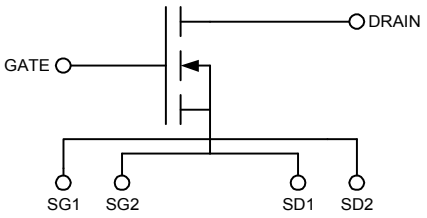
DE475-102N20A
RF Power MOSFET

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

V_{DSS} = 1000 V
I_{D25} = 20 A
$R_{DS(on)}$ ≤ 0.6 Ω
P_{DC} = 1800W



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	20	A
I_{DM}	T_c = 25°C, pulse width limited by T_{JM}	120	A
I_{AR}	T_c = 25°C	20	A
E_{AR}	T_c = 25°C	30	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}		1800	W
P_{DHS}	T_c = 25°C Derate 4.4W/°C above 25°C	730	W
P_{DAMB}	T_c = 25°C	4.5	W
R_{thJC}		0.08	C/W
R_{thJHS}		0.20	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	1000			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 μa	3.0	3.6	5.0	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, $I_D = 0.5I_{D25}$ Pulse test, t ≤ 300μS, duty cycle d ≤ 2%			0.6	Ω
g_{fs}	V_{DS} = 15 V, $I_D = 0.5I_{D25}$, pulse test	6	9		S
T_J		-55		+150	°C
T_{JM}			150		°C
T_{stg}		-55		+150	°C
T_L	1.6mm (0.063 in) from case for 10 s		300		°C
Weight			3		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 30MHz
- Easy to mount—no insulators needed
- High power density

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values min.	typ.	max.	
R_G			0.3		Ω
C_{iss}			6200		pF
C_{oss}	V_{GS} = 0 V, V_{DS} = 0.8 $V_{DSS(max)}$, f = 1 MHz		185		pF
C_{rss}			44		pF
C_{stray}	Back Metal to any Pin		46		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)		5		ns
T_{off}			8		ns
$Q_{g(on)}$			145		nC
Q_{gs}	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS} I_D = 0.5 I_{D25}		28		nC
Q_{gd}			68		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			20	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			120	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}			14		A

