

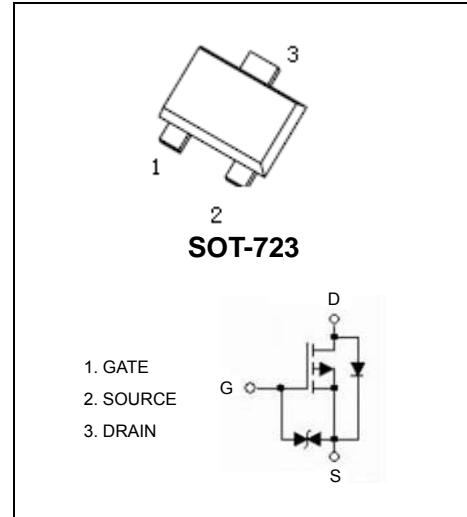
### Features

- Lead Free
- Surface Mount Package
- P-Channel Switch with Low  $R_{DS(on)}$
- Operated at Low Logic Level Gate Drive

### Applications

- Load/Power Switching
- Interfacing, Logic Switching
- Battery Management for Ultra Small Portable Electronics

**Marking: KD**



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current (note 1)	$I_D$	-0.66	A
Pulsed Drain Current ( $t_p=10 \mu\text{ s}$ )	$I_{DM}$	-1.2	A
Power Dissipation (note 1)	$P_D$	150	mW
Thermal Resistance from Junction to Ambient (note 1)	$R_{\theta JA}$	833	°C/W
Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-55~+150	°C
Lead Temperature for Soldering Purposes(1/8" from case for 10 s)	$T_L$	260	°C

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

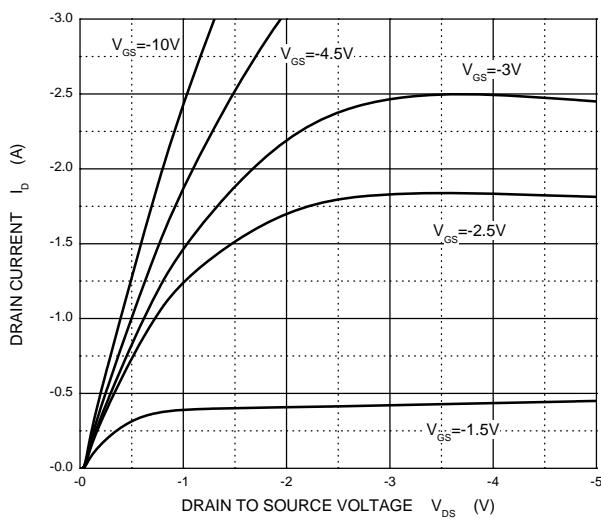
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>STATIC CHARACTERISTICS</b>						
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0\text{V}, I_D = -250\mu\text{A}$	-20			V
Zero gate voltage drain current	$I_{\text{DSS}}$	$V_{\text{DS}} = -20\text{V}, V_{\text{GS}} = 0\text{V}$			-1	$\mu\text{A}$
Gate-body leakage current	$I_{\text{GSS}}$	$V_{\text{GS}} = \pm 12\text{V}, V_{\text{DS}} = 0\text{V}$			20	$\mu\text{A}$
Gate threshold voltage (note 2)	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}, I_D = -250\mu\text{A}$	-0.35		-1.1	V
Drain-source on-resistance (note 2)	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}} = -4.5\text{V}, I_D = -1\text{A}$			520	$\text{m}\Omega$
		$V_{\text{GS}} = -2.5\text{V}, I_D = -0.8\text{A}$			700	$\text{m}\Omega$
		$V_{\text{GS}} = -1.8\text{V}, I_D = -0.5\text{A}$			950	$\text{m}\Omega$
Forward transconductance (note 2)	$g_{\text{FS}}$	$V_{\text{DS}} = -10\text{V}, I_D = -0.54\text{A}$		1.2		S
Diode forward voltage	$V_{\text{SD}}$	$I_S = -0.5\text{A}, V_{\text{GS}} = 0\text{V}$			-1.2	V
<b>DYNAMIC CHARACTERISTICS</b>						
Input capacitance	$C_{\text{iss}}$	$V_{\text{DS}} = -16\text{V}, V_{\text{GS}} = 0\text{V}, f = 1\text{MHz}$		113	170	pF
Output capacitance	$C_{\text{oss}}$			15	25	pF
Reverse transfer capacitance	$C_{\text{rss}}$			9	15	pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-on delay time (note 3)	$t_{\text{d}(\text{on})}$	$V_{\text{GS}} = -4.5\text{V}, V_{\text{DS}} = -10\text{V}, I_D = -200\text{mA}, R_{\text{GEN}} = 10\Omega$		9		ns
Turn-on rise time (note 3)	$t_r$			5.8		ns
Turn-off delay time (note 3)	$t_{\text{d}(\text{off})}$			32.7		ns
Turn-off fall time (note 3)	$t_f$			20.3		ns

