NTLMS4507N

Power MOSFET

30 V, 24 A, N−Channel, SO−8 Leadless Package

Features and Benefits

- Fast Switching Performance
- Low t_{RR} and Q_{RR} Optimized for Synchronous Operation
- Low $R_{DS(on)}$ to Minimize Conduction Loss
- Optimized FOM (Q_{GD} x $R_{DS(on)}$)
- Low Gate Charge to Minimize Switching Losses

Applications

- Server and Notebook Power Supplies
- DC−DC Converters

MAXIMUM RATINGS (T_J = 25°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 (Note 1)	Steady State	T_A = 25°C	I_D	15.7	A
		T_A = 85°C		11.3	
	t ≤ 10 s	T_A = 25°C		24	
Power Dissipation (Note 1)	Steady State	T_A = 25°C	P_D	2.4	W
	t ≤10 s			5.7	
Continuous Drain Current (Note 2)	Steady State	T_A = 25°C	I_D	11	A
		T_A = 85°C		8.0	
Power Dissipation (Note 2)	Steady State	T_A = 25°C	P_D	1.2	W
Pulsed Drain Current (Note 1)	t_p = 10 μs		I_{DM}	47	A
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to 150	°C
Source Current (Body Diode)			I_S	15.7	A
Lead Temperature for Soldering Purposes (1/8 in from case for 10 s)			T_L	260	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction−to−Ambient – Steady State (Note 1)	$R_{\theta JA}$	52	°C/W
Junction−to−Ambient – t ≤ 10 s (Note 1)	$R_{\theta JA}$	22	°C/W
Junction−to−Ambient – Steady State (Note 2)	$R_{\theta JA}$	105	°C/W

1. Surface−mounted on FR4 board using 1 sq. in. pad size (Cu. area = 1.127 sq. in. [1 oz] including traces).
2. Surface−mounted on FR4 board using minimum recommended pad size (Cu. area = 0.0821 sq. in.).

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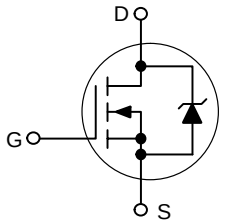
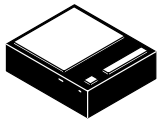
$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D MAX
30 V	5.5 mΩ @ 10 V	24 A
	7.8 mΩ @ 4.5 V	





SO−8 Leadless
CASE 751AD

MARKING DIAGRAM

XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping†
NTLMS4507NR2	SO−8 Leadless	2500/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

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ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 μA		30	33		V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$				25		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 24 V	T_A = 25°C			0.8	μA
			T_A = 125°C			10	
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V				±100	nA
ON CHARACTERISTICS (Note 3)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250 μA		1.0	1.7	2.0	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$				−4.0		mV/°C
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 15.7 A			5.5	5.8	mΩ
		V_{GS} = 4.5 V, I_D = 9.0 A			7.8	9.0	
Forward Transconductance	g_{FS}	V_{DS} = 10 V, I_D = 15.7 A			80		S
CHARGES AND CAPACITANCES							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 20 V			2800	2950	pF
Output Capacitance	C_{OSS}				890	1200	
Reverse Transfer Capacitance	C_{RSS}				276	400	
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 15 V, I_D = 15.7 A			23	25	nC
Gate−to−Source Gate Charge	Q_{GS}				6.8		
Gate−to−Drain “Miller” Charge	Q_{GD}				9.8		
SWITCHING CHARACTERISTICS (Note 4)							
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = 10 V, V_{DS} = 15 V, I_D = 15.7 A, R_G = 2.5 Ω			16	18	ns
Rise Time	t_r				98	109	
Turn−Off Delay Time	$t_{d(OFF)}$				26	30	
Fall Time	t_f				16	25	
DRAIN−SOURCE DIODE CHARACTERISTICS (Note 3)							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 10 A	T_A = 25°C		0.85	1.2	V
			T_A = 125°C		0.8		
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, dI_S/dt = 100 A/μs, I_S = 15.7 A			24	28	ns
Charge Time	t_a				22		
Discharge Time	t_b				24		
Reverse Recovery Charge	Q_{RR}				0.050		nC

3. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
4. Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES (T_J = 25°C unless otherwise noted)

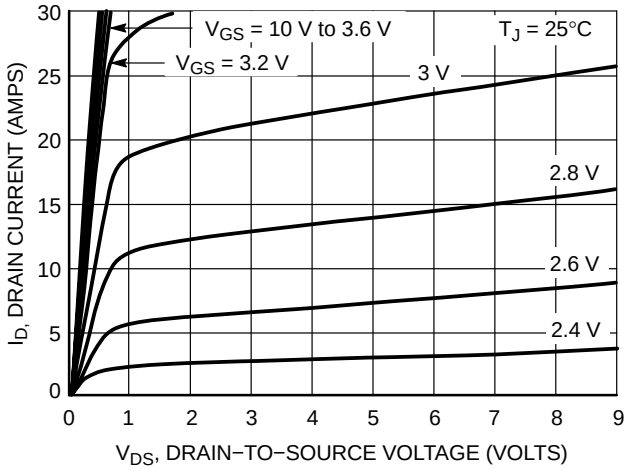


Figure 1. On−Region Characteristics

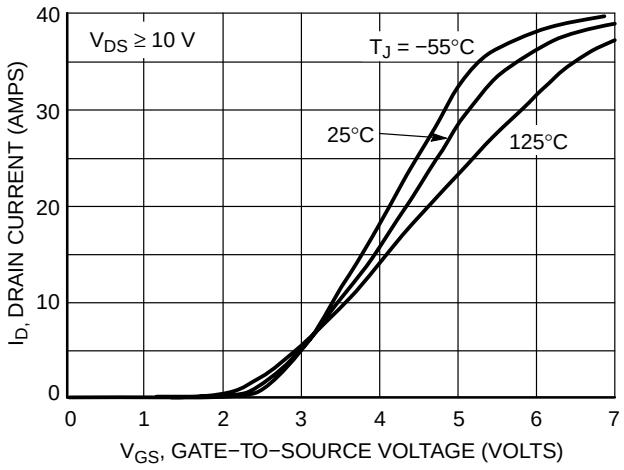


Figure 2. Transfer Characteristics

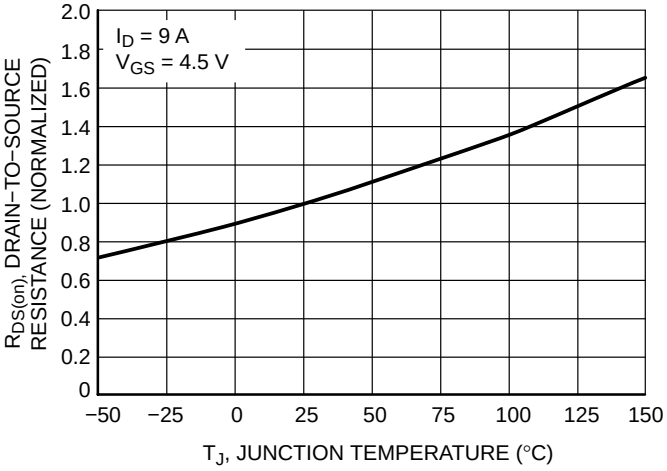


Figure 3. On−Resistance Variation with Temperature

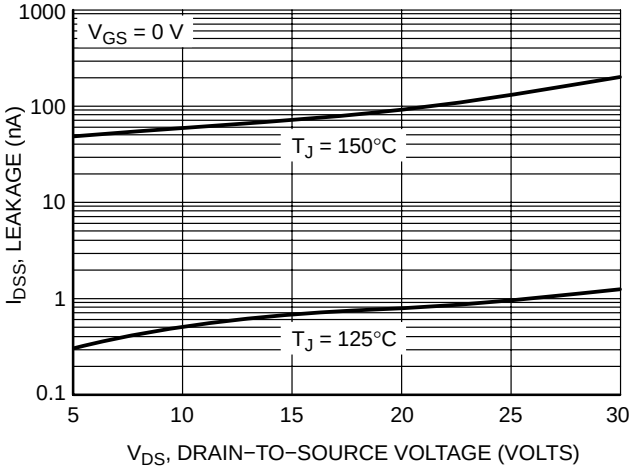


Figure 4. Drain−to−Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES (T_J = 25°C unless otherwise noted)

