

# Power MOSFET

30 V, 7.0 A, Single N-Channel, TSOP-6

## Features

- Low  $R_{DS(on)}$
- Low Gate Charge
- Pb-Free Package is Available

## Applications

- Load Switch
- Notebook PC
- Desktop PC

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

Rating		Symbol	Value	Unit
Drain-to-Source Voltage		$V_{DS}$	30	V
Gate-to-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current (Note 1)	Steady State	$I_D$	$T_A = 25^\circ\text{C}$	A
			$T_A = 85^\circ\text{C}$	
	$t \leq 10\text{ s}$		$T_A = 25^\circ\text{C}$	
Power Dissipation (Note 1)	Steady State	$P_D$	$T_A = 25^\circ\text{C}$	W
	$t \leq 10\text{ s}$			
Continuous Drain Current (Note 2)	Steady State	$I_D$	$T_A = 25^\circ\text{C}$	A
			$T_A = 85^\circ\text{C}$	
Power Dissipation (Note 2)		$P_D$	$T_A = 25^\circ\text{C}$	W
Pulsed Drain Current	$t_p = 10\text{ }\mu\text{s}$	$I_{DM}$	21	A
Operating Junction and Storage Temperature		$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$
Source Current (Body Diode)		$I_S$	2.0	A
Single Pulse Drain-to-Source Avalanche Energy ( $V_{DD} = 30\text{ V}, I_L = 10.4\text{ A}, V_{GS} = 10\text{ V}, L = 1.0\text{ mH}, R_G = 25\text{ }\Omega$ )		EAS	54	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		$T_L$	260	$^\circ\text{C}$

## THERMAL RESISTANCE RATINGS

Rating	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Junction-to-Ambient – $t \leq 10\text{ s}$ (Note 1)	$R_{\theta JA}$	62.5	
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	248	

1. Surface-mounted on FR4 board using 1 inch sq pad size (Cu area = 1.127 in sq [1 oz] including traces).
2. Surface-mounted on FR4 board using the minimum recommended pad size (Cu area = 0.0773 in sq).

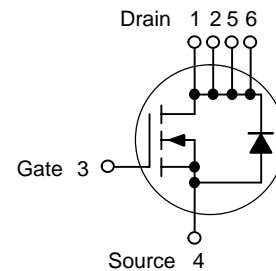


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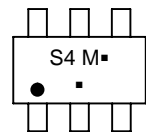
$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	$I_D$ MAX
30 V	21.5 m $\Omega$ @ 10 V	7.0 A
	30 m $\Omega$ @ 4.5 V	

## N-Channel



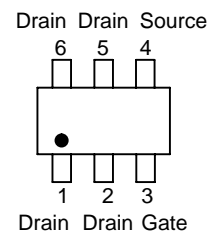
TSOP-6  
CASE 318G  
STYLE 1

## MARKING DIAGRAM



S4 = Device Code  
M = Date Code  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

## PIN ASSIGNMENT



## ORDERING INFORMATION

Device	Package	Shipping†
NTGS4141NT1	TSOP-6	3000/Tape & Reel
NTGS4141NT1G	TSOP-6 (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.

# NTGS4141N

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V <sub>(BR)DSS</sub> /T <sub>J</sub>			18.4		mV/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 24 V	T <sub>J</sub> = 25°C		1.0	μA
			T <sub>J</sub> = 125°C		10	
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V			±100	nA

### ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250 μA	1.0		3.0	V
Negative Threshold Temperature Coefficient	V <sub>GS(TH)</sub> /T <sub>J</sub>			5.7		mV/°C
Drain-to-Source On Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 7.0 A		21.5	25	mΩ
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 6.0 A		30	35	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 7.0 A		30		S