**Notes :**

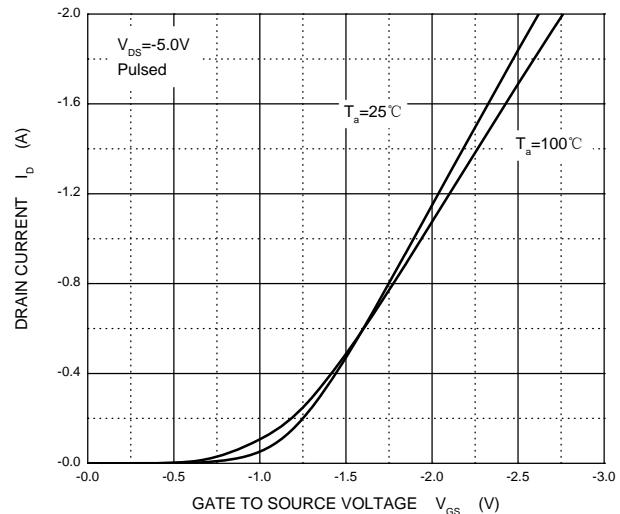
1. Surface mounted on FR4 board using the minimum recommended pad size.
2. Pulse Test : Pulse Width=300 $\mu\text{s}$ , Duty Cycle=2%.
3. Switching characteristics are independent of operating junction temperatures.

