AT010SP020MSP

P-Channel Enhancement Mode MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-20V	25mΩ@-4.5V	-10A
	31mΩ@-2.5V	

Feature

- Advanced trench technology
- Excellent $R_{DS(ON)}$
- Low gate charge
- Surface mount package

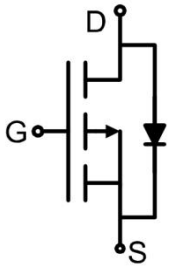
Application

- Battery protection
- Load switch
- Uninterruptible power supply

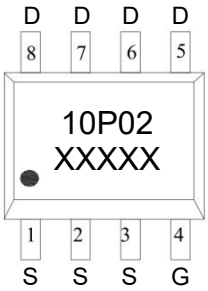
Package

SOP-8

Circuit diagram



Marking



Absolute maximum ratings (T_C=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current[1] (V_{GS}=-4.5V,T_A=25℃)	I_D	-10	A
Continuous Drain Current[1] (V_{GS}=-4.5V,T_A=70℃)	I_D (70℃)	-8.4	A
Pulsed Drain Current[2]	I_{DM}	-54	A
Power Dissipation[3](T_A=25℃)	P_D	1.31	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	7.4	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55 ~ +150	℃

Electrical characteristics (T_J=25 °C, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} =0V, I_D =-250μA	-20			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =-16V,V_{GS} =0V			-1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±12V, V_{DS} =0V			±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA	-0.5	-0.6	-1.2	V
Drain-source on-resistance[2]	$R_{DS(on)}$	V_{GS} =-4.5V, I_D =-5A		21	25	mΩ
		V_{GS} =-2.5V, I_D =-3A		26	31	
Forward Transconductance	g_{FS}	V_{DS} =-5V, I_D =-3A		12.8		S
Dynamic characteristics[5]						
Input Capacitance	C_{iss}	V_{DS} =-15V,V_{GS} =0V,f =1MHz		857		pF
Output Capacitance	C_{oss}			114		
Reverse Transfer Capacitance	C_{rss}			108		
Total Gate Charge	Q_g	V_{DS} =-15V,V_{GS} =-4.5V,I_D =-3A		10.2		nC
Gate-Source Charge	Q_{gs}			1.89		
Gate-Drain Charge	Q_{gd}			3.1		
Turn-on delay time	$t_{d(on)}$	V_{DD}=-10V,V_{GS}=-4.5V, I_D =-3A R_G=3.3Ω		5.6		nS
Turn-on rise time	t_r			40.8		
Turn-off delay time	$t_{d(off)}$			33.6		
Turn-off fall time	t_f			18		
Source-Drain Diode characteristics						
Diode Forward Current[1,4]	I_S	V_G =V_D =0V,Force Current			-10	A
Diode Forward voltage[2]	V_{SD}	V_{GS} =0V, I_S=-1A			-1	V
Reverse Recovery Time	t_{rr}	I_F=-3A,di/dt =100A/μs		21.8		nS
Reverse Recovery Charge	Q_{rr}			6.9		nC

Notes:

1) The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2) The data tested by pulsed , pulse width △ 300us , duty cycle △ 2%.

3) The power dissipation is limited by 150℃ junction temperature.

4) The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

5) Guaranteed by design, not subject to production testing.

