An LIXYS Company

DE275X2-102N06A RF Power MOSFET

- Common Source Push-Pull Pair
- N-Channel Enhancement Mode
- Low Q_g and R_g
- High dv/dt
- Nanosecond Switching

The DE275X2-102N06A is a matched pair of RF power MOSFET devices in a common source configuration. The device is optimized for push-pull or parallel operation in RF generators and amplifiers at frequencies to >65 MHz.

Unless noted,	specifications are for each output device
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Symbol	Test Conditions	Maximum Ra	atings
V _{DSS}	$T_J = 25^{\circ}C$ to $150^{\circ}C$	1000	V
\mathbf{V}_{DGR}	$T_{\rm J}$ = 25°C to 150°C; R_{GS} = 1 $M\Omega$	1000	V
V _{GS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
D25	T _c = 25°C	6	А
DM	$T_{\rm c}$ = 25°C, pulse width limited by $T_{\rm JM}$	48	А
I _{AR}	T _c = 25°C	6	Α
E _{AR}	T _c = 25°C	20	mJ
dv/dt	$ \begin{split} & I_{S} \leq I_{DM}, di/dt \leq \ 100A/\mus, V_{DD} \leq V_{DSS}, \\ & T_{j} \leq 150^\circC, R_{G} \texttt{=} \ 0.2\Omega \end{split} $	5	V/ns
	I _S = 0	>200	V/ns
P _{DHS} ⁽¹⁾	T_c = 25°C, Derate 6.0W/°C above 25°C	750	W
P _{DAMB} ⁽¹⁾	T _c = 25°C	5.0	W
R _{thJHS} ⁽¹⁾		0.17	K/W
TJ		-55+150	°C
\mathbf{T}_{JM}		150	°C
T _{stg}		-55+150	°C
TL	1.6mm (0.063 in) from case for 10 s	300	°C
Weight		4	g

Symbol Test Conditions

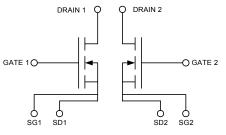
Characteristic Values T_J = 25°C unless otherwise specified

		min.	typ.	max.	
/ _{DSS}	V_{GS} = 0 V, I _D = 3 ma	1000			V
heet4U.com GS(th)	$V_{DS} = V_{GS}, I_D = 4 \text{ ma}$	2.5		5.5	V
GSS	V_{GS} = ±20 V_{DC} , V_{DS} = 0			±100	nA
DSS				50 1	μA mA
RDS(on)	$\label{eq:VGS} \begin{array}{l} V_{\rm GS} \mbox{=} 15 \mbox{ V}, \mbox{ I}_{\rm D} \mbox{=} 0.5 \mbox{ I}_{\rm D25} \\ \mbox{Pulse test, } t \leq 300 \mbox{ S}, \mbox{ duty cycle } d \leq 2\% \end{array}$			2.5	Ω
fs	V_{DS} = 15 V, I_{D} = 0.5 $I_{\text{D25}},$ pulse test	2	6		S
	GS(th) GSS DSS DSS DS(on)	$V_{DSS} = 0 V, I_D = 3 ma$ $V_{GS} = 0 V, I_D = 3 ma$ $V_{DS} = V_{GS}, I_D = 4 ma$ $SSS = \pm 20 V_{DC}, V_{DS} = 0$ $V_{DS} = 0.8 V_{DSS}, T_J = 25^{\circ}C$ $V_{GS} = 0 T_J = 125^{\circ}C$ $V_{GS} = 15 V, I_D = 0.5I_{D25}$ $Pulse test, t \le 300\mu S, duty cycle d \le 2\%$ $V_{DS} = 45 V (J_D = 0.5I_{D25})$	min. v_{DSS} $V_{GS} = 0 \ V, \ I_D = 3 \ ma$ 1000 $v_{GS(th)}$ $V_{DS} = V_{GS}, \ I_D = 4 \ ma$ 2.5 GSS $V_{GS} = \pm 20 \ V_{DC}, \ V_{DS} = 0$ 2.5 OSS $V_{GS} = 0.8 \ V_{DS}, \ T_J = 25^{\circ}C$ $V_{GS} = 0 \ T_J = 125^{\circ}C$ $V_{GS} = 0$ $T_J = 125^{\circ}C$ $V_{GS} = 15 \ V, \ I_D = 0.5I_{D25}$ Pulse test, $t \le 300 \mu S$, duty cycle $d \le 2\%$ $V_{GS} = 45 \ V, \ V_{SS} = 0.5I_{SS}$ $V_{SS} = 45 \ V, \ V_{SS} = 0.5I_{SS}$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	min. typ. max. V_{DSS} $V_{GS} = 0 \ V, \ I_D = 3 \ ma$ 1000 1000 $M_{GS}(th)$ $V_{DS} = V_{GS}, \ I_D = 4 \ ma$ 2.5 5.5 GSS $V_{GS} = \pm 20 \ V_{DC}, \ V_{DS} = 0$ ± 100 DSS $V_{GS} = 0.8 \ V_{DS}, \ T_J = 25^{\circ}C$ 50 $V_{GS} = 0$ $T_J = 125^{\circ}C$ 1 $R_{DS(on)}$ $V_{GS} = 15 \ V, \ I_D = 0.5 \ I_{D25}$ 2.5 Pulse test, t ≤ 300 \ MS, duty cycle d ≤ 2% 2.5

Preliminary Data Sheet

V_{DSS}	=	1000 V
I _{D25}	=	6 A
$\mathbf{R}_{DS(on)}$	=	2.0 Ω
P _{DHS}	=	750 W





Features

- Isolated Substrate
- high isolation voltage (>2500V)
- excellent thermal transfer
- Increased temperature and power cycling capability
- IXYS advanced low Qg 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

- High Performance Push-Pull RF
 Package
- Optimized for RF and high speed switching at frequencies to >100MHz
- Easy to mount-no insulators needed
- High power density

Note: All specifications are per each transistor, unless otherwise noted.

