

NTS4409N

S-NTS4409N

Small Signal MOSFET

1. FEATURES

- Gate to Source ESD protected.
- Advance Planar Technology for Fast Switching, Low RDS(on).
- Higher Efficiency Extending Battery Life.
- This is a Pb-Free Device
- We declare that the material of product compliance with RoHS requirements and Halogen Free.
- S- prefix for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.

2. APPLICATIONS

- Boost and Buck Converter
- Load Switch
- Battery Protection

3. DEVICE MARKING AND ORDERING INFORMATION

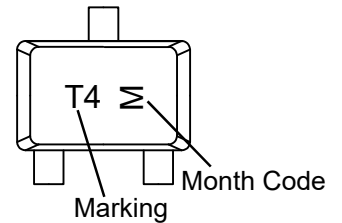
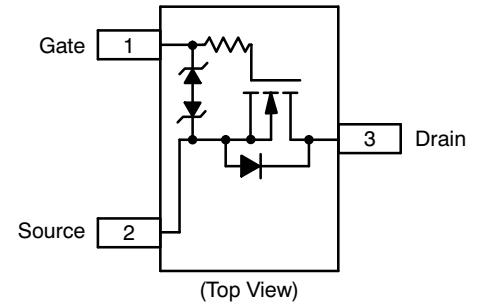
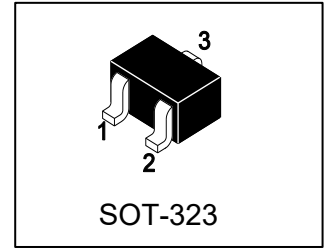
Device	Marking	Shipping
NTS4409N	T4	3000/Tape&Reel
S-NTS4409N	T4	3000/Tape&Reel

4. MAXIMUM RATINGS(Ta = 25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	VDSS	25	V
Gate-Source Voltage	VGS	±8	V
Drain Current	ID	0.75	A
- t<5s TA = 25°C		0.7	
- Steady State TA = 25°C TA = 75°C		0.6	
Pulsed Drain Current (tp=10µs)	IDM	3	A
Source Current (Body Diode)(Note 1)	IS	0.3	A
Operating Junction and Storage Temperature Range	TJ,Tstg	-55~+150	°C
Lead Temperature for Soldering Purposes (1/8 " from case for 10 s)	TL	260	°C
ESD Rating - Machine Model		250	V

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).



5. THERMAL CHARACTERISTICS

Parameter	Symbol	Limits	Unit
Total Device Dissipation(Note 1) – Steady State – $t \leq 5s$	PD	0.28 0.33	W
Junction-to-Ambient(Note 1) – Steady State – $t \leq 5s$	R θ JA	450 375	$^{\circ}C/W$

6. ELECTRICAL CHARACTERISTICS (T_J = 25 $^{\circ}C$ unless otherwise noted)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
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OFF CHARACTERISTICS

Drain-Source Breakdown Voltage (V _{GS} = 0, I _D = 250 μ A)	V _{BRDSS}	25	-	-	V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{BRDSS} /T _J	-	30	-	mV/ $^{\circ}C$
Zero Gate Voltage Drain Current (V _{GS} = 0, V _{DS} = 20 V, T _J = 25 $^{\circ}C$) (V _{GS} = 0, V _{DS} = 20 V, T _J = 70 $^{\circ}C$) (V _{GS} = 0, V _{DS} = 20 V, T _J = 125 $^{\circ}C$)	I _{DSS}	-	-	0.5 2 5	μ A
Gate-to-Source Leakage Current (V _{DS} = 0 V, V _{GS} = ± 8 V)	I _{GSS}	-	-	± 3	μ A

ON CHARACTERISTICS (Note 2)

Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 250 μ A)	V _{GS(th)}	0.5	-	1.5	V
Negative Threshold Temperature Coefficient	V _{GS(th)} /T _J	-	-2	-	mV/ $^{\circ}C$
Drain-Source On-State Resistance (V _{GS} = 4.5 V, I _D = 0.6 A) (V _{GS} = 2.7 V, I _D = 0.2 A) (V _{GS} = 4.5 V, I _D = 1.2 A)	R _{DS(on)}	-	249 299 260	350 400 -	m Ω
Forward Transconductance (V _{DS} = 5.0 V, I _D = 0.5 A)	g _{fs}	-	0.5	-	S

CHARGES AND CAPACITANCES

Input Capacitance (V _{DS} = 10 V, V _{GS} = 0, f = 1.0 MHz)	C _{iss}	-	96	-	pF	
Output Capacitance (V _{DS} = 10 V, V _{GS} = 0, f = 1.0 MHz)	C _{oss}	-	16	-		
Reverse Transfer Capacitance (V _{DS} = 10 V, V _{GS} = 0, f = 1.0 MHz)	C _{rss}	-	10	-		
Total Gate Charge	(V _{GS} = 4.5 V, V _{DS} = 15 V, I _D = 0.8 A)	QG(TOT)	-	1.2	1.5	nC
Threshold Gate Charge		QG(TH)	-	0.2	-	
Gate-to-Source Charge		QGS	-	0.28	0.5	
Gate-to-Drain Charge		QGD	-	0.3	0.4	



6. ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)(Con.)

