



TMN1004MI

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

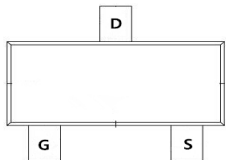
General Features

$V_{DS} = 100V$ $I_D = 4A$

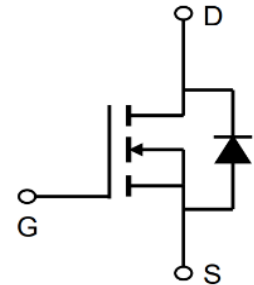
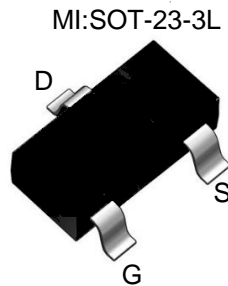
$R_{DS(ON)} = 110m\Omega$ (typ.) @ $V_{GS} = 10V$

100% UIS Tested

100% R_g Tested



Marking:04N10R



Absolute Maximum Ratings (TC=25°C unless otherwise specified)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	100	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_A = 25^\circ C$	I_D	4	A
	$T_A = 70^\circ C$		3.1	
Pulsed Drain Current ^A		I_{DM}	21	A
Total Power Dissipation @ $T_A = 25^\circ C$		P_D	1.2	W
Thermal Resistance Junction-to-Ambient ^B		$R_{\theta JA}$	104	$^\circ C / W$
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	$^\circ C$



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

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.8	3.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=3.0A$		110	140	m Ω
		$V_{GS}=4.5V, I_D=2.0A$		160	200	
Diode Forward Voltage	V_{SD}	$I_S=3.0A, V_{GS}=0V$		0.8	1.2	V
Maximum Body-Diode Continuous Current	I_S				4.0	A
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, f=1MHz$		206		pF
Output Capacitance	C_{oss}			29		
Reverse Transfer Capacitance	C_{rss}			1.4		
Switching Parameters						
Total Gate Charge	Q_g	$V_{GS}=10V, V_{DS}=50V, I_D=3.0A$		4.3		nC
Gate-Source Charge	Q_{gs}			1.5		
Gate-Drain Charge	Q_{gd}			1.1		
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=50V, I_D=3.0A, R_{GEN}=2\Omega$		14.7		ns
Turn-on Rise Time	t_r			3.5		
Turn-off Delay Time	$t_{D(off)}$			20.9		
Turn-off fall Time	t_f			2.7		
Reverse recovery time	t_{rr}	$I_S=3A, di/dt=100 A/\mu s$		32		ns
Reverse recovery charge	Q_{rr}			39		nC
Peak reverse recovery current	I_{rm}			2.1		A

A. Pulse Test: Pulse Width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.



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Typical Performance Characteristics

