



TM04N03MI

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

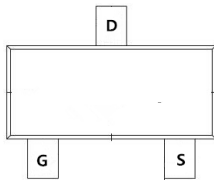
General Features

 $V_{DS} = 30V$ $I_D = 3.8A$ $R_{DS(ON)} = 38m\Omega$ (Typ.) @ $V_{GS} = 10V$

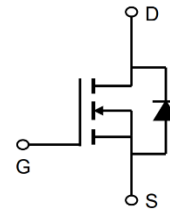
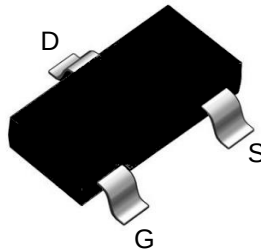
100% UIS Tested

100% R_g Tested

MI:SOT-23-3L



Marking: 4N03 OR 3402

Absolute Maximum Ratings: ($T_C = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Continuous Drain Current- $T_A = 25^\circ C$	3.8	A
	Continuous Drain Current- $T_A = 100^\circ C$	2.8	
I_{DM}	Pulse Drain Current Tested ^{note1}	19	A
P_D	Power Dissipation- $T_A = 25^\circ C$	1.25	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	100	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Sourtce Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	30	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =30V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 12V, V _{DS} =0A	---	---	± 100	nA
On Characteristics						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	0.5	0.9	1.4	V
R _{DS(ON)}	Drain-Source On Resistance ^{note2}	V _{GS} =10V, I _D =4A	---	38	42	m Ω
		V _{GS} =4.5V, I _D =3A	---	43	48	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	280	---	pF
C _{OSS}	Output Capacitance		---	30	---	
C _{rSS}	Reverse Transfer Capacitance		---	25	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DS} =15V, I _D =2A, V _{GS} =4.5V, R _{GEN} =3 Ω	---	15	---	ns
t _r	Rise Time		---	42	---	ns
t _{d(off)}	Turn-Off Delay Time		---	16	---	ns
t _f	Fall Time		---	10	---	ns
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =15V, I _D =4.2A	---	2.6	---	nC
Q _{gs}	Gate-Source Charge		---	0.6	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	0.9	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Forward Voltage	V _{GS} =0V, I _S =4.2A	---	---	1.2	V
I _S	Source drain current(Body Diode)	---	---	---	4.0	A
I _{SM}	Source Diode Forward Current	---	---	---	16	A

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



Typical Characteristics: ($T_C=25^\circ\text{C}$ unless otherwise noted)

