MOSFET – Single, N-Channel, Small Signal, ESD Protection, SC-70/SOT-323

25 V, 0.75 A

NTS4409N, NVS4409N

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

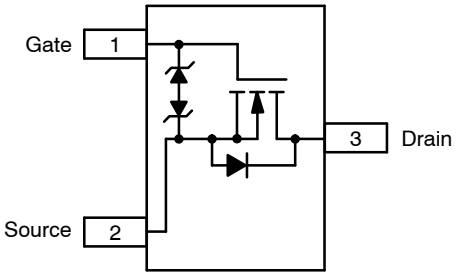
Features

- Advance Planar Technology for Fast Switching, Low $R_{DS(on)}$
- Higher Efficiency Extending Battery Life
- AEC-Q101 Qualified and PPAP Capable – NVS4409N
- These Devices are Pb-Free and are RoHS Compliant

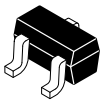
Applications

- Boost and Buck Converter
- Load Switch
- Battery Protection

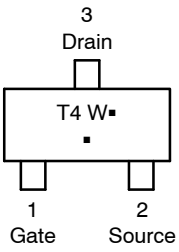
SC-70 (3-Leads)



MARKING DIAGRAM & PIN ASSIGNMENT



SC-70 (SOT-323)
CASE 419
STYLE 8



T4 = Device Code
W = Work Week
▪ = Pb-Free Package
(Note: Microdot may be in either location)

MAXIMUM RATINGS (T_J = 25 °C unless otherwise noted)

Rating			Symbol	Value	Unit
Drain-to-Source Voltage			V_{DSS}	25	V
Gate-to-Source Voltage			V_{GS}	±8.0	V
Drain Current	t < 5 s	T_A = 25 °C	I_D	0.75	A
Continuous Drain Current (Note 1)	Steady State	T_A = 25 °C	I_D	0.7	A
		T_A = 75 °C		0.6	
Power Dissipation (Note 1)	Steady State		P_D	0.28	W
Power Dissipation (Note 1)	t ≤ 5 s		P_D	0.33	W
Pulsed Drain Current	t_p = 10 μs		I_{DM}	3.0	A
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to +150	°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	°C
ESD Rating – Machine Model				25	V

THERMAL RESISTANCE RATINGS

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

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, 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).

ORDERING INFORMATION

Device	Package	Shipping†
NTS4409NT1G	SC-70 (SOT-323) (Pb-Free)	3000 / Tape & Reel
NVS4409NT1G	SC-70 (SOT-323) (Pb-Free)	3000 / 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 noted)

Characteristic	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		25			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$				30		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 20 V	T_J = 25 °C			0.5	μA
			T_J = 70 °C			2.0	
			T_J = 125 °C			5.0	
Gate-to-Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = 8.0 V				100	nA
ON CHARACTERISTICS (Note 2)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250 μA		0.65		1.5	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$				−2.0		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 0.6 A			249	350	mΩ
		V_{GS} = 2.7 V, I_D = 0.2 A			299	400	
		V_{GS} = 4.5 V, I_D = 1.2 A			260		
Forward Transconductance	g_{FS}	V_{DS} = 5.0 V, I_D = 0.5 A			0.5		S
CHARGES AND CAPACITANCES							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0 MHz, V_{DS} = 10 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 V, V_{DS} = 15 V, I_D = 0.8 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 V, V_{DS} = 15 V, I_D = 0.7 A, R_G = 51 Ω			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 V, I_S = 0.6 A	T_J = 25 °C		0.82	1.20	V