SWITCHING CHARACTERISTICS(Note 3)

Turn-On Delay Time	(V _{GS} = 4.5 V, V _{DS} = 15 V, I _D = 0.7 A, R _G = 51Ω)	td(on)	-	5	12	ns
Rise Time		tr	-	8.2	8	
Turn-Off Delay Time		td(off)	-	23	35	
Fall Time		tf	-	41	60	

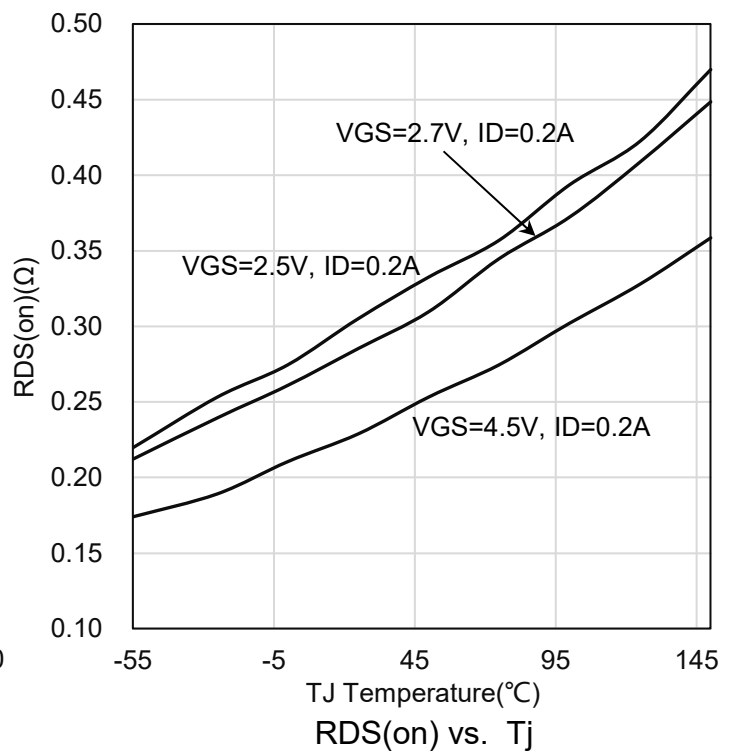
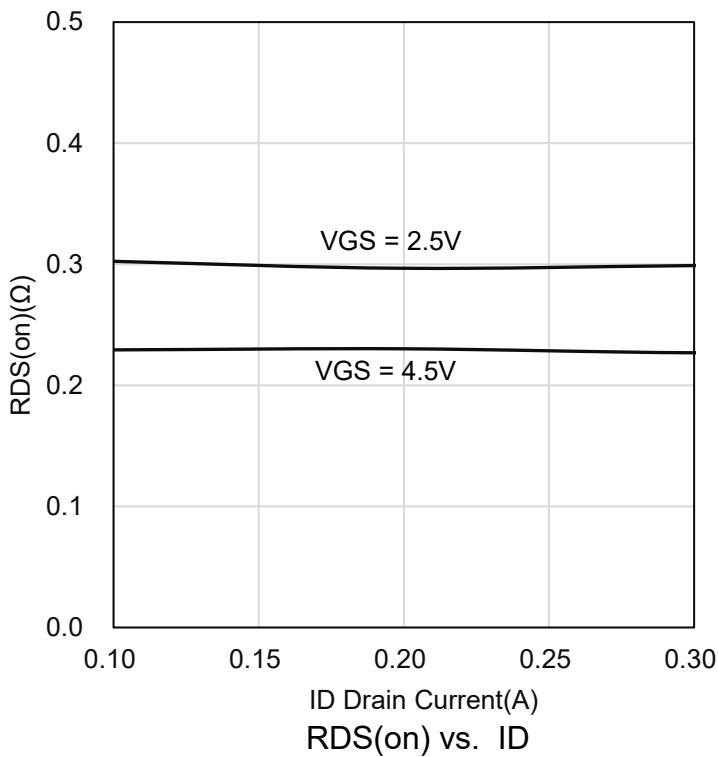
