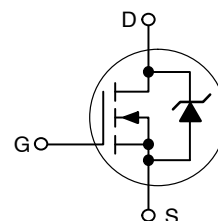


Features

- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Optimized Gate Charge to Minimize Switching Losses

Applications

- Disk Drives
- DC – DC Converters
- Printers
- $V_{DS(V)} = 30V$
- $I_D = 11A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 10m\Omega$ ($V_{GS}=10V$)
- $R_{DS(ON)} < 16 m\Omega$ ($V_{GS}=4.5V$)



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}	±20	V
Continuous Drain Current R _{θJA} (Note 1)	Steady State	T _A = 25°C	I _D	9.0	A
		T _A = 70°C		7.2	
Power Dissipation R _{θJA} (Note 1)	Steady State	T _A = 25°C	P _D	1.37	W
Continuous Drain Current R _{θJA} (Note 2)	Steady State	T _A = 25°C	I _D	6.8	A
		T _A = 70°C		5.4	
Power Dissipation R _{θJA} (Note 2)		T _A = 25°C	P _D	0.78	W
Continuous Drain Current R _{θJA} , t ≤ 10 s (Note 1)	Steady State	T _A = 25°C	I _D	11	A
		T _A = 70°C		8.8	
Power Dissipation R _{θJA} , t ≤ 10 s (Note 1)	Steady State	T _A = 25°C	P _D	2.04	W
Pulsed Drain Current	T _A = 25°C, t _p = 10 μs		I _{DM}	33	A
Operating Junction and Storage Temperature			T _J , T _{stg}	−55 to 150	°C
Source Current (Body Diode)			I _S	2.7	A
Single Pulse Drain-to-Source Avalanche Energy (T _J = 25°C, V _{DD} = 30 V, V _{GS} = 10 V, I _L = 12.5 A _{pk} , L = 1.0 mH, R _G = 25 Ω)			E _{AS}	78	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T _L	260	°C

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	91.5	$^\circ C/W$
Junction-to-Ambient – $t \leq 10$ s (Note 1)	$R_{\theta JA}$	61.3	
Junction-to-Foot (Drain)	$R_{\theta JF}$	22.5	
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	159.5	

1. Surfaced mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces).
2. Surfaced mounted on FR4 board using the minimum recommended pad size.

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			26		mV/ $^\circ\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 24\text{ V}$	$T_J = 25^\circ\text{C}$		1.0	μA
			$T_J = 100^\circ\text{C}$		10	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\text{ }\mu\text{A}$	1.5		3.0	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			6.0		mV/ $^\circ\text{C}$
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 9\text{ A}$		8.2	10	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 7.2\text{ A}$		12.7	16	
Forward Transconductance	g_{FS}	$V_{DS} = 1.5\text{ V}, I_D = 9\text{ A}$		26		S
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 25\text{ V}$		1060		pF
Output Capacitance	C_{oss}			220		
Reverse Transfer Capacitance	C_{rss}			126		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V}, I_D = 9\text{ A}$		9.2		nC
Threshold Gate Charge	$Q_{G(TH)}$			2.4		
Gate-to-Source Charge	Q_{GS}			4.4		
Gate-to-Drain Charge	Q_{GD}			3.8		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V}, I_D = 9\text{ A}$		18.3		nC
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V}, I_D = 1.0\text{ A}, R_G = 6.0\text{ }\Omega$		8.0		ns
Rise Time	t_r			3.8		
Turn-Off Delay Time	$t_{d(off)}$			21.6		
Fall Time	t_f			8.0		
Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 2.7\text{ A}$	$T_J = 25^\circ\text{C}$	0.75	1.0	V
			$T_J = 125^\circ\text{C}$	0.55		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, dI_S/dt = 100\text{ A}/\mu\text{s}, I_S = 2.7\text{ A}$		20		ns
Charge Time	t_a			9.0		
Discharge Time	t_b			11		
Reverse Recovery Charge	Q_{RR}			9.0		nC
Source Inductance	L_S	$T_A = 25^\circ\text{C}$		0.66		nH
Drain Inductance	L_D	$T_A = 25^\circ\text{C}$		0.20		nH
Gate Inductance	L_G	$T_A = 25^\circ\text{C}$		1.5		nH
Gate Resistance	R_G	$T_A = 25^\circ\text{C}$		1.5	2.3	Ω