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

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

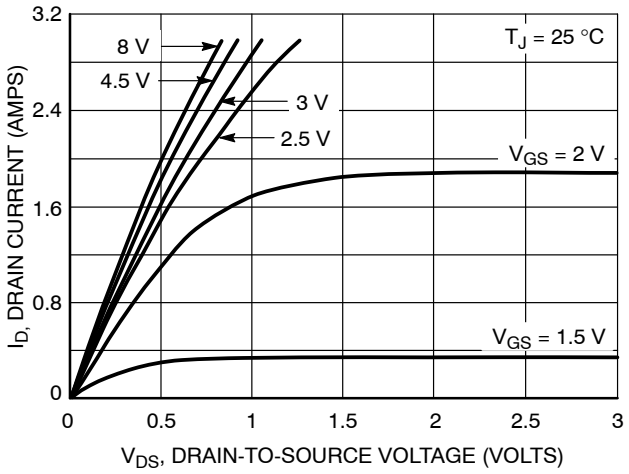


Figure 1. On-Region Characteristics

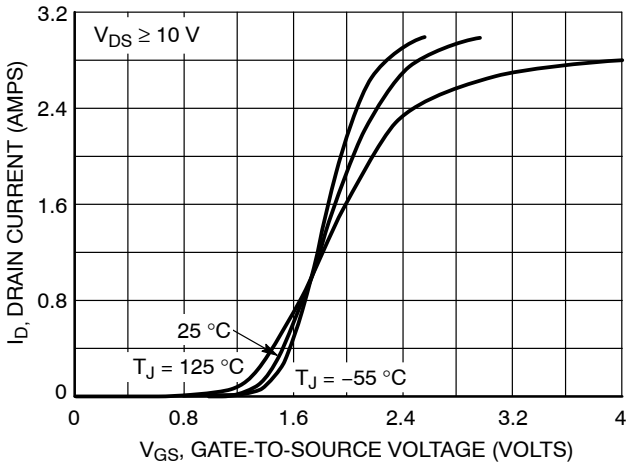


Figure 2. Transfer Characteristics

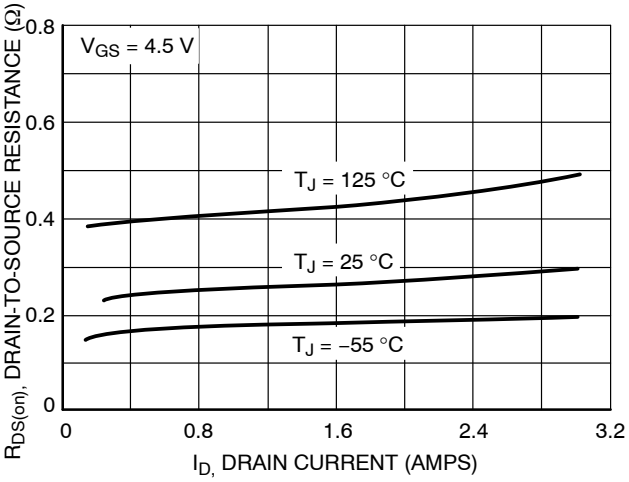


Figure 3. On-Resistance vs. Drain Current and Temperature

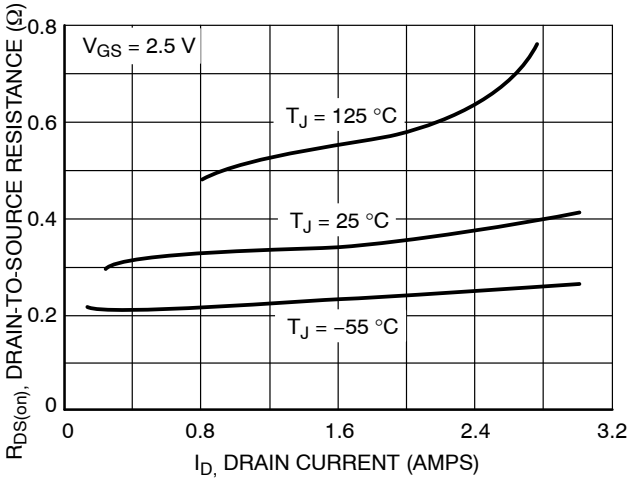


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

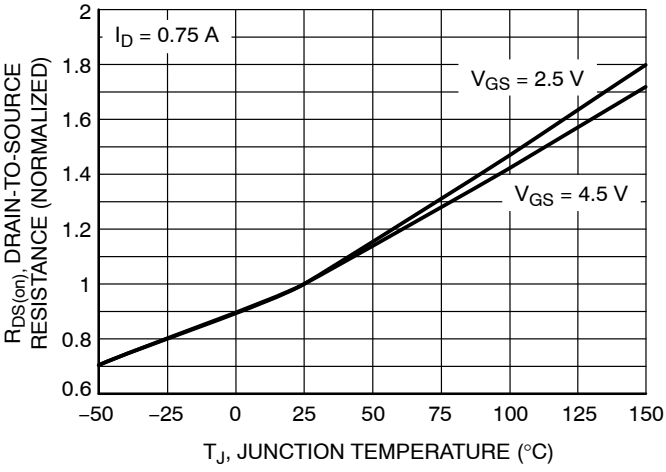


Figure 5. On-Resistance Variation with Temperature

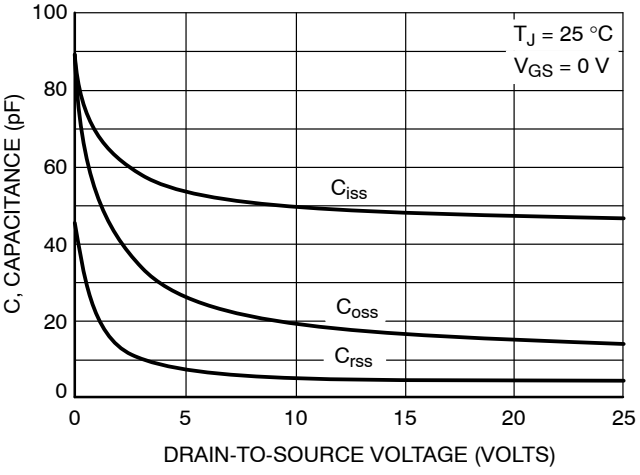


Figure 6. Capacitance Variation

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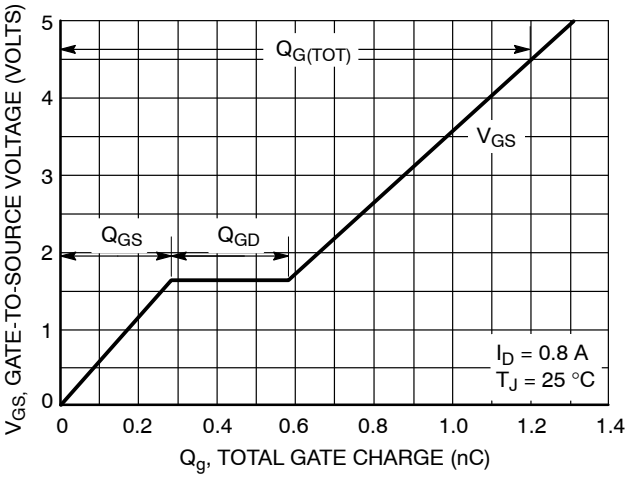