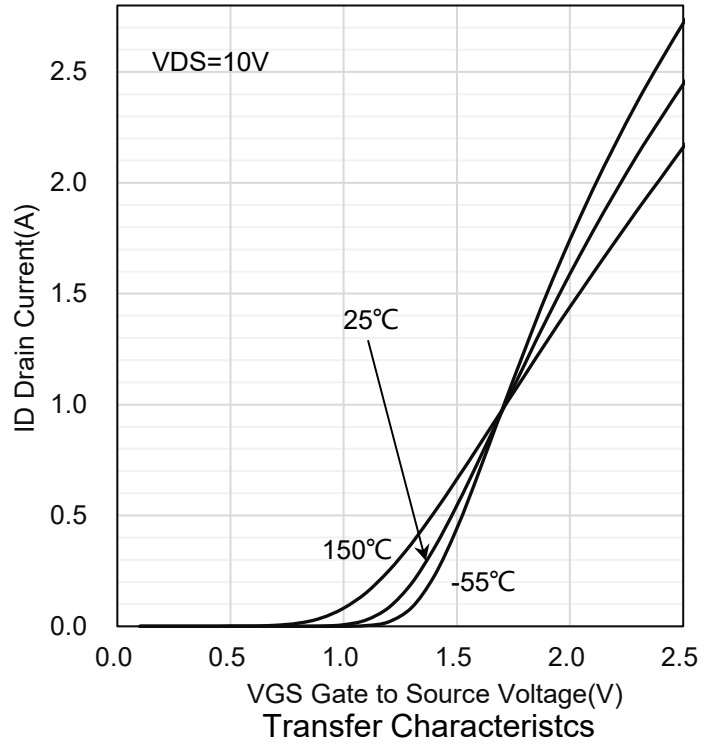
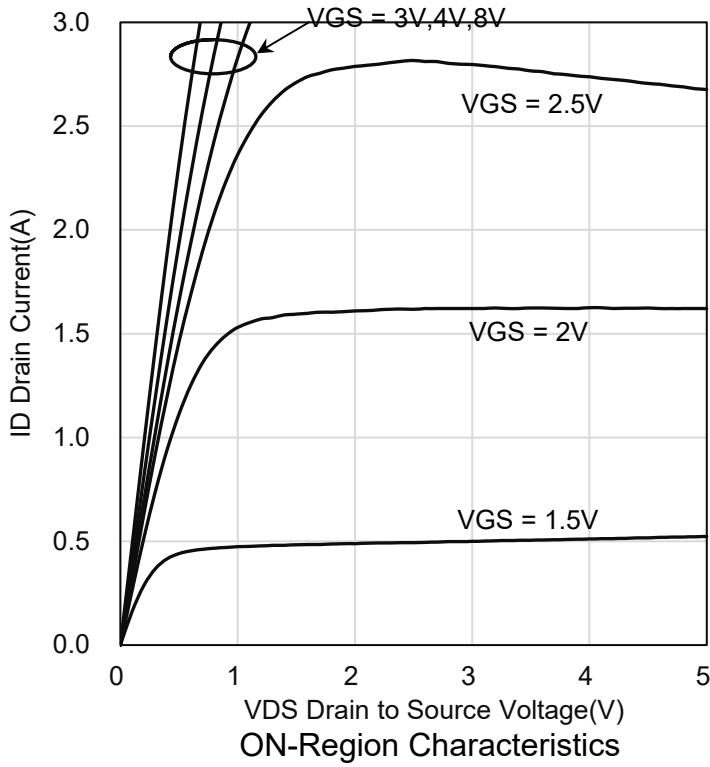
DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage (V _{GS} = 0 V, I _S = 0.6 A, T _J = 25°C)	VSD	-	0.82	1.2	V
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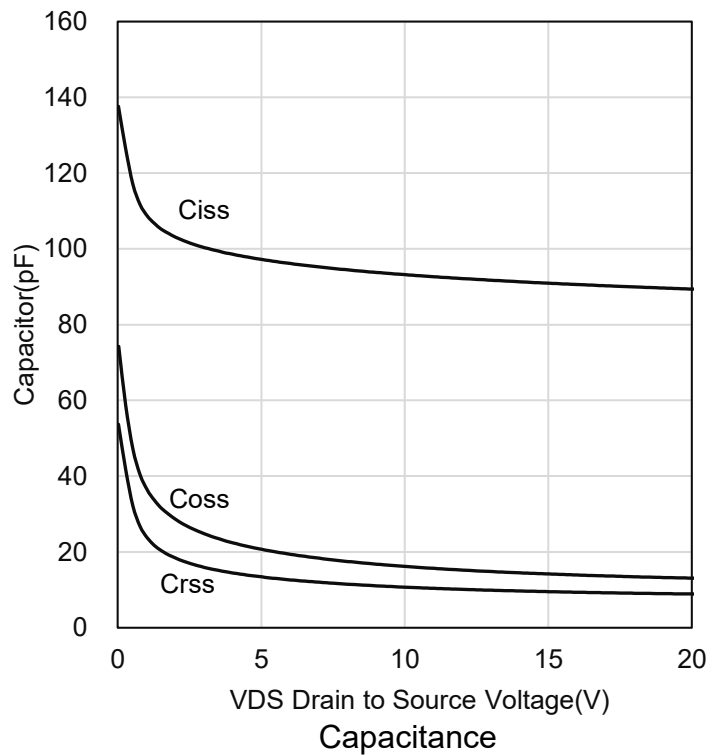