3. Pulse Test: pulse width = 300 μs , duty cycle $\leq 2\%$.

4. Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES

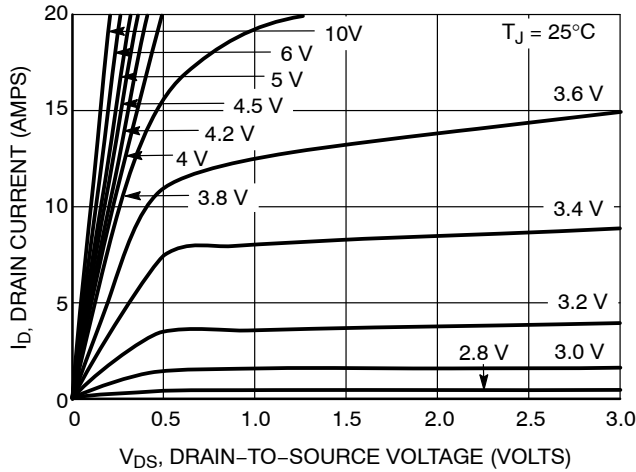


Figure 1. On-Region Characteristics

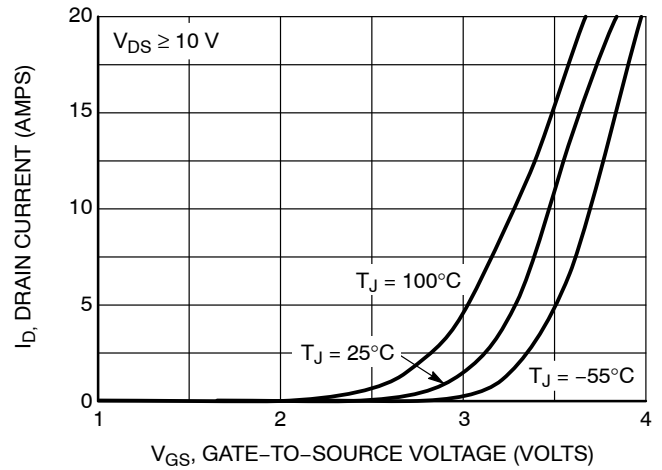


Figure 2. Transfer Characteristics

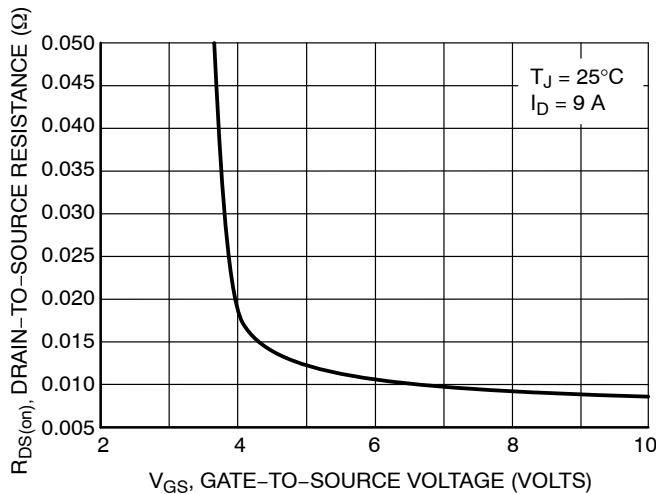


Figure 3. On-Resistance vs. Gate-to-Source Voltage