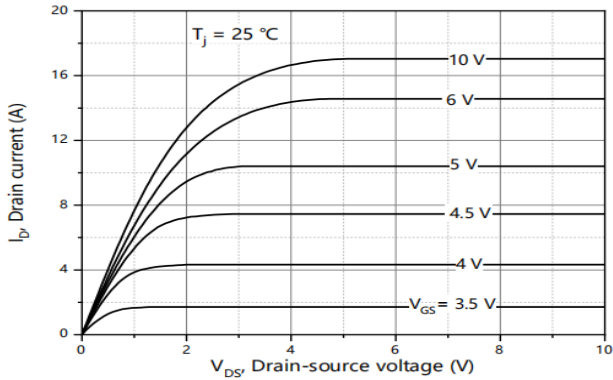


Figure1. Output Characteristics

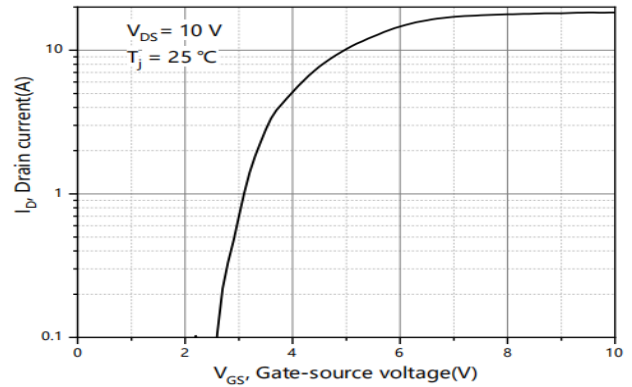


Figure2. Transfer Characteristics

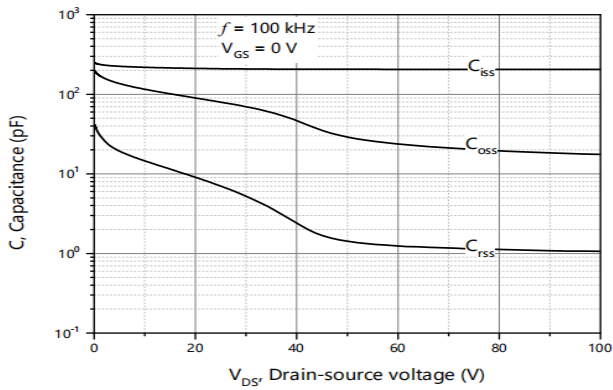


Figure3. Capacitance Characteristics

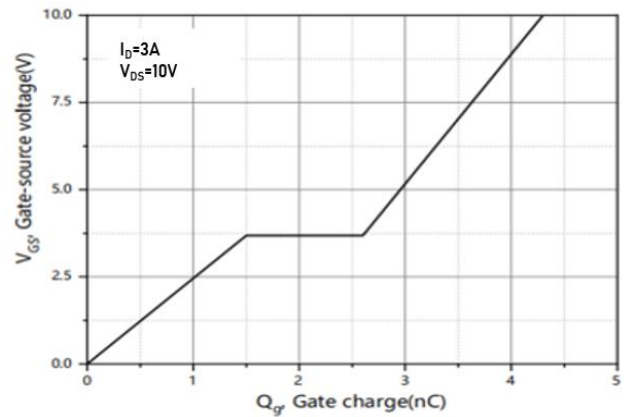


Figure4. Gate Charge

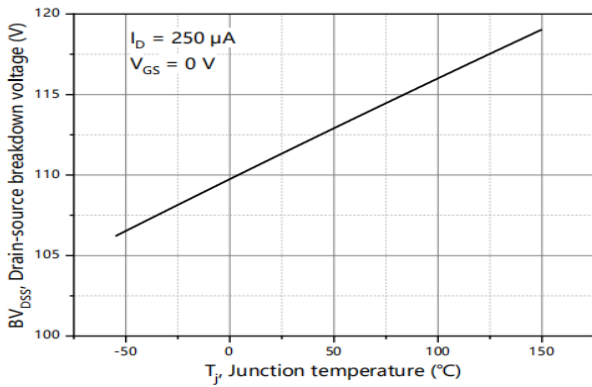


Figure5. Drain-Source breakdown voltage

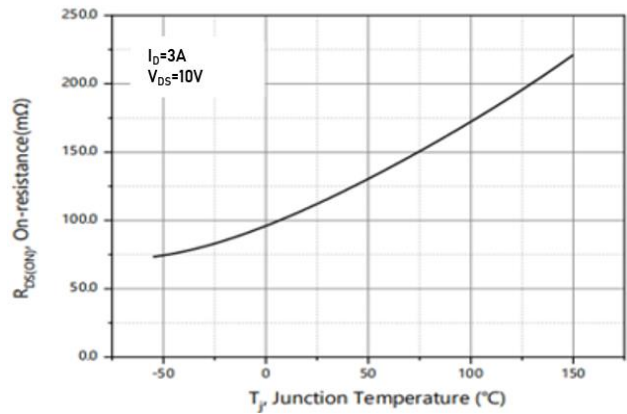


Figure6. Drain-Source on Resistance

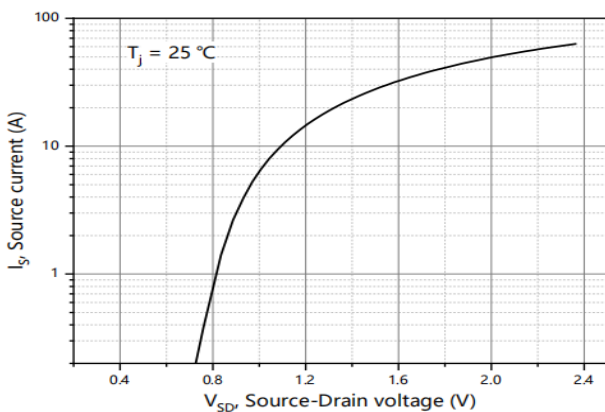


