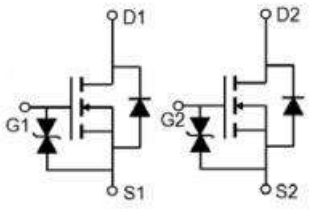
Feature

- 50V,0.4A
  $R_{DS(ON)}$ <2.8Ω @V_{GS}=10V TYP:1.4Ω
  $R_{DS(ON)}$ <4.0Ω @V_{GS}=4.5V TYP:1.8Ω
  $R_{DS(ON)}$ <4.5Ω @V_{GS}=3.3V TYP:2.2Ω
- Advanced Trench Technology
- 5V Logic Level Control
- Lead free product is acquired
- ESD Protected



Schematic Diagram

SOT-363 top view

Application

- Interfacing Switching
- ON/OFF Switching
- Logic Level shift

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
-	AP138KDW	Sot-363	7 inch	-	-

ABSOLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	50	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current (T_a =25℃)	I_D	0.4	A
Continuous Drain Current (T_a =70℃)	I_D	0.3	A
Pulsed Drain Current	I_{DM}	0.8	A
Power Dissipation	P_D	0.9	W
Thermal Resistance from Junction to Ambient(4)	$R_{\theta JA}$	125	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	50	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =50V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±12V,V_{DS} = 0V	-	-	±10	μA
Gate threshold voltage(3)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	0.6	0.85	1.2	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =10V, I_D =0.4A	-	1.4	2.8	Ω
		V_{GS} =4.5V, I_D =0.3A	-	1.8	4.0	
		V_{GS} =3.3V, I_D =0.2A		2.2	4.5	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =30V, V_{GS} =0V, f =1MHz	-	12	-	pF
Output Capacitance	C_{oss}		-	3.2	-	
Reverse Transfer Capacitance	C_{rss}		-	0.8	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=30V, I_D=0.3A, V_{GS}=10V, R_G=3.3Ω	-	4.5	-	ns
Turn-on rise time	t_r		-	3.1	-	
Turn-off delay time	$t_{d(off)}$		-	15	-	
Turn-off fall time	t_f		-	3.3	-	
Total Gate Charge	Qg	VDS=30V, ID=0.3A, VGS=4.5V	-	0.58	-	nC
Gate-Source Charge	Qgs		-	0.12	-	
Gate-Drain Charge	Qgd		-	0.21	-	
Source-Drain Diode characteristics						
Diode Forward voltage(3)	V_{DS}	V_{GS} =0V, I_S=0.3A	-	-	1.2	V
Diode Forward current(3)	I_S		-	-	0.4	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width≤300μs, duty cycle≤2%
3. Surface Mounted on FR4 Board,t≤10 sec

