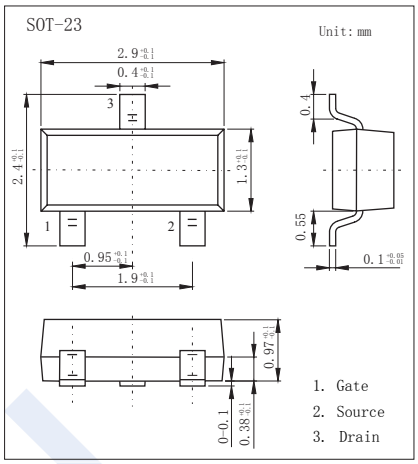
N-Channel MOSFET
NTR4501NT1G



■ Features

- $V_{DS\ (V)}$ = 20V
- I_D = 3.2 A (V_{GS} = 4.5V)
- $R_{DS(ON)}$ < 70mΩ (V_{GS} = 4.5V)
- $R_{DS(ON)}$ < 85mΩ (V_{GS} = 2.5V)
- Leading Planar Technology for Low Gate Charge / Fast Switching
- 2.5 V Rated for Low Voltage Gate Drive

■ Absolute Maximum Ratings Ta = 25℃

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	
Continuous Drain Current (Note.1)	TA=25℃	I_D	3.2	A
	TA=85℃		2.4	
Pulsed Drain Current @ t_P=10us		I_{DM}	10	
Power Dissipation (Note.1)		P_D	1.25	W
Thermal Resistance.Junction- to-Ambient (Note.1)		R_{thJA}	100	℃/W
(Note.2)			300	
Lead Temperature for Soldering Purposes (Note.3)		T_L	260	℃
Junction Temperature		T_J	150	
Storage Temperature Range		T_{stg}	-55 to 150	

Note.1: Surface−mounted on FR4 board using 1 in sq pad size.

Note.2: Surface−mounted on FR4 board using the minimum recommended pad size.

Note.3: 1/8” from case for 10 s.

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■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V (Note.1)	20	24.5		V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V, V_{GS}=0V, T_J=25℃			1.5	μA
		V_{DS}=16V, V_{GS}=0V, T_J=85℃			10	
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±12V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA (Note.1)	0.65		1.2	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=3.6A		70	80	mΩ
		V_{GS}=2.5V, I_D=3.1A		85	105	
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=3.6A		9		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=10V, f=1MHz		200		pF
Output Capacitance	C_{oss}			80		
Reverse Transfer Capacitance	C_{rss}			50		
Total Gate Charge	Q_g	V_{GS}=4.5V, V_{DS}=10V, I_D=3.6A		2.4	6	nC
Gate Source Charge	Q_{gs}			0.5		
Gate Drain Charge	Q_{gd}			0.6		
Turn-On DelayTime	$t_{d(on)}$	V_{GS}=4.5V, V_{DS}=10V, I_D=3.6A,R_G=6Ω (Note.2)		6.5		ns
Turn-On Rise Time	t_r			12		
Turn-Off DelayTime	$t_{d(off)}$			12		
Turn-Off Fall Time	t_f			3		
Body Diode Reverse Recovery Time	t_{rr}	I_S= 1.6A, dI/dt= 100A/μs,V_{GS}=0		7.1		
Charge Time	t_a			5		
Discharge Time	tb			1.9		
Body Diode Reverse Recovery Charge	Q_{rr}			3		nC
Maximum Body-Diode Continuous Current	I_S				1.6	A
Diode Forward Voltage	V_{SD}	I_S=1.6A,V_{GS}=0V		0.8	1.2	V

Note.1: Pulse Test: Pulse width ≤ 300 us, duty cycle ≤ 2%.

Note.2: Switching characteristics are independent of operating junction temperatures.