Figure 1: Output Characteristics

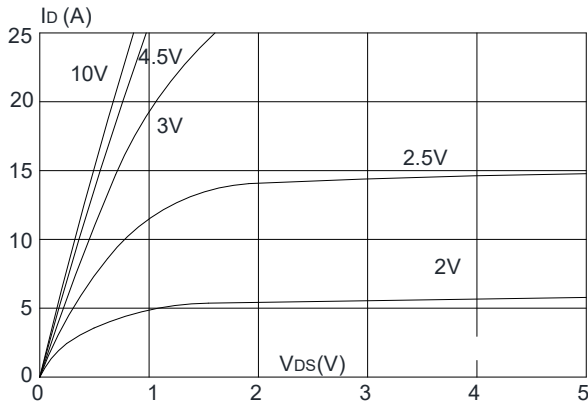


Figure 2: Typical Transfer Characteristics

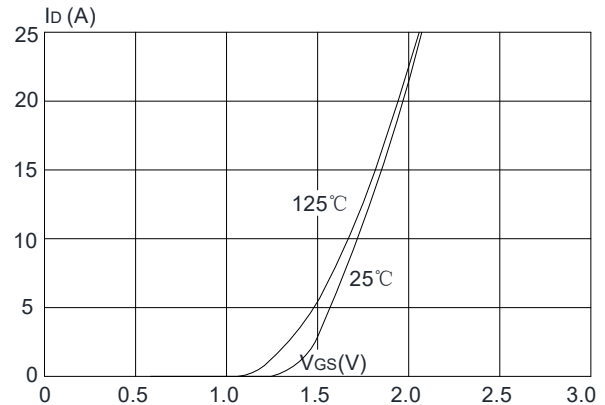


Figure 3: On-resistance vs. Drain Current

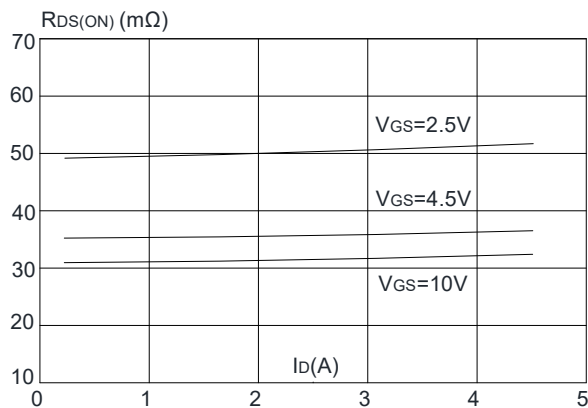


Figure 4: Body Diode Characteristics

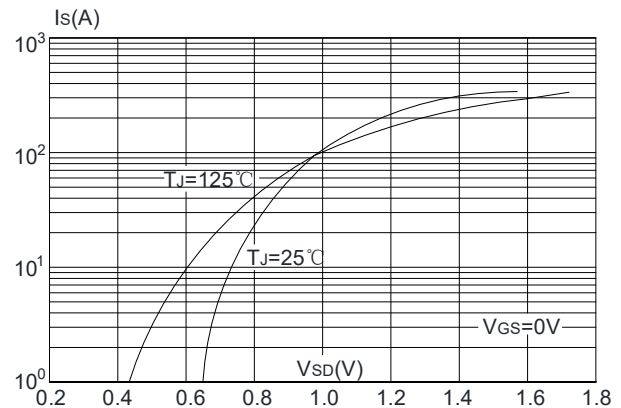


Figure 5: Gate Charge Characteristics

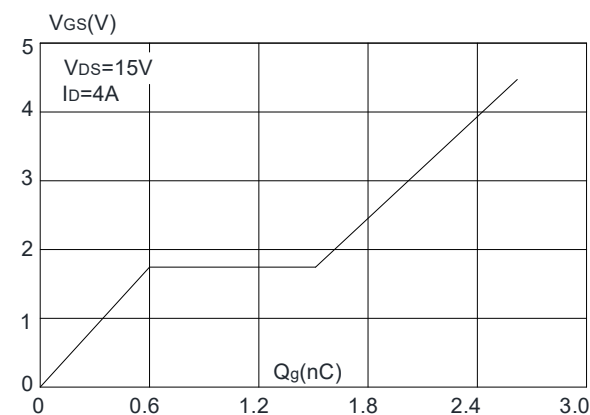
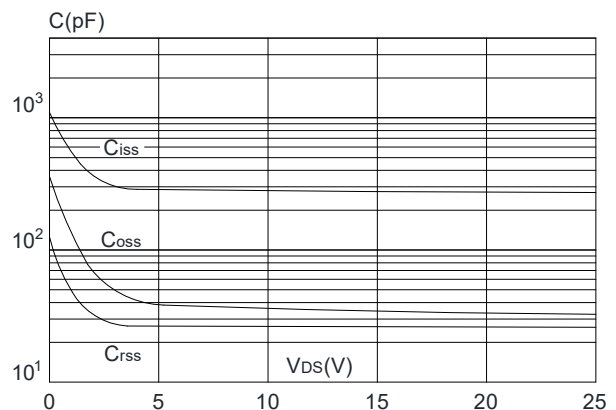
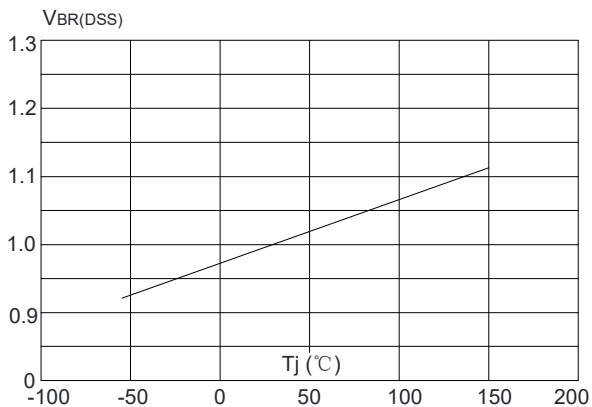
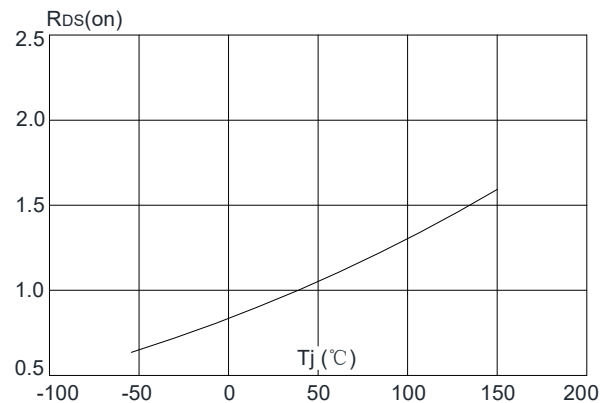
