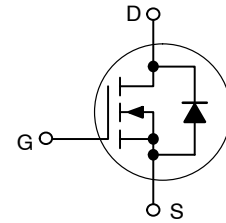


### Features

- $V_{DS(V)} = 30V$
- $I_D = 11.6 A (V_{GS} = 10V)$
- $R_{DS(ON)} < 9 m\Omega (V_{GS}=10V)$
- $R_{DS(ON)} < 12 m\Omega (V_{GS}=4.5V)$
- Low  $R_{DS(on)}$  to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Optimized Gate Charge to Minimize Switching Losses
- Optimized for 5 V, 12 V Gate Drives
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant



N-Channel

### MAXIMUM RATINGS ( $T_J = 25^\circ C$ unless otherwise stated)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			$V_{DSS}$	30	V
Gate-to-Source Voltage			$V_{GS}$	$\pm 20$	V
Continuous Drain Current $R_{\theta JA}$ (Note 1)	Steady State	$T_A = 25^\circ C$	$I_D$	9.4	A
		$T_A = 70^\circ C$		7.5	
Power Dissipation $R_{\theta JA}$ (Note 1)	Steady State	$T_A = 25^\circ C$	$P_D$	1.30	W
Continuous Drain Current $R_{\theta JA}$ (Note 2)	Steady State	$T_A = 25^\circ C$	$I_D$	7.8	A
		$T_A = 70^\circ C$		6.2	
Power Dissipation $R_{\theta JA}$ (Note 2)		$T_A = 25^\circ C$	$P_D$	0.89	W
Continuous Drain Current $R_{\theta JA}$ , $t \leq 10 s$ (Note 1)	Steady State	$T_A = 25^\circ C$	$I_D$	11.6	A
		$T_A = 70^\circ C$		9.3	
Power Dissipation $R_{\theta JA}$ , $t \leq 10 s$ (Note 1)	Steady State	$T_A = 25^\circ C$	$P_D$	1.98	W
Pulsed Drain Current	$T_A = 25^\circ C, t_p = 10 \mu s$		$I_{DM}$	145	A
Operating Junction and Storage Temperature			$T_J, T_{stg}$	-55 to 150	$^\circ C$
Source Current (Body Diode)			$I_S$	2.5	A
Single Pulse Drain-to-Source Avalanche Energy ( $T_J = 25^\circ C, V_{DD} = 30 V, V_{GS} = 10 V, I_L = 9 A_{pk}, L = 1.0 mH, R_G = 25 \Omega$ )			$E_{AS}$	40.5	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			$T_L$	260	$^\circ C$

### THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	96	$^\circ C/W$
Junction-to-Ambient – $t \leq 10 s$ (Note 1)	$R_{\theta JA}$	63	
Junction-to-Foot (Drain)	$R_{\theta JF}$	24.5	
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	141	

**ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit	
<b>OFF CHARACTERISTICS</b>							
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	30			V	
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			16		mV/°C	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0\text{ V}, V_{DS} = 30\text{ V}$	$T_J = 25^\circ\text{C}$		1.0	$\mu\text{A}$	
			$T_J = 125^\circ\text{C}$		10		
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA	
<b>ON CHARACTERISTICS</b> (Note 3)							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	1.1	1.2	2.5	V	
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			5		mV/°C	
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 12\text{ A}$		6.75	9	m $\Omega$	
		$V_{GS} = 4.5\text{ V}, I_D = 10\text{ A}$		9.0	12		
Forward Transconductance	$g_{FS}$	$V_{DS} = 1.5\text{ V}, I_D = 7.5\text{ A}$		23		S	
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>							
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 25\text{ V}$		1376		pF	
Output Capacitance	$C_{oss}$			401			
Reverse Transfer Capacitance	$C_{rss}$			205			
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V}, I_D = 7.5\text{ A}$		15		nC	
Threshold Gate Charge	$Q_{G(TH)}$			2.44			
Gate-to-Source Charge	$Q_{GS}$			4			
Gate-to-Drain Charge	$Q_{GD}$			6.5			
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V}, I_D = 7.5\text{ A}$		28		nC	
<b>SWITCHING CHARACTERISTICS</b> (Note 4)							
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V}, I_D = 1.0\text{ A}, R_G = 6.0\ \Omega$		9.4		ns	
Rise Time	$t_r$			7.4			
Turn-Off Delay Time	$t_{d(off)}$			32			
Fall Time	$t_f$			15.6			
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>							
Forward Diode Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = 2.0\text{ A}$	$T_J = 25^\circ\text{C}$		0.740	1.0	V
			$T_J = 125^\circ\text{C}$		0.570		
Reverse Recovery Time	$t_{RR}$	$V_{GS} = 0\text{ V}, dI_S/dt = 100\text{ A}/\mu\text{s}, I_S = 2.0\text{ A}$		30.7		ns	
Charge Time	$t_a$			14.3			
Discharge Time	$t_b$			16.4			
Reverse Recovery Charge	$Q_{RR}$			20			nC
<b>PACKAGE PARASITIC VALUES</b>							
Source Inductance	$L_S$	$T_A = 25^\circ\text{C}$		0.66		nH	
Drain Inductance	$L_D$			0.2			
Gate Inductance	$L_G$			1.5			
Gate Resistance	$R_G$			0.77			$\Omega$

