

N-Channel MOSFET

RC2302A

■ Features

- 20V, 3.0A, $R_{DS(ON)} = 35m\Omega @ V_{GS} = 4.5V$
- Improved dv/dt capability
- Fast switching

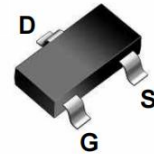
■ Applications

- Notebook
- Load Switch
- Power Management

V_{DSS}	20V
I_D	3.0A
$R_{DS(ON)}$	48mΩ @ $V_{GS}=2.5V$
$R_{DS(ON)}$	35mΩ @ $V_{GS}=4.5V$

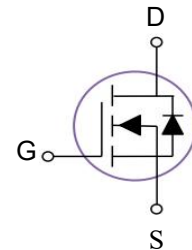
■ Outline

SOT-23



■ Equivalent

- (1) Gate
(2) Source
(3) Drain



■ Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±10	V
Drain Current-Continuous ^(Note2)	$T_C=25^{\circ}C$	I_D	3.0	A
	$T_C=70^{\circ}C$		2.6	A
-Pulsed ^(Note 1· Note 2)		I_{DM}	12	A
Maximum Power Dissipation	$T_C=25^{\circ}C$	P_D	1.4	W
	$T_C=70^{\circ}C$		1	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C
Thermal Resistance Junction-Ambient		$R_{\theta JA}$	60	°C /W

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V , I _D =250uA	20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V , V _{GS} =0V			1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±12V , V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250uA	0.5		1.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =2.5V , I _D =2A		48	60	mΩ
		V _{GS} =4.5V , I _D =3.0A		35	45	mΩ
DYNAMIC CHARACTERISTICS ^{Note4}						
Input Capacitance	C _{ISS}	V _{DS} =10V , V _{GS} =0 V , f =1.0MHz		300		pF
Output Capacitance	C _{OSS}			70		pF
Reverse Transfer Capacitance	C _{RSS}			50		pF
Total Gate Charge	Q _g	V _{DS} =10V , I _D =3A , V _{GS} =4.5V		3.5		nC
Gate-Source Charge	Q _{gs}	V _{DS} =10V , I _D =3A , V _{GS} =4.5V		0.5		nC
Gate-Drain Charge	Q _{gd}			1.5		nC
SWITCHING CHARACTERISTICS ^{Note4}						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =10V , I _D =3A , V _{GS} =4.5V , R _G =25Ω		4		ns
Rise Time	tr			10		ns
Turn-Off Delay Time	t _{D(OFF)}			20		ns
Fall Time	tf			8		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V , I _S =1A			1	V

Notes:

- 1、Pulse Test Width < 300us, Duty Cycle < 2%
- 2、Drain current limited by maximum junction temperature.
- 3、Guaranteed by design, not subject to production testing.

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Typical Performance Characteristics

Fig.1 Continuous Drain Current vs. TC

T_C , Case Temperature ($^{\circ}\text{C}$)

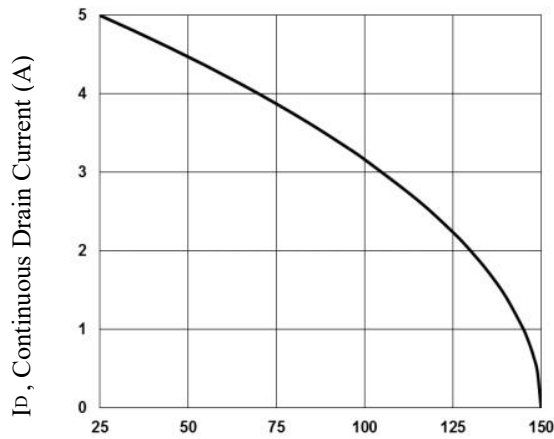


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

T_J , Junction Temperature ($^{\circ}\text{C}$)

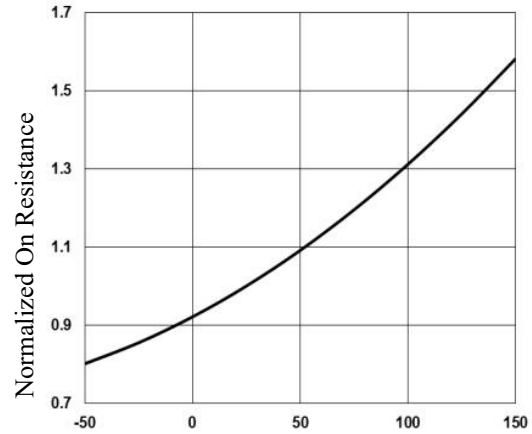


Fig.3 Normalized V_{th} vs. T_J

T_J , Junction Temperature ($^{\circ}\text{C}$)

