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Jameco Part Number 2017041

NTR4502P

Power MOSFET

-30 V, -1.95 A, Single, P-Channel, SOT-23

Features

- Leading Planar Technology for Low Gate Charge / Fast Switching
- Low $R_{DS(ON)}$ for Low Conduction Losses
- SOT-23 Surface Mount for Small Footprint (3 X 3 mm)
- Pb-Free Package May be Available. The G-Suffix Denotes a Pb-Free Lead Finish

Applications

- DC to DC Conversion
- Load/Power Switch for Portables and Computing
- Motherboard, Notebooks, Camcorders, Digital Camera's, etc.
- Battery Charging Circuits

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

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		V_{DSS}	-30	V	
Gate-to-Source Voltage		V_{GS}	-20	V	
Drain Current (Note 1)	t < 10 s	$T_A = 25^\circ\text{C}$	I_D	-1.95	A
		$T_A = 70^\circ\text{C}$		-1.56	
Power Dissipation (Note 1)	t < 10 s	P_D	1.25	W	
Continuous Drain Current (Note 1)	Steady State	$T_A = 25^\circ\text{C}$	I_D	-1.13	A
		$T_A = 70^\circ\text{C}$		-0.90	
Power Dissipation (Note 1)	Steady State	P_D	0.4	W	
Pulsed Drain Current	$t_p = 10 \mu\text{s}$	I_{DM}	-6.8	A	
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$	
Source Current (Body Diode)		I_S	-1.25	A	
Lead Temperature for Soldering Purposes (1/8 in from case for 10 s)		T_L	260	$^\circ\text{C}$	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient - Steady State (Note 1)	$R_{\theta JA}$	300	$^\circ\text{C/W}$
Junction-to-Ambient - t = 10 s (Note 1)	$R_{\theta JA}$	100	

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

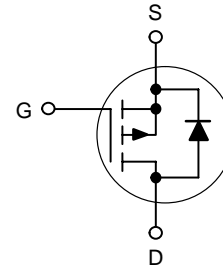


ON Semiconductor®

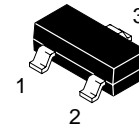
<http://onsemi.com>

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D Max (Note 1)
-30 V	155 m Ω @ -10 V	-1.95 A
	240 m Ω @ -4.5 V	

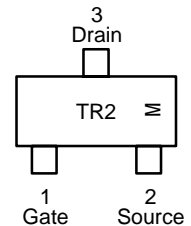
P-Channel MOSFET



MARKING DIAGRAM/ PIN ASSIGNMENT



SOT-23
CASE 318
Style 21



TR2 = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NTR4502PT1	SOT-23	3000 / Tape & Reel
NTR4502PT1G	SOT-23 (Pb-Free)	3000 / Tape & Reel
NTR4502PT3	SOT-23	10000 / Tape & Reel
NTR4502PT3G	SOT-23 (Pb-Free)	10000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

NTR4502P

Electrical Characteristics (T_J = 25°C unless otherwise specified)

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	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = -30 V	T _J = 25°C		-1	μA
			T _J = 55°C		-10	
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = -250 μA	-1.0		-3.0	V
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = -10 V, I _D = -1.95 A		155	200	mΩ
		V _{GS} = -4.5 V, I _D = -1.5 A		240	350	
Forward Transconductance	g _{FS}	V _{DS} = -10 V, I _D = -1.25 A		3		S

CHARGES AND CAPACITANCES

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1 MHz, V _{DS} = -15 V		200		pF
Output Capacitance	C _{OSS}			80		
Reverse Transfer Capacitance	C _{RSS}			50		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = -10 V, V _{DS} = -15 V; I _D = -1.95 A		6	10	nC
Threshold Gate Charge	Q _{G(TH)}			0.3		
Gate-to-Source Charge	Q _{GS}			1		
Gate-to-Drain Charge	Q _{GD}			1.7		

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = -10 V, V _{DD} = -15 V, I _D = -1.95 A, R _G = 6 Ω		5.2	10	ns
Rise Time	t _r			12	20	
Turn-Off Delay Time	t _{d(OFF)}			19	35	
Fall Time	t _f			17.5	30	

DRAIN-SOURCE DIODE CHARACTERISTICS (Note 3)

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = -1.25 A		-0.8	-1.2	V
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _{SD} /dt = 100 A/μs, I _S = -1.25 A		23		ns

2. Surface-mounted on FR4 board using 1 in sq. pad size (Cu area = 1.127 in sq. [1 oz] including traces).
3. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
4. Switching characteristics are independent of operating junction temperatures.