TYPICAL PERFORMANCE CURVES

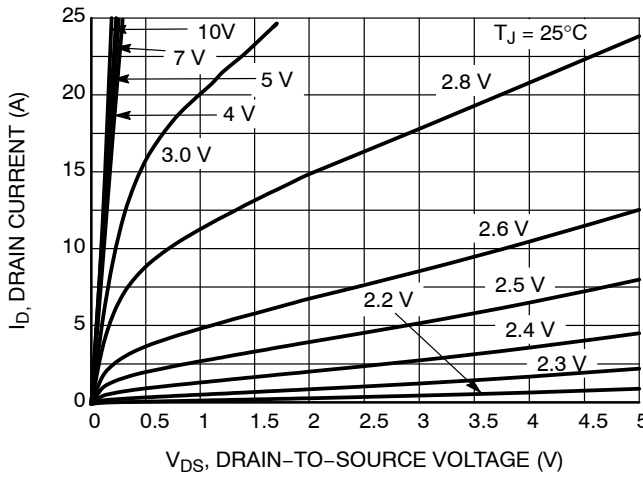


Figure 1. On-Region Characteristics

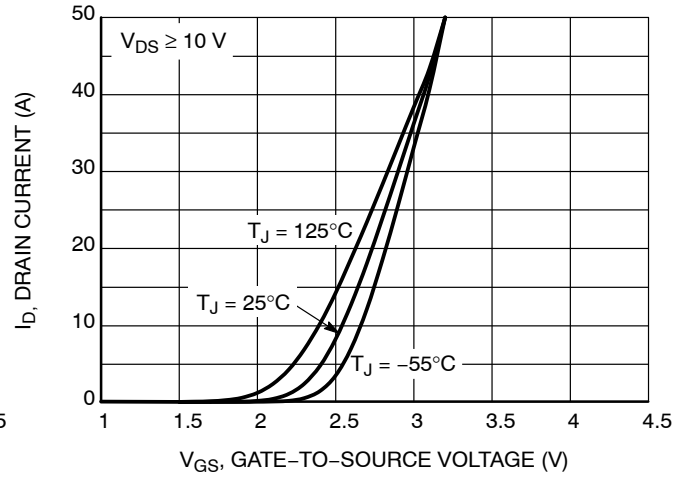


Figure 2. Transfer Characteristics

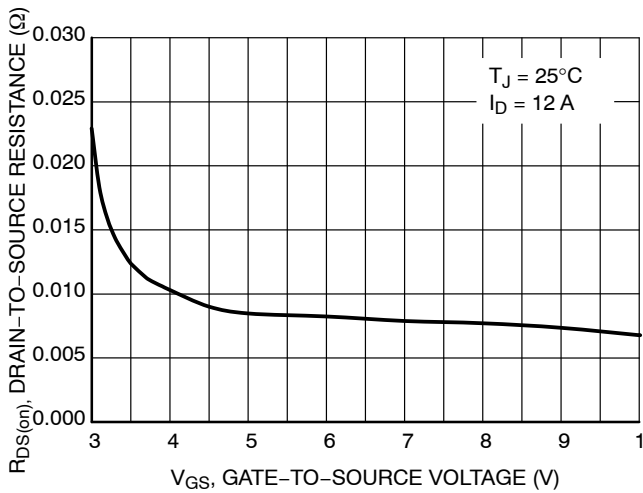


Figure 3. On-Resistance vs. Gate-to-Source Voltage

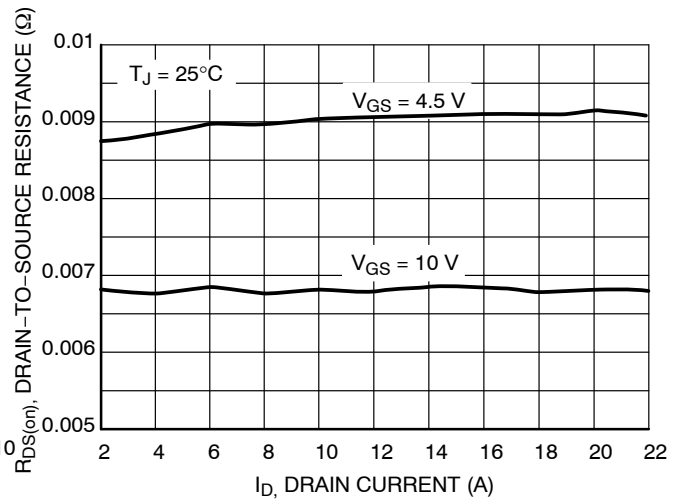


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