■ Marking

Marking	TR1*

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■ Typical Characterisitics

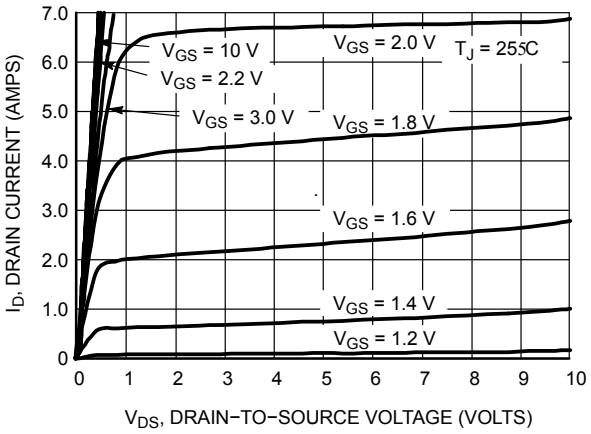

Figure 1. On−Region Characteristics

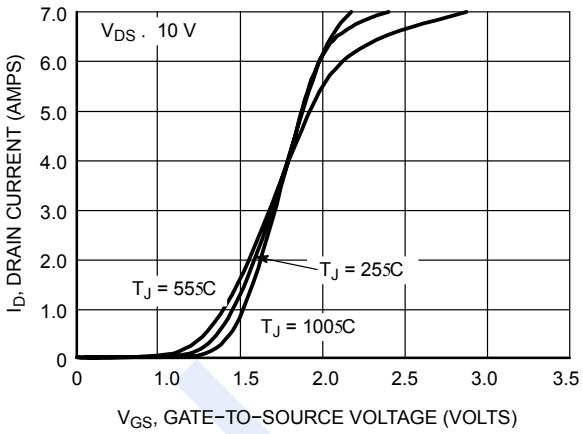

Figure 2. Transfer Characteristics

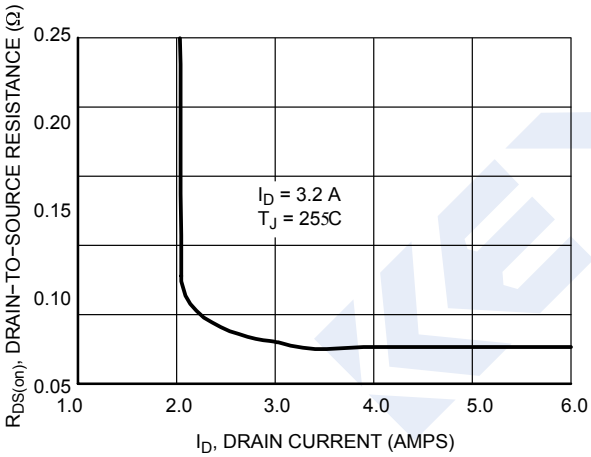

Figure 3. On−Resistance versus Gate−to−Source Voltage

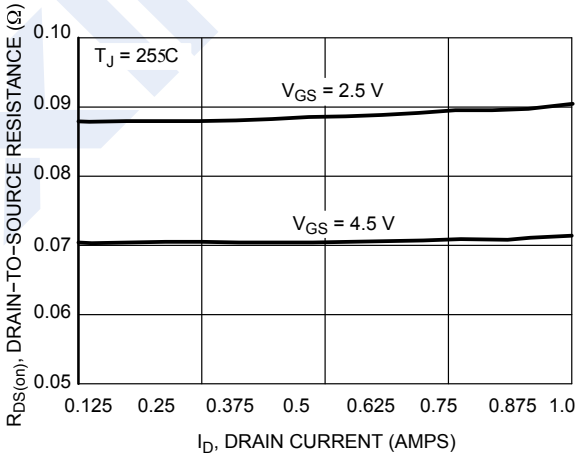

Figure 4. On−Resistance versus Drain Current and Gate Voltage

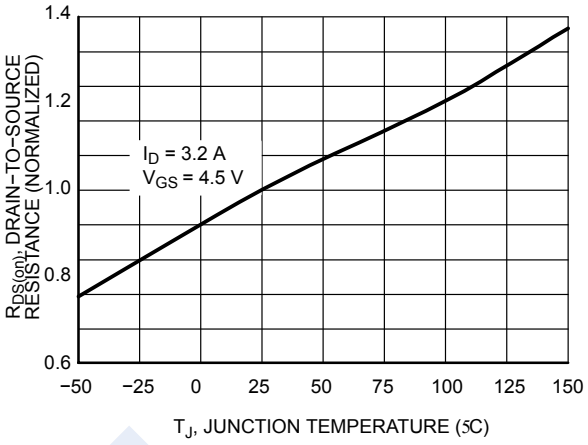

Figure 5. On−Resistance Variation with Temperature

