

Power MOSFET

NTS2101P

-8.0 V, -1.4 A, Single P-Channel, SC-70

Features

- Leading Trench Technology for Low $R_{DS(on)}$ Extending Battery Life
- -1.8 V Rated for Low Voltage Gate Drive
- SC-70 Surface Mount for Small Footprint (2 x 2 mm)
- Pb-Free Package is Available

Applications

- High Side Load Switch
- Charging Circuit
- Single Cell Battery Applications such as Cell Phones, Digital Cameras, PDAs, etc.

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

Parameter	Symbol	Value	Units	
Drain-to-Source Voltage	V_{DSS}	-8.0	V	
Gate-to-Source Voltage	V_{GS}	± 8.0	V	
Continuous Drain Current (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	-1.4	A
		$T_A = 70^\circ\text{C}$	-1.1	A
	$t \leq 5$ s	$T_A = 25^\circ\text{C}$	-1.5	A
Power Dissipation (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	0.29	W
		$t \leq 5$ s	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), Continuous	I_S	-0.46	A	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	T_L	260	$^\circ\text{C}$	

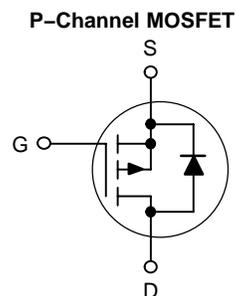
THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Units
Junction-to-Ambient - Steady State (Note 1)	$R_{\theta JA}$	430	$^\circ\text{C/W}$
Junction-to-Ambient - $t \leq 5$ s (Note 1)	$R_{\theta JA}$	375	

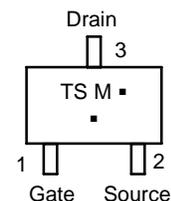
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

$V_{(BR)DSS}$	$R_{DS(on)}$ Typ	I_D Max
-8.0 V	65 m Ω @ -4.5 V	-1.4 A
	78 m Ω @ -2.5 V	
	117 m Ω @ -1.8 V	



MARKING DIAGRAM & PIN ASSIGNMENT



TS = Device Code
M = Date Code*
▪ = Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
NTS2101PT1	SOT-323	3000/Tape & Reel
NTS2101PT1G	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.

NTS2101P

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = -250 μA	-8.0	-20		V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J			-10		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = -6.4 V	T _J = 25°C		-1.0	μA
			T _J = 70°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	-0.45	-0.7		V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J			2.6		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = -4.5 V, I _D = -1.0 A		65	100	mΩ
		V _{GS} = -2.5 V, I _D = -0.5 A		78	140	
		V _{GS} = -1.8 V, I _D = -0.3 A		117	210	

CHARGES AND CAPACITANCES

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = -8.0 V		640		pF
Output Capacitance	C _{OSS}			120		
Reverse Transfer Capacitance	C _{RSS}			82		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = -5.0 V, V _{DD} = -5.0 V, I _D = -1.0 A		6.4		nC
Threshold Gate Charge	Q _{G(TH)}			0.7		
Gate-to-Source Charge	Q _{GS}			1.0		
Gate-to-Drain Charge	Q _{GD}			1.5		

SWITCHING CHARACTERISTICS (Note 3)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = -4.5 V, V _{DD} = -4.0 V, I _D = -1.0 A, R _G = 6.2 Ω		6.2		ns
Rise Time	t _r			15		
Turn-Off Delay Time	t _{d(OFF)}			26		
Fall Time	t _f			18		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = -0.3 A	T _J = 25°C		-0.62	-1.2	V
			T _J = 125°C		-0.51		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _{SD} /dt = 100 A/μs, I _S = -1.0 A		23.4		ns	
Charge Time	T _a			7.7			
Discharge Time	T _b			15.7			
Reverse Recovery Charge	Q _{RR}			9.5			nC

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