

-30V P-Channel Enhancement Mode MOSFET

Description

The AP3407AI 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

$V_{DS} = -30V$ $I_D = -5.2A$

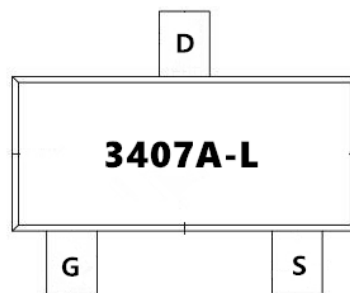
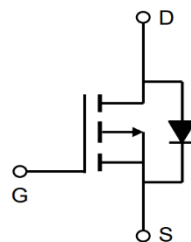
$R_{DS(ON)} < 45m\Omega$ @ $V_{GS}=10V$ (Type: 35m Ω)

Application

Battery protection

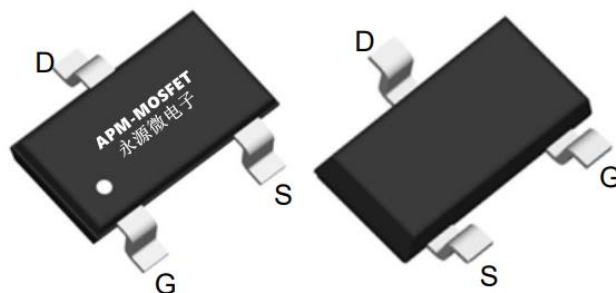
Load switch

Uninterruptible power supply



Top View

Bottom View



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP3407AI	SOT23L	3407	3000

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

Symbol	Parameter	Max.	Units
V_{DSS}	Drain-Source Voltage	-30	V
V_{GSS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-5.2	A
$I_D @ T_C=100^{\circ}C$	Continuous Drain Current, $V_{GS} @ -10V^1$	-3.6	A
I_{DM}	Pulsed Drain Current ^{note1}	-20.4	A
P_D	Power Dissipation $T_A = 25^{\circ}C$	2.15	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	104	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance from Junction to Ambient ²	125	$^{\circ}C/W$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^{\circ}C$



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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}$, $I_D=-250\mu\text{A}$	-30	-	-	V
IDSS	Zero Gate Voltage Drain Current	$V_{DS}=-30\text{V}$, $V_{GS}=0\text{V}$	-	-	-1	μA
IGSS	Gate-Source Leakage	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$	-	-	± 100	nA
VGS(th)	Gate-Source Threshold voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-1	-1.5	-2.5	V
RDS(on)	Drain-Source on-State Resistance ³	$V_{GS}=-10\text{V}$, $I_D=-4.1\text{A}$	-	35	45	m Ω
		$V_{GS}=-4.5\text{V}$, $I_D=-3\text{A}$	-	48	65	
Ciss	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=-15\text{V}$, $f=1.0\text{MHz}$	-	530	-	pF
Coss	Output Capacitance		-	70	-	
Crss	Reverse Transfer Capacitance		-	56	-	
Qg	Total Gate Charge	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $I_D=-4.1\text{A}$	-	6.8	-	nC
Qgs	Gate-Source Charge		-	1.0	-	
Qgd	Gate-Drain Charge		-	1.4	-	
td(on)	Turn-on Delay Time	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $R_L=15\Omega$, $R_{GEN}=2.5\Omega$	-	14	-	ns
t _r	Rise Time		-	61	-	
td(off)	Turn-off Delay time		-	19	-	
t _f	Fall Time		-	10	-	
VSD	Diode Forward Voltage ³	$I_S=-4.1\text{A}$, $V_{GS}=0\text{V}$	-	-	-1.2	V
IS	Continuous Source Current		-	-	-4.1	A

Note :

- 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 $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