Typical Characteristics

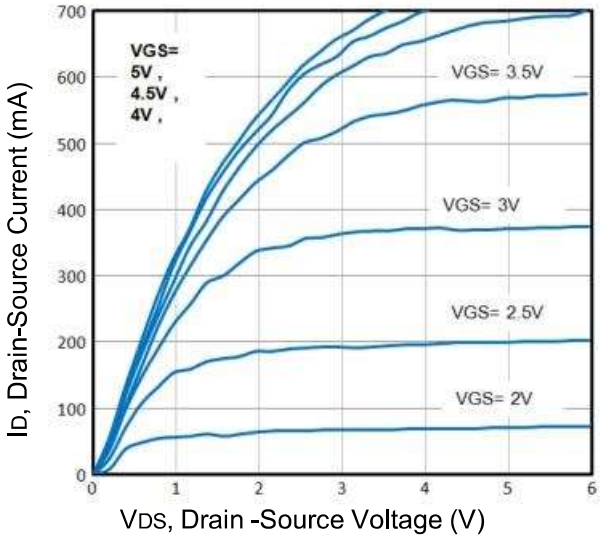


Fig1. Typical Output Characteristics

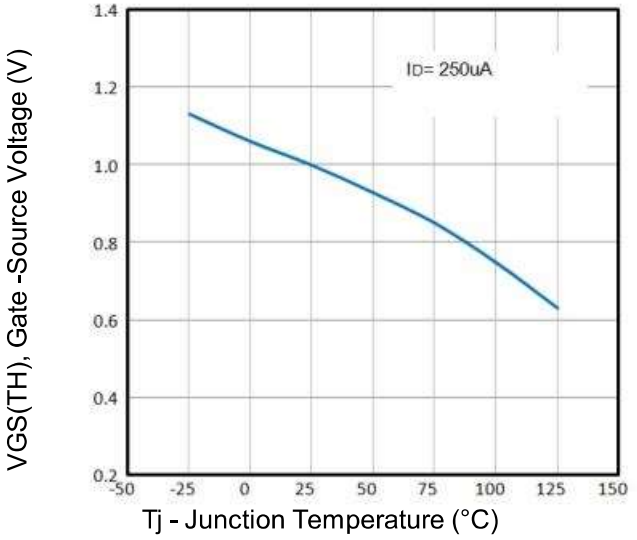


Fig2. Normalized Threshold Voltage Vs. Temperature

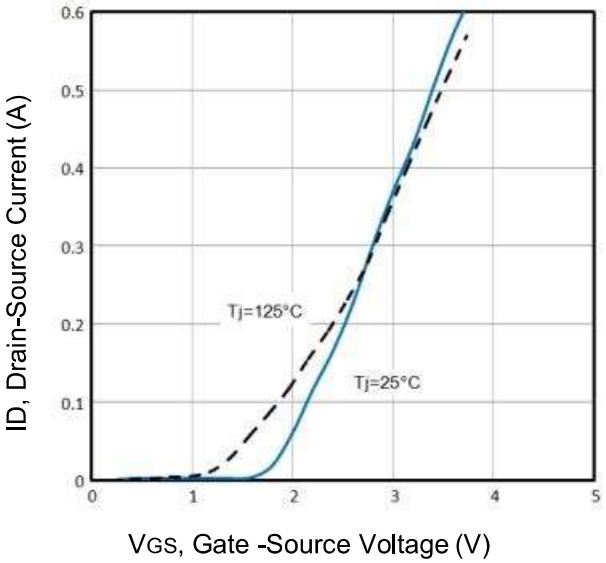


Fig3. Typical Transfer Characteristics

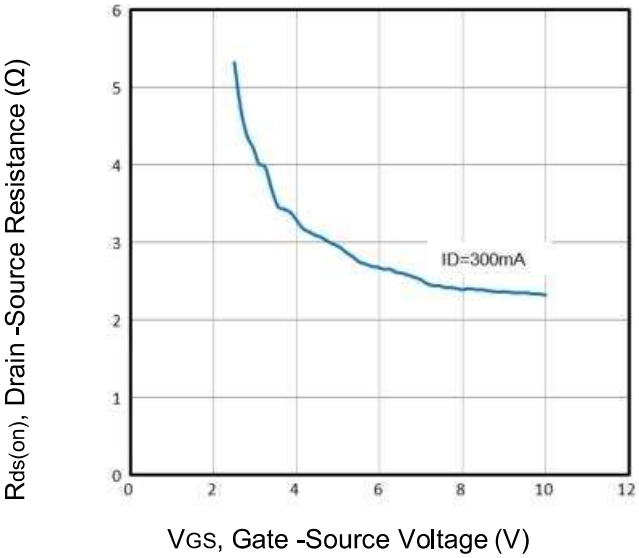


