

## FEATURES

- | P-Channel Switch with Low  $R_{DS(on)}$
- | Operated at Low Logic Level Gate Drive
- | Load/Power Switching
- | Interfacing, Logic Switching
- | Battery Management for Ultra Small Portable Electronics



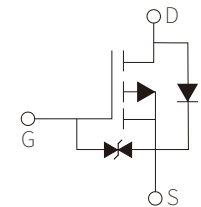
## MECHANICAL DATA

- | SOT-23 Small Outline Plastic Package
- | Epoxy UL: 94V-0
- | Mounting Position: Any



## APPROVALS

<b>RoHS</b>	Compliance with 2011/65/EU
<b>HF</b>	Compliance with IEC61249-2-21:2003



## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Typical Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current <sup>(note 1)</sup>	$I_D$	-0.66	A
Pulsed Drain Current (tp=10μs)	$I_{DM}$	-1.2	A
Power Dissipation <sup>(note 1)</sup>	$P_D$	350	mW
Thermal Resistance from Junction to Ambient <sup>(note 1)</sup>	$R_{\theta JA}$	357	°C/W
Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-55 to 150	°C

## ELECTRICAL CHARACTERISTICS (Ta=25°C )

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$			$\pm 20$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$			-1	$\mu A$
Gate Threshold Voltage <sup>(note 2)</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.35		-1.2	V
Drain-Source On-Resistance <sup>(note 2)</sup>	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-1A$		450	520	m $\Omega$
		$V_{GS}=-2.5V, I_D=-0.8A$		570	700	m $\Omega$
		$V_{GS}=-1.8V, I_D=-0.5A$		950		m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-10V, I_D=-540mA$		1.2		S
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-0.5A$			-1.2	V
<b>Dynamic Characteristics<sup>(note 4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-16V, V_{GS}=0V, f=1MHz$		113	170	pF
Output Capacitance	$C_{oss}$			15	25	pF
Reverse Transfer Capacitance	$C_{rss}$			9	15	pF
<b>Switching Characteristics<sup>(note 4)</sup></b>						
Turn-on Delay Time <sup>(note 3)</sup>	$t_{d(on)}$	$V_{DS}=-10V, I_D=-200mA$ $V_{GS}=-4.5V, R_{GEN}=10\Omega$		9		ns
Turn-on Rise Time <sup>(note 3)</sup>	$t_r$			5.8		ns
Turn-Off Delay Time <sup>(note 3)</sup>	$t_{d(off)}$			32.7		ns
Turn-off Fall Time <sup>(note 3)</sup>	$t_f$			20.3		ns

**Notes :**

1. Surface mounted on FR4 board using the minimum recommended pad size.
2. Pulse Test : Pulse Width=300 $\mu s$ , Duty Cycle=2%.
3. Switching characteristics are independent of operating junction temperatures.
4. Guaranteed by design, not subject to producing.