Typical Characteristics

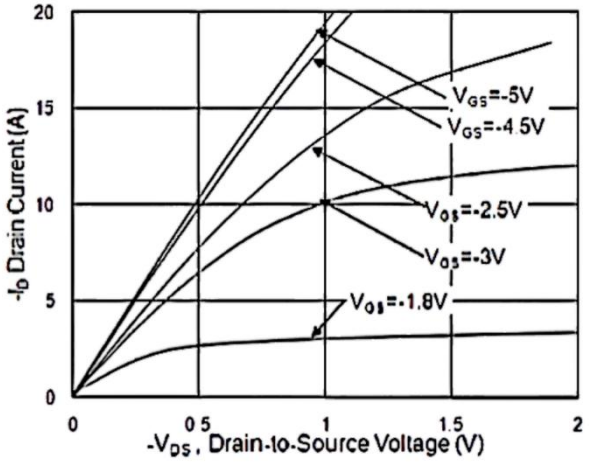


Fig.1 Typical Output Characteristics

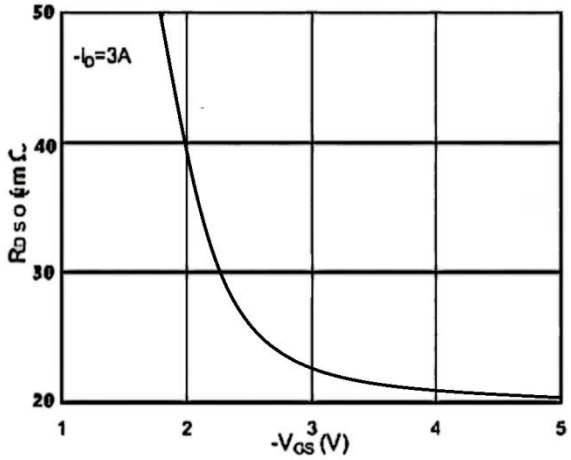


Fig.2 On-Resistance vs. G-S Voltage

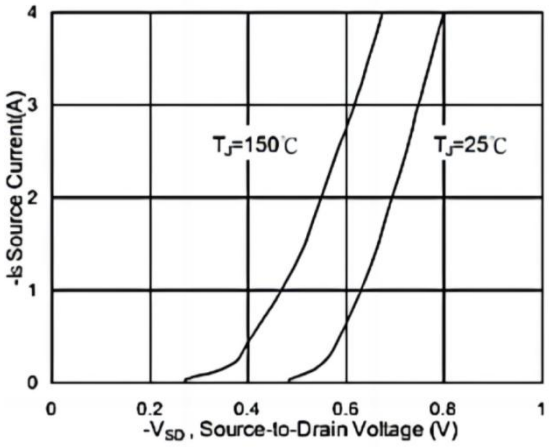


Fig.3 Forward Characteristics of Reverse

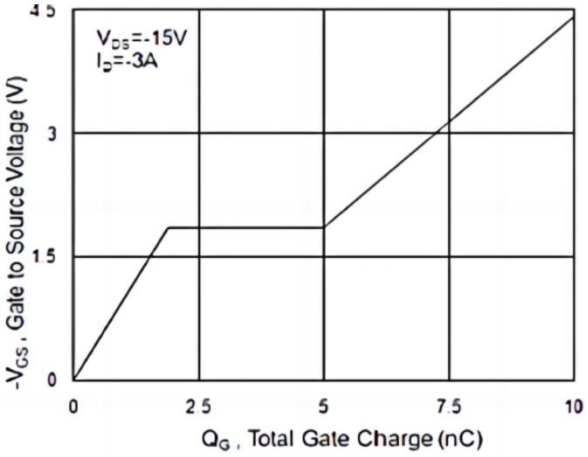


Fig.4 Gate-charge Characteristics

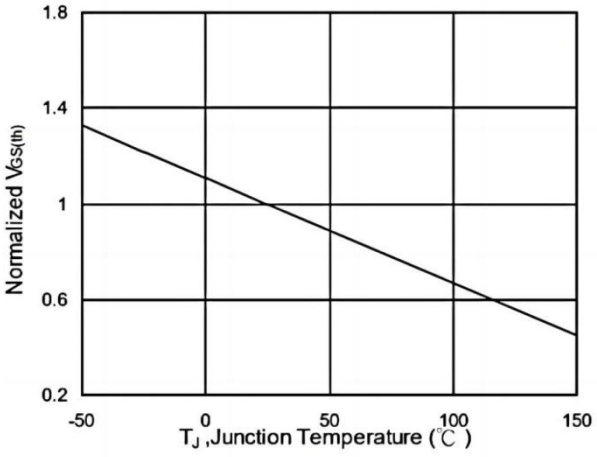