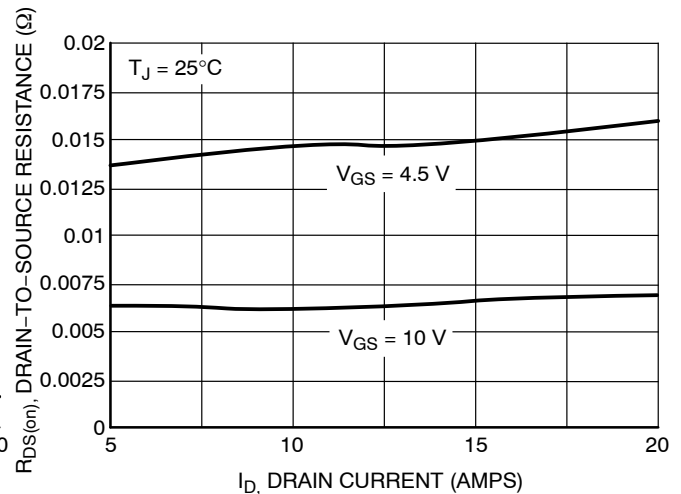


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

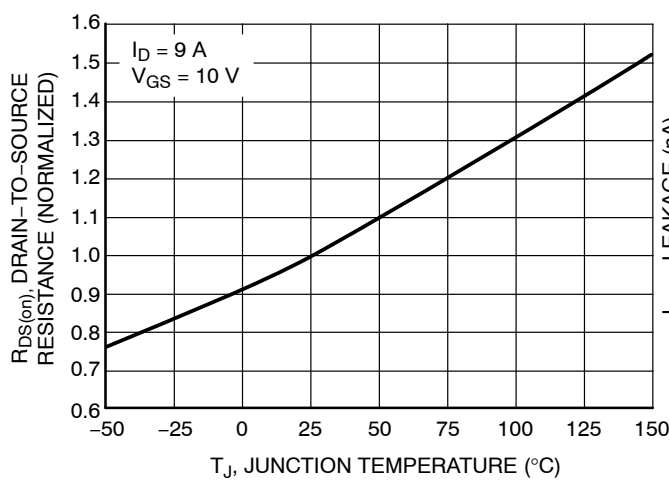


Figure 5. On-Resistance Variation with Temperature

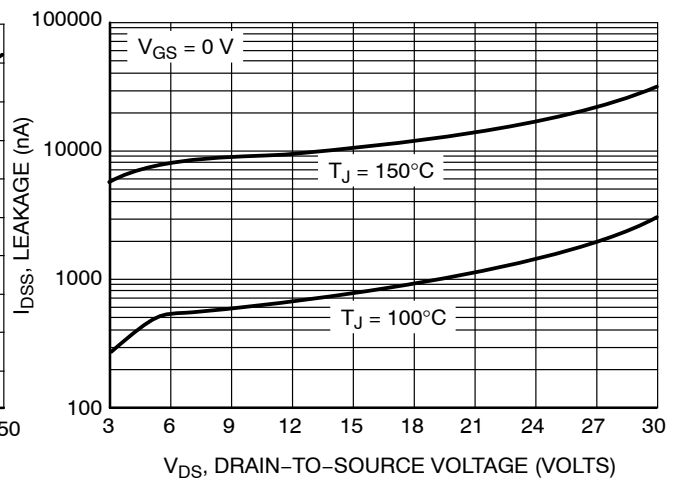


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES

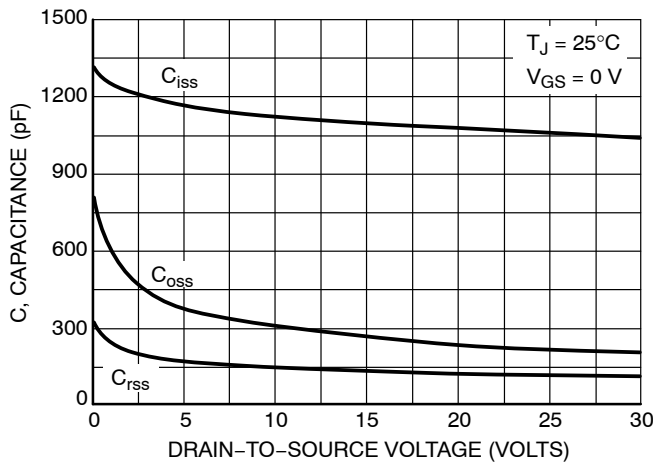


Figure 7. Capacitance Variation