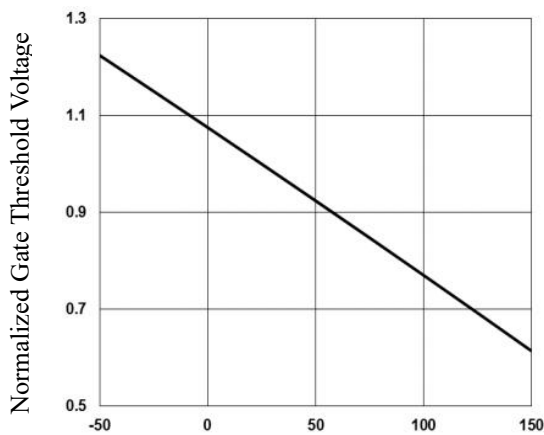


Fig.4 Gate Charge Waveform

Q_g , Gate Charge (nC)

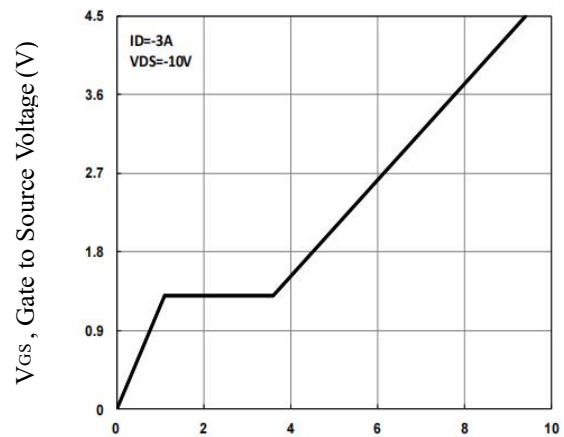


Fig.5 Typical Output Characteristics

V_{DS} , Drain to Source Voltage (V)

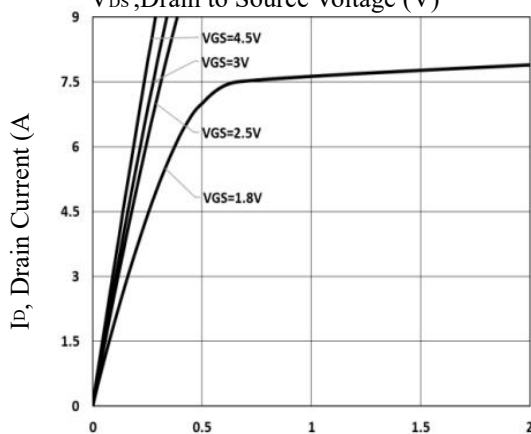
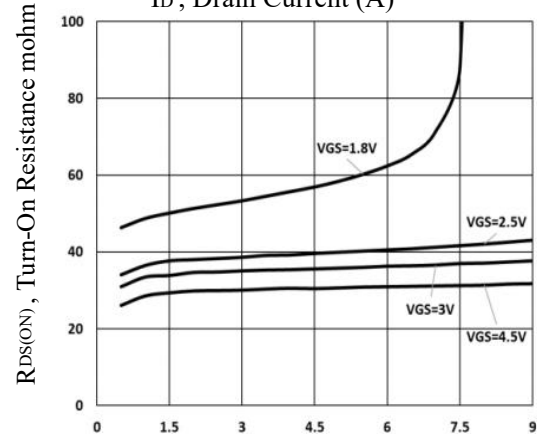


Fig.6 Turn-On Resistance vs. I_D

I_D , Drain Current (A)



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Fig.7 Maximum Safe Operation Area