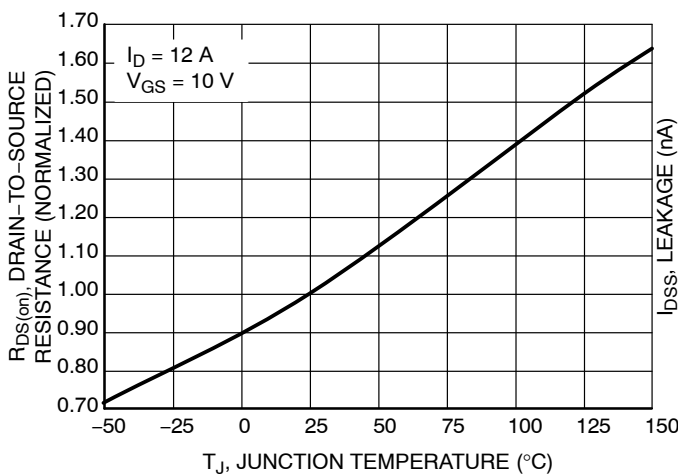


Figure 5. On-Resistance Variation with Temperature

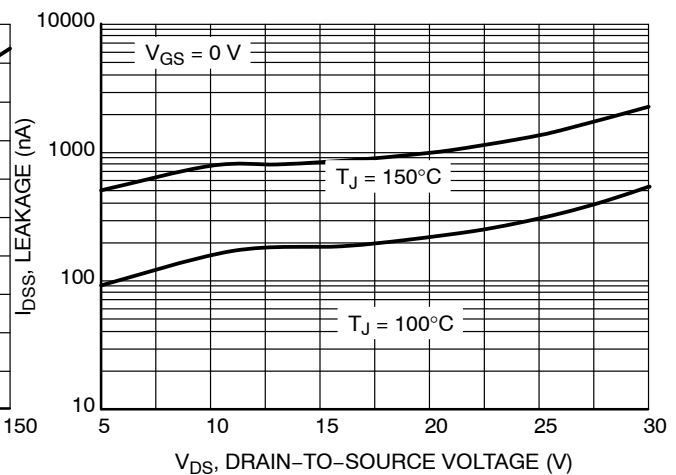


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES

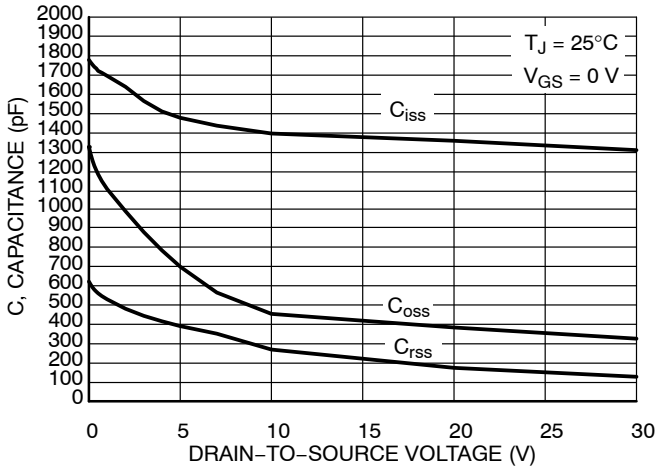


Figure 7. Capacitance Variation

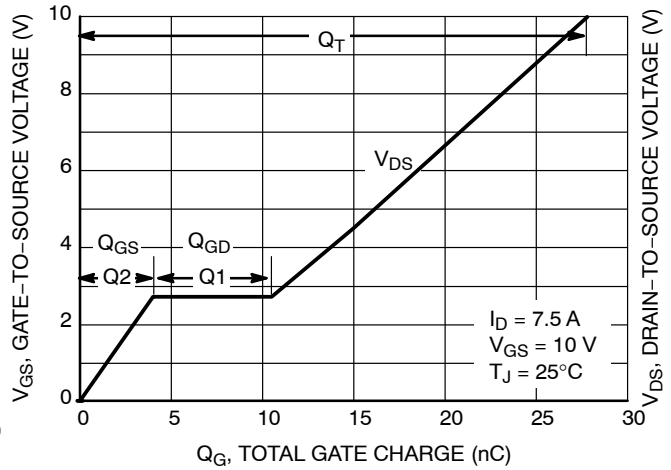