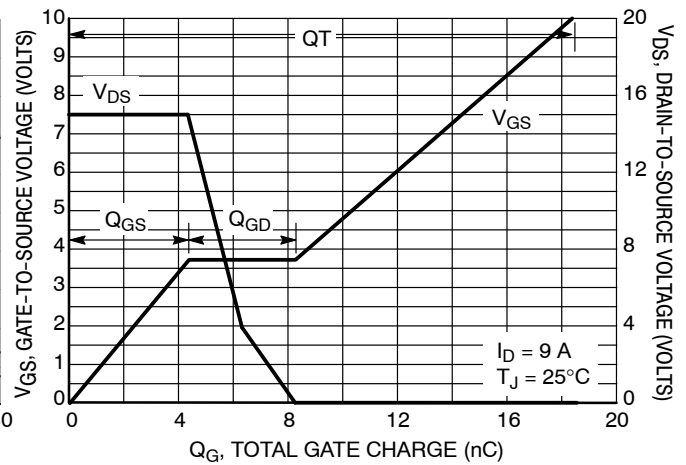


Figure 8. Gate-To-Source and Drain-To-Source Voltage vs. Total Charge

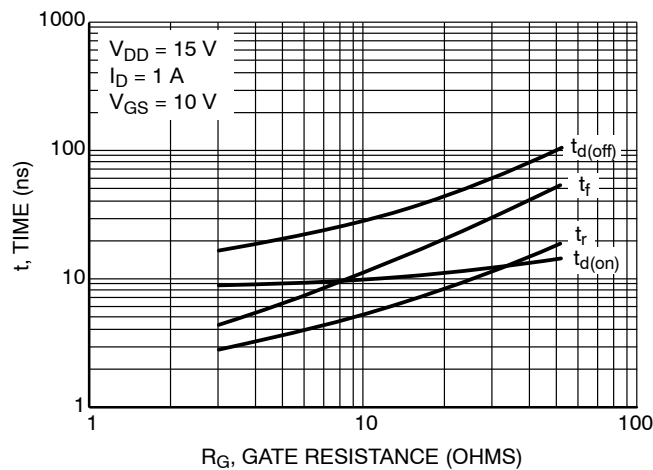


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

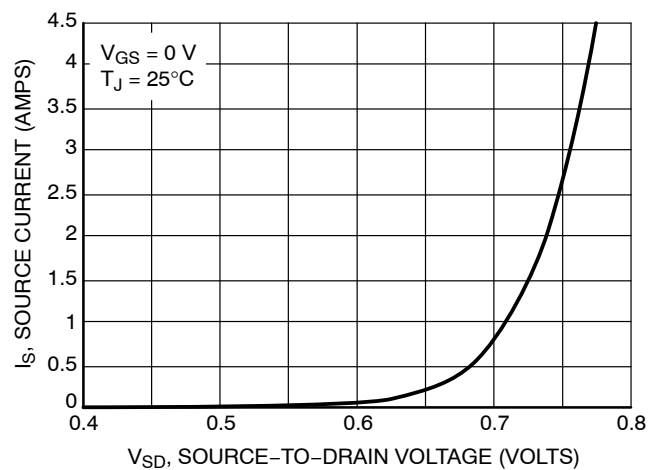


Figure 10. Diode Forward Voltage vs. Current

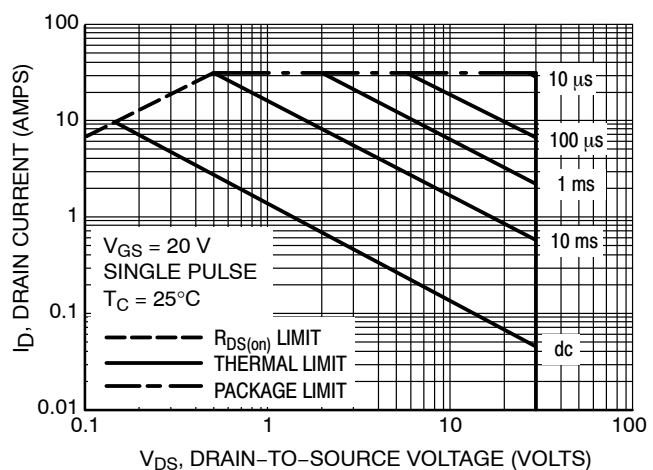


Figure 11. Maximum Rated Forward Biased Safe Operating Area