# PARAMETER CHARACTERISTIC CURVE

Figure1: Output Characteristics

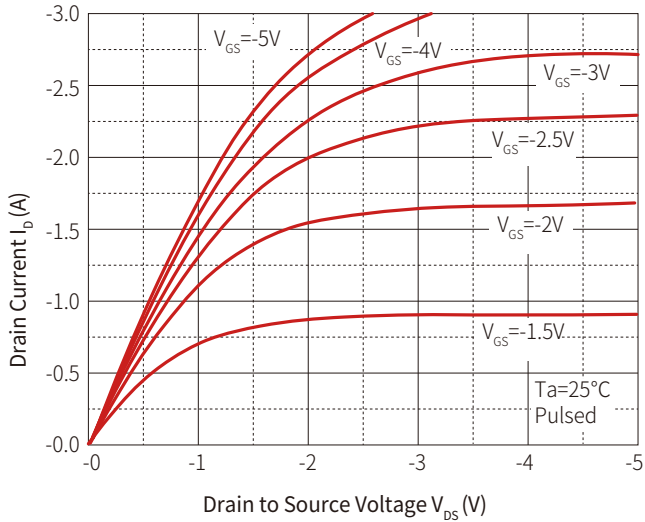


Figure2: Transfer Characteristics

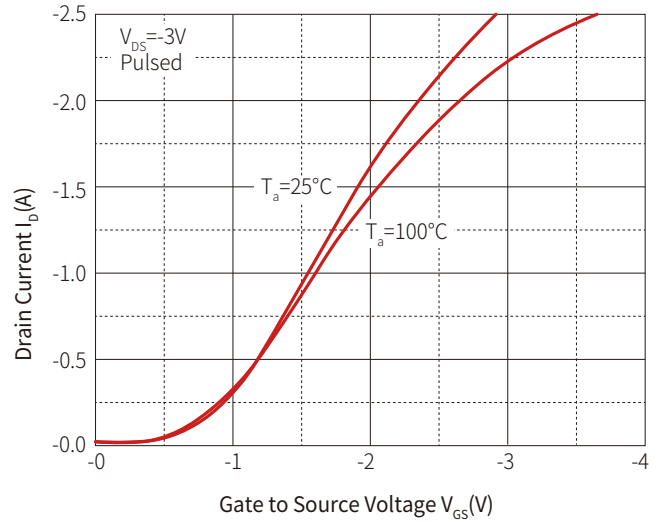


Figure3:  $R_{DS(ON)} - I_D$

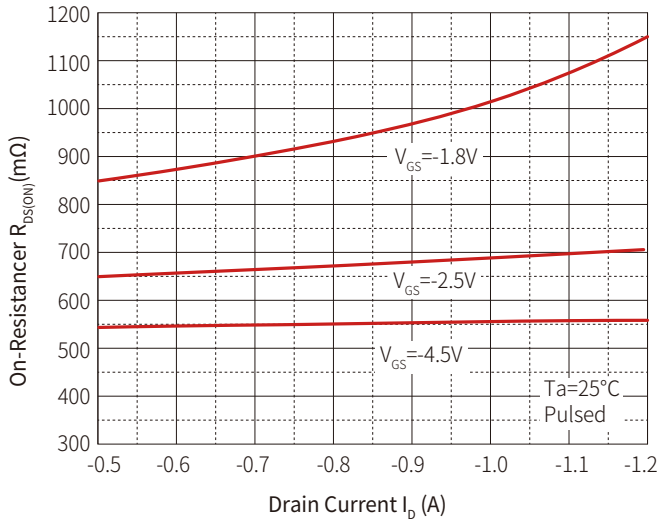
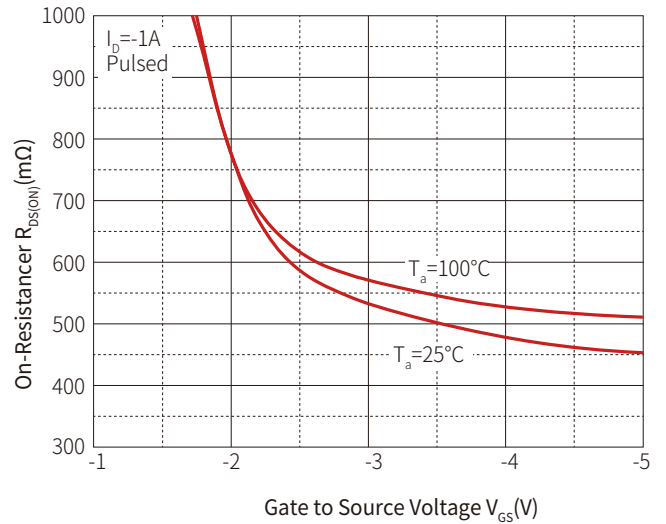
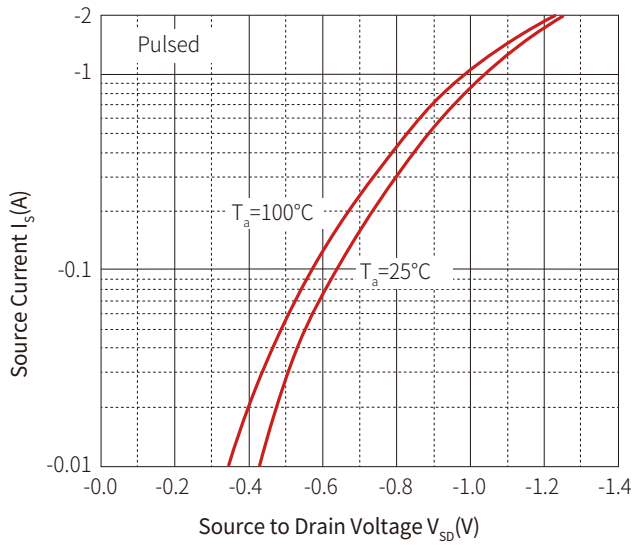
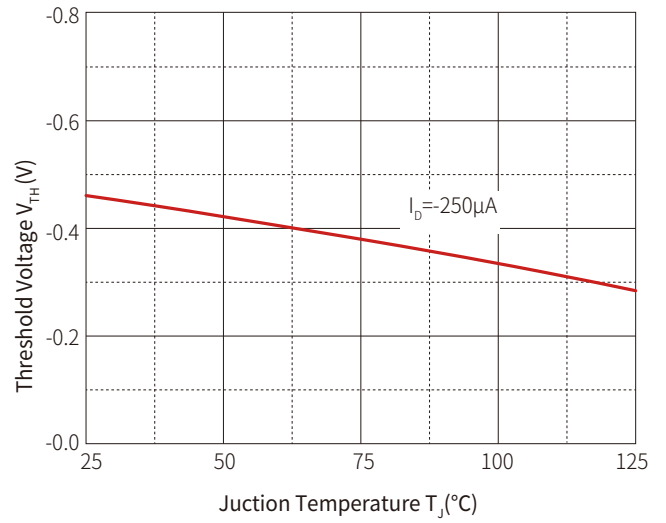
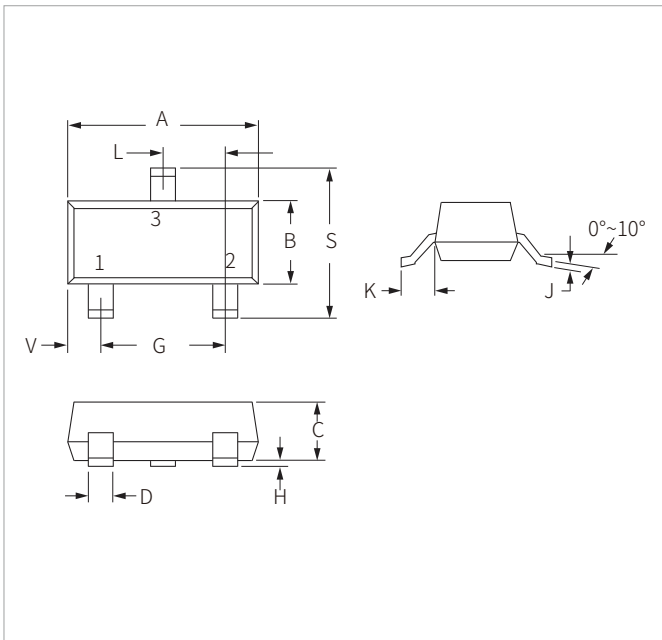


