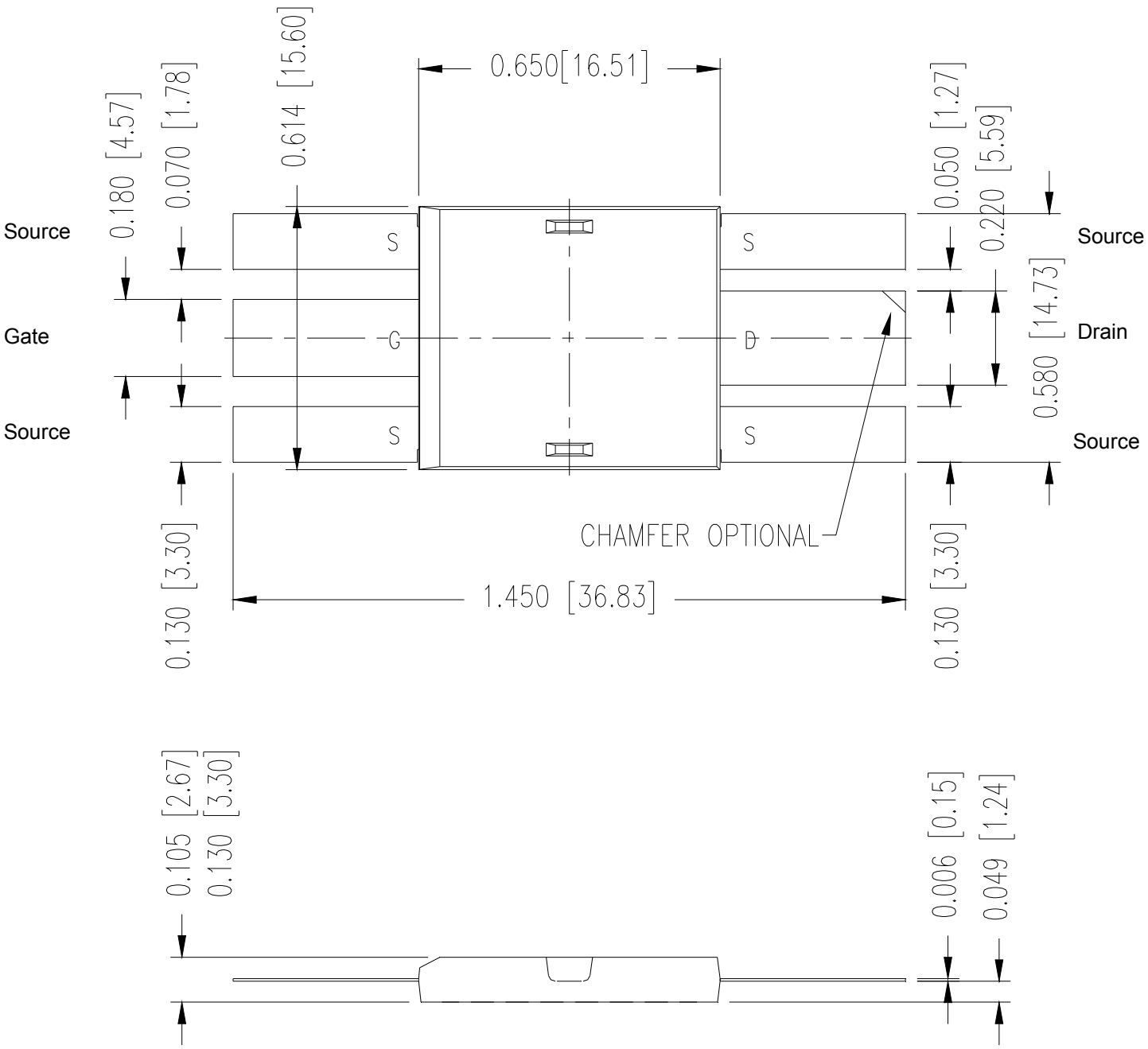


Fig. 6 Package Drawing



101N30A DE-SERIES SPICE Model

The DE-SERIES SPICE Model is illustrated in Figure 7. The model is an expansion of the SPICE level 3 MOSFET model. It includes the stray inductive terms L_G, L_S and L_D. Rd is the $R_{DS(ON)}$ of the device, Rds is the resistive leakage term. The output capacitance, C_{OSS}, and reverse transfer capacitance, C_{RSS} are modeled with reversed biased diodes. This provides a varactor type response necessary for a high power device model. The turn on delay and the turn off delay are adjusted via Ron and Roff.

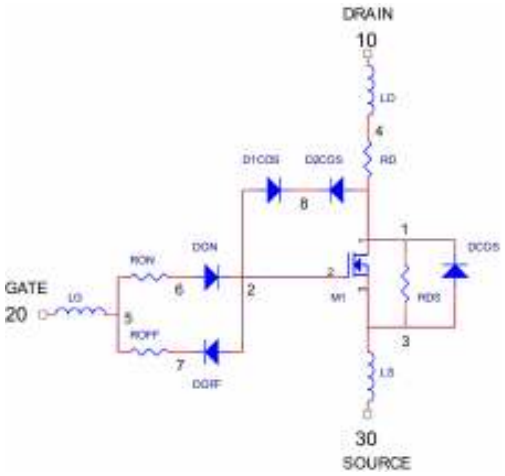


Figure 7 DE-SERIES SPICE Model

This SPICE model may be downloaded as a text file from the IXYSRF web site at

http://www.ixysrf.com/products/switch_mode.html

http://www.ixysrf.com/spice/de275-101n30a.html

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*SYM=POWMOSN
.SUBCKT 101N09A  10 20 30
*     TERMINALS:  D  G  S
*  100 Volt  30 Amp  .05 ohm  N-Channel Power MOSFET  10-30-2001
M1   1 2  3  3  DMOS  L=1U W=1U
RON  5 6 1.5
DON  6 2  D1
ROF  5 7 .2
DOF  2 7  D1
D1CRS 2 8 D2
D2CRS 1 8 D2
CGS  2 3  2.5N
RD   4 1  .05
DCOS 3 1 D3
RDS  1  3  5.0MEG
LS  3 30 .1N
LD  10 4  1N
LG  20 5  1N
.MODEL DMOS NMOS (LEVEL=3 VTO=3.0 KP=9.0)
.MODEL D1 D (IS=.5F CJO=1P BV=100 M=.5 VJ=.6 TT=1N)
.MODEL D2 D (IS=.5F CJO=1100P BV=100 M=.5 VJ=.6 TT=1N RS=10M)
.MODEL D3 D (IS=.5F CJO=300P BV=100 M=.3 VJ=.4 TT=400N RS=10M)
.ENDS
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