Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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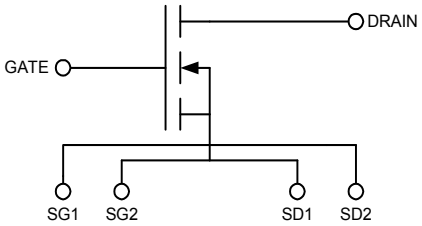
DE275-501N16A
RF Power MOSFET

N-Channel Enhancement Mode
Low Q_g and R_g
High dv/dt
Nanosecond Switching
Ideal for Class C, D, & E Applications

V_{DSS}	=	500 V
I_{D25}	=	16 A
$R_{DS(on)}$	=	0.4 Ω
P_{DC}	=	590 W

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	16	A
I_{DM}	T_c = 25°C, pulse width limited by T_{JM}	96	A
I_{AR}	T_c = 25°C	16	A
E_{AR}	T_c = 25°C	20	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	V/ns
	I_S = 0	>200	V/ns
P_{DC}		590	W
P_{DHS}	T_c = 25°C Derate 1.9W/°C above 25°C	284	W
P_{DAMB}	T_c = 25°C	3.0	W
R_{thJC}		0.25	C/W
R_{thJHS}		0.53	C/W

Symbol	Test Conditions	Characteristic Values			
T_J = 25°C unless otherwise specified		min.	typ.	max.	
V_{DSS}	V_{GS} = 0 V, I_D = 3 ma	500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4 ma	3.5	4.0	5.5	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			50 1	μA mA
$R_{DS(on)}$	V_{GS} = 15 V, $I_D = 0.5 I_{D25}$ Pulse test, t ≤ 300μS, duty cycle d ≤ 2%		.38		Ω
g_{fs}	V_{DS} = 20V, $I_D = 0.5\ I_{D25}$ pulse test	3	5	8	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 at frequencies to 100MHz
- 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			0.3		Ω
C_{iss}			1650		pF
C_{oss}	V_{GS} = 0 V, V_{DS} = 0.8 $V_{DSS(max)}$, f = 1 MHz		122		pF
C_{rss}			33		pF
C_{stray}	Back Metal to any Pin		21		pF
$T_{d(on)}$			3		ns
T_{on}	V_{GS} = 15 V, V_{DS} = 0.8 V_{DSS}		2		ns
$T_{d(off)}$	I_D = 0.5 I_{DM} R_G = 0.2 Ω (External)		4		ns
T_{off}			5		ns
Q_g			50		nC
Q_{gs}	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS} I_D = 0.5 I_{D25}		12		nC
Q_{gd}			24		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			6	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			98	A
V_{SD}	I_F = I_S, V_{GS} = 0 V, Pulse test, t ≤ 300 μs, duty cycle ≤ 2%			1.5	V
T_{rr}			200		ns
Q_{RM}	I_F = I_S, -di/dt = 100A/μs, V_R = 100V		0.6		μC
I_{RM}			4		A

