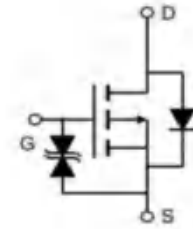


Feature

- -20V,-0.66A
 $R_{DS(ON)} < 520m\Omega @ V_{GS} = -4.5V$ TYP:430 mΩ
 $R_{DS(ON)} < 700m\Omega @ V_{GS} = -2.5V$ TYP:624 mΩ
 $R_{DS(ON)} < 1200m\Omega @ V_{GS} = -1.8V$ TYP:950 mΩ
- Advanced Trench Technology
- Lead free product is acquired
- ESD Protected Up to 2.0KV(HBM)



Equivalent Circuit

Application

- Interfacing Switching
- Load Switching
- Logic Level shift

SOT-23



1. GATE
2. SOURCE
3. DRAIN

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
KD	AP3139	SOT-23	7 inch	-	3000

ABSOLUTE MAXIMUM RATINGS (T_a=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	-20	V
Gate-Source Voltage	V _{GS}	±12	V
Continuous Drain Current (T _C =25°C)	I _D	-0.66	A
Continuous Drain Current (T _C =70°C)	I _D	-0.35	A
Pulsed Drain Current	I _{DM}	-1.2	A
Power Dissipation	P _D	0.15	W
Thermal Resistance from Junction to Ambient ⁽⁴⁾	R _{θJA}	833	°C/W
Junction Temperature	T _J	150	°C
Storage Temperature	T _{STG}	-55~ +150	°C

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

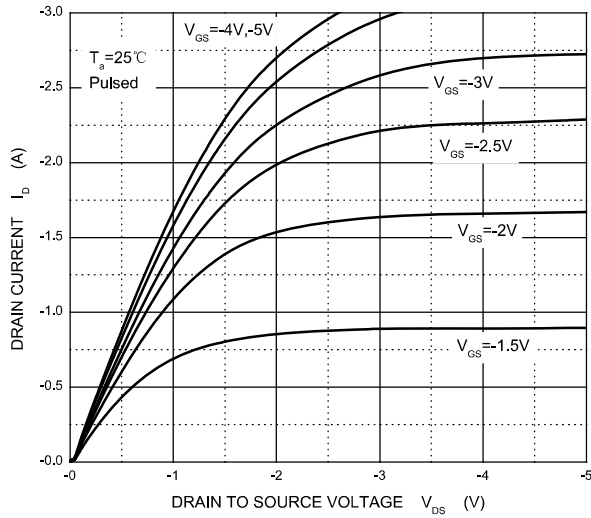
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -20V, V_{GS} = 0V$	-	-	-1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 10V, V_{DS} = 0V$	-	-	± 20	μA
Gate threshold voltage ⁽³⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.35	-0.45	-1.1	V
Drain-source on-resistance ⁽³⁾	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -0.65A$	-	430	520	m Ω
		$V_{GS} = -2.5V, I_D = -0.55A$	-	624	700	
		$V_{GS} = -1.8V, I_D = -0.45A$		950	1200	
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = -16V, V_{GS} = 0V, f = 1MHz$	-	113	-	pF
Output Capacitance	C_{oss}		-	15	-	
Reverse Transfer Capacitance	C_{rss}		-	9	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -10V, I_D = -0.5A,$ $V_{GS} = -4.5V, R_G = 10\Omega$	-	9	-	ns
Turn-on rise time	t_r		-	5.8	-	
Turn-off delay time	$t_{d(off)}$		-	32.7	-	
Turn-off fall time	t_f		-	20.3	-	
Total Gate Charge	Q_g	$V_{DS} = -15V, I_D = -1A,$ $V_{GS} = -4.5V$	-	1.8	-	nC
Gate-Source Charge	Q_{gs}		-	0.31	-	
Gate-Drain Charge	Q_{gd}		-	0.3	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V_{DS}	$V_{GS} = 0V, I_S = -0.5A$	-	-	-1.2	V
Diode Forward current ⁽⁴⁾	I_S		-	-	-0.66	A

Notes:

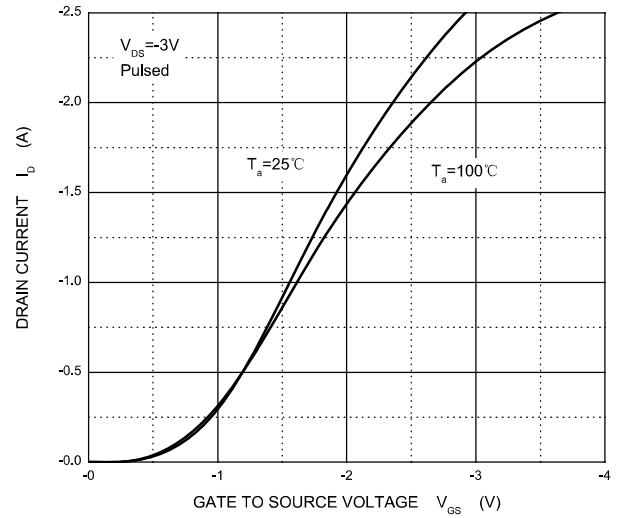
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. Surface Mounted on FR4 Board, $t \leq 10$ sec

Typical Characteristics

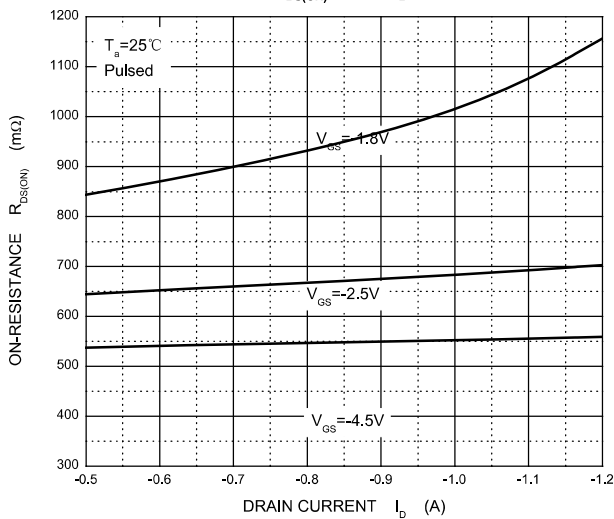
Output Characteristics



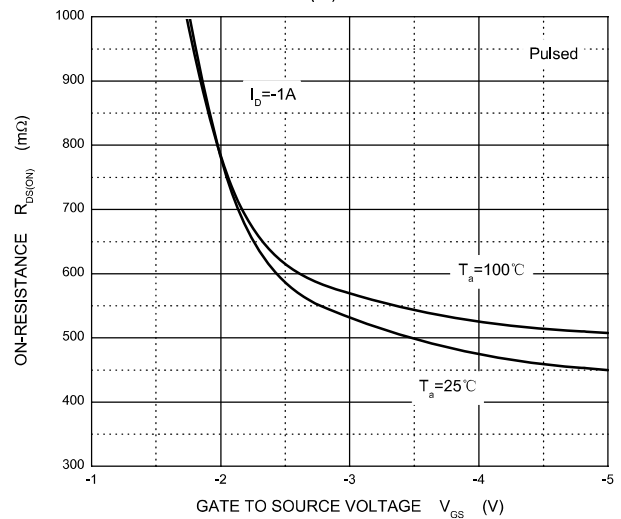
Transfer Characteristics



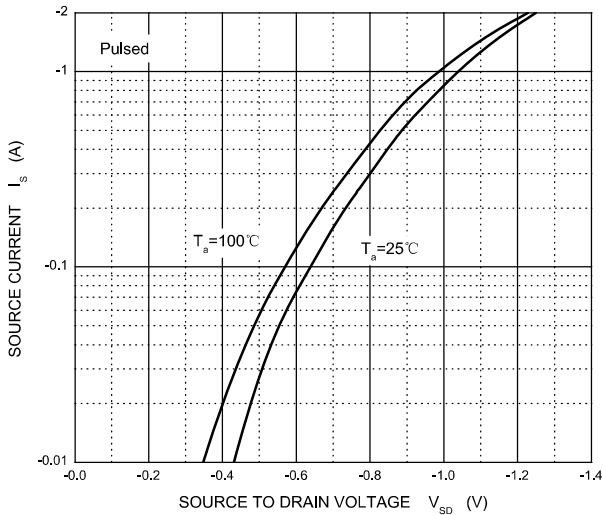
$R_{DS(ON)}$ — I_D



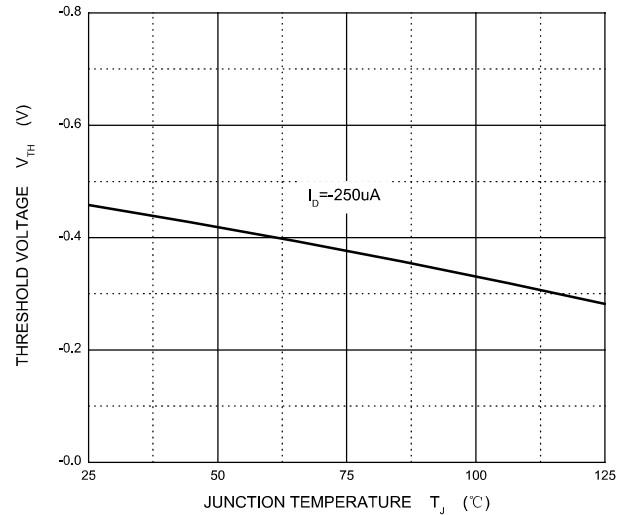
$R_{DS(ON)}$ — V_{GS}



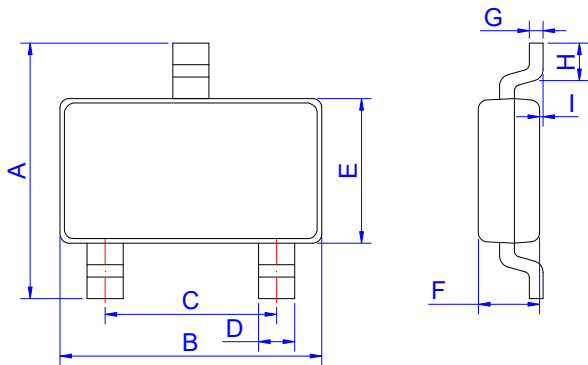
I_S — V_{SD}



Threshold Voltage



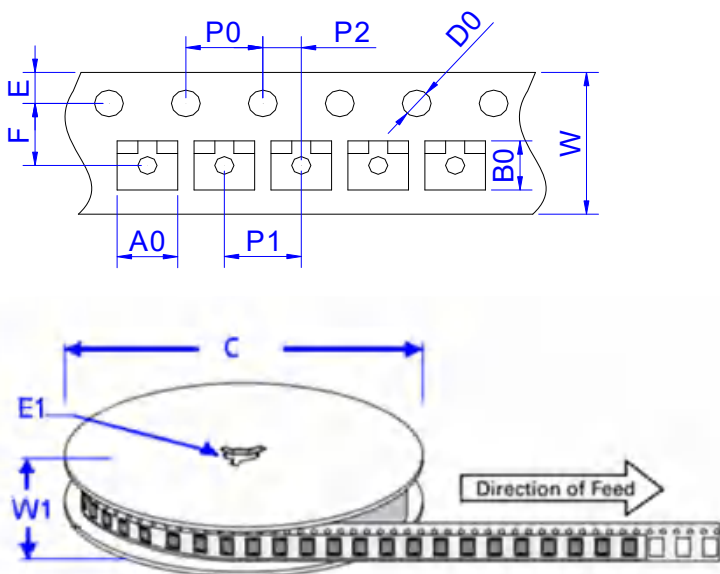
SOT-23 Package Information



SOT-23

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.30	2.40	2.50	0.091	0.095	0.098
B	2.80	2.90	3.00	0.110	0.114	0.118
C	1.90 REF			0.075 REF		
D	0.35	0.40	0.45	0.014	0.016	0.018
E	1.20	1.30	1.40	0.047	0.051	0.055
F	0.90	1.00	1.10	0.035	0.039	0.043
G		0.10	0.15		0.004	0.006
H	0.20			0.008		
I	0		0.10	0		0.004

Package Information-SOT-23



Ref.	Dimensions	
	Millimeters	Inches
A0	3.15 ± 0.3	0.124 ± 0.012
B0	2.77 ± 0.3	0.109 ± 0.012
C	178	7.0
D0	1.50±0.1	0.059 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3±0.3	0.524± 0.012
F	3.5 ± 0.2	0.138 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	4.00 ± 0.2	0.157 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	8.00 ± 0.2	0.315 ± 0.008
W1	11.5±1.0	0.453 ± 0.039