Fig4. Rds(on) vs Gate -Source Voltage

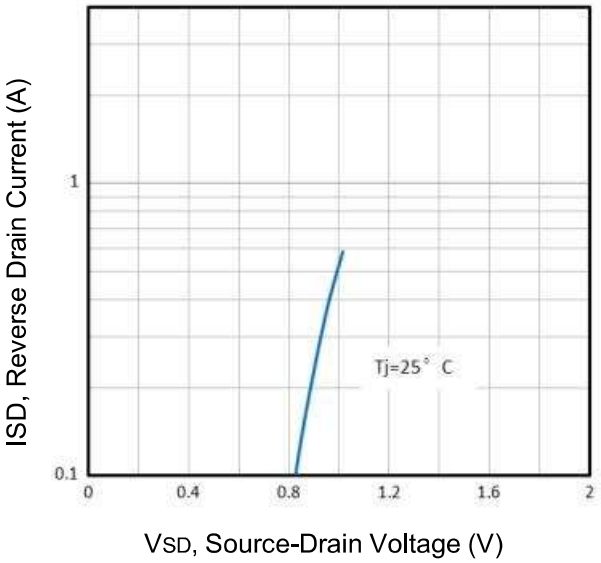


Fig5. Typical Source-Drain Diode Forward Voltage

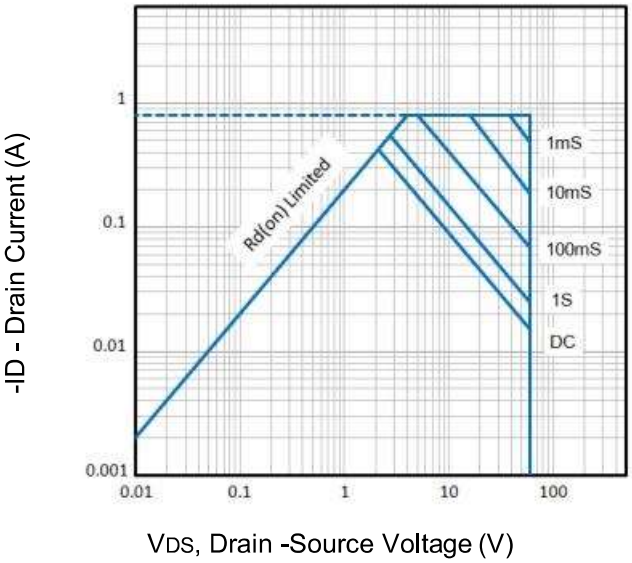


Fig6. Maximum Safe Operating Area

Typical Characteristics

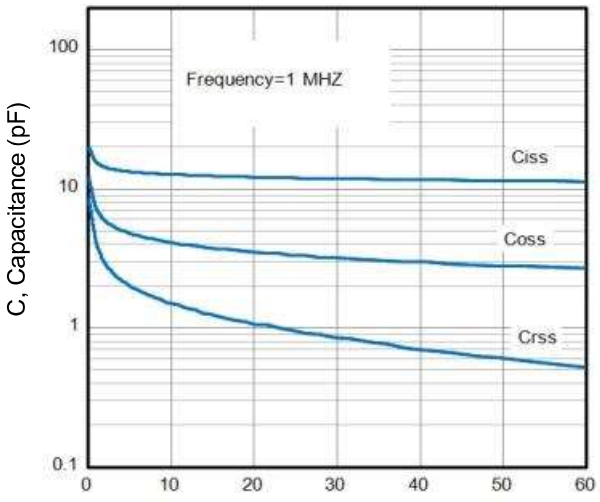


Fig7. Typical Capacitance Vs. Drain-Source Voltage