⁽¹⁾ Thermal specifications are for the package, not per transistor

DE Directed Energy, Inc.

Test Conditions

C. DE275X2-102N06A RF Power MOSFET

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Characteristic Values (T_u = 25°C unless otherwise specified)

	$(T_J = 25^{\circ}C \text{ unless otherwise specified})$								
		min.	typ.	max.					
R _G			0.3	2	2	0.180 [4.57] - 0.070 [1.78] -	H	⊢ 0.650 [16.52]	
C _{iss}			1800	pl	=	°.0 10 10 10 10 10 10 10 10 10 10 10 10 10	s	T T	s
C _{oss}	V_{GS} = 0 V, V_{DS} = 0.8 $V_{DSS(max)}$, f = 1 MHz		100	pl	= <u>i</u>		G1		D1
C _{rss}			30	pl	[2:54] -	±_	G2		D2
T _{d(on)}			3	n	~	T	S		S
\mathbf{T}_{on}	V_{GS} = 15 V, V_{DS} = 0.8 V_{DSS} I _D = 0.5 I _{DM}		2	n	S	0.130 [3.30]		— 1.450 [36.83]	
$\mathbf{T}_{d(off)}$	$R_G = 0.2 \Omega$ (External)		4	n	S				
T _{off}			5	n	S	0.125 [3.18]			
Q _{g(on)}			50	nC)	ľ_		<u> </u>	
\mathbf{Q}_{gs}	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS} I _D = 0.5 I _{D25}		20	nC	2	t			
\mathbf{Q}_{gd}			30	nC	2				

Source-Drain Diode

Symbol

Characteristic Values

(T_J = 25°C unless otherwise specified)

Symbol	Test Conditions	min.	typ.	max.	
l _S	V_{GS} = 0 V			6	Α
SM	Repetitive; pulse width limited by $T_{\mbox{\scriptsize JM}}$			48	Α
V _{SD}	$\label{eq:lse} \begin{array}{l} I_{F} = I_{S}, V_{\mathrm{GS}} = 0 \; V, \\ Pulse test, t \leq 300 \; \mu s, duty cycle \leq 2\% \end{array}$			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		Α

(1) These parameters apply to the package, not individual MOSFET devices.

For detailed device mounting and installation instructions, see the "*DE-Series MOSFET Mounting Instructions*" technical note on DEI's web site at www.directedenergy.com/apptech.htm

www.DataSheet4U.com

Directed Energy, Inc. reserves the right to change limits, test conditions and dimensions. DEI MOSFETS are covered by one or more of the following U.S. patents:

4,835,592	4,850,072	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				

0.130 [3.30]

0.049 [0.15] 0.049 [1.24]

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102N06A DE-SERIES SPICE Model

The DE-SERIES SPICE Model is illustrated in Figure 1. 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.

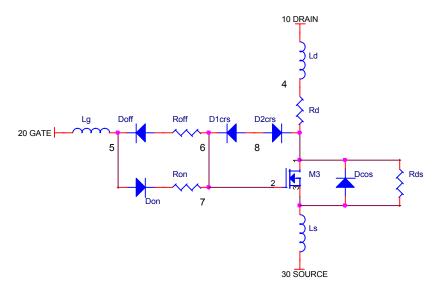


Figure 1 DE-SERIES SPICE Model

This SPICE model may be downloaded as a text file from the DEI web site at www.directedenergy.com/spice.htm

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Net List:
*SYM=POWMOSN
.SUBCKT 102N06A 10 20 30
   TERMINALS: D G S
* 1000 Volt 6 Amp 2.0 Ohm N-Channel Power MOSFET
M1 1 2 3 3 DMOS L=1U W=1U
RON 56.5
DON 62 D1
ROF 57 1.0
DOF 27 D1
D1CRS 2 8 D2
D2CRS 1 8 D2
CGS 23 1.9N
RD 41 1.7
DCOS 3 1 D3
RDS 1 3 5.0MEG
LS 3 30 .5N
                                                                     Doc #9200-0224 Rev 2
LD 104 1N
                                                                     © 2001 Directed Energy, Inc.
LG 205 1N
.MODEL DMOS NMOS (LEVEL=3 VTO=4 KP=2.3)
.MODEL D1 D (IS=.5F CJO=10P BV=100 M=.5 VJ=.2 TT=1N)
.MODEL D2 D (IS=.5F CJO=400P BV=1000 M=.6 VJ=.6 TT=1N RS=10M)
                                                                     Directed Energy, Inc.
.MODEL D3 D (IS=.5F CJO=400P BV=1000 M=.35 VJ=.6 TT=400N RS=10M)
                                                                     An 🛄 IXYS Company
.ENDS
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