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

Fig. 1

Typical Transfer Characteristics
V_{DS} = 50V, PW = 15µS

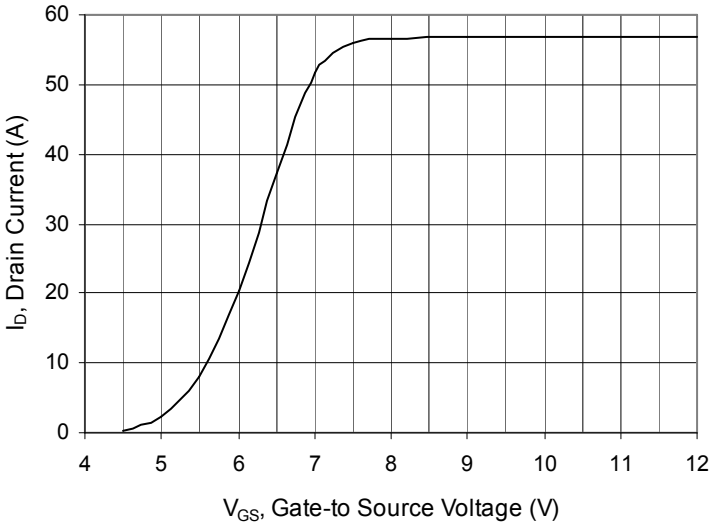


Fig. 2

Typical Output Characteristics

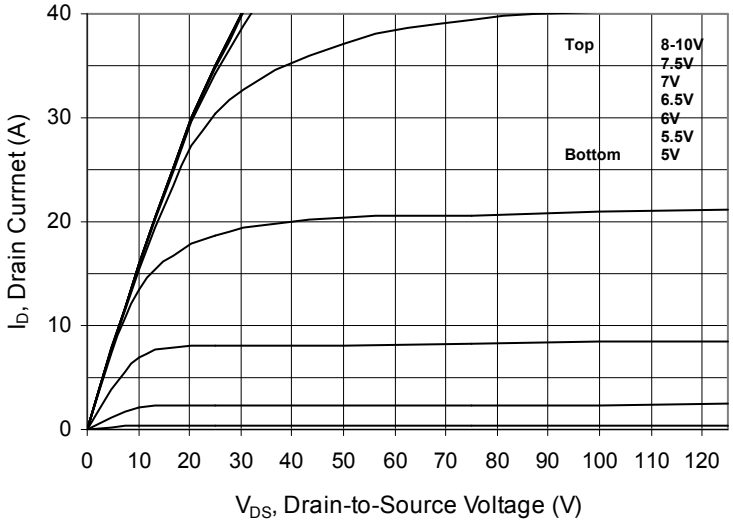


Fig. 3

Gate Charge vs. Gate-to-Source Voltage