Figure 4:  $R_{DS(ON)} - V_{GS}$



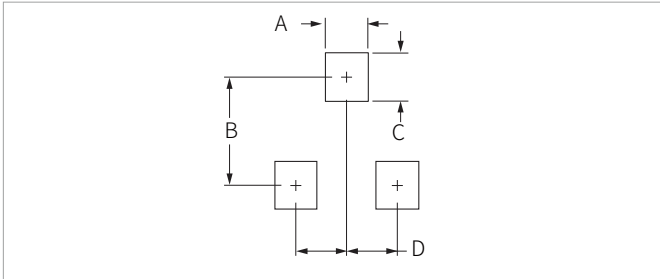
**Figure 5:  $I_s$ — $V_{SD}$** 

**Figure 6: Threshold Voltage**


## SOT-23 PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.80	3.05	0.110	0.120
B	1.20	1.40	0.047	0.055
C	0.90	1.15	0.035	0.045
D	0.37	0.50	0.015	0.020
G	1.75	2.05	0.069	0.081
H	0.01	0.100	0.001	0.004
J	0.085	0.180	0.003	0.007
K	0.35	0.69	0.014	0.029
L	0.89	1.02	0.035	0.040
S	2.10	2.65	0.083	0.104
V	0.45	0.60	0.018	0.024

## RECOMMENDED PAD LAYOUT DIMENSIONS



Ref.	Millimeters		Inches	
	Min	Max	Min	Max
A	0.71	0.97	0.028	0.038
B	1.88	2.13	0.074	0.084
C	0.71	0.97	0.028	0.038
D	0.81	1.07	0.032	0.042

## ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SPM3139KS	SOT-23	3000PCS	7"

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