

RoHS Compliant Product  
A suffix of "-C" specifies halogen & lead-free

## FEATURES

- Low  $R_{DS(on)}$  Improving System Efficiