

# Small Signal MOSFET

25 V, 0.75 A, Single, N-Channel,  
ESD Protection, SC-70/SOT-323

## Features

- Advance Planar Technology for Fast Switching, Low  $R_{DS(on)}$
- Higher Efficiency Extending Battery Life
- This is a Pb-Free Device
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

## Applications

- Boost and Buck Converter
- Load Switch
- Battery Protection

## MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating		Symbol	Value	Unit
Drain-to-Source Voltage		$V_{DSS}$	25	V
Gate-to-Source Voltage		$V_{GS}$	$\pm 8.0$	V
Drain Current	$t < 5\text{ s}$	$I_D$	0.75	A
Continuous Drain Current (Note 1)	Steady State		$T_A = 25^\circ\text{C}$	0.7
		$T_A = 75^\circ\text{C}$	0.6	A
Power Dissipation (Note 1)	Steady State	$P_D$	0.28	W
Power Dissipation (Note 1)	$t \leq 5\text{ s}$	$P_D$	0.33	W
Pulsed Drain Current	$t_p = 10\ \mu\text{s}$	$I_{DM}$	3.0	A
Operating Junction and Storage Temperature		$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$
Source Current (Body Diode) (Note 1)		$I_S$	0.3	A
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		$T_L$	260	$^\circ\text{C}$
ESD Rating – Machine Model			250	V

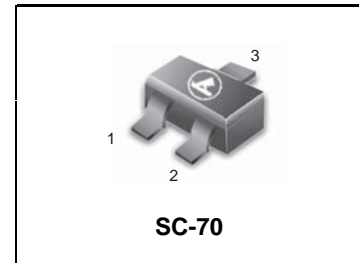
## THERMAL RESISTANCE RATINGS

Rating	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	450	$^\circ\text{C}/\text{W}$
Junction-to-Ambient – $t \leq 5\text{ s}$ (Note 1)	$R_{\theta JA}$	375	$^\circ\text{C}/\text{W}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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

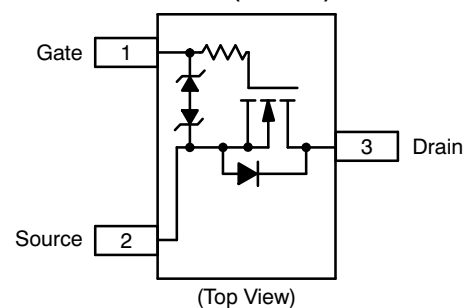
LNTS4409NWT1G  
S-LNTS4409NWT1G



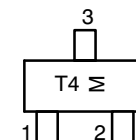
$V_{(BR)DSS}$	$R_{DS(on)}$ Typ	$I_D$ Max
25 V	249 m $\Omega$ @ 4.5 V	0.75 A
	299 m $\Omega$ @ 2.7 V	

## PIN CONNECTIONS

### SC-70 (3-Leads)



## MARKING DIAGRAM



T4 = Specific Device Code  
M = Month Code

Device	Package	Shipping
LNTS4409NWT1G S-LNTS4409NWT1G	SC-70 (Pb-Free)	3000/Tape & Reel

**LNTS4409NWT1G , S-LNTS4409NWT1G**
**ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	25			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			30		mV/ $^\circ\text{C}$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0\text{ V}, V_{DS} = 20\text{ V}$	$T_J = 25^\circ\text{C}$		0.5	$\mu\text{A}$
			$T_J = 70^\circ\text{C}$		2.0	
			$T_J = 125^\circ\text{C}$		5.0	
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = 8.0\text{ V}$			3	$\mu\text{A}$

**ON CHARACTERISTICS** (Note 2)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	0.5		1.5	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			-2.0		mV/ $^\circ\text{C}$
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 0.6\text{ A}$		249	350	m $\Omega$
		$V_{GS} = 2.7\text{ V}, I_D = 0.2\text{ A}$		299	400	
		$V_{GS} = 4.5\text{ V}, I_D = 1.2\text{ A}$		260		
Forward Transconductance	$g_{FS}$	$V_{DS} = 5.0\text{ V}, I_D = 0.5\text{ A}$		0.5		S

**CHARGES AND CAPACITANCES**

Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 10\text{ V}$		49	60	pF
Output Capacitance	$C_{OSS}$			22.4	30	
Reverse Transfer Capacitance	$C_{RSS}$			8.0	12	
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V}, I_D = 0.8\text{ A}$		1.2	1.5	nC
Threshold Gate Charge	$Q_{G(TH)}$			0.2		
Gate-to-Source Charge	$Q_{GS}$			0.28	0.50	
Gate-to-Drain Charge	$Q_{GD}$			0.3	0.40	

**SWITCHING CHARACTERISTICS** (Note 3)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V}, I_D = 0.7\text{ A}, R_G = 51\ \Omega$		5.0	12	ns
Rise Time	$t_r$			8.2	8.0	
Turn-Off Delay Time	$t_{d(OFF)}$			23	35	
Fall Time	$t_f$			41	60	

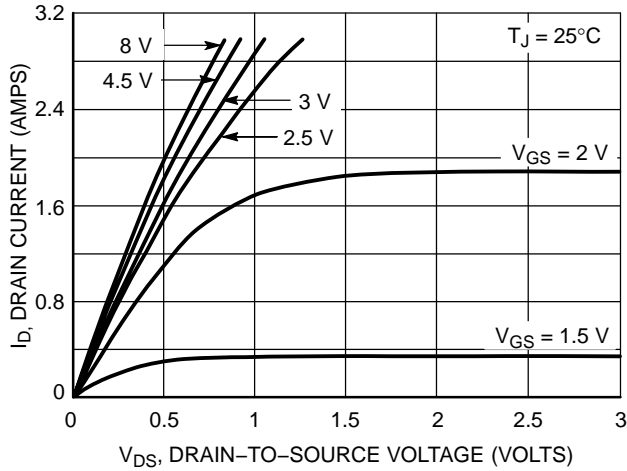
**DRAIN-SOURCE DIODE CHARACTERISTICS**

Forward Diode Voltage	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = 0.6\text{ A}$	$T_J = 25^\circ\text{C}$		0.82	1.20	V
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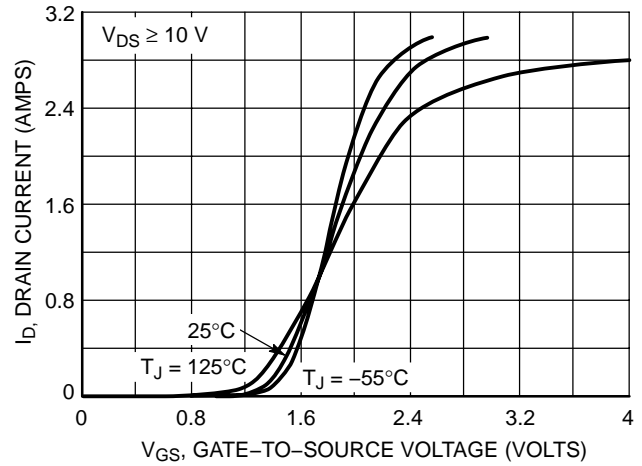
- Pulse Test: pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Switching characteristics are independent of operating junction temperatures.

**LNTS4409NWT1G , S-LNTS4409NWT1G**

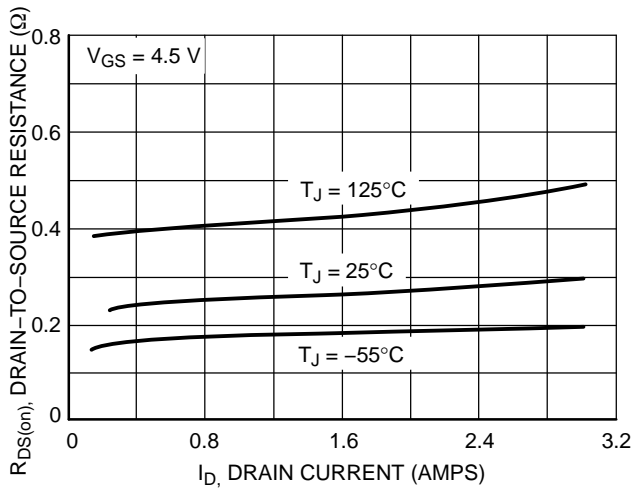
**TYPICAL PERFORMANCE CURVES** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)



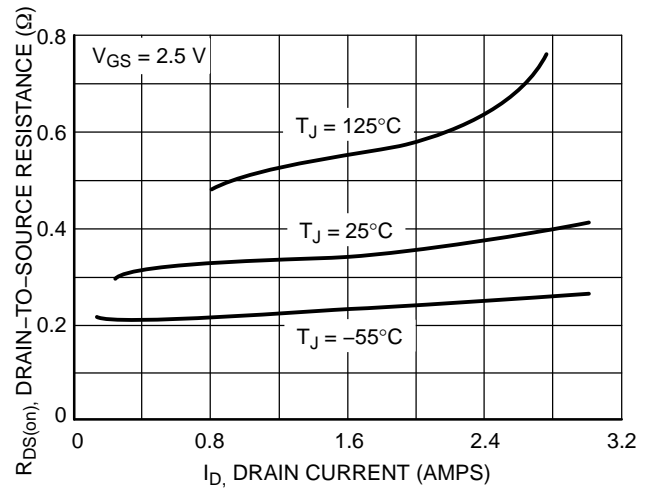
**Figure 1. On-Region Characteristics**



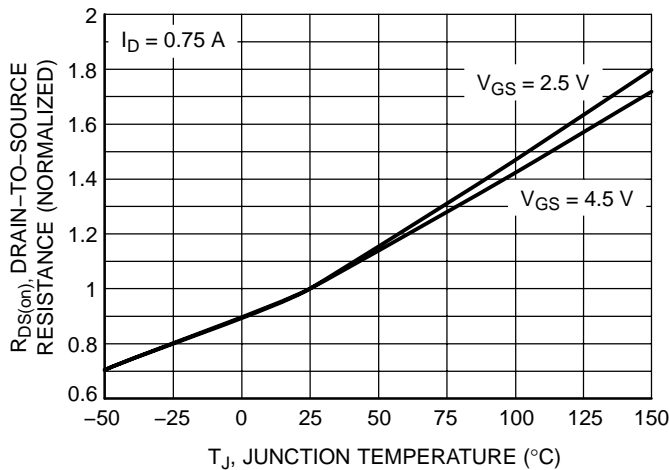
**Figure 2. Transfer Characteristics**



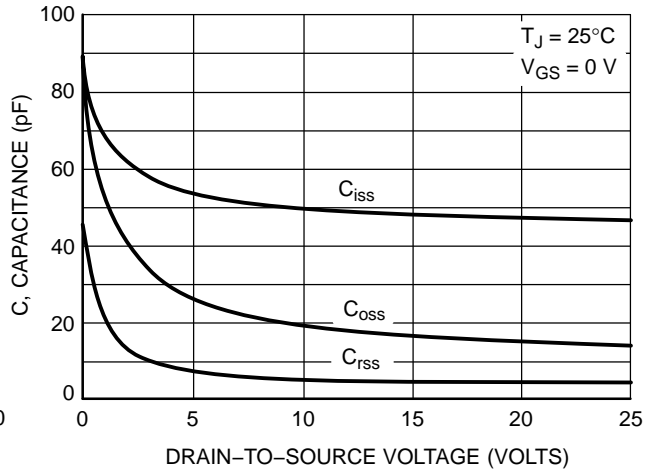
**Figure 3. On-Resistance vs. Drain Current and Temperature**



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



**Figure 5. On-Resistance Variation with Temperature**



**Figure 6. Capacitance Variation**

LNTS4409NWT1G , S-LNTS4409NWT1G

TYPICAL PERFORMANCE CURVES ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

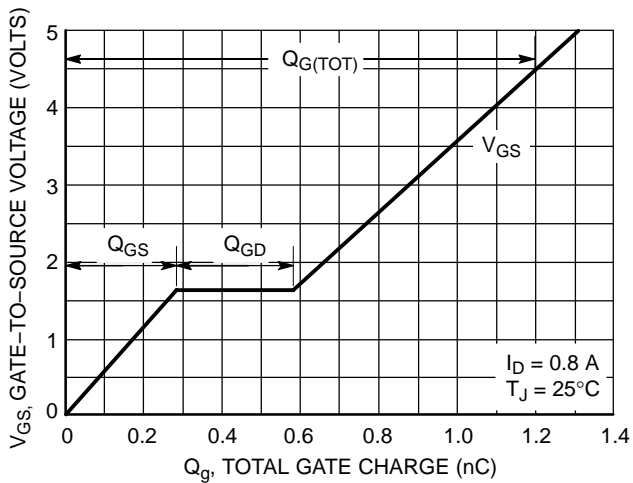


Figure 7. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

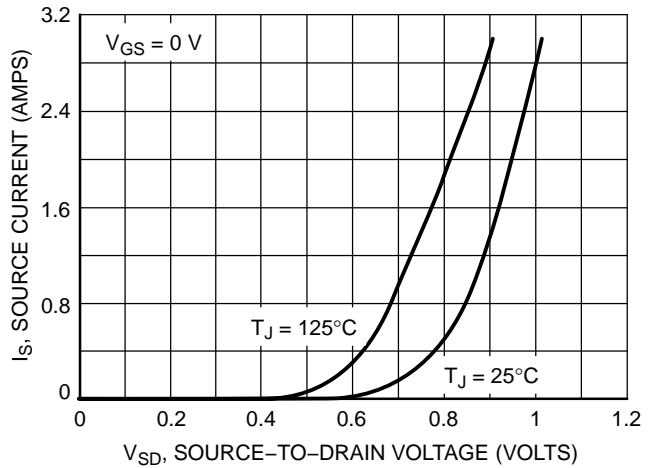
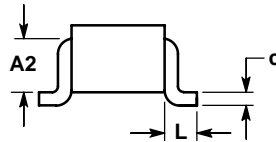
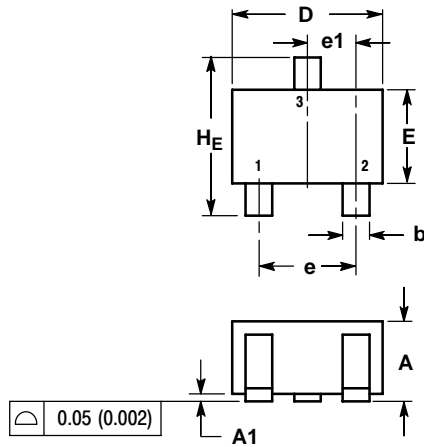


Figure 8. Diode Forward Voltage vs. Current

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PACKAGE DIMENSIONS

SC-70 (SOT-323)

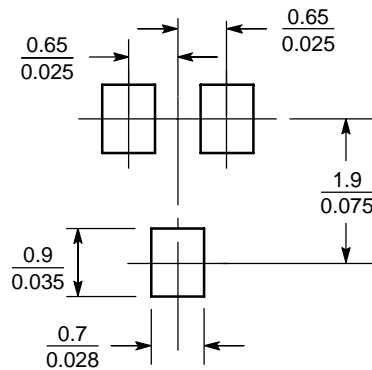


- NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.90	1.00	0.032	0.035	0.040
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	0.7 REF			0.028 REF		
b	0.30	0.35	0.40	0.012	0.014	0.016
c	0.10	0.18	0.25	0.004	0.007	0.010
D	1.80	2.10	2.20	0.071	0.083	0.087
E	1.15	1.24	1.35	0.045	0.049	0.053
e	1.20	1.30	1.40	0.047	0.051	0.055
e1	0.65 BSC			0.026 BSC		
L	0.425 REF			0.017 REF		
HE	2.00	2.10	2.40	0.079	0.083	0.095

- STYLE 8:  
 PIN 1. GATE  
 2. SOURCE  
 3. DRAIN

SOLDERING FOOTPRINT\*



单击下面可查看定价，库存，交付和生命周期等信息

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