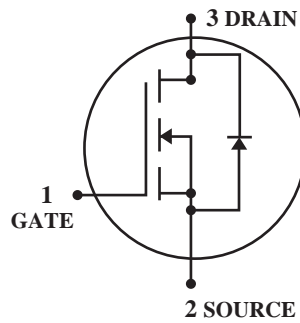


N-Channel Enhancement Mode Power MOSFET

 Lead(Pb)-Free



DRAIN CURRENT
3.2 AMPERES

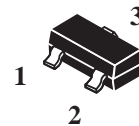
DRAIN SOURCE VOLTAGE
20 VOLTAGE

Features:

- * Leading Planar Technology for Low Gate Charge / Fast Switching.
- * 2.5V Rated for Low Voltage Gate Drive.
- * SOT-23 Surface Mount for Small Footprint.

Applications:

- * Load/Power Switch for Portables.
- * Load/Power Switch for Computing.
- * DC-DC Conversion.



SOT-23

Maximum Ratings ($T_A=25^{\circ}\text{C}$ Unless Otherwise Specified)

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	$T_A=25^{\circ}\text{C}$ 3.2 $T_A=85^{\circ}\text{C}$ 2.4	A
Pulsed Drain Current	I_{DM}	$t_p=10\mu\text{s}$ 10	A
Continuous Source Current (Body Diode)	I_S	1.6	A
Total Power Dissipation ($T_A=25^{\circ}\text{C}$)	P_D	1.25	W
Maximum Junction-Ambient ^{1,2}	$R_{\theta JA}$	100 300	$^{\circ}\text{C}/\text{W}$
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	T_L	260 $^{\circ}$	$^{\circ}\text{C}$
Operating Junction Temperature Range	T_J	-55~+150	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-55~+150	$^{\circ}\text{C}$

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.

Device Marking

WTC4501 = N45

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage (Note 3)	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	20	24.5		V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			22		mV/ $^\circ\text{C}$
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, T_J = 25^\circ\text{C}$			1.5	μA
		$V_{DS} = 16\text{ V}, T_J = 85^\circ\text{C}$			10	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 12\text{ V}$			± 100	nA

ON CHARACTERISTICS

Gate Threshold Voltage (Note 3)	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\ \mu\text{A}$	0.65		1.2	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			-2.3		mV/ $^\circ\text{C}$
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 3.6\text{ A}$		70	80	m Ω
		$V_{GS} = 2.5\text{ V}, I_D = 3.1\text{ A}$		85	105	
Forward Transconductance	g_{FS}	$V_{DS} = 5.0\text{ V}, I_D = 3.6\text{ A}$		9		S

CHARGES AND CAPACITANCES

Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 10\text{ V}$		200		pF
Output Capacitance	C_{oss}			80		
Reverse Transfer Capacitance	C_{rss}			50		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 10\text{ V}, I_D = 3.6\text{ A}$		2.4	6.0	nC
Gate-to-Source Gate Charge	Q_{GS}			0.5		
Gate-to-Drain Charge	Q_{GD}			0.6		

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 10\text{ V}, I_D = 3.6\text{ A}, R_G = 6.0\ \Omega$		6.5		ns
Rise Time	t_r			12		
Turn-Off Delay Time	$t_{d(off)}$			12		
Fall Time	t_f			3		

SOURCE-DRAIN DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_{SD} = 1.6\text{ A}$		0.8	1.2	V
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, dI_S/dt = 100\text{ A}/\mu\text{s}, I_S = 1.6\text{ A}$		7.1		ns
Charge Time	t_a			5		
Discharge Time	t_b			1.9		
Reverse Recovery Charge	Q_{RR}			3.0		nC