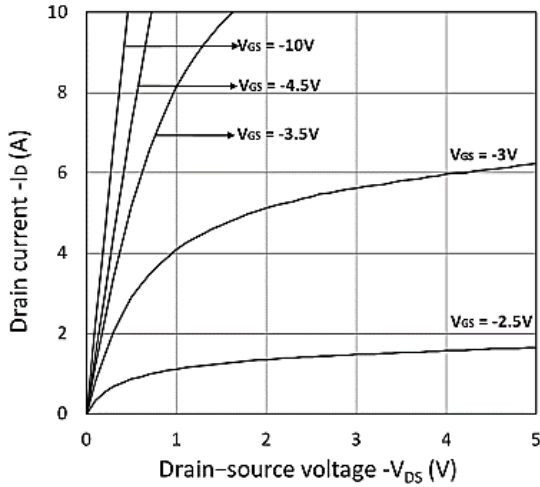


Figure 1. Output Characteristics

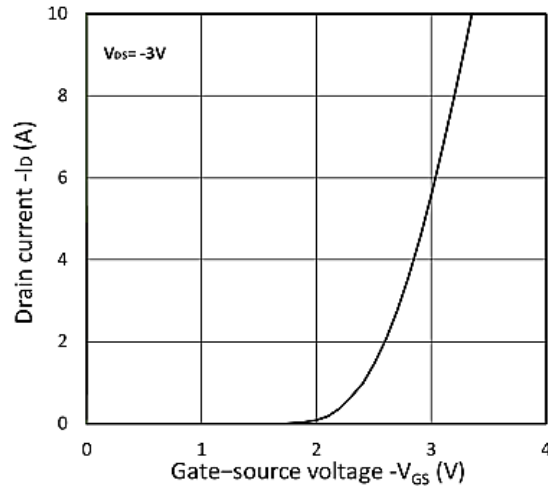


Figure 2. Transfer Characteristics

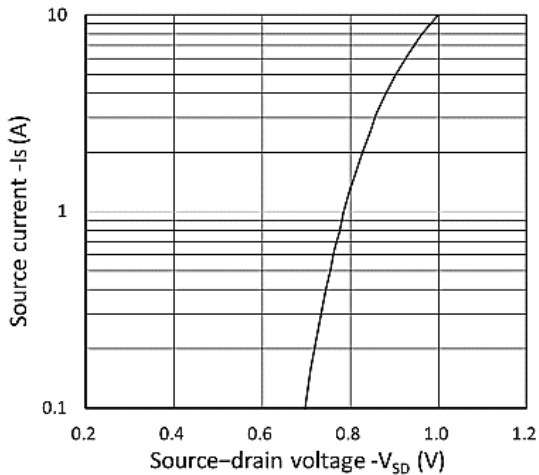


Figure 3. Forward Characteristics of Reverse

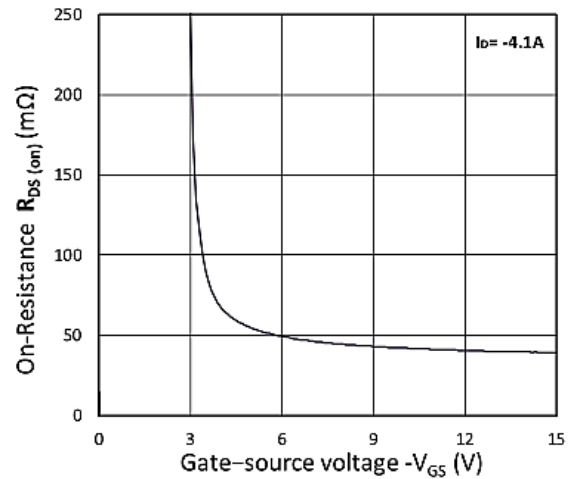