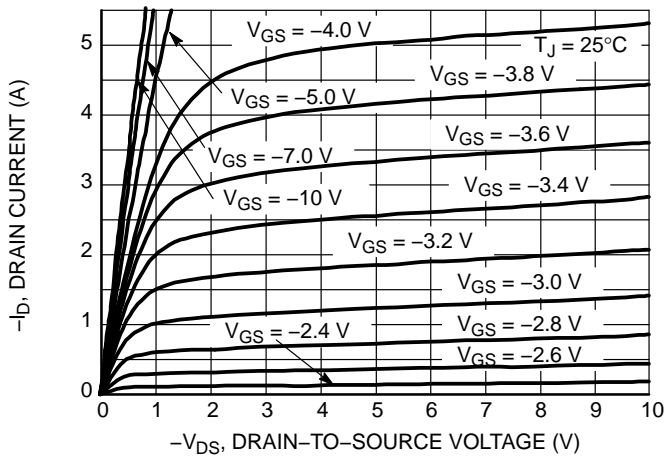


Figure 1. On-Region Characteristics

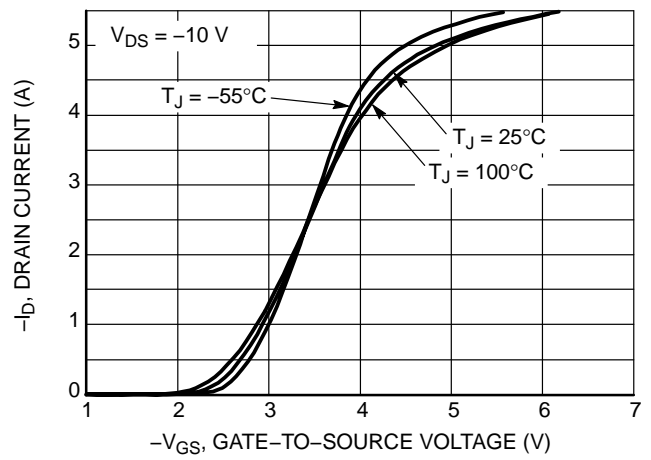


Figure 2. Transfer Characteristics

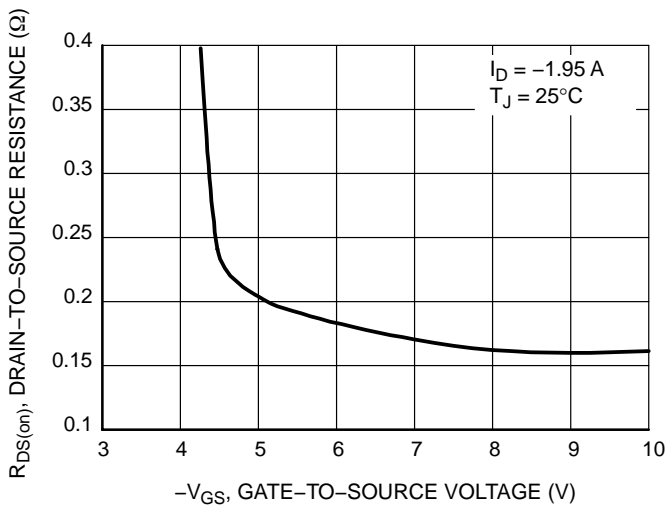


Figure 3. On-Resistance versus Gate-to-Source Voltage

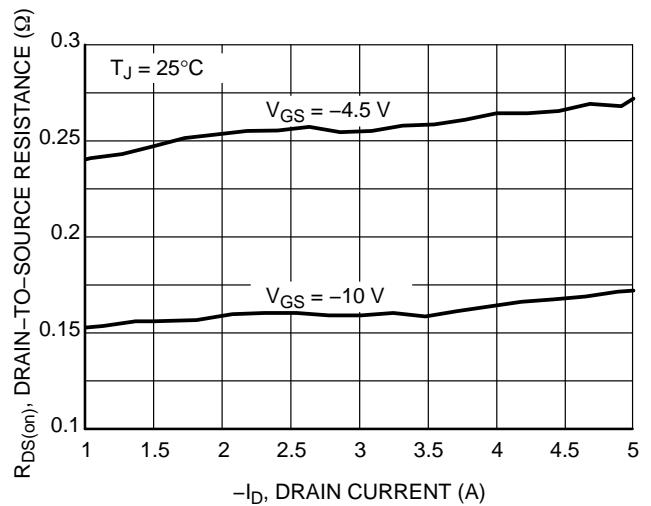


Figure 4. On-Resistance versus Drain Current and Gate Voltage