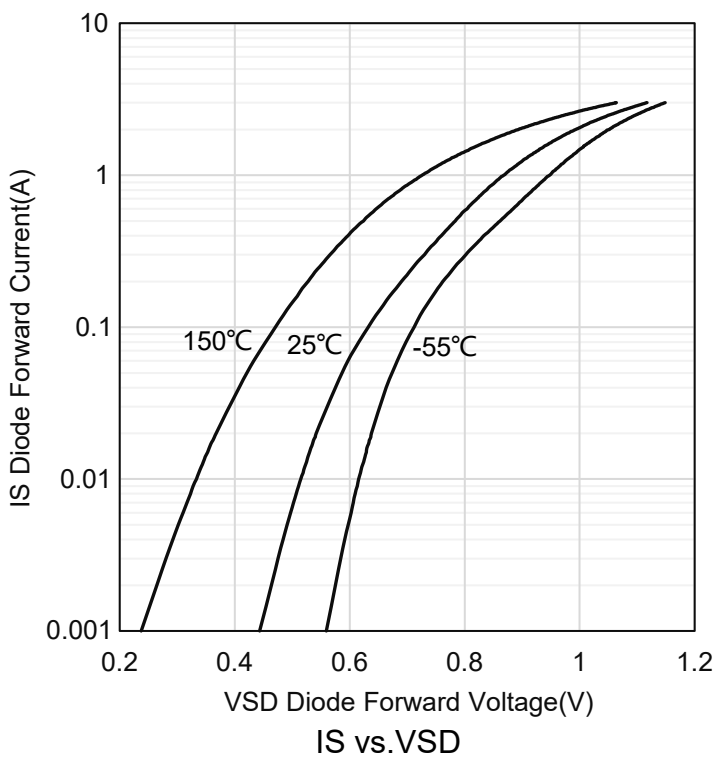
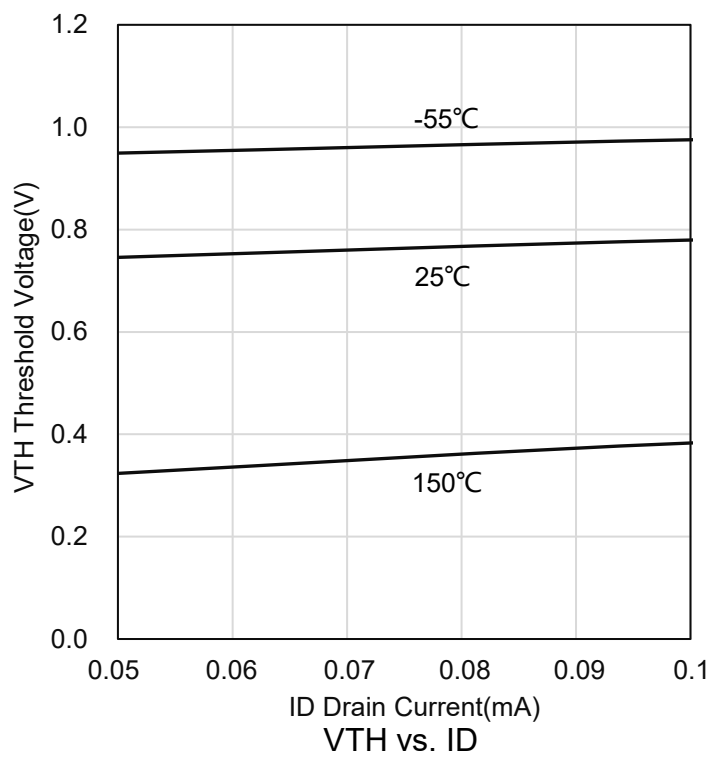
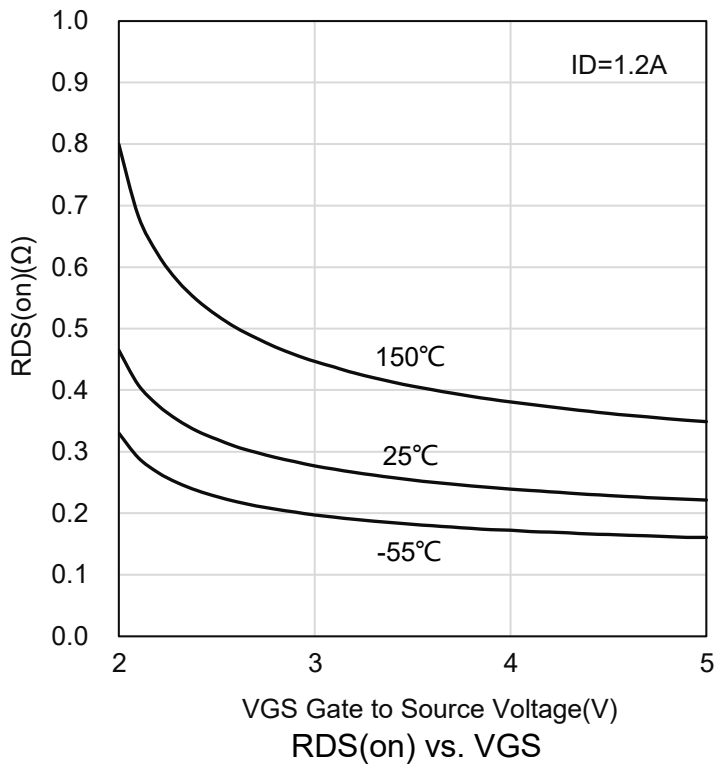
2. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
3. Switching characteristics are independent of operating junction temperatures.