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

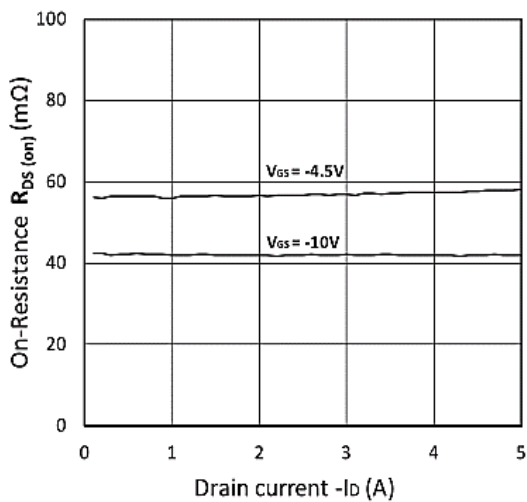


Figure 5. $R_{DS(ON)}$ vs. I_D

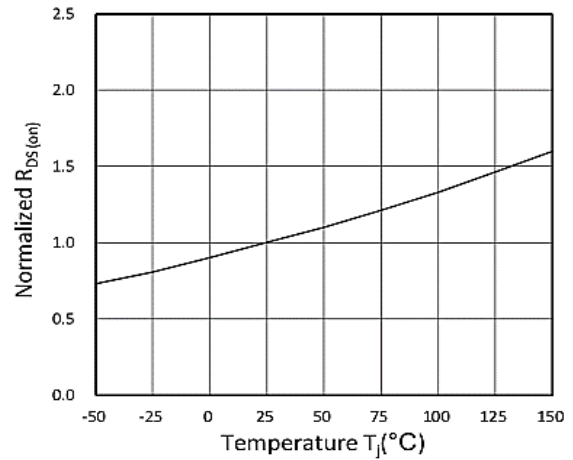


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

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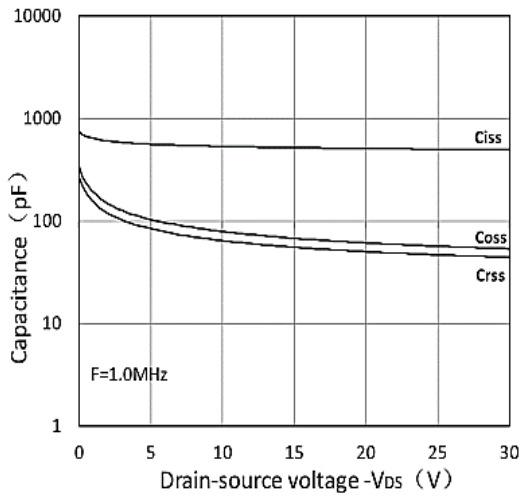