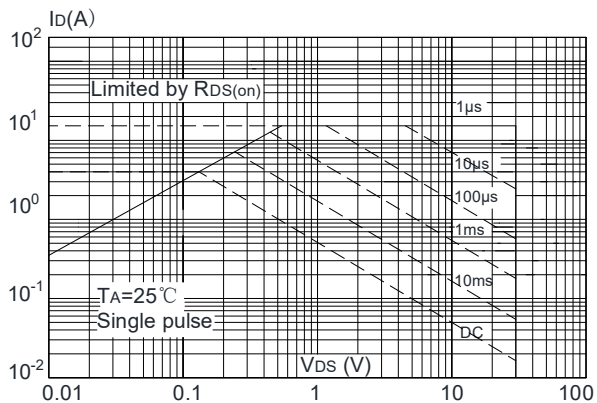
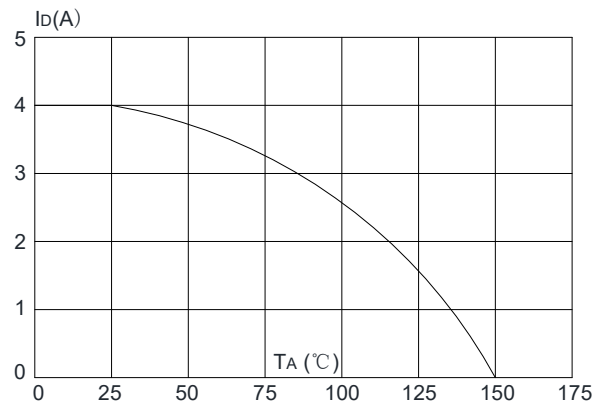
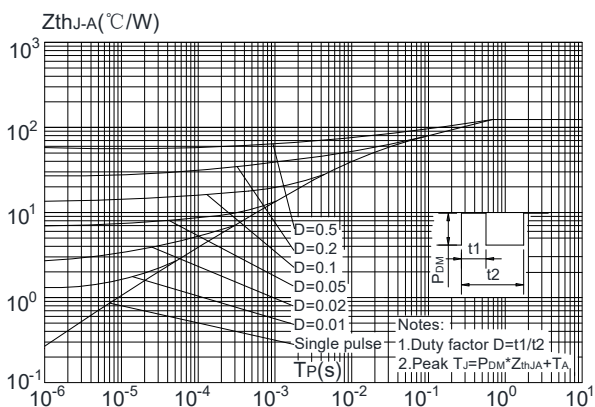
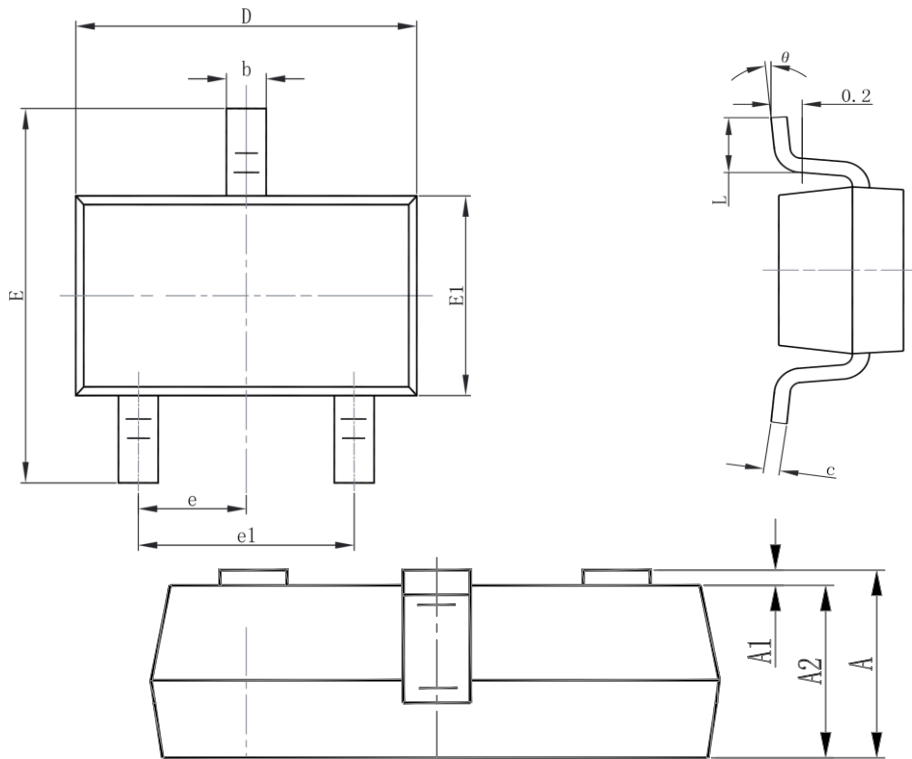


Figure 6: Capacitance Characteristics



**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature**Figure 8:** Normalized on Resistance vs. Junction Temperature**Figure 9:** Maximum Safe Operating Area**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Package Mechanical Data: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°