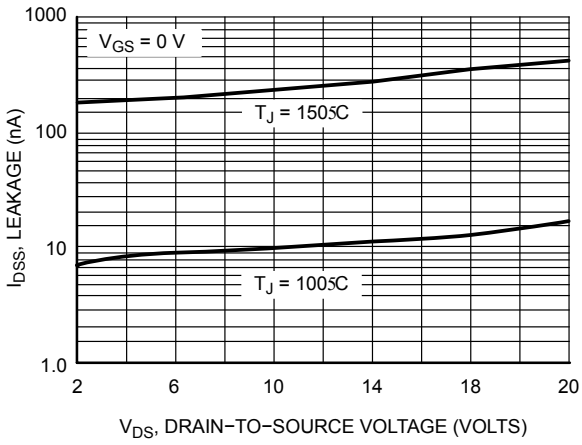

Figure 6. Drain−to−Source Leakage Current versus Voltage

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■ Typical Characterisitics

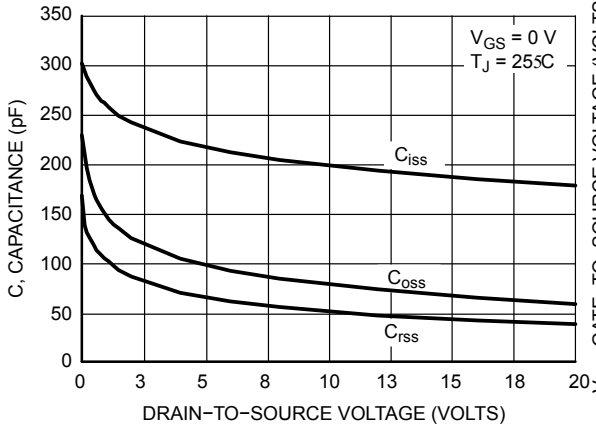

Figure 7. Capacitance Variation

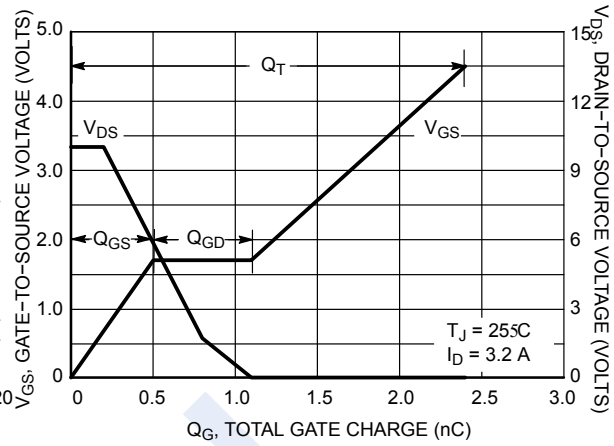

Figure 8. Gate−to−Source and Drain−to−Source Voltage versus Total Charge

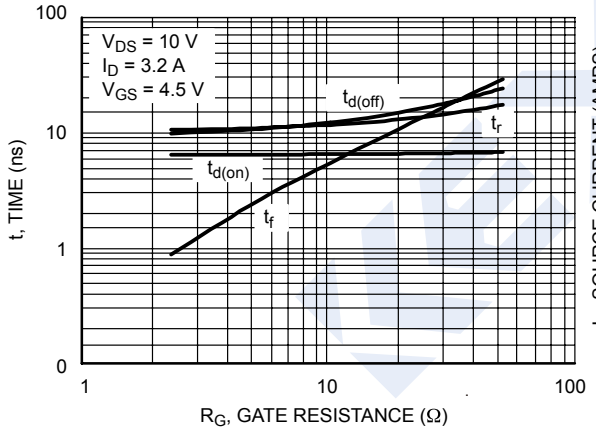

Figure 9. Resistive Switching Time Variation versus Gate Resistance

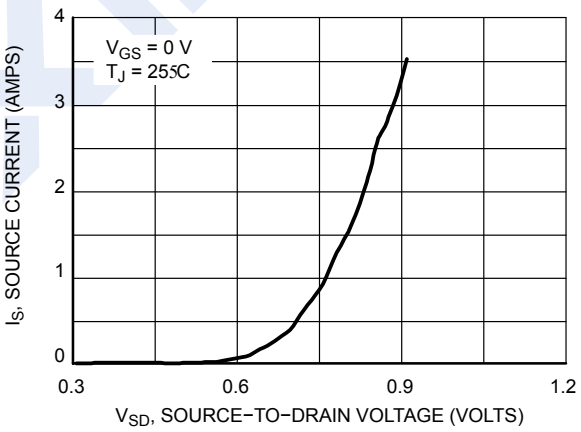

Figure 10. Diode Forward Voltage versus Current