Figure 7. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

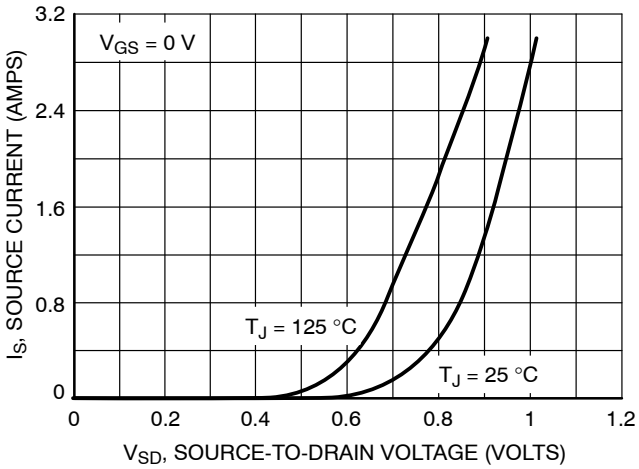


Figure 8. Diode Forward Voltage vs. Current

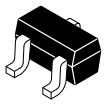
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REVISION HISTORY

Revision	Description of Changes	Date
5	Document rebranded to **onsemi** format.	1/26/2026

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

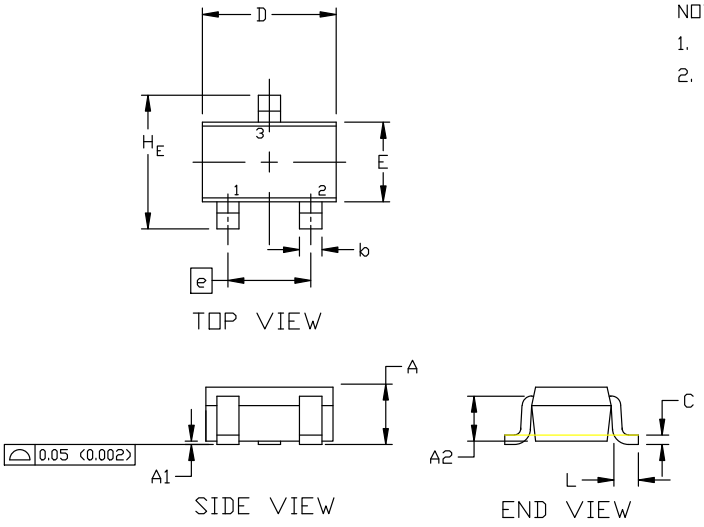
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SCALE 4:1

SC−70 (SOT−323)
CASE 419
ISSUE R

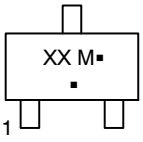
DATE 11 OCT 2022



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

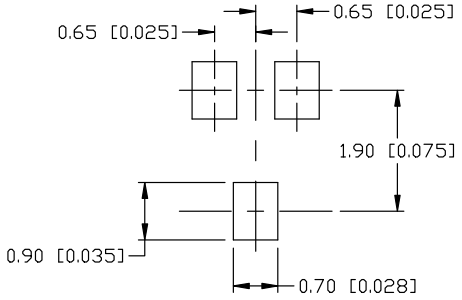
	MILLIMETERS			INCHES		
DIM	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.80	0.90	1.00	0.032	0.035	0.040
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	0.70 REF			0.028 BSC		
b	0.30	0.35	0.40	0.012	0.014	0.016
c	0.10	0.18	0.25	0.004	0.007	0.010
D	1.80	2.00	2.20	0.071	0.080	0.087
E	1.15	1.24	1.35	0.045	0.049	0.053
e	1.20	1.30	1.40	0.047	0.051	0.055
e1	0.65 BSC			0.026 BSC		
L	0.20	0.38	0.56	0.008	0.015	0.022
H_E	2.00	2.10	2.40	0.079	0.083	0.095

GENERIC MARKING DIAGRAM



XX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.



* For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

SOLDERING FOOTPRINT

STYLE 1:
CANCELLED

STYLE 2:
PIN 1. ANODE
2. N.C.
3. CATHODE

STYLE 3:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 5:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 6:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 7:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

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

STYLE 9:
PIN 1. ANODE
2. CATHODE
3. CATHODE−ANODE

STYLE 10:
PIN 1. CATHODE
2. ANODE
3. ANODE−CATHODE

STYLE 11:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

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DESCRIPTION:	**SC−70 (SOT−323)**	**PAGE 1 OF 1**

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