### CHARGES, CAPACITANCES AND GATE RESISTANCE

Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> = 0 V, f = 1.0 MHz, V <sub>DS</sub> = 24 V		560		pF
Output Capacitance	C <sub>OSS</sub>			115		
Reverse Transfer Capacitance	C <sub>RSS</sub>			75		
Total Gate Charge	Q <sub>G(TOT)</sub>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 15 V, I <sub>D</sub> = 7.0 A		12		nC
Threshold Gate Charge	Q <sub>G(TH)</sub>			0.85		
Gate-to-Source Charge	Q <sub>GS</sub>			1.9		
Gate-to-Drain Charge	Q <sub>GD</sub>	V <sub>GS</sub> = 4.5 V, V <sub>DS</sub> = 15 V, I <sub>D</sub> = 7.0 A		3.0		nC
Total Gate Charge	Q <sub>G(TOT)</sub>			6.0		
Threshold Gate Charge	Q <sub>G(TH)</sub>			0.8		
Gate-to-Source Charge	Q <sub>GS</sub>			1.85		
Gate-to-Drain Charge	Q <sub>GD</sub>			3.0		
Gate Resistance	R <sub>G</sub>			2.8		Ω

### SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	t <sub>d(ON)</sub>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 24 V, I <sub>D</sub> = 7.0 A, R <sub>G</sub> = 3.0 Ω		6.0		ns
Rise Time	t <sub>r</sub>			15		
Turn-Off Delay Time	t <sub>d(OFF)</sub>			18		
Fall Time	t <sub>f</sub>			4.0		

### DRAIN - SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 2.0 A	T <sub>J</sub> = 25°C		0.78	1.0	V
			T <sub>J</sub> = 125°C		0.63		
Reverse Recovery Time	t <sub>RR</sub>	V <sub>GS</sub> = 0 V dI <sub>S</sub> /dt = 100 A/μs, I <sub>S</sub> = 2.0 A			15		ns
Charge Time	t <sub>a</sub>				9.0		
Discharge Time	t <sub>b</sub>				6.0		
Reverse Recovery Charge	Q <sub>RR</sub>				8.0		nC

3. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.

4. Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES

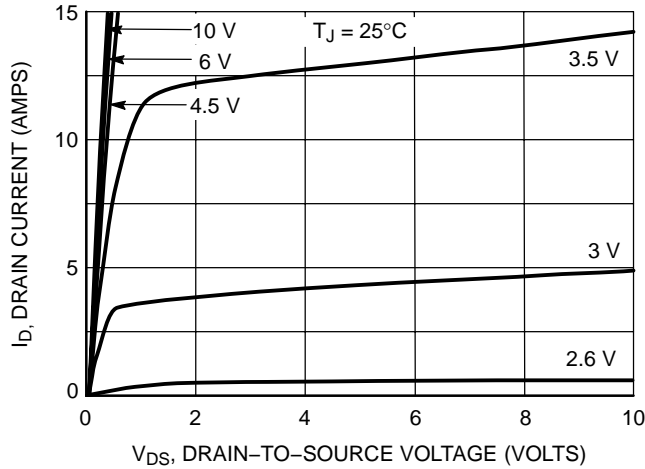


Figure 1. On-Region Characteristics

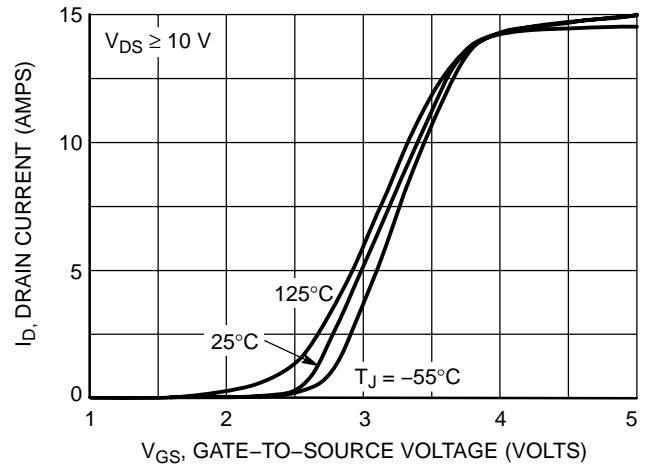


Figure 2. Transfer Characteristics

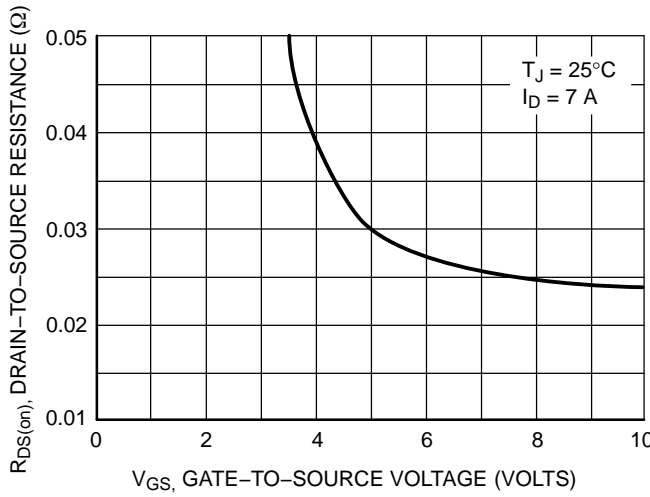


Figure 3. On-Resistance vs. Gate-to-Source Voltage

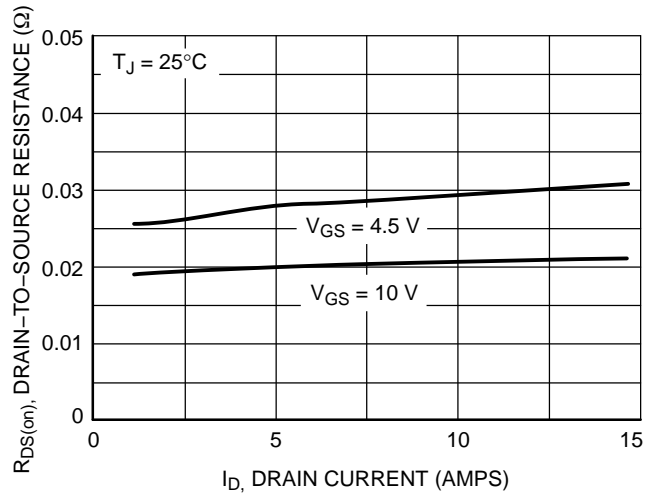


