

N-Channel Enhancement Mode Power MOSFET

- Features**

$V_{DS} = 20V$
 $I_D = 0.75A$
 $R_{DS(ON)} \leq 230m\Omega (V_{GS} = 4.5V)$

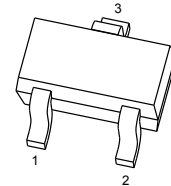
- General Description**

The TNM01K20FX is N-Channel enhancement MOSFET Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$, with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit.

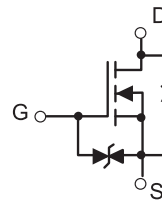
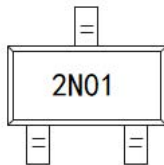
- Pin Configurations**

SOT-523

1. GATE
2. SOURCE
3. DRAIN



- Equivalent Circuit**


MARKING


- Absolute Maximum Ratings (@TA=25°C unless otherwise noted)**

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DSS}	20	V
Gate Source Voltage	V_{GSS}	± 10	V
Drain Current (Continuous) *AC	I_D	$T_A = 25^\circ C$	0.75
		$T_A = 100^\circ C$	0.3
Drain Current (Pulse) *B	I_{DM}	1.8	A
Power Dissipation	P_D	0.15	W
Operating Temperature/ Storage Temperature	T_J/T_{STG}	-55~155	$^\circ C$

- Thermal Characteristics**

Parameter	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	833	$^\circ C/W$

● Electrical Characteristics (@TA=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=16V, V_{GS}=0V$	--	--	1	μA
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	0.45	--	1.1	V
Gate Leakage Current	I_{GSS}	$V_{GS}=\pm 10V, V_{DS}=0V$	--	--	± 10	μA
Drain-Source On-state Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=0.55A$	--	190	230	m Ω
		$V_{GS}=2.5V, I_D=0.45A$	--	234	305	m Ω
		$V_{GS}=1.8V, I_D=0.35A$	--	303	455	m Ω
Total Gate Charge	Q_g	$V_{GS}=4.5V, V_{DS}=10V, I_D=1A$	--	2	--	nC
Gate- Source Charge	Q_{gs}		--	0.3	--	nC
Gate- Drain Charge	Q_{gd}		--	0.3	--	nC
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=10V, I_D=500mA,$ $V_{GS}=4.5V, R_G=10\Omega$	--	6.6	--	ns
Turn-on Rise Time	t_r		--	4.5	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	16.8	--	ns
Turn-off Fall Time	t_f		--	7.6	--	ns
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=10V, f=1MHZ$	--	43	--	pF
Output Capacitance	C_{oss}		--	9	--	pF
Reverse Transfer Capacitance	C_{rss}		--	6	--	pF

● Reverse Diode Characteristics (@TA=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Diode Forward Current	I_{SD}	$V_G=V_D=0V$, Force Current	--	--	3.5	A
Diode Forward Voltage	V_{SD}	$I_{SD}=0.35A, V_{GS}=0V$	--	--	1.1	V
Reverse Recovery Time	t_{rr}	$I_F = 1A$ $di/dt = 100 A/\mu s$	--	9	--	nS
Reverse Recovery Charge	Q_{rr}		--	1	--	nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with TA=25C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature .

C: The current rating is based on the t<10s junction to ambient thermal resistance rating.