Figure 7. Capacitance Characteristics

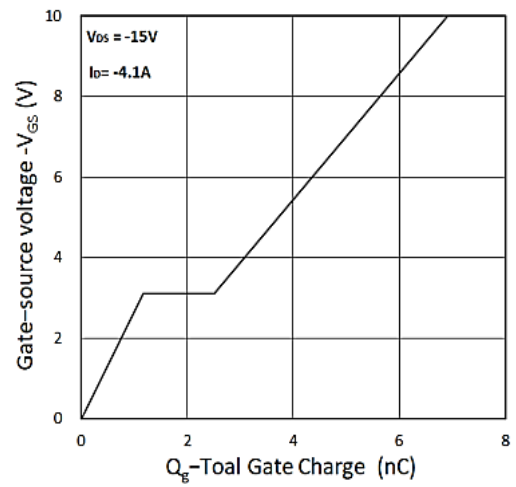


Figure 8. Gate Charge Characteristics

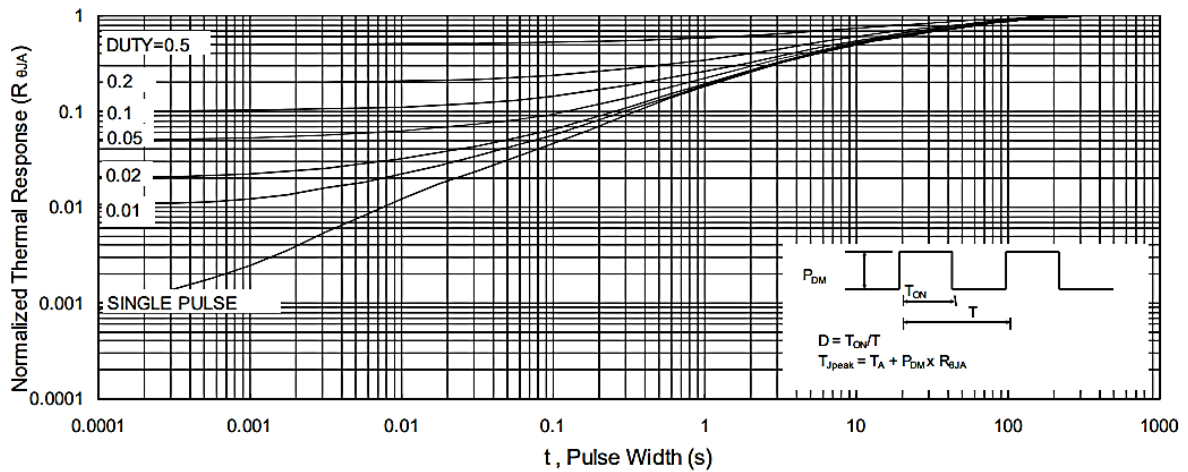


Figure 9 Normalized Maximum Transient Thermal Impedance

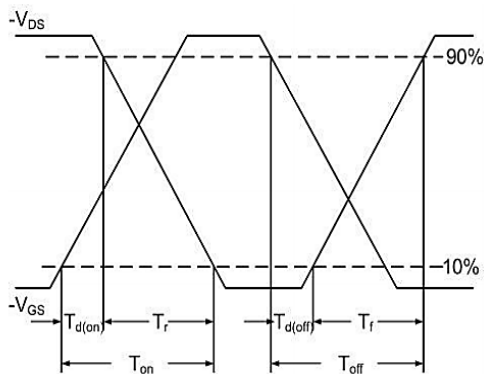


Figure.10 Switching Time Waveform

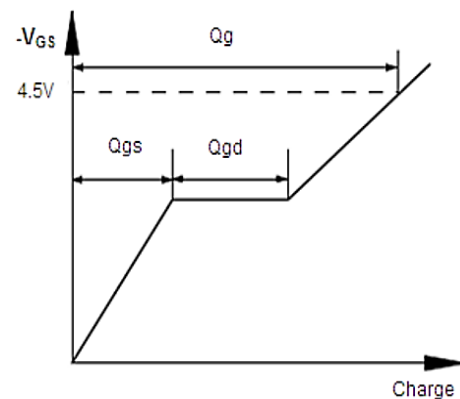
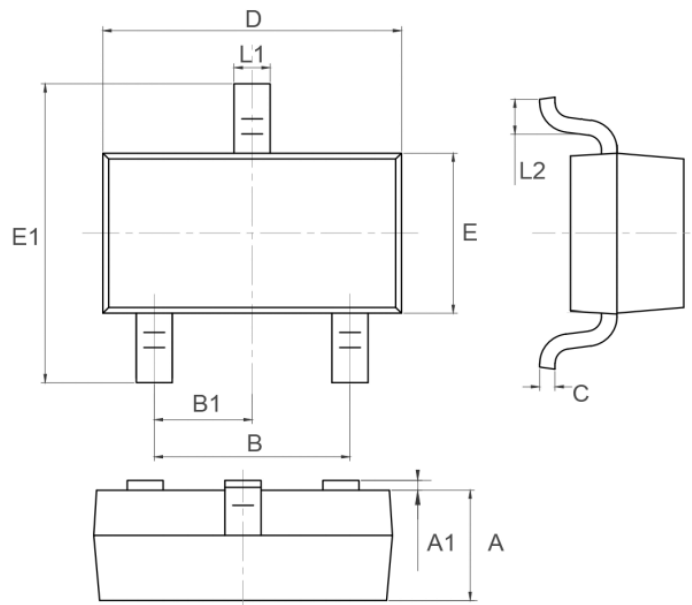


Figure.11 Gate Charge Waveform

Package Mechanical Data-SOT23L



Symbol	Dim in mm		
	Min.	Typ.	Max.
A	0.9	1	1.15
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	2018/11/31	Initial release

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