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

Fig. 1

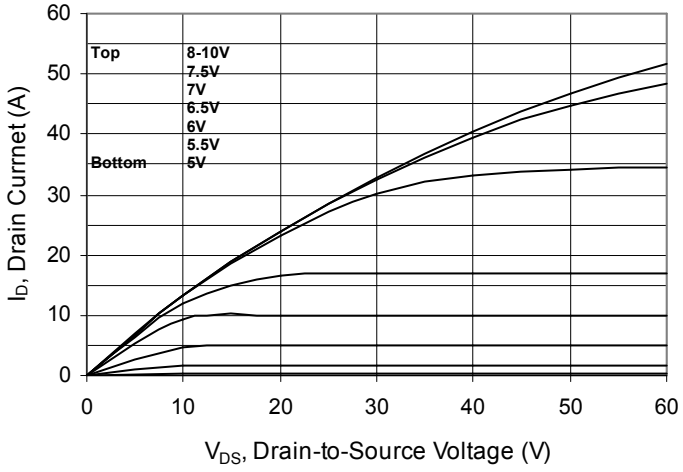


Fig. 2

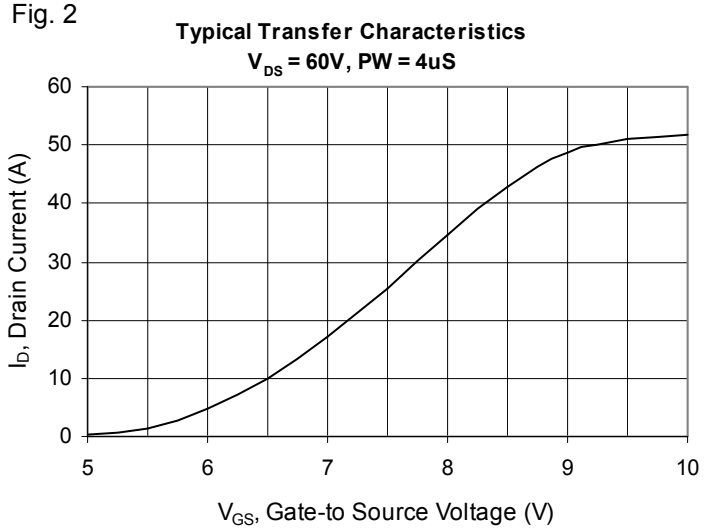


Fig. 3

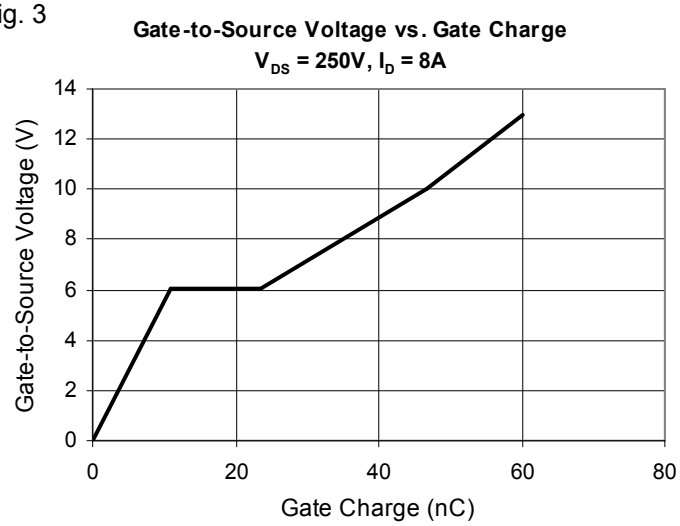


Fig. 4

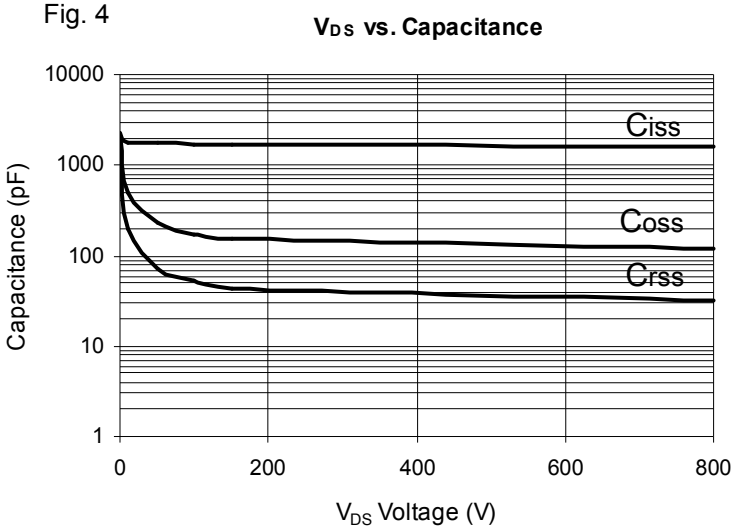
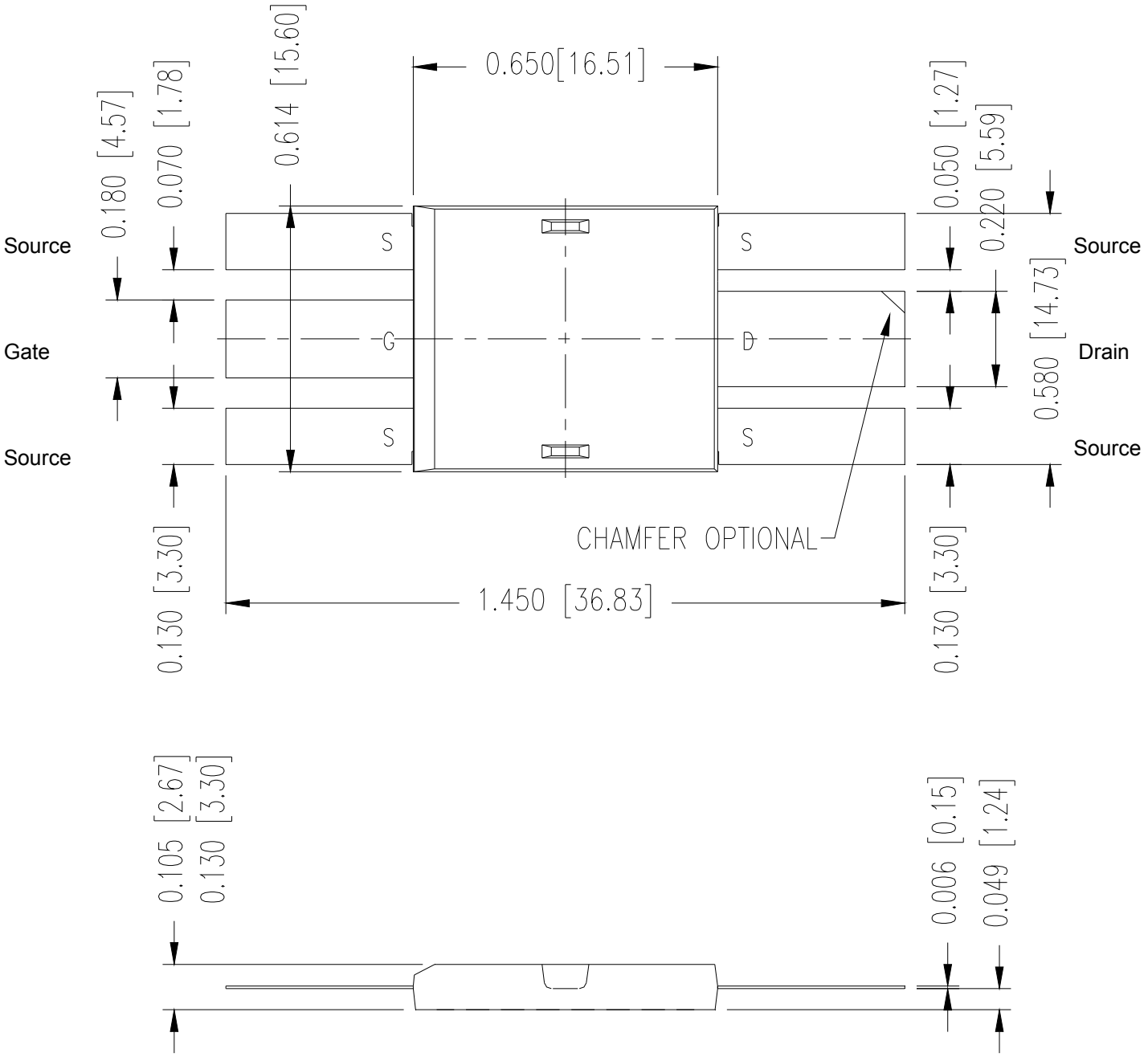


