

-100V P-Channel Enhancement Mode MOSFET

Description

The AP01P10I uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = -100V$ $I_D = -0.9A$

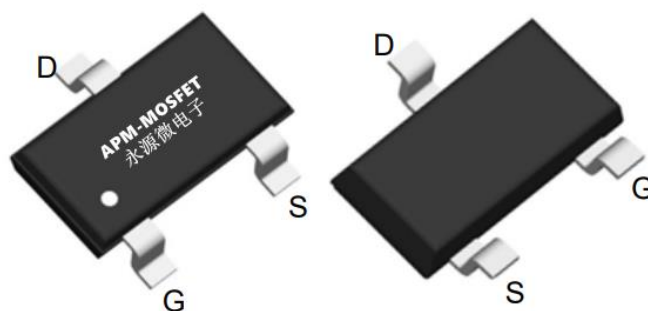
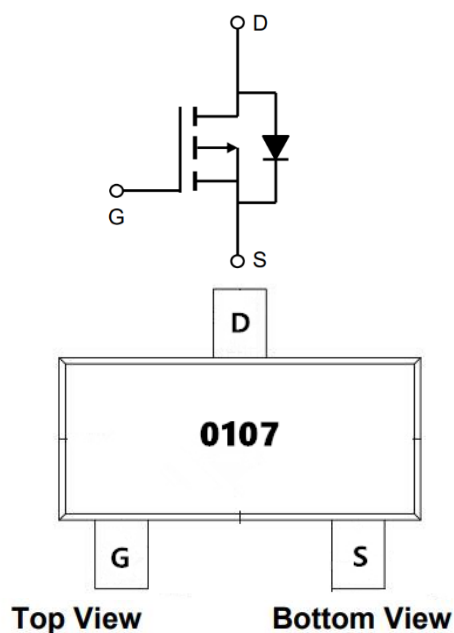
$R_{DS(ON)} < 650m\Omega$ @ $V_{GS}=10V$ (Type: 500m Ω)

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP01P10I	SOT23L	0107	3000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10V^1$	-0.9	A
$I_D @ T_A=70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ -10V^1$	-0.7	A
I_{DM}	Pulsed Drain Current ²	-1.8	A
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation ³	1	W
TSTG	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	125	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	80	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-100	-111	---	V
$\Delta BVDSS/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=-1\text{mA}$	---	-0.0624	---	$V/^{\circ}\text{C}$
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=-10V$, $I_D=-0.8A$	---	500	650	$m\Omega$
		$V_{GS}=-4.5V$, $I_D=-0.4A$	---	560	700	$m\Omega$
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.0	-1.5	-2.5	V
$\Delta V_{GS}(\text{th})$	VGS(th) Temperature Coefficient		---	4.5	---	$mV/^{\circ}\text{C}$
IDSS	Drain-Source Leakage Current	$V_{DS}=-80V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	10	μA
		$V_{DS}=-80V$, $V_{GS}=0V$, $T_J=55^{\circ}\text{C}$	---	---	100	μA
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=-5V$, $I_D=-0.8A$	---	3	---	S
Rg	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	16	32	Ω
Qg	Total Gate Charge (-4.5V)	$V_{DS}=-15V$, $V_{GS}=-4.5V$, $I_D=-0.5A$	---	4.5	---	nC
Qgs	Gate-Source Charge		---	1.14	---	nC
Qgd	Gate-Drain Charge		---	1.5	---	nC
Td(on)	Turn-On Delay Time	$V_{DD}=-50V$, $V_{GS}=-10V$, $R_G=3.3\Omega$, $I_D=-0.5A$	---	13.6	---	ns
Tr	Rise Time		---	6.8	---	ns
Td(off)	Turn-Off Delay Time		---	34	---	ns
Tf	Fall Time		---	3	---	ns
Ciss	Input Capacitance	$V_{DS}=-15V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	553	---	pF
Coss	Output Capacitance		---	29	---	pF
Crss	Reverse Transfer Capacitance		---	20	---	pF
IS	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	-0.9	A
ISM	Pulsed Source Current ^{2,4}		---	---	-1.8	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^{\circ}\text{C}$	---	---	-1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The power dissipation is limited by 150°C 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.