V_{GS} = 500V, I_D = 10A, Ig = 4mA

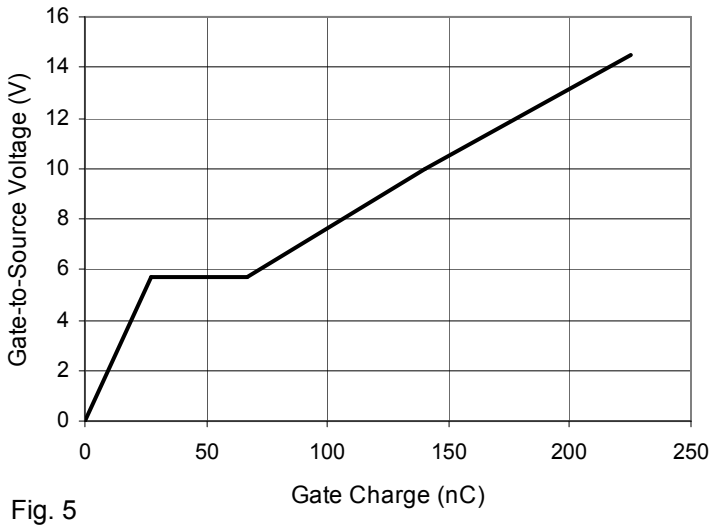


Fig. 4

Extended Typical Output Characteristics

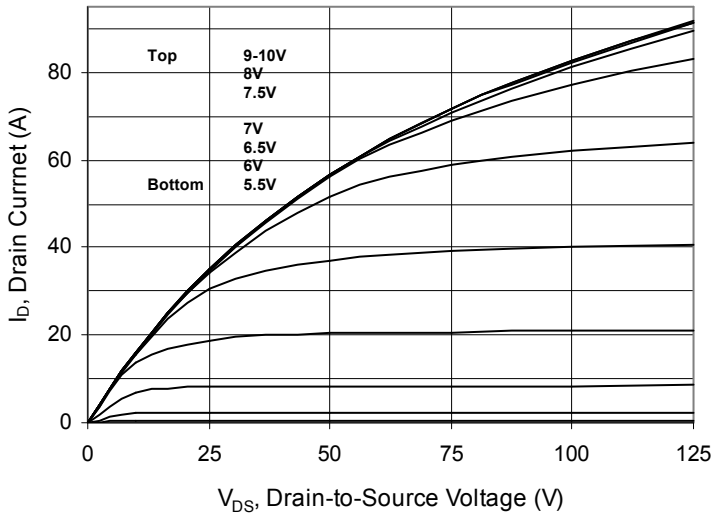


Fig. 5

V_{DS} vs. Capacitance

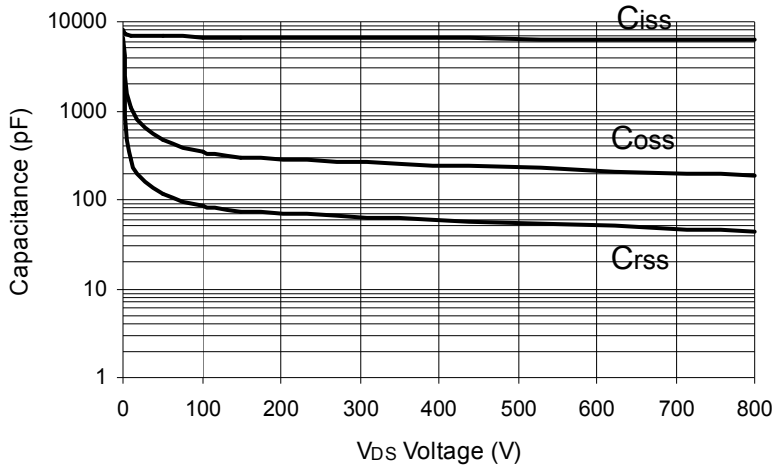
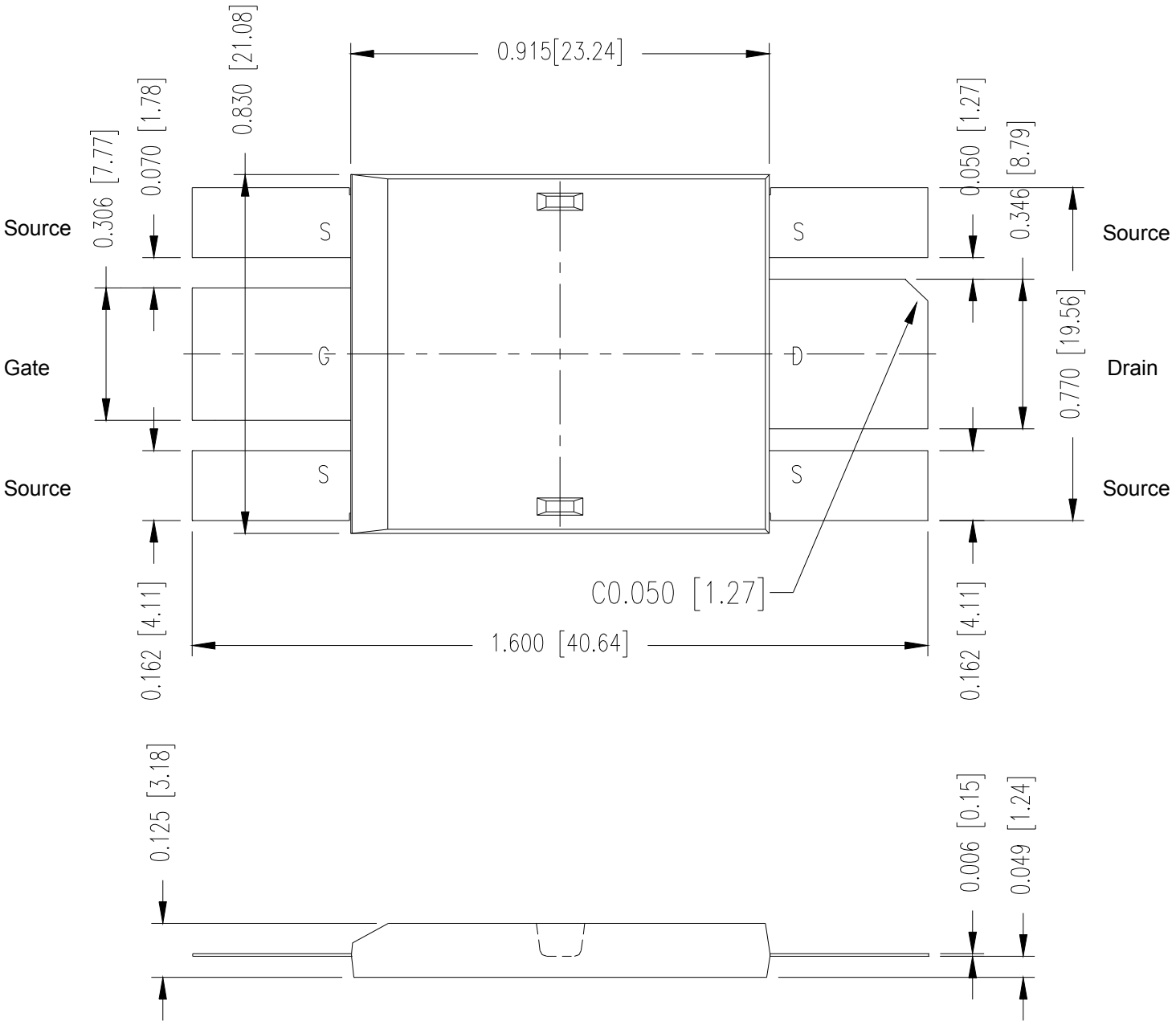