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

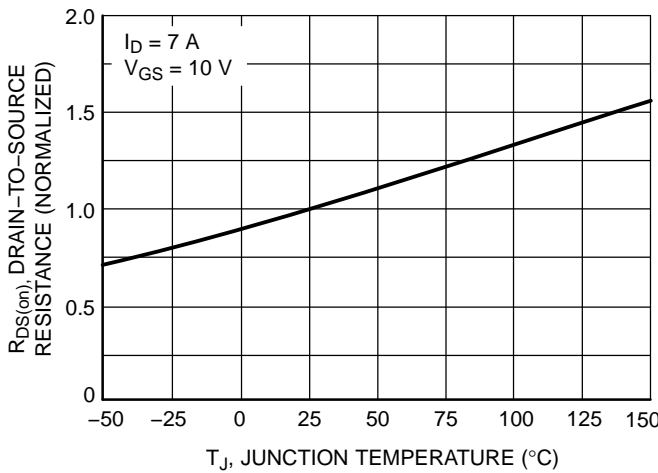


Figure 5. On-Resistance Variation with Temperature

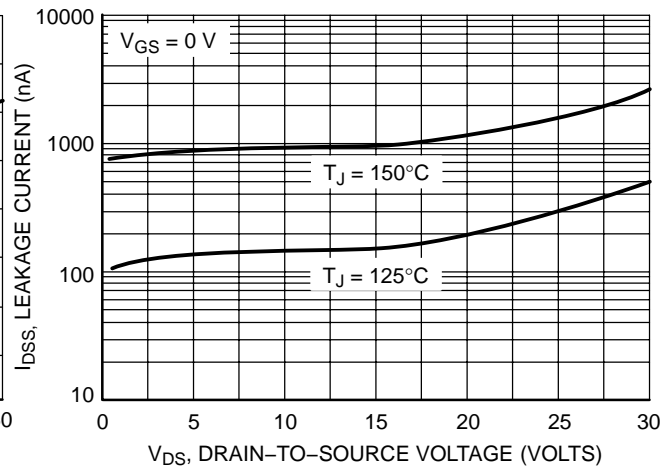
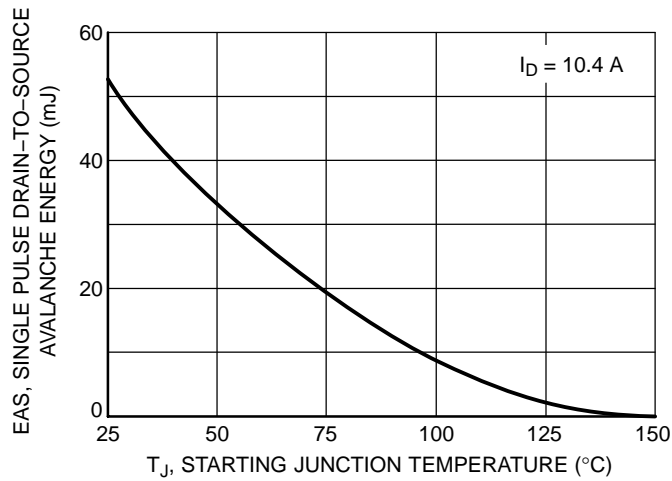
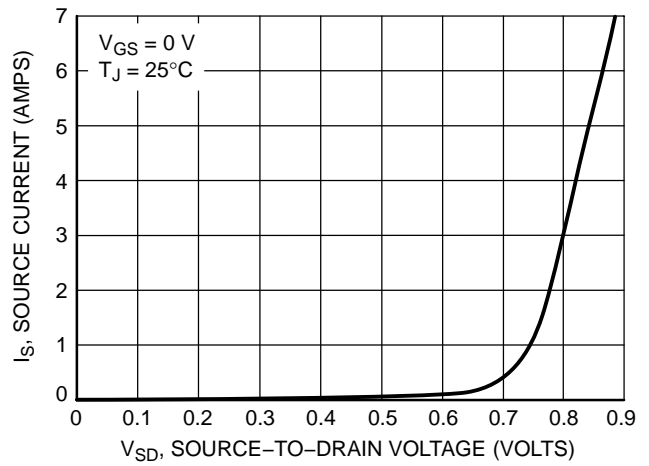
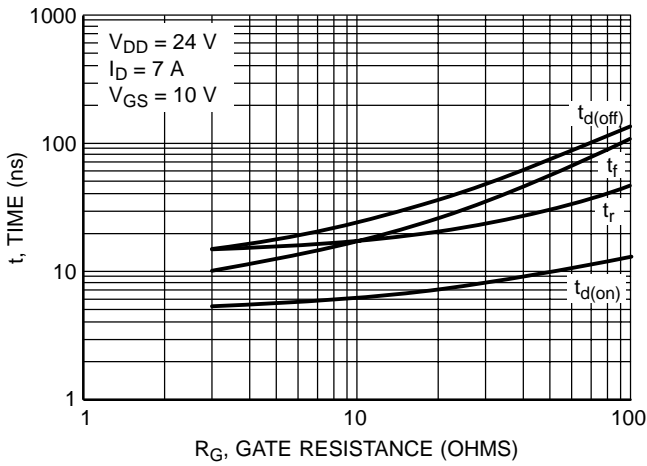
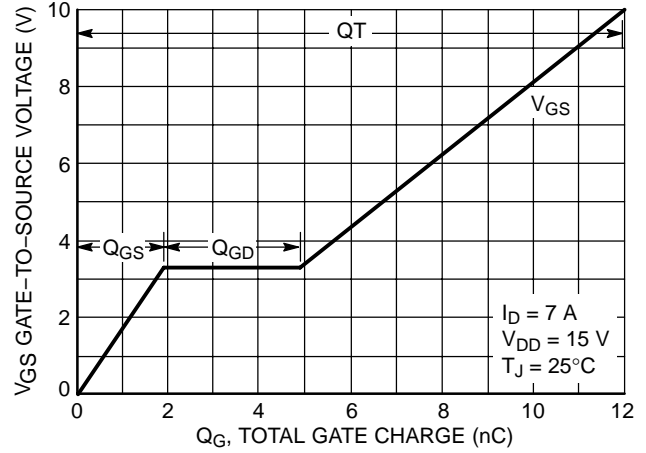
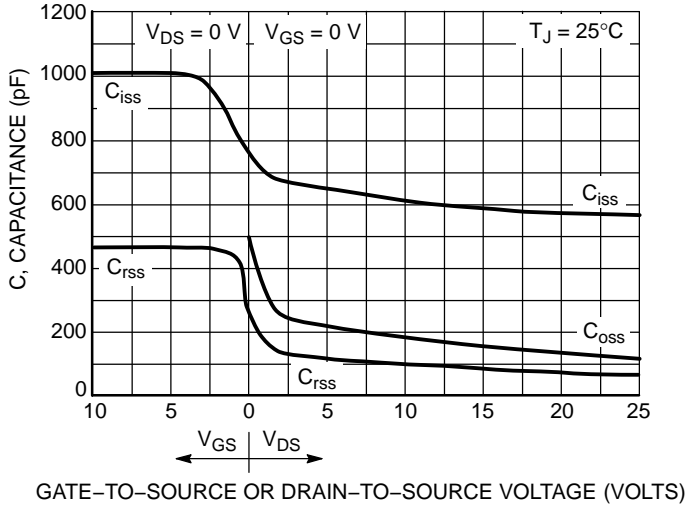