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Typical Characteristics

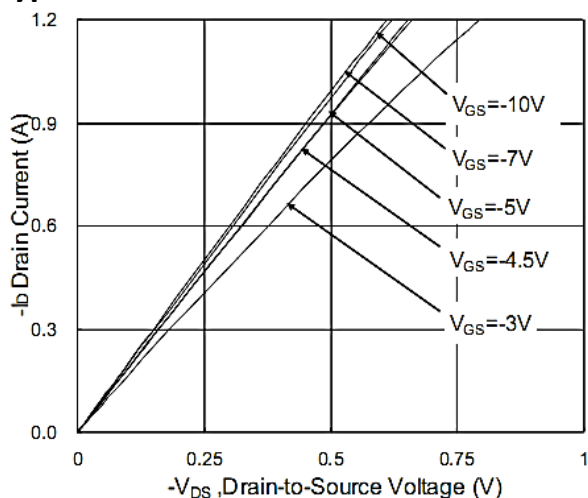


Fig.1 Typical Output Characteristics

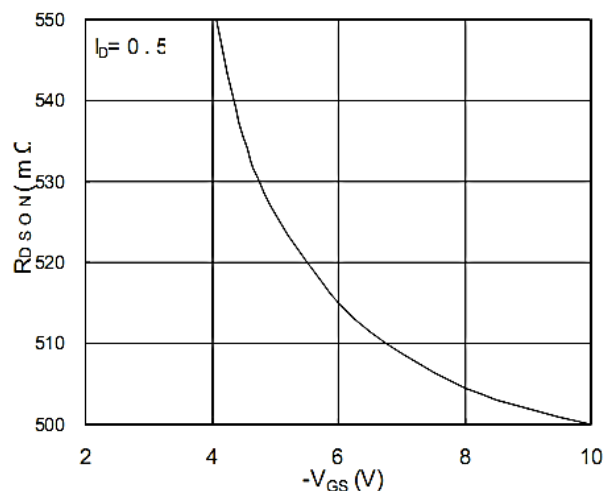


Fig.2 On-Resistance vs. Gate-Source

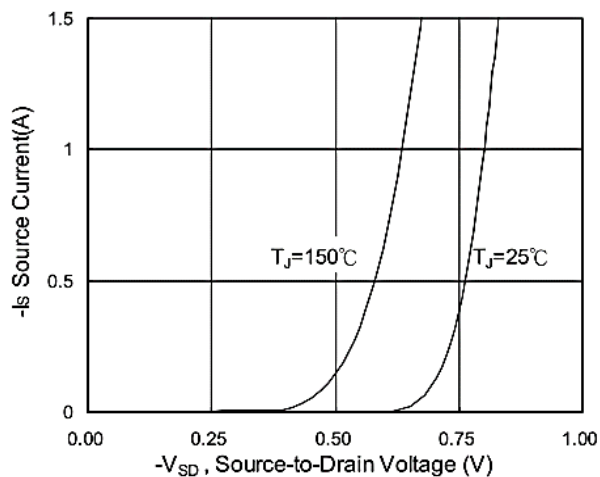


Fig.3 Forward Characteristics Of Reverse

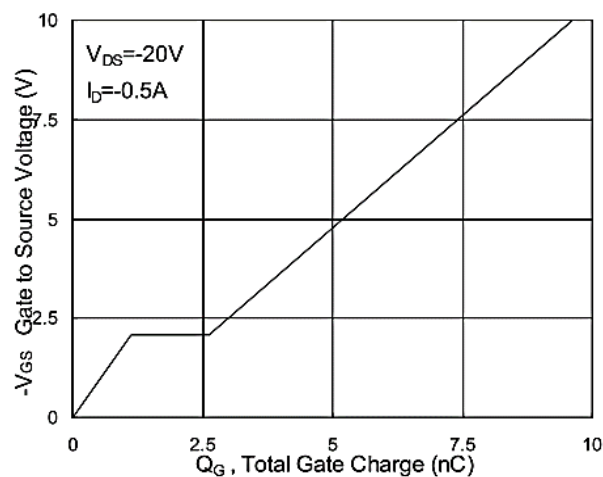


Fig.4 Gate-Charge Characteristics

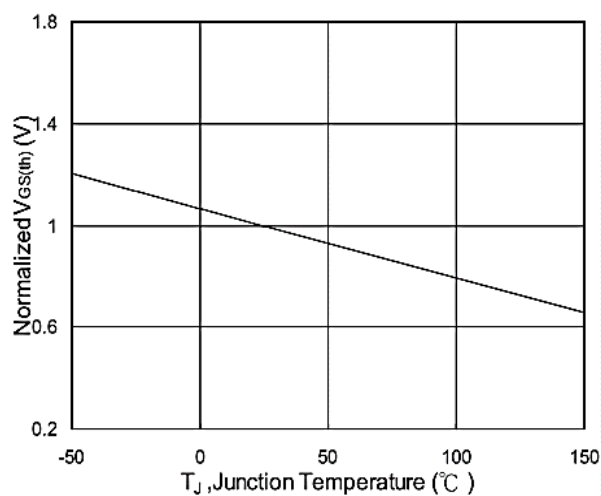


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

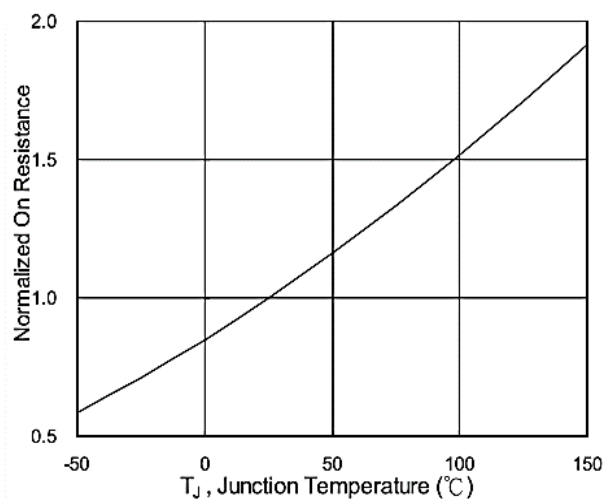


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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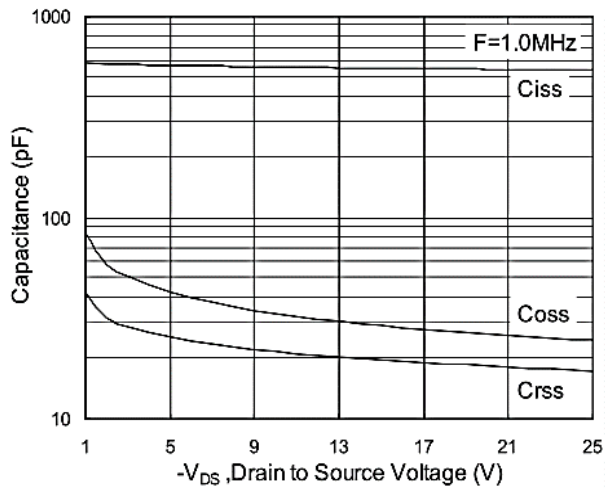