## Typical Characteristics

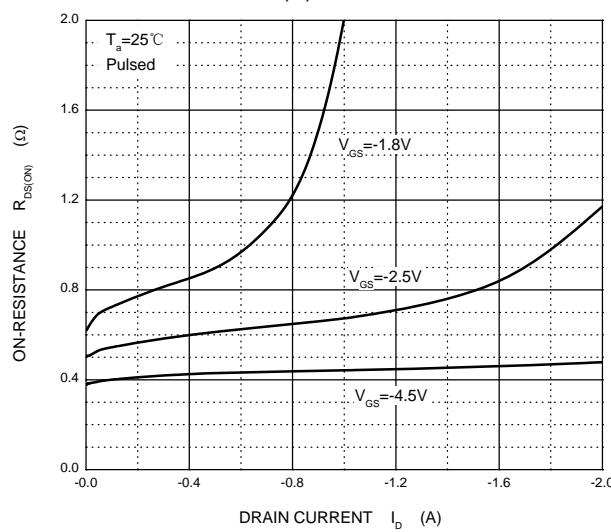
Output Characteristics



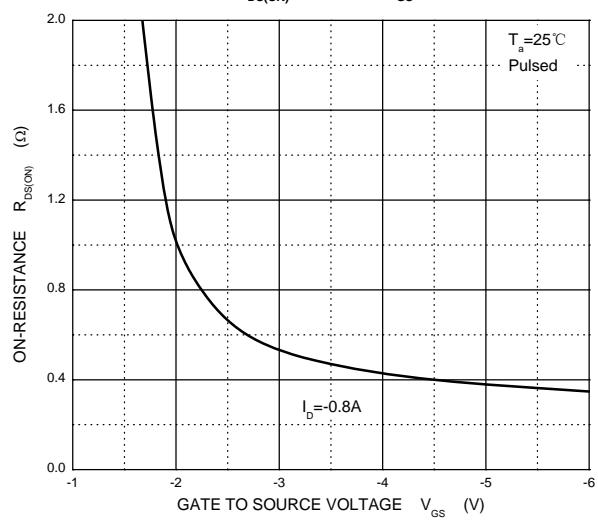
Transfer Characteristics



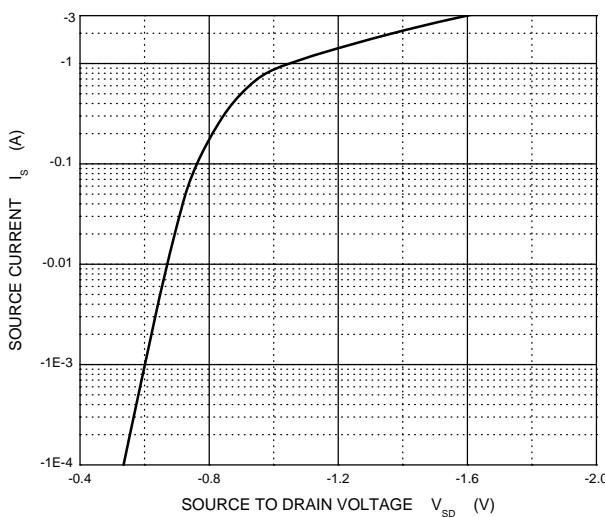
$R_{DS(ON)}$  —  $I_D$



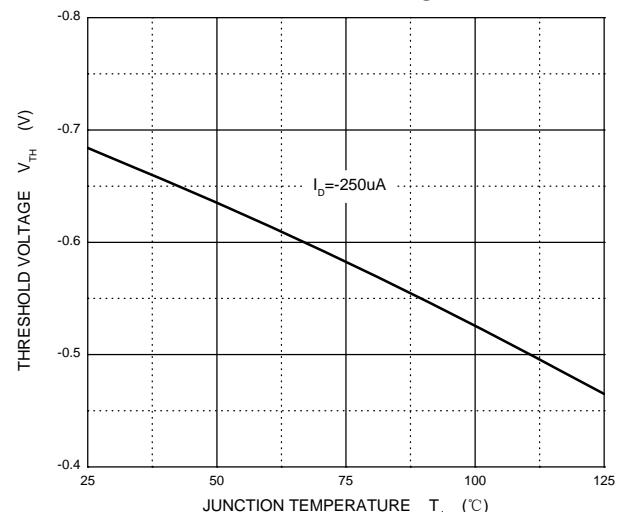
$R_{DS(ON)}$  —  $V_{GS}$



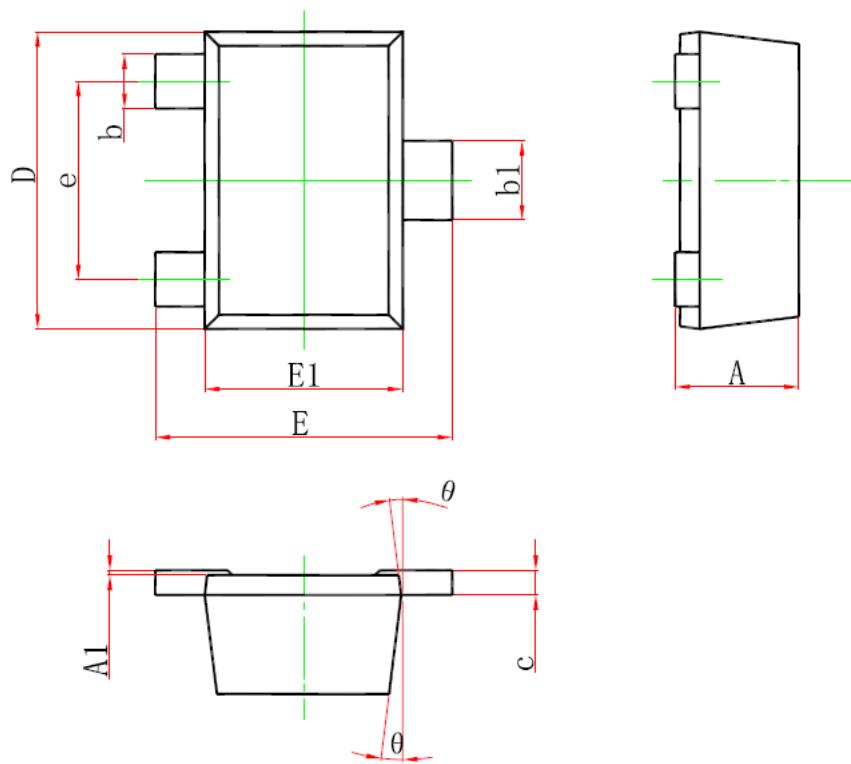
$I_s$  —  $V_{SD}$



Threshold Voltage



**Package Outline Dimensions**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.430	0.500	0.017	0.020
A1	0.000	0.050	0.000	0.002
b	0.170	0.270	0.007	0.011
b1	0.270	0.370	0.011	0.015
c	0.080	0.150	0.003	0.006
D	1.150	1.250	0.045	0.049
E	1.150	1.250	0.045	0.049
E1	0.750	0.850	0.030	0.033
e	0.800TYP.		0.031TYP.	
$\theta$	7° REF.		7° REF.	