Figure7. Forward characteristic of body diode

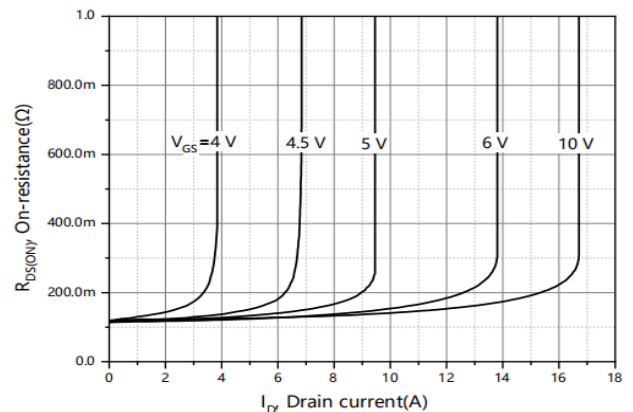


Figure8. Drain-source on-state resistance



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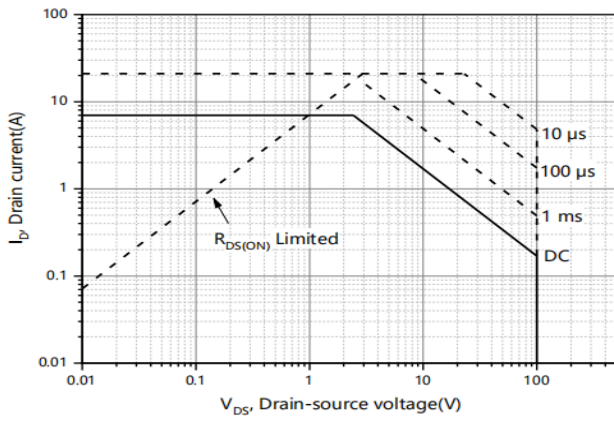


Figure9. Safe Operation Area $T_A=25\text{ }^\circ\text{C}$

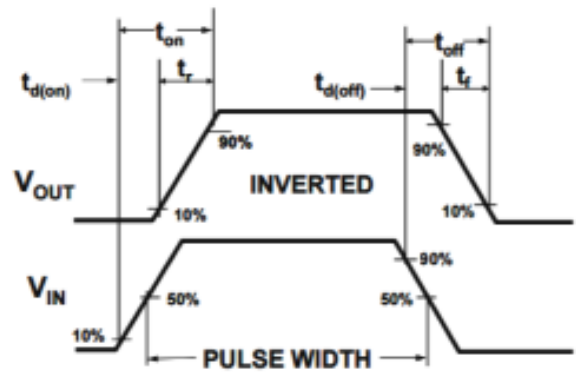
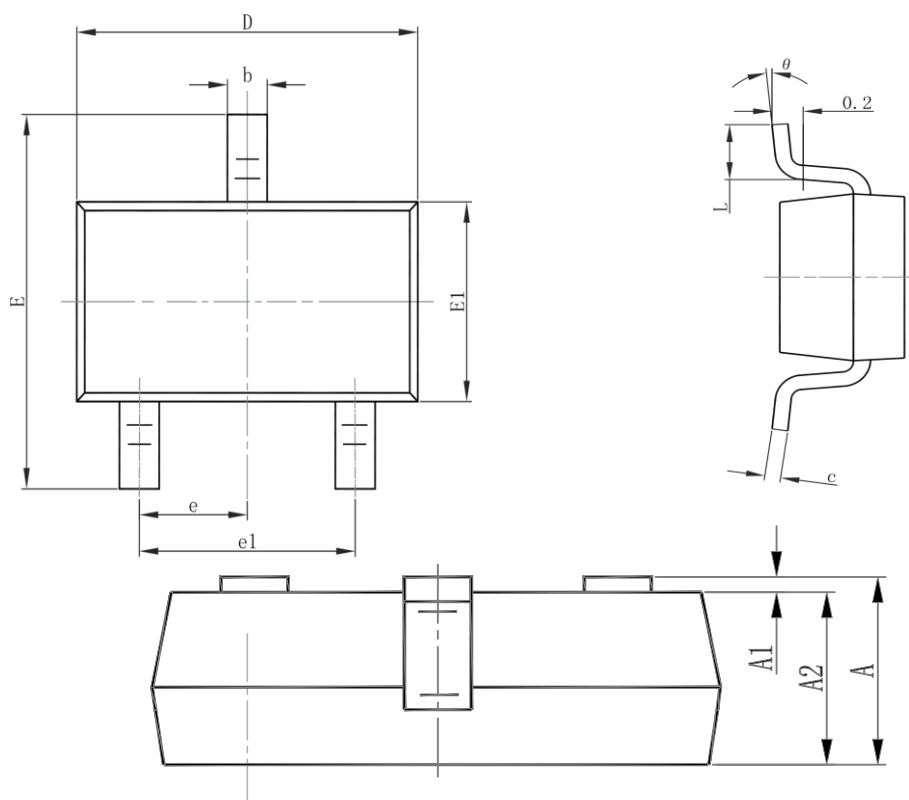


Figure10. Switching wave

Package Information:SOT-23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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