3. Pulse Test: Pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

4. Switching characteristics are independent of operating junction temperatures.

TYPICAL ELECTRICAL CHARACTERISTICS

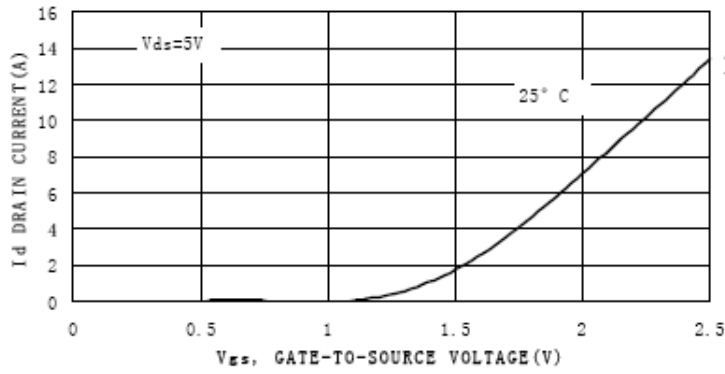


Figure 1. Transfer Characteristics

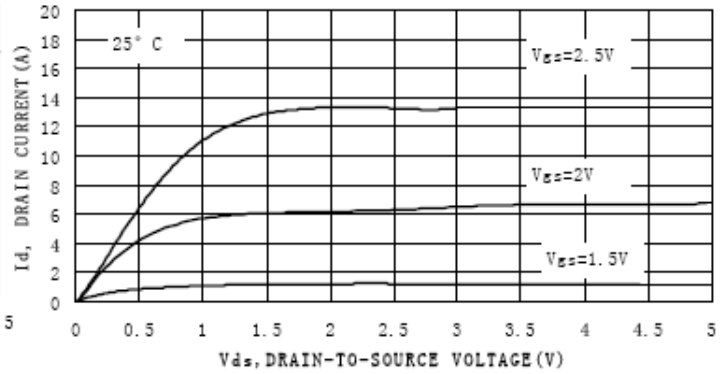


Figure 2. On-Region Characteristics

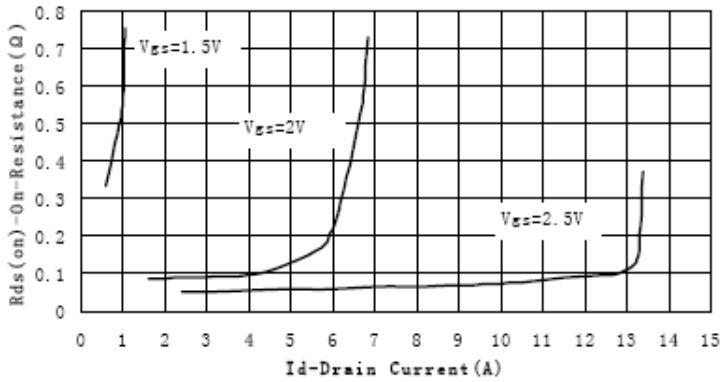


Figure 3. On-Resistance versus Drain Current

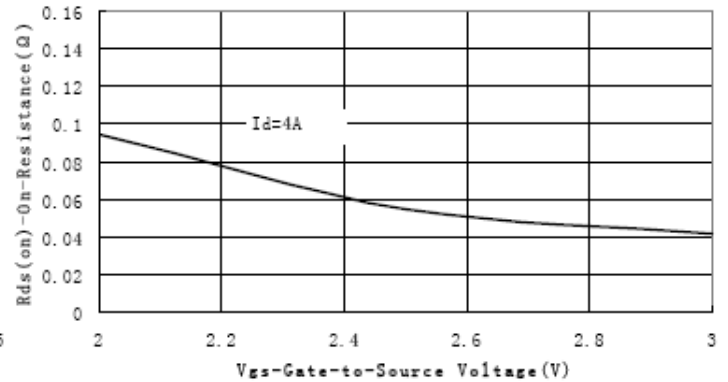


Figure 4. On-Resistance vs. Gate-to-Source Voltage

SOT-23 Outline Dimension