Fig. 5 Package Drawing



501N16A DE-SERIES SPICE Model

The DE-SERIES SPICE Model is illustrated in Figure 6. 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.

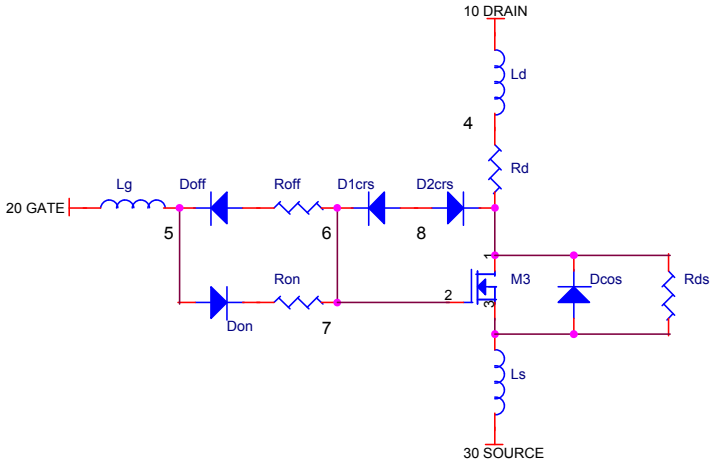


Figure 6 DE-SERIES SPICE Model

This SPICE model may be downloaded as a text file from the IXYS RF web site at http://www.ixysrf.com/products/switch_mode.html

http://www.ixysrf.com/spice/de275-501n16a.html

Net List:

```
SYM=POWMOSN
.SUBCKT 501N16A  10 20 30
* TERMINALS:  D  G  S
* 500 Volt  16 Amp  .38 ohm  N-Channel Power MOSFET
* REVA 6-15-00
M1   1 2  3  3  DMOS  L=1U W=1U
RON  5 6 .2
DON  6 2  D1
ROF  5 7 .2
DOF  2 7  D1
D1CRS 2 8 D2
D2CRS 1 8 D2
CGS  2 3  2.0N
RD   4 1  .38
DCOS 3 1 D3
RDS  1  3  5.0MEG
LS  3 30 .5N
LD  10 4  1N
LG  20 5  1N
.MODEL DMOS NMOS (LEVEL=3 VTO=3.0 KP=5.8)
.MODEL D1 D (IS=.5F CJO=10P BV=100 M=.5 VJ=.7 TT=1N RS=10M)
.MODEL D2 D (IS=.5F CJO=450P BV=500 M=.4 VJ=.6 TT=10N RS=10M)
.MODEL D3 D (IS=.5F CJO=900P BV=500 M=.3 VJ=.3 TT=400N RS=10M)
.ENDS
```

Doc #9200-0222 Rev 5

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