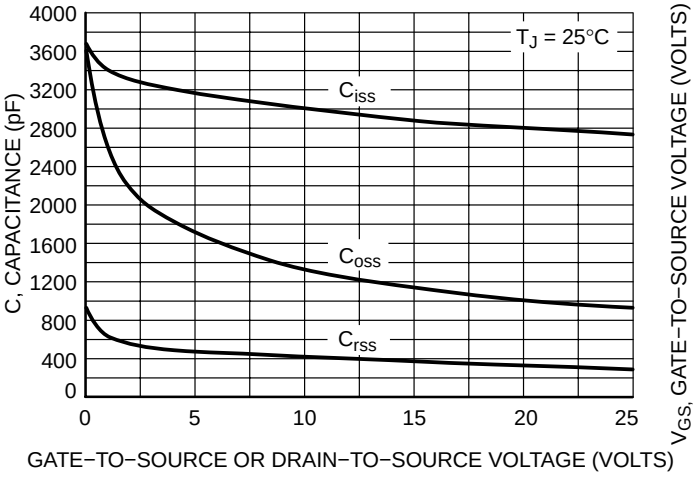


Figure 5. Capacitance Variation

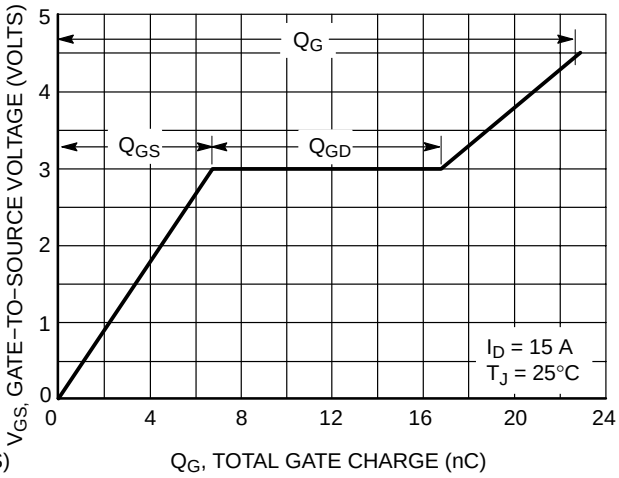


Figure 6. Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

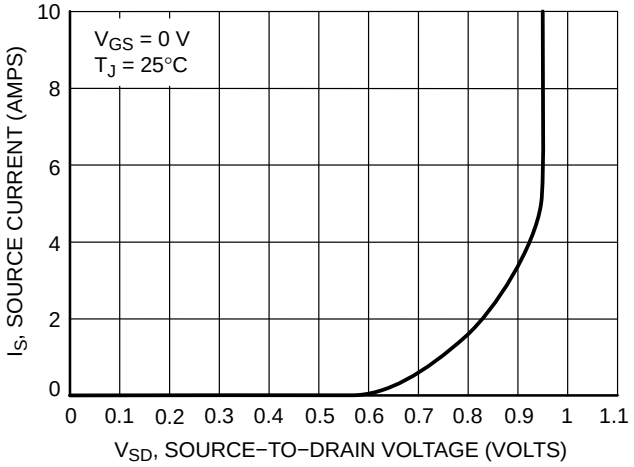


Figure 7. Diode Forward Voltage vs. Current

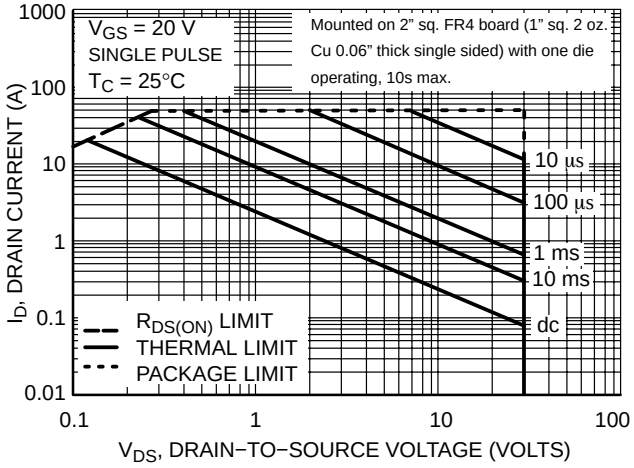
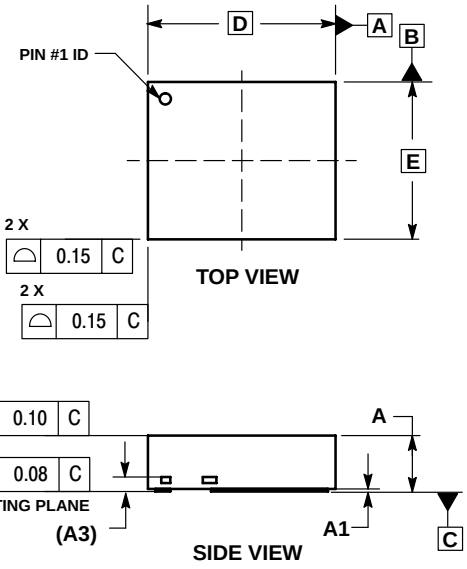
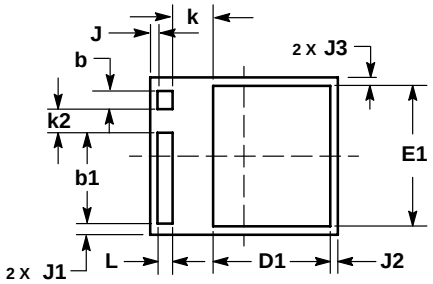


Figure 8. Maximum Rated Forward Biased Safe Operating Area

PACKAGE DIMENSIONS

SO−8 Leadless
CASE 751AD−01
ISSUE O





NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.

	MILLIMETERS	
DIM	MIN	MAX
A	1.750	1.950
A1	0.000	0.050
A3	0.254 REF	
b	0.400	0.600
b1	2.930	3.030
D	6.200 BSC	
D1	3.777	3.977
E	5.200 BSC	
E1	4.544	4.744
J	0.027	0.227
J1	0.350	0.550
J2	0.154	0.354
J3	0.178	0.378
k	1.246	1.446
k2	0.680	0.880
L	0.500	0.700

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