Figure 8. Gate-To-Source and Drain-To-Source Voltage vs. Total Charge

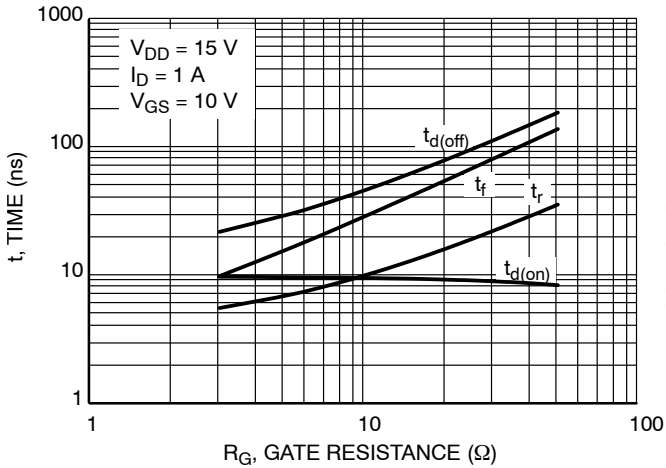


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

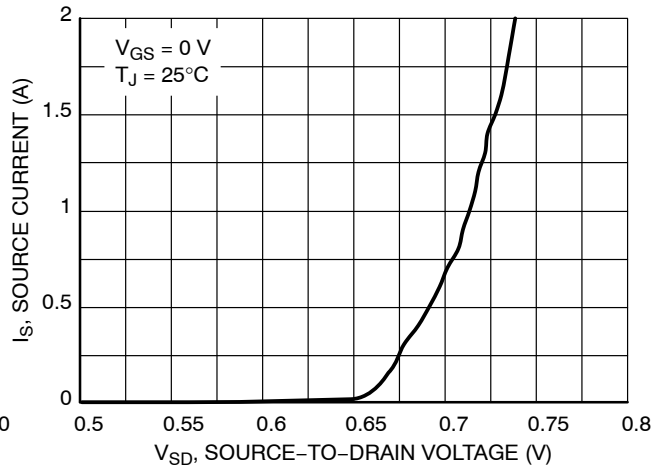


Figure 10. Diode Forward Voltage vs. Current

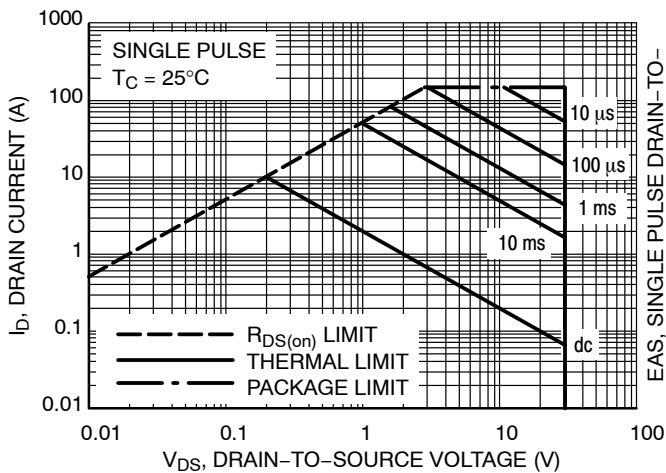


Figure 11. Maximum Rated Forward Biased Safe Operating Area

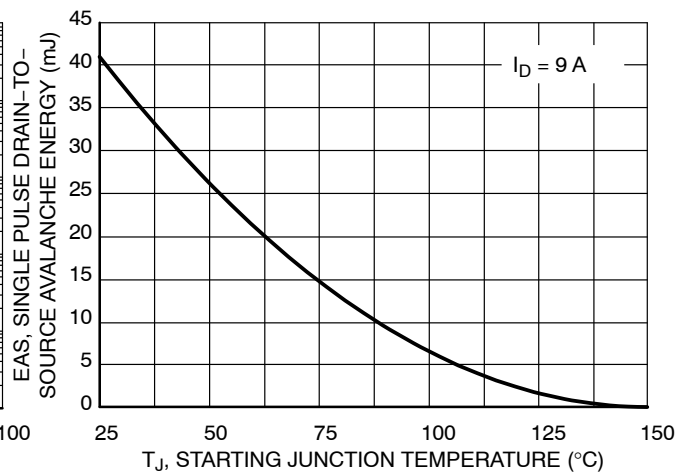