● **TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

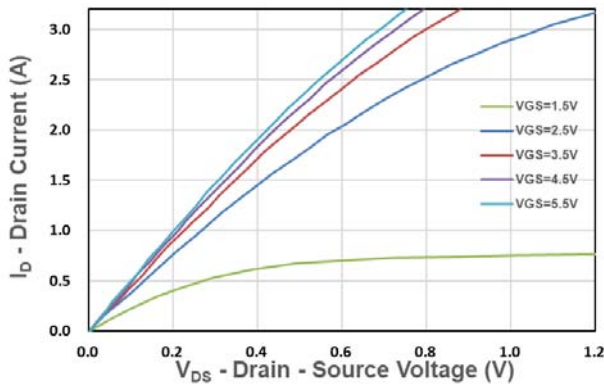


Figure 1. Output Characteristics

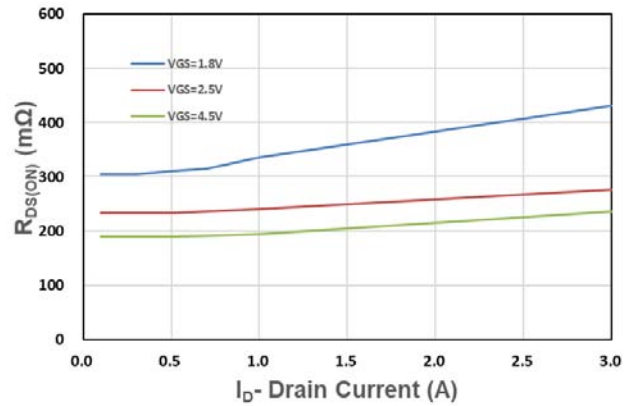


Figure 2. On-Resistance vs. I

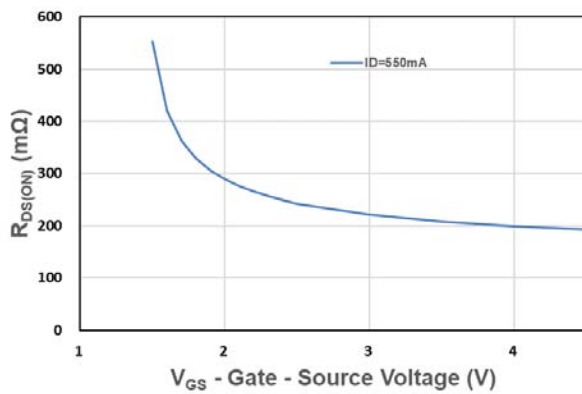


Figure 3. On-Resistance vs. VGS

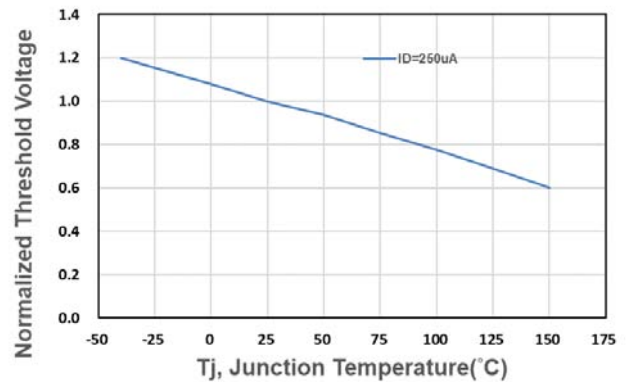


Figure 4. Gate Threshold Voltage

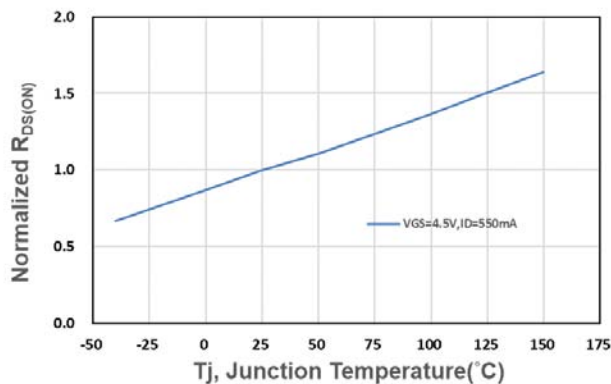


Figure 5. Drain-Source On Resistance

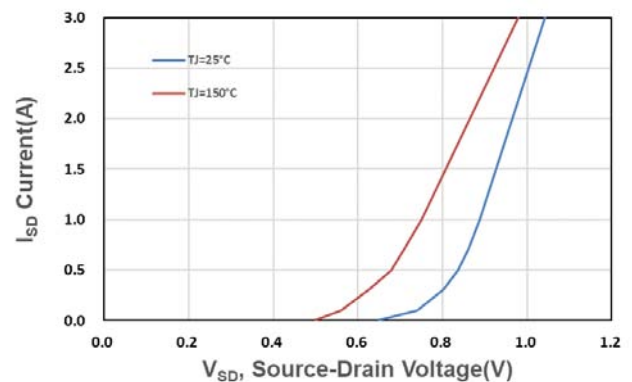
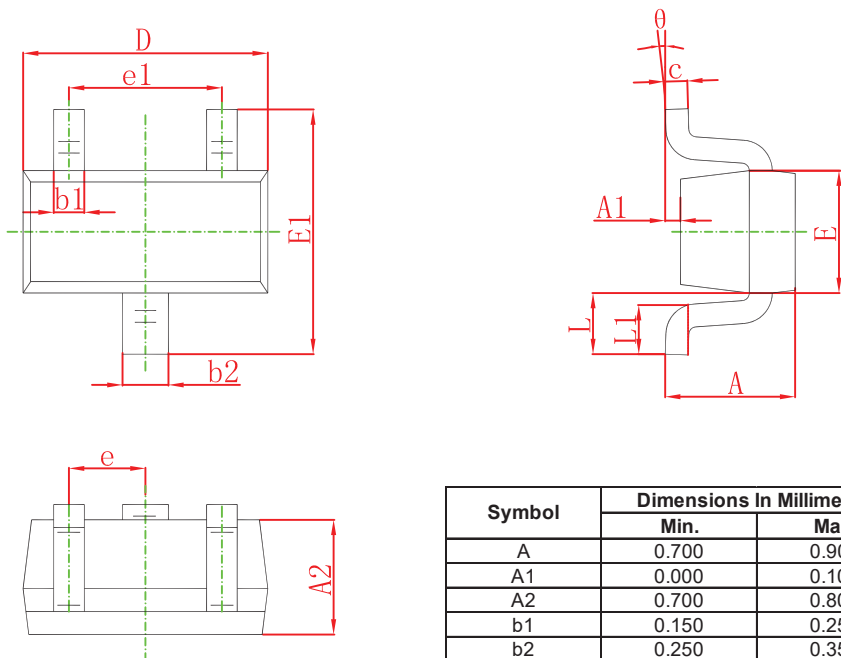
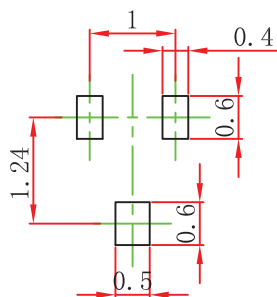


Figure 6. Source-Drain Diode Forward

SOT-523 Package Outline Dimensions


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.350	0.010	0.014
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500 TYP.		0.020 TYP.	
e1	0.900	1.100	0.035	0.043
L	0.400 REF.		0.016 REF.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

SOT-523 Suggested Pad Layout


- Note:
1. Controlling dimension: in millimeters.
 2. General tolerance: ± 0.05 mm.
 3. The pad layout is for reference purposes only.

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