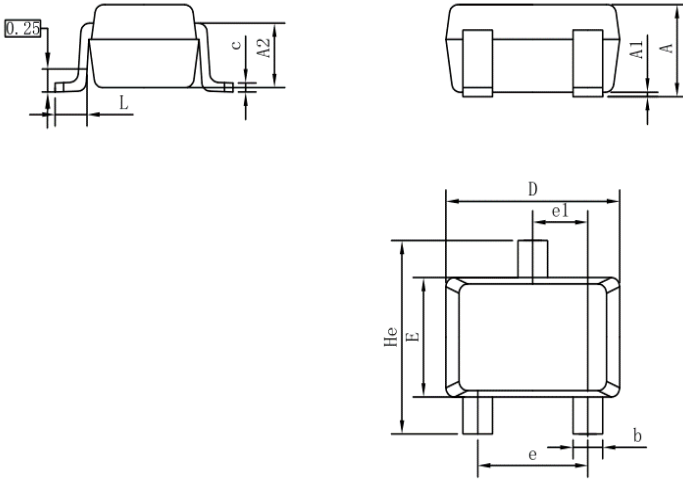
7.ELECTRICAL CHARACTERISTICS CURVES



7.ELECTRICAL CHARACTERISTICS CURVES(Con.)

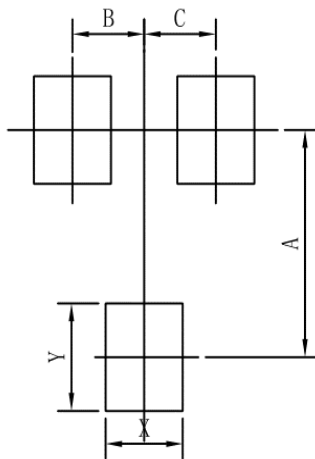


8. OUTLINE AND DIMENSIONS



SOT-323			
DIM	MIN	NOR	MAX
A	0.80	0.95	1.00
A1	0.00	0.05	0.10
A2	0.7 REF		
b	0.30	0.35	0.40
c	0.10	0.15	0.25
D	1.80	2.05	2.20
E	1.15	1.30	1.35
e	1.20	1.30	1.40
e1	0.65 BSC		
L	0.20	0.35	0.56
He	2.00	2.10	2.40
ALL Dimension in mm			

9. SOLDERING FOOTPRINT



SOT-323	
DIM	MIN
A	1.90
B	0.65
C	0.65
X	0.70
Y	0.90

