



**THE DATASHEET OF
NTK3142PT1G**



NTK3142P

Small Signal MOSFET

-20 V, -280 mA, P-Channel with ESD Protection, SOT-723

Features

- Enables High Density PCB Manufacturing
- 44% Smaller Footprint than SC-89 and 38% Thinner than SC-89
- Low Voltage Drive Makes this Device Ideal for Portable Equipment
- Low Threshold Levels, 1.8 V $R_{DS(on)}$ Rating
- Low Profile (< 0.5 mm) Allows It to Fit Easily into Extremely Thin Environments such as Portable Electronics
- Operated at Standard Logic Level Gate Drive, Facilitating Future Migration to Lower Levels Using the Same Basic Topology.
- This is a Pb-Free Device

Applications

- Interfacing, Switching
- High Speed Switching
- Cellular Phones, PDA's

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

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		V_{DSS}	-20	V	
Gate-to-Source Voltage		V_{GS}	± 8.0	V	
Continuous Drain Current (Note 1)	Steady State	I_D	$T_A = 25^\circ\text{C}$	-260	
			$T_A = 85^\circ\text{C}$	-185	
	$t \leq 5 \text{ s}$	$T_A = 25^\circ\text{C}$	-280	mA	
Power Dissipation (Note 1)	Steady State	P_D	$T_A = 25^\circ\text{C}$	400	
			$t \leq 5 \text{ s}$	500	mW
Continuous Drain Current (Note 2)	Steady State	I_D	$T_A = 25^\circ\text{C}$	-215	
			$T_A = 85^\circ\text{C}$	-155	mA
Power Dissipation (Note 2)	Steady State	P_D	$T_A = 25^\circ\text{C}$	280	mW
Pulsed Drain Current	$t_p = 10 \mu\text{s}$	I_{DM}	-310	mA	
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$	
Source Current (Body Diode) (Note 2)		I_S	-240	mA	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	$^\circ\text{C}$	

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)
2. Surface-mounted on FR4 board using the minimum recommended pad size.

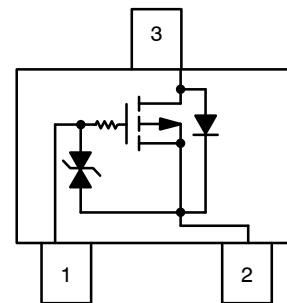


ON Semiconductor®

<http://onsemi.com>

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D Max
-20 V	2.7 Ω @ -4.5 V	-280 mA
	4.1 Ω @ -2.5 V	
	6.1 Ω @ -1.8 V	

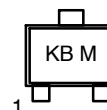
SOT-723 (3-LEAD)



Top View
 1 - Gate
 2 - Source
 3 - Drain

MARKING DIAGRAM


 CASE 631AA
 SOT-723



KB = Specific Device Code
 M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NTK3142PT1G	SOT-723 (Pb-Free)	4000/Tape & Reel 4 mm Pitch
NTK3142PT5G	SOT-723 (Pb-Free)	8000/Tape & Reel 2 mm Pitch

†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.

NTK3142P

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	315	°C/W
Junction-to-Ambient – $t = 5$ s (Note 3)	$R_{\theta JA}$	250	
Junction-to-Ambient – Steady State Minimum Pad (Note 4)	$R_{\theta JA}$	440	

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

MOSFET ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -100\ \mu\text{A}$	-20			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	$I_D = -100\ \mu\text{A}$, Reference to 25°C		14		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = -16\text{ V}$			-1.0	μA
		$T_J = 125^\circ\text{C}$			-2.0	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 5\text{ V}$			± 1	μA

ON CHARACTERISTICS (Note 5)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\ \mu\text{A}$	-0.4		-1.3	V
Gate Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			-2.0		mV/°C
Drain-to-Source On Resistance	$R_{DS(ON)}$	$V_{GS} = -4.5\text{ V}, I_D = -260\text{ mA}$		2.9	4.0	Ω
Drain-to-Source On Resistance	$R_{DS(ON)}$	$V_{GS} = -4.5\text{ V}, I_D = -10\text{ mA}$		2.7	3.4	Ω
		$V_{GS} = -2.5\text{ V}, I_D = -1\text{ mA}$		4.1	5.3	
		$V_{GS} = -1.8\text{ V}, I_D = -1\text{ mA}$		6.1	10	
Forward Transconductance	g_{FS}	$V_{DS} = -5\text{ V}, I_D = -10\text{ mA}$		73		mS