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

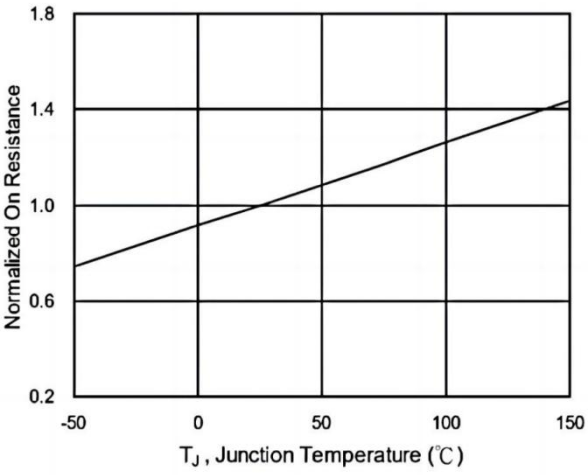


Fig.6 Normalized R_{DSON} vs. T_J

Typical Characteristics

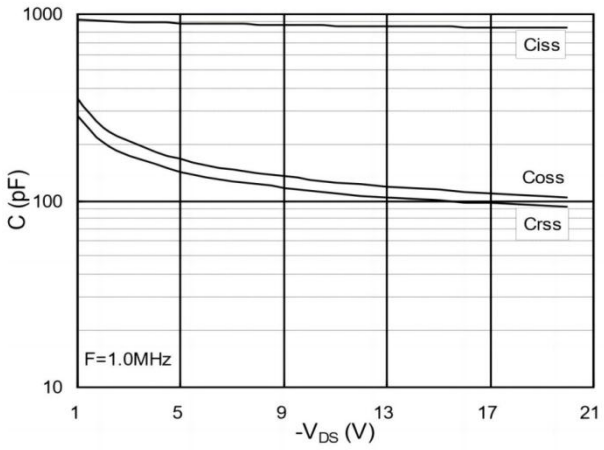


Fig.7 Capacitance

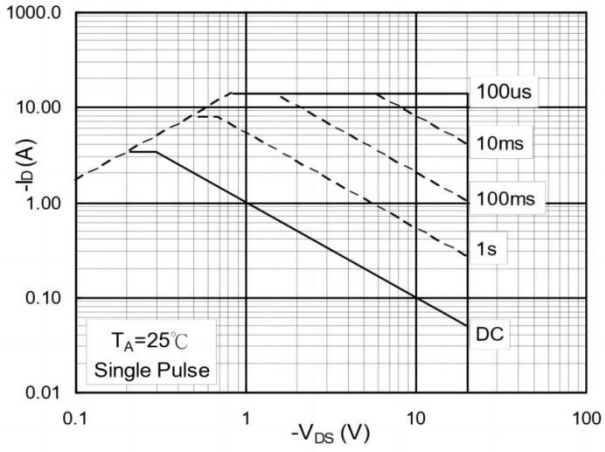


Fig.8 Safe Operating Area

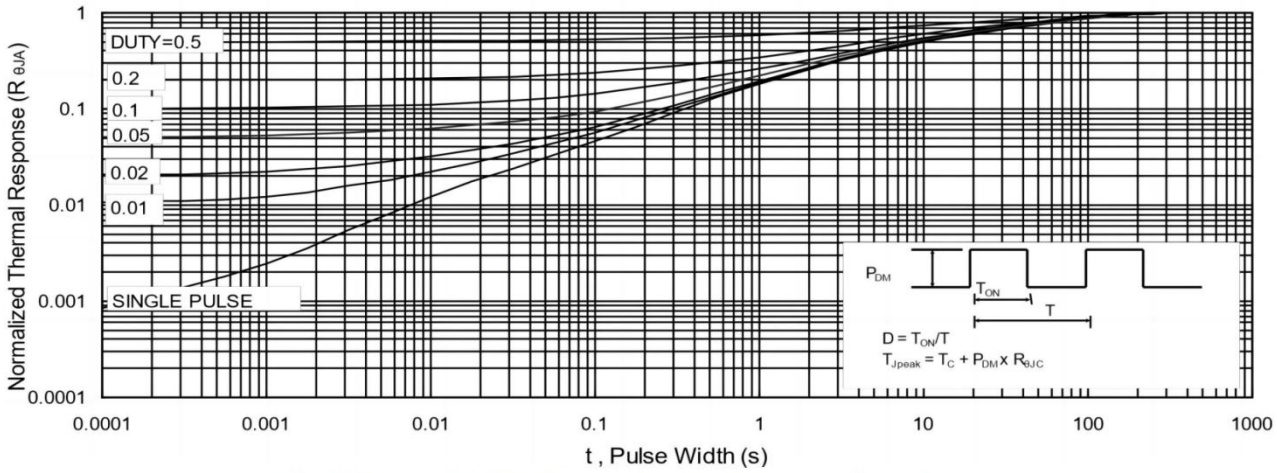


Fig.9 Normalized Maximum Tansient Thermal Impedance

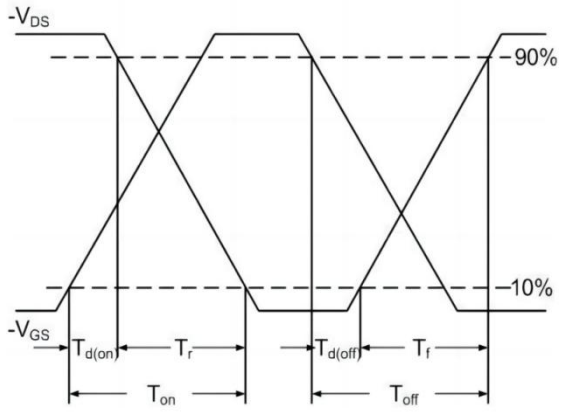