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES

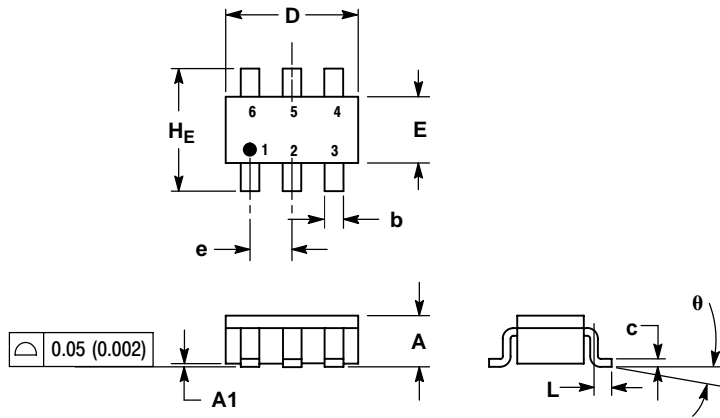


# NTGS4141N

查询"NTGS4141N-D"供应商

## PACKAGE DIMENSIONS

### TSOP-6 CASE 318G-02 ISSUE P



#### NOTES:

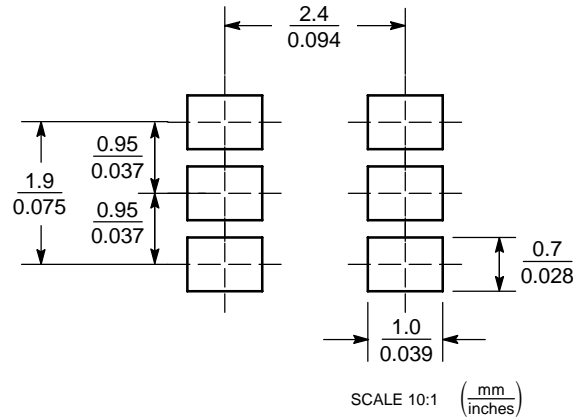
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.38	0.50	0.010	0.014	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.034	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
HE	2.50	2.75	3.00	0.099	0.108	0.118
θ	0°	—	10°	0°	—	10°


#### STYLE 1:

- PIN 1. DRAIN
- 2. DRAIN
- 3. GATE
- 4. SOURCE
- 5. DRAIN
- 6. DRAIN

#### SOLDERING FOOTPRINT\*



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

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