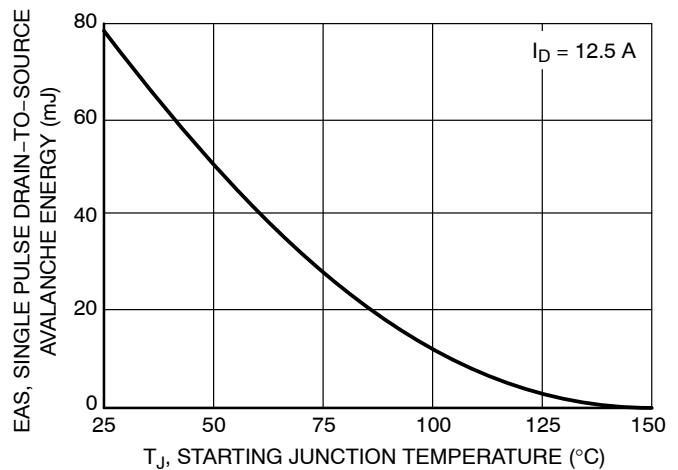
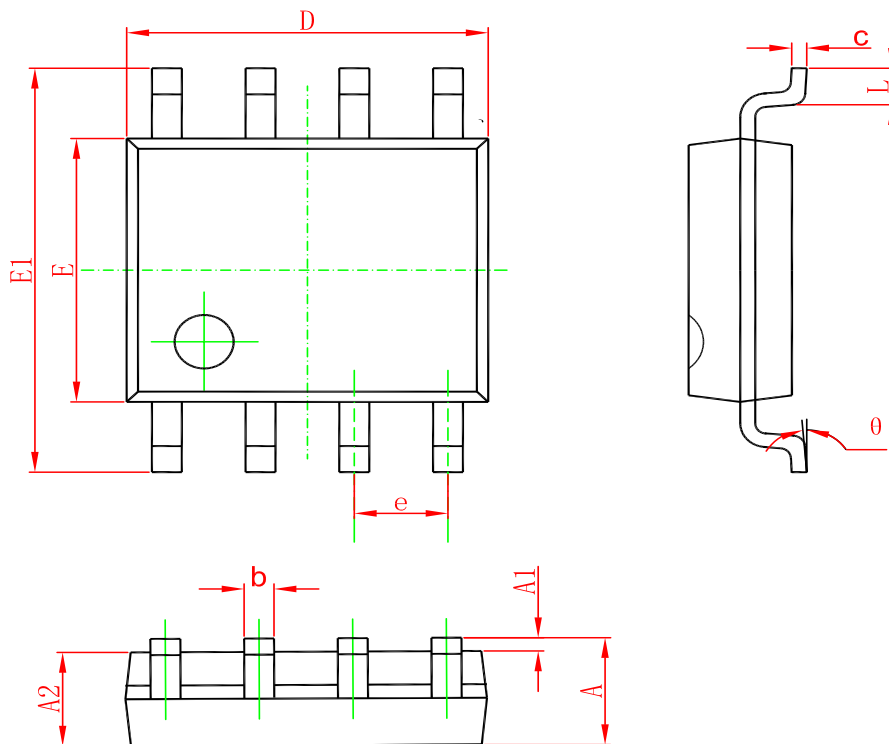


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

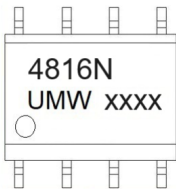
PACKAGE OUTLINE DIMENSIONS

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
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW NTMS4816NR2G	SOP-8	3000	Tape and reel