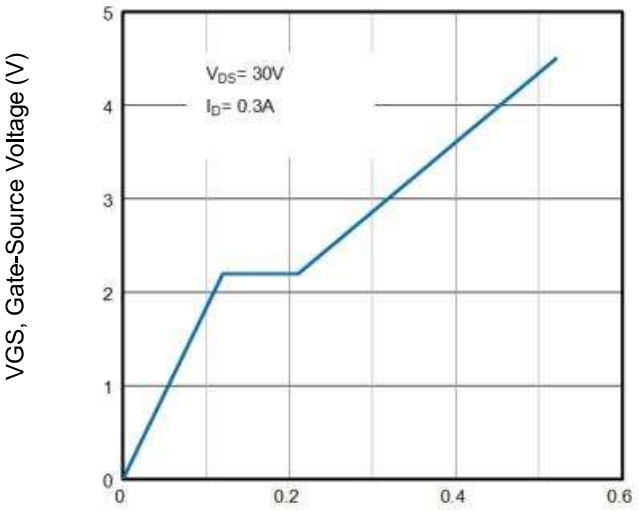


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

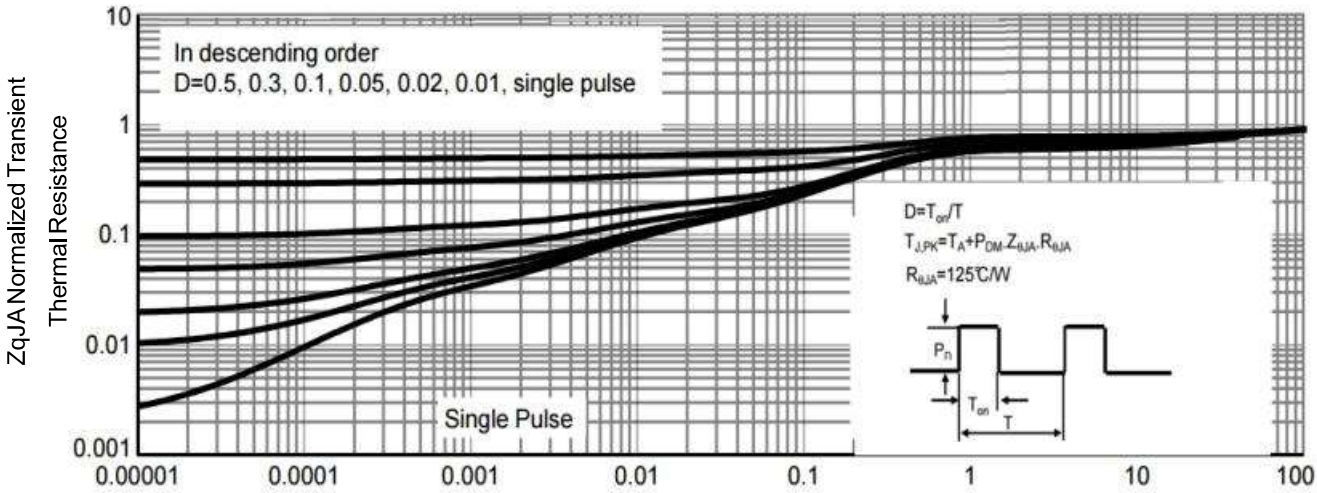


Fig9. Normalized Maximum Transient Thermal Impedance

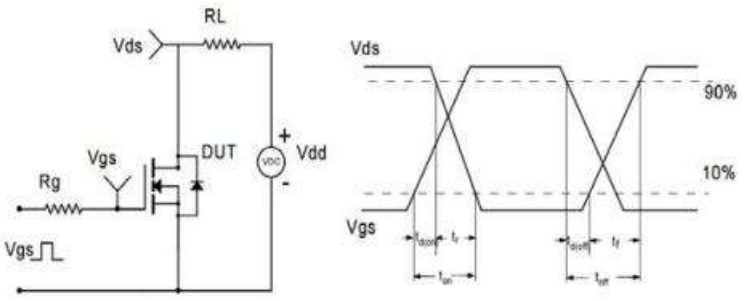
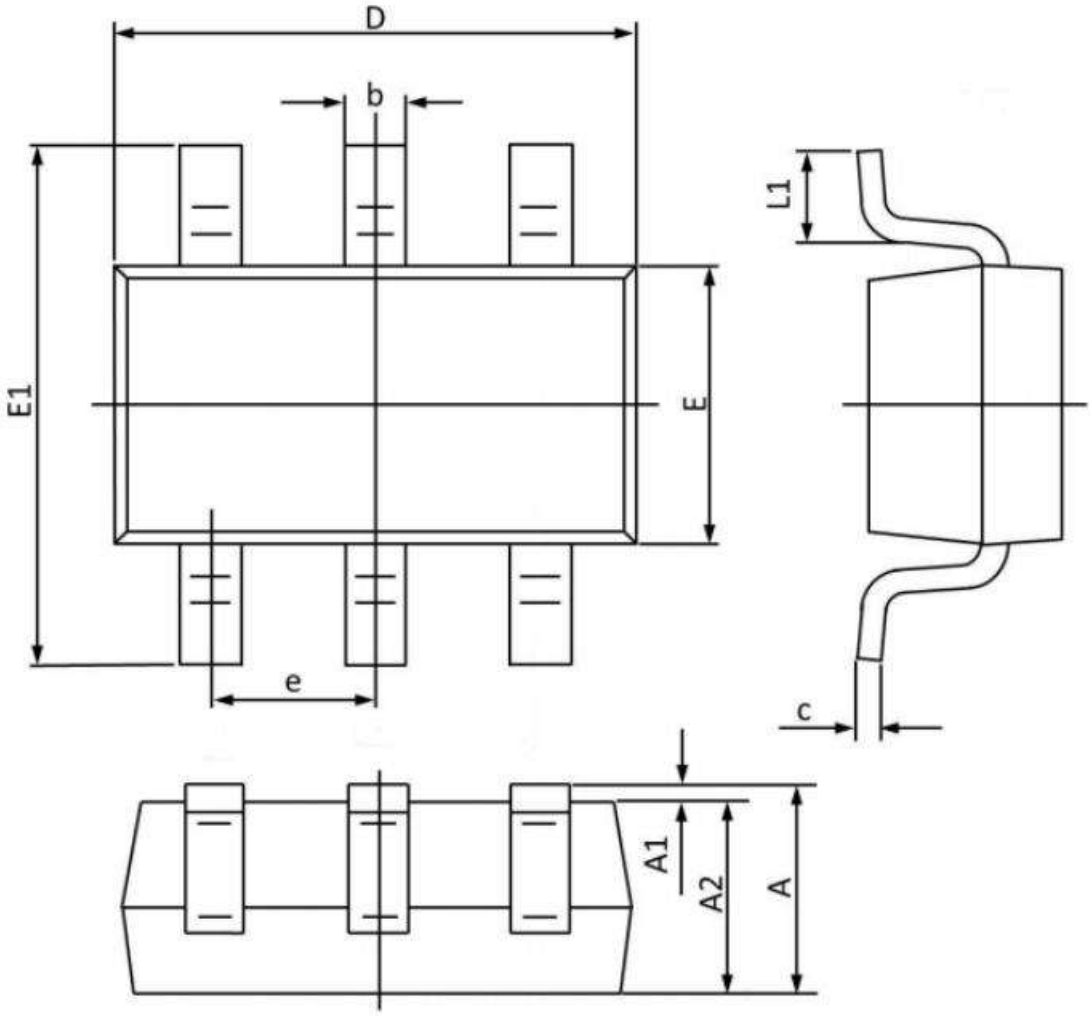


Fig10. Switching Time Test Circuit and waveforms

SOT-363 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
A1	0.100	0.000	0.004	0.000
A2	1.000	0.800	0.039	0.031
b	0.330	0.100	0.013	0.004
c	0.250	0.100	0.010	0.004
D	2.200	1.800	0.087	0.071
E	1.350	1.150	0.053	0.045
E1	2.400	1.800	0.094	0.071
e	0.65BSC		0.026BSC	
L1	0.350	0.100	0.014	0.004