Fig. 6 Package Drawing



102N20A 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.

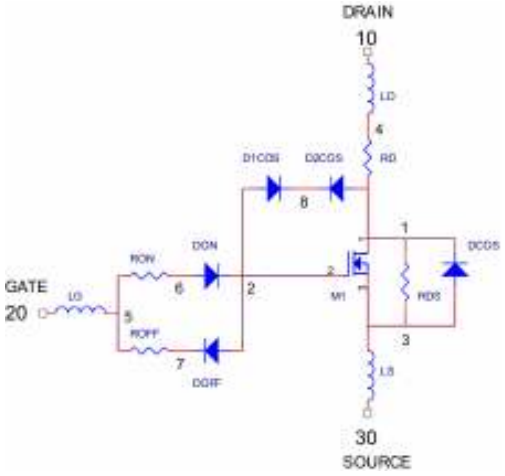


Figure 7 DE-SERIES SPICE Model

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/de475-102n20a.html

Net List:

```
.SUBCKT 102N20A   10 20 30
*  TERMINALS:  D  G  S
*  1000 Volt  20 Amp  0.6 ohm  N-Channel Power MOSFET
*  REV.A  10-29-01
M1   1  2  3  3  DMOS L=1U W=1U
RON   5  6  0.5
DON   6  2  D1
ROF   5  7 .1
DOF   2  7  D1
D1CRS 2  8  D2
D2CRS 1  8  D2
CGS   2  3  6.2N
RD    4  1  0.5
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=3.8)
.MODEL D1 D (IS=.5F CJO=1P BV=100 M=.5 VJ=.6 TT=1N)
.MODEL D2 D (IS=.5F CJO=400P BV=1000 M=.4 VJ=.6 TT=400N RS=10M)
.MODEL D3 D (IS=.5F CJO=900P BV=1000 M=.3 VJ=.4 TT=400N RS=10M)
.ENDS
```

Doc #9200-0238 Rev 6

An IXYS Company
2401 Research Blvd., Suite 108
Fort Collins, CO USA 80526
970-493-1901 Fax: 970-493-1903
Email: sales@ixyscolorado.com
Web: http://www.ixyscolorado.com

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for RF MOSFET Transistors ***category:***

Click to view products by IXYS ***manufacturer:***

Other Similar products are found below :

MRF492 MRFE8VP8600HR5 ARF1511 ARF465BG BF 2030 E6814 BLF861A DU1215S DU28200M UF28100M DU2820S MHT1008NT1 MMRF1014NT1 MRF426 ARF468AG ARF468BG MAPHST0045 DU2860U MRFE6VP5300NR1 BF2040E6814HTSA1 MRFE6VP5150GNR1 LET9060S MRF136Y BF999E6327HTSA1 SD2931-12MR BF998E6327HTSA1 MRF141 MRF171 MRF172 MRF174 SD2942 QPD1020SR BF 1005S E6327 MRF134 MRF136 MRF137 MRF141G MRF151A MRF151G MRF157 MRF158 MRF160 MRF166C MRF171A MRF177 UF2840G TGF3021-SM ARF1510 ARF448BG ARF449AG ARF466BG