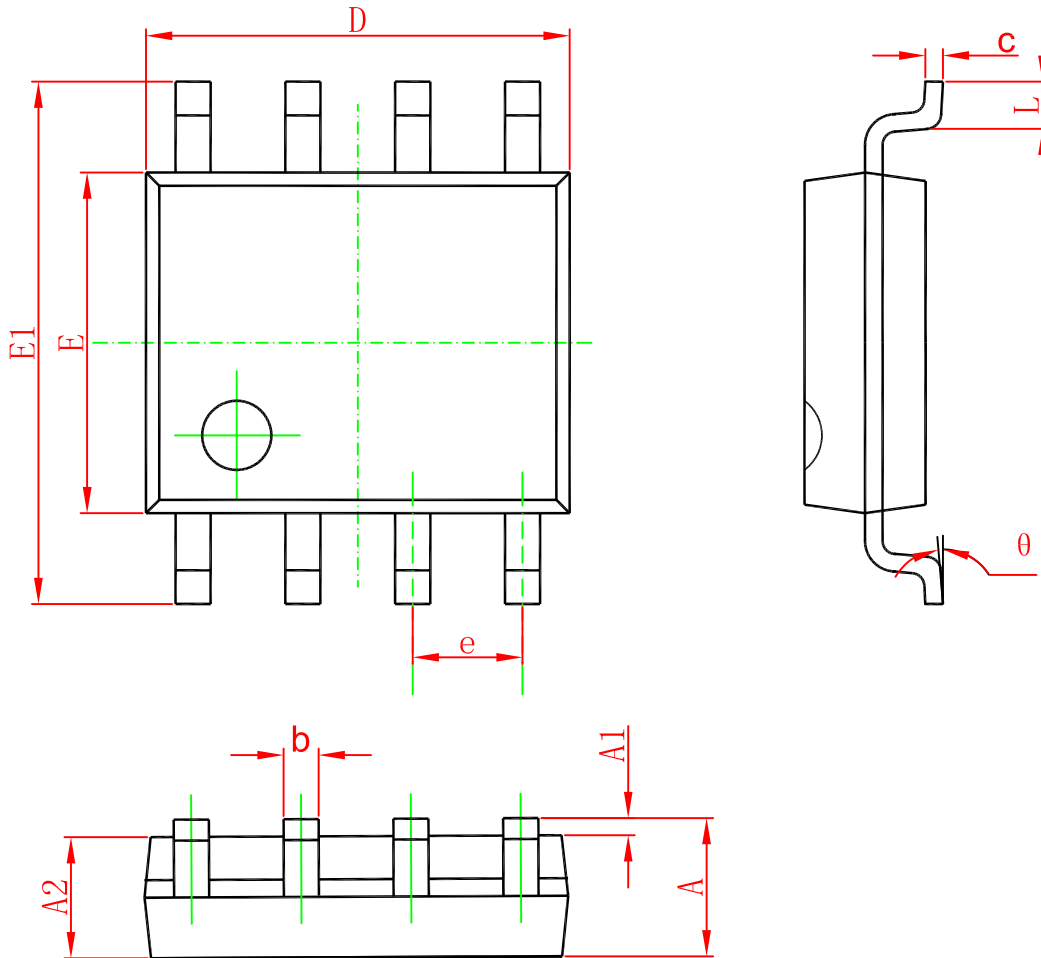


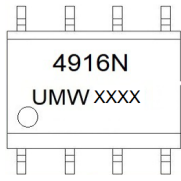
Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

Package Mechanical Data SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
theta	0°	8°	0°	8°

**Marking**



**Ordering information**

Order code	Package	Baseqty	Deliverymode
UMW NTMS4916NR2G	SOP-8	3000	Tape and reel