Fig.10 Switching Time Waveform

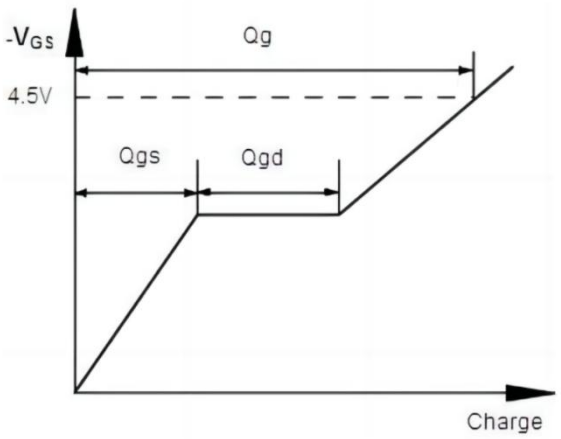
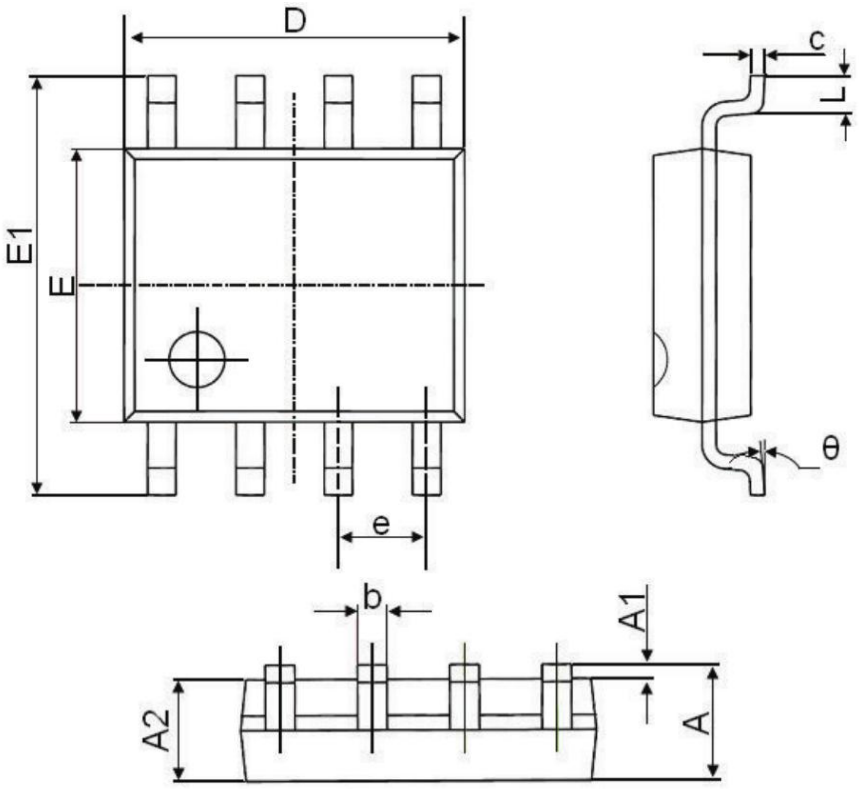


Fig.11 Gate Charge Waveform

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.020	0.250	0.001	0.010
A2	1.425	1.475	0.056	0.058
b	0.300	0.500	0.012	0.020
c	0.150	0.250	0.006	0.010
D	4.800	5.200	0.189	0.205
E	3.800	4.200	0.150	0.165
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°