CAPACITANCES

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = -10\text{ V}$		15.3		pF
Output Capacitance	C_{OSS}			4.3		
Reverse Transfer Capacitance	C_{RSS}			2.3		

SWITCHING CHARACTERISTICS, $V_{GS} = 4.5\text{ V}$ (Note 6)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = -4.5\text{ V}, V_{DD} = -5\text{ V}, I_D = -100\text{ mA}, R_G = 6\ \Omega$		8.4	16	ns
Rise Time	t_r			15.3	28	
Turn-Off Delay Time	$t_{d(OFF)}$			37.5	80	
Fall Time	t_f			22.7	43	

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = -10\text{ mA}$	$T_J = 25^\circ\text{C}$	0.69	-1.2	V
			$T_J = 125^\circ\text{C}$	0.56		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, V_{DD} = -20\text{ V}, dI_{SD}/dt = 100\text{ A}/\mu\text{s}, I_S = -1.0\text{ A}$		37	80	ns
Charge Time	t_a			15.9	30	
Discharge Time	t_b			21.1	50	
Reverse Recovery Charge	Q_{RR}			20	70	

5. Pulse Test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
 6. Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES

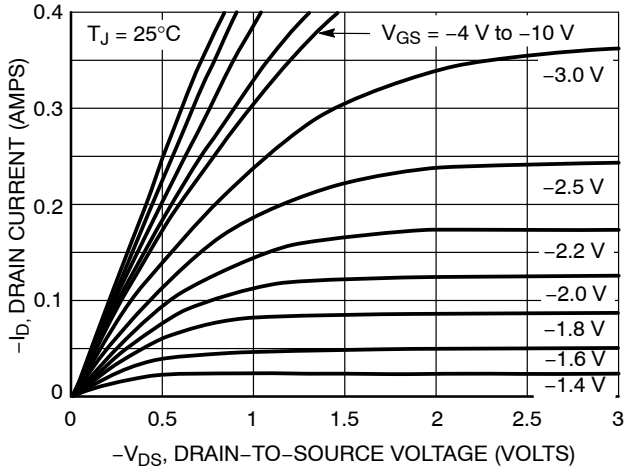


Figure 1. On-Region Characteristics

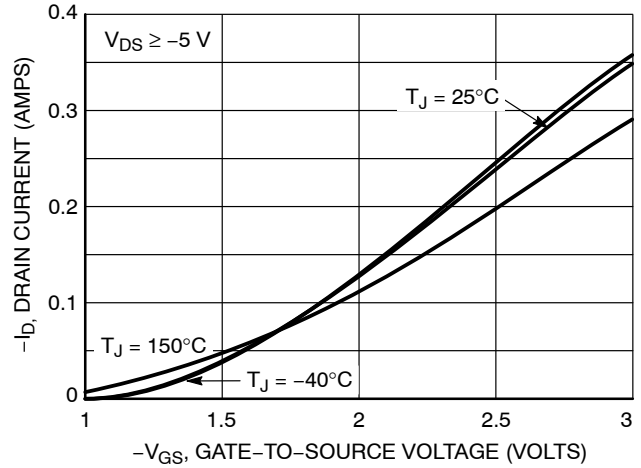


Figure 2. Transfer Characteristics

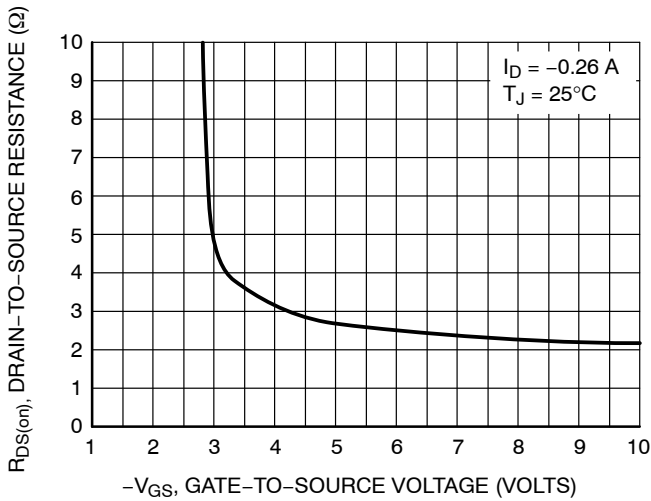


Figure 3. On-Resistance vs. Gate-to-Source Voltage

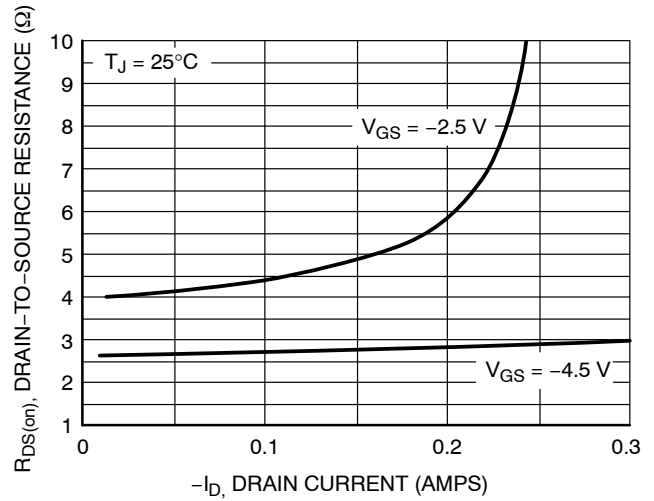


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

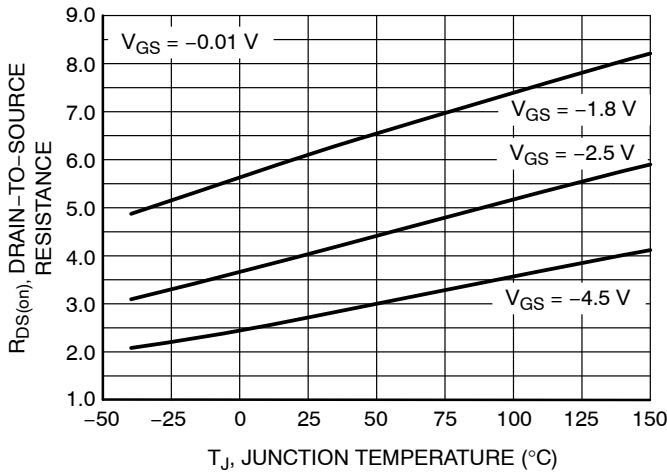


Figure 5. On-Resistance Variation with Temperature

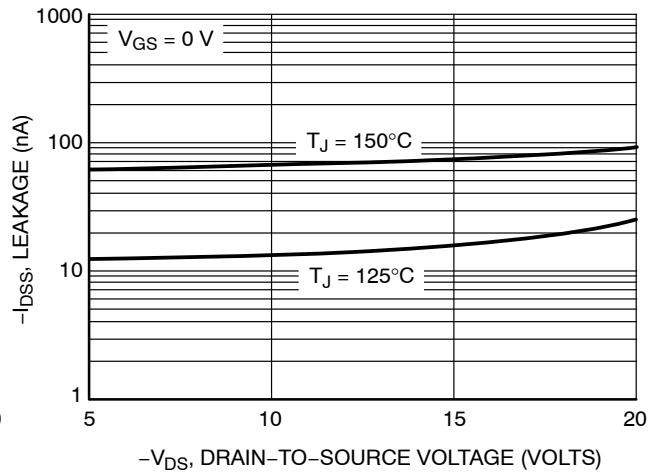


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES

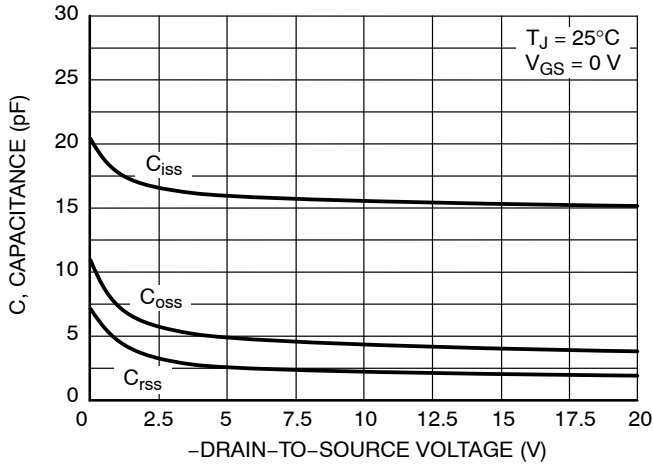


Figure 7. Capacitance Variation

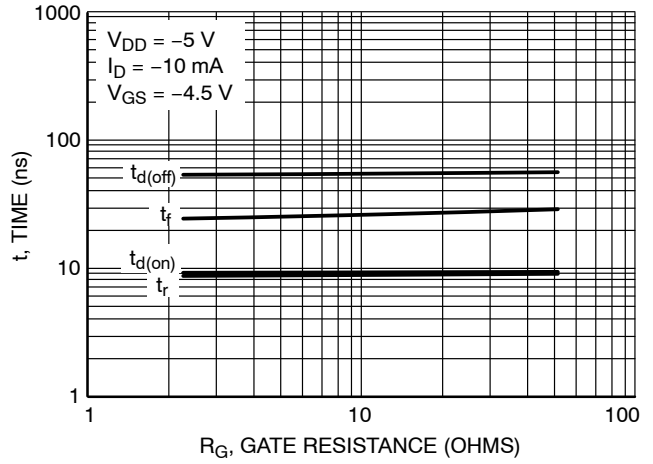


Figure 8. Resistive Switching Time Variation vs. Gate Resistance