Fig.7 Capacitance

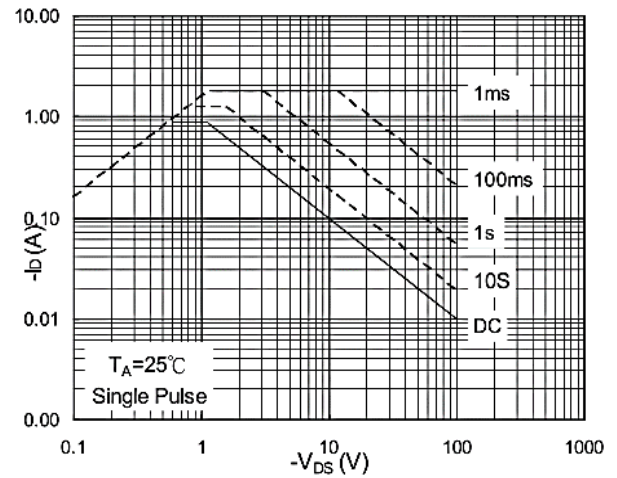


Fig.8 Safe Operating Area

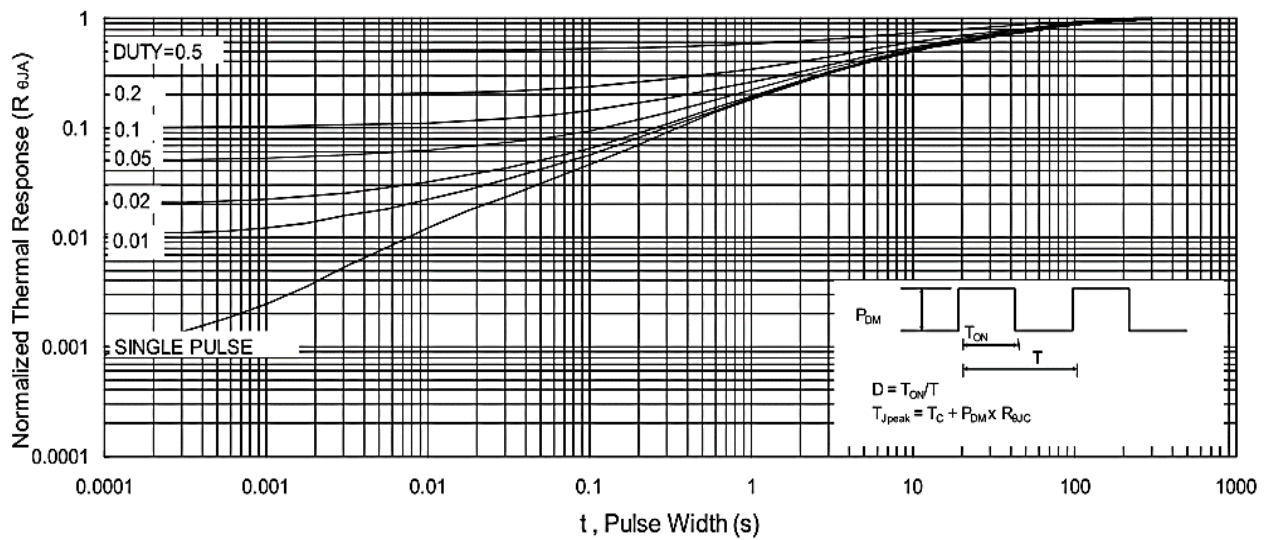


Fig.9 Normalized Maximum Transient Thermal Impedance

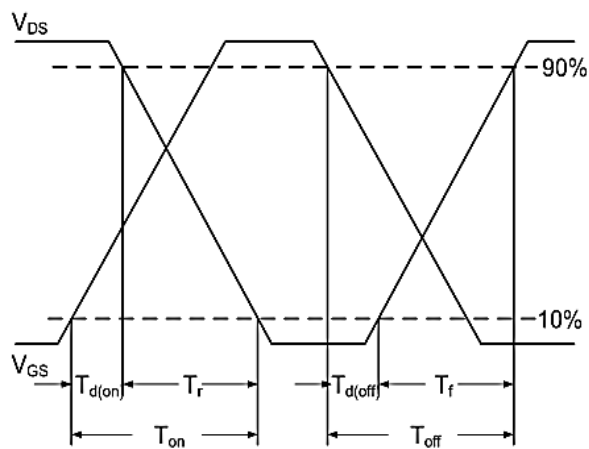


Fig.10 Switching Time Waveform

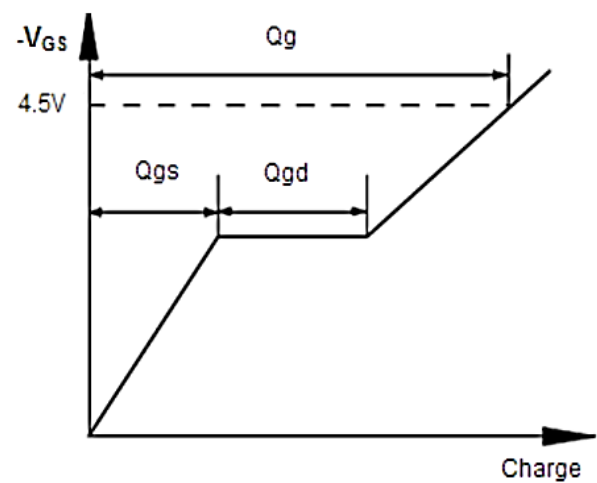
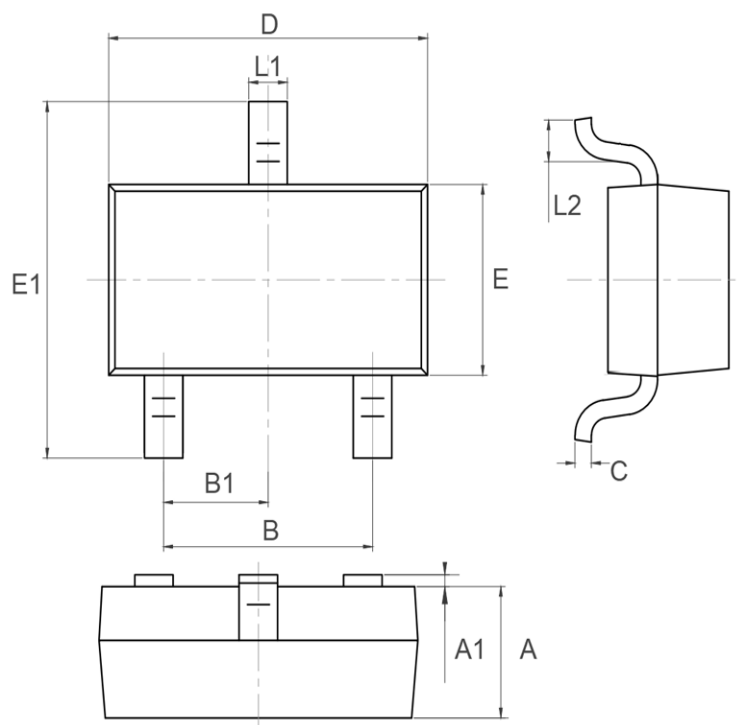


Fig.11 Gate Charge Waveform

Package Mechanical Data-SOT23L-Single



Symbol	Dim in mm		
	Min	Typ	Max
A	0.9	1	1.1
A1	0	0.05	0.1
B	1.8	1.9	2
B1	0.95TYP		
C	0.08	0.115	0.15
D	2.8	2.9	3
E	1.2	1.3	1.4
E1	2.25	2.4	2.55
L1	0.3	0.4	0.5
L2	0.2	0.35	0.5

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Edition	Date	Change
REV1.0	2020/12/1	Initial release
REV1.1	2025/11/22	Change Logo

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