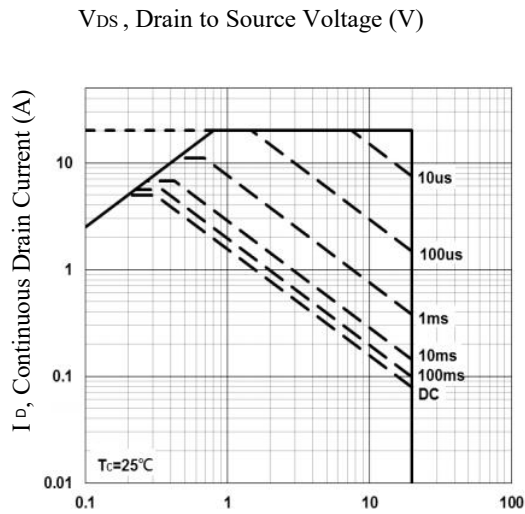


Fig.8 Normalized Transient Impedance

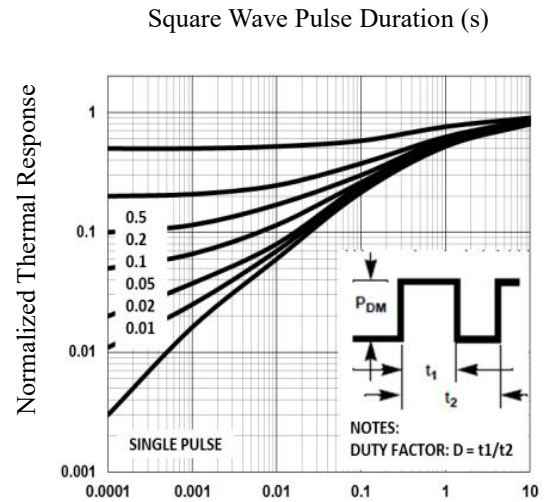


Fig.9 Switching Time Waveform

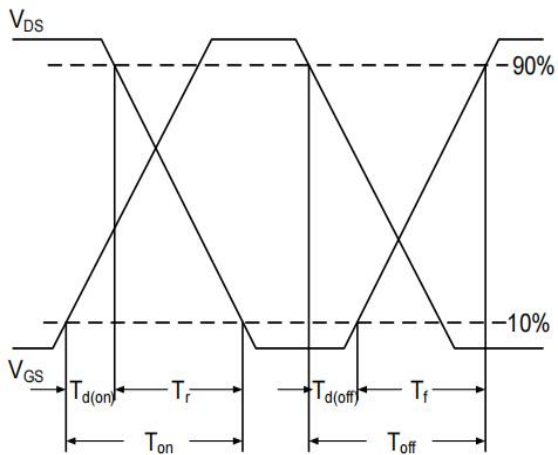
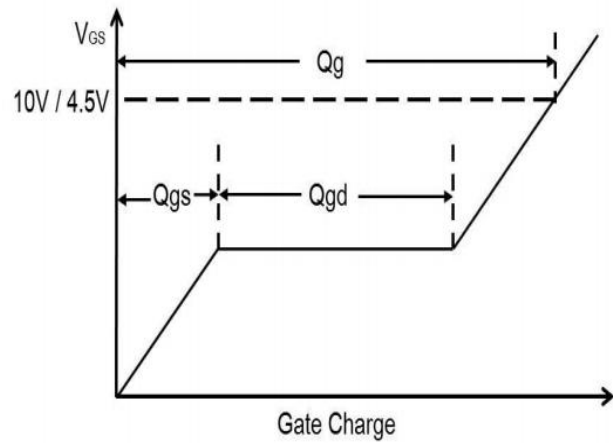
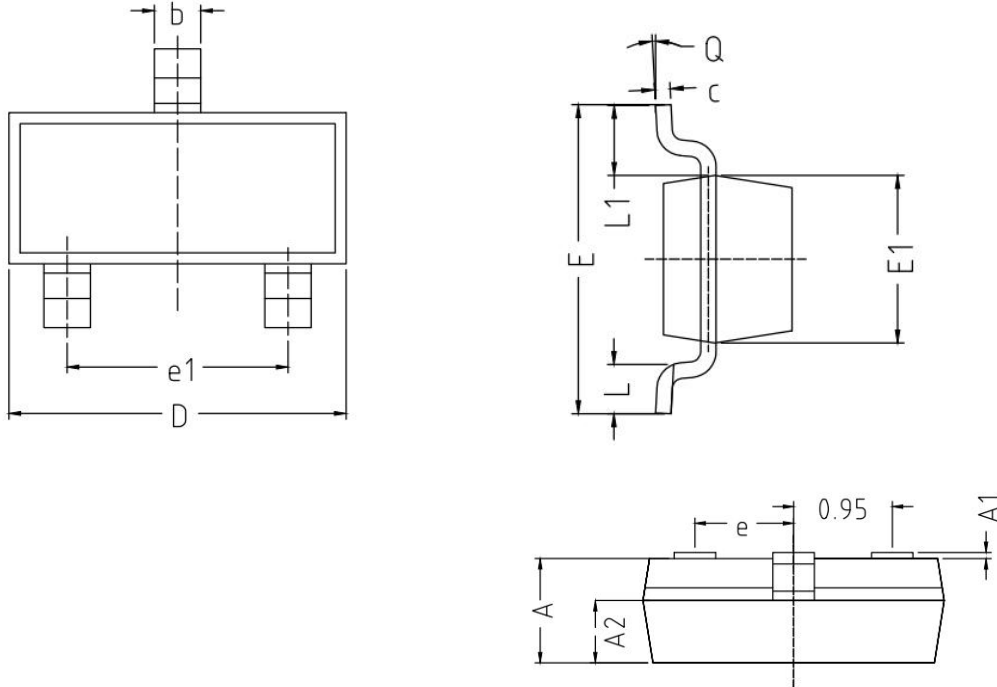


Fig.10 Gate Charge Waveform



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■ SOT-23 Package Information



SOT-23 PKG			
SYMBOL	MIN	TYP	MAX
A	0.950	1.000	1.050
A1	0.000	0.050	0.100
A2	0.570	0.600	0.630
b	0.350	0.400	0.450
c	0.100	0.130	0.200
D	2.800	2.900	3.000
E	2.250	2.400	2.550
E1	1.200	1.300	1.400
e	0.950 TYP		
e1	1.800	1.900	2.000
L	0.290	0.390	0.490
L1	0.550REF		
Q	0°	4°	8°