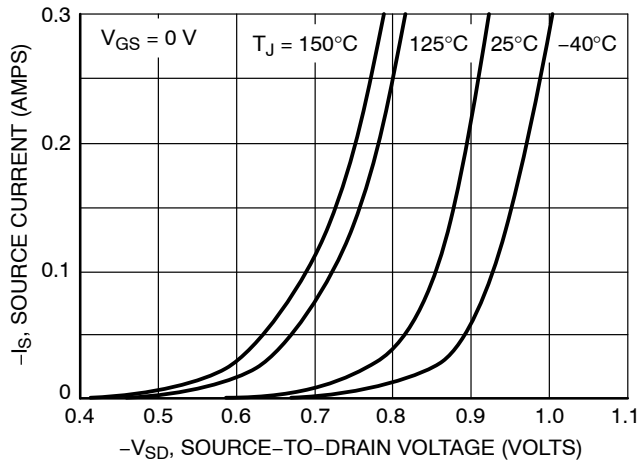
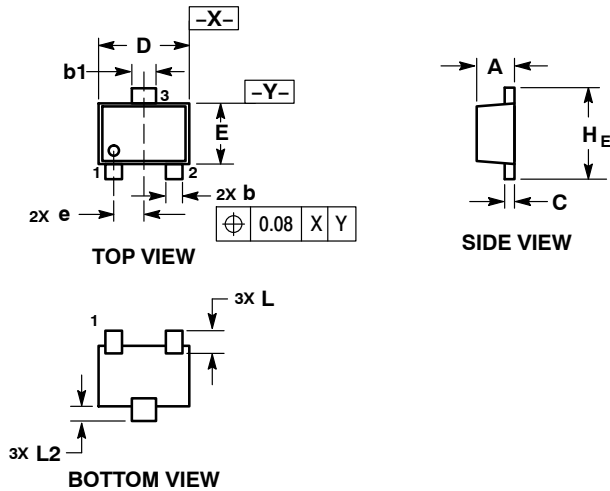


Figure 9. Diode Forward Voltage vs. Current

NTK3142P

PACKAGE DIMENSIONS

SOT-723
CASE 631AA-01
ISSUE D



NOTES:

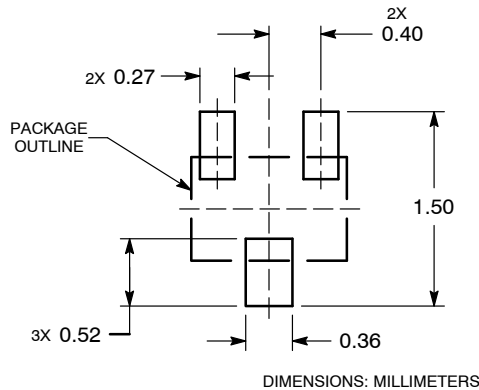
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.45	0.50	0.55
b	0.15	0.21	0.27
b1	0.25	0.31	0.37
C	0.07	0.12	0.17
D	1.15	1.20	1.25
E	0.75	0.80	0.85
e	0.40 BSC		
H _E	1.15	1.20	1.25
L	0.29 REF		
L2	0.15	0.20	0.25

STYLE 3:

- PIN 1. ANODE
- ANODE
- CATHODE

RECOMMENDED 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.

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5773-3850

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 [View NTK3142PT1G on WIN SOURCE](#)

 [ON Semiconductor](#) Information

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management