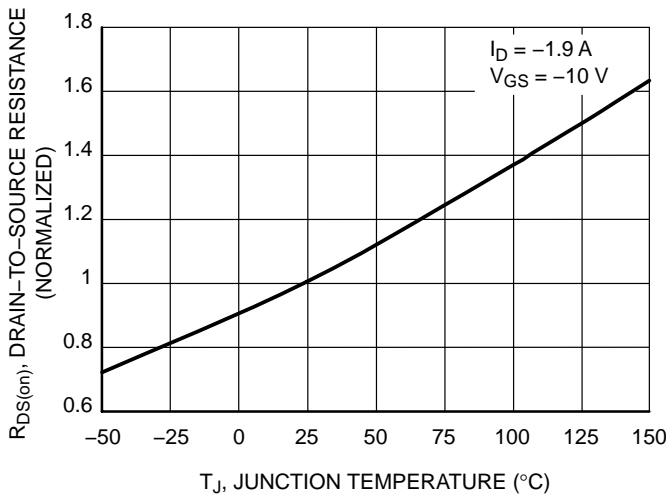


Figure 5. On-Resistance Variation with Temperature

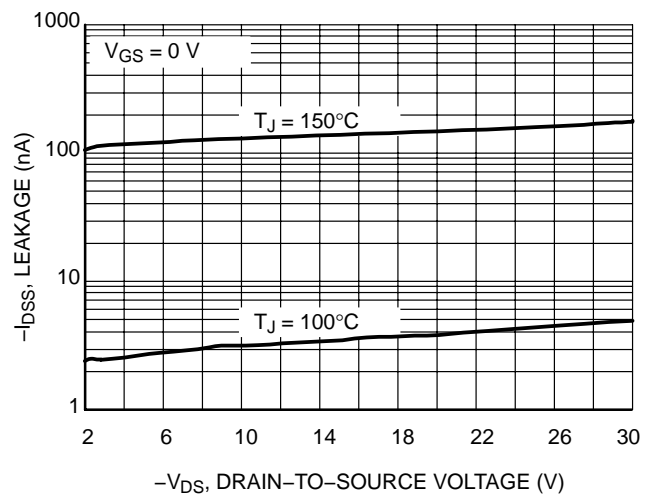
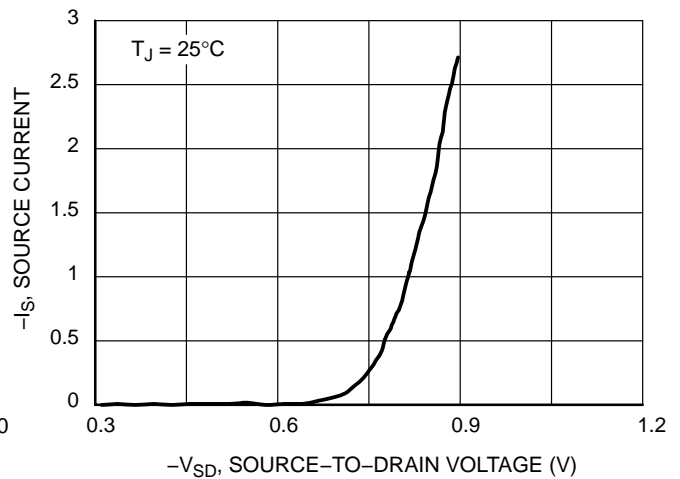
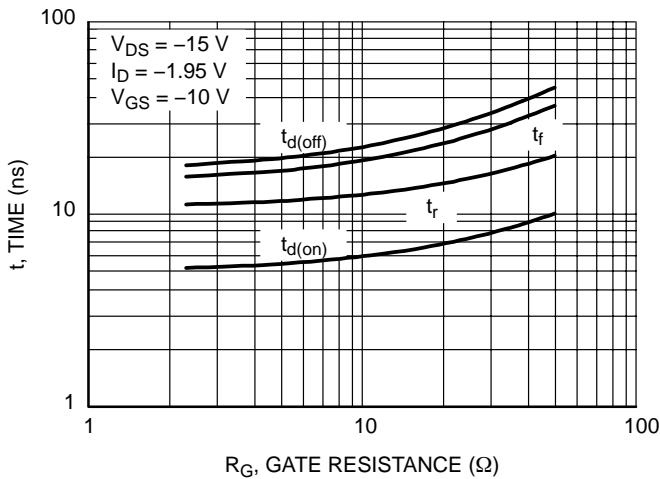
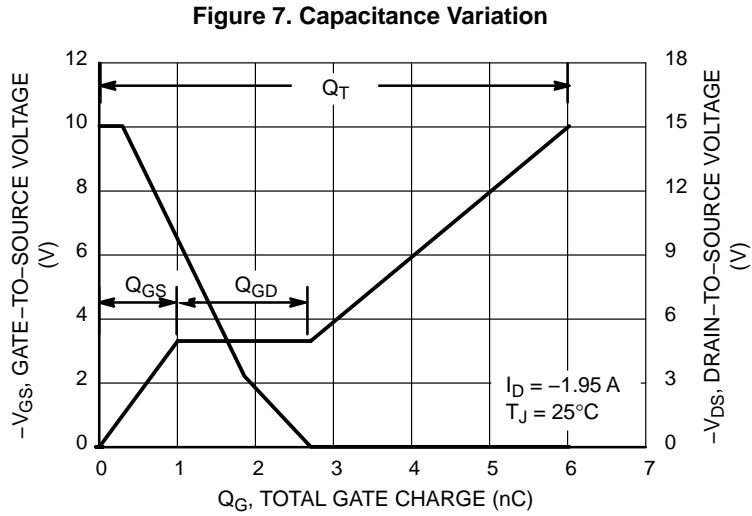
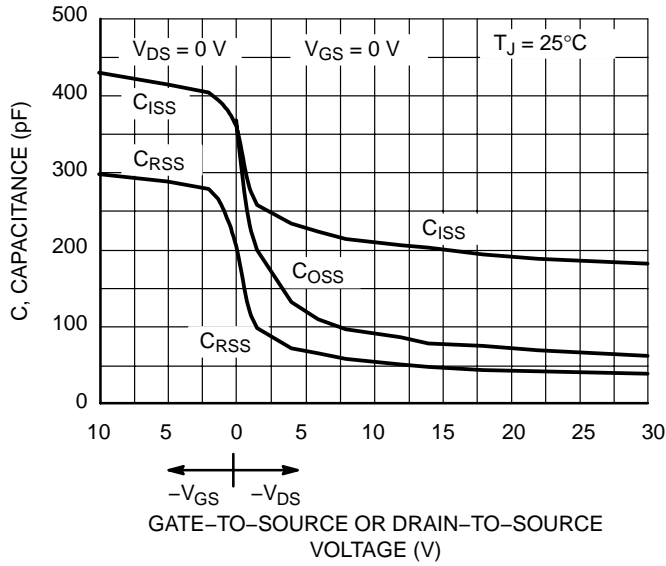


Figure 6. Drain-to-Source Leakage Current versus Voltage

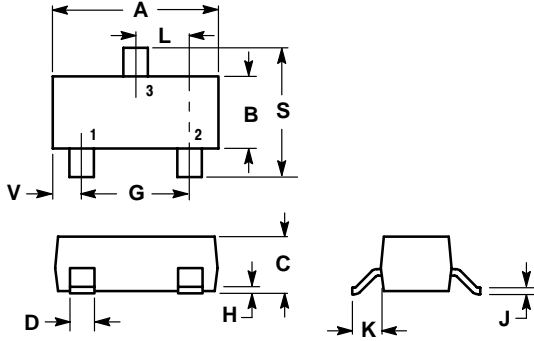
NTR4502P



NTR4502P

PACKAGE DIMENSIONS

**SOT-23
(TO-236)
CASE 318-08
ISSUE AK**



NOTES:

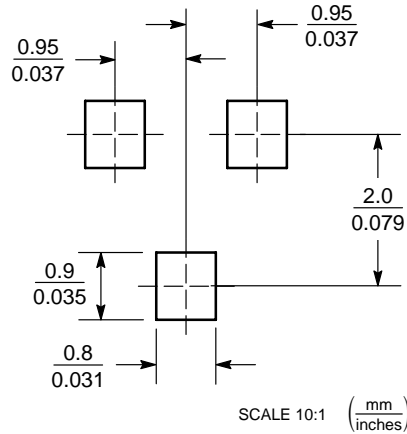
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60


STYLE 21:

- PIN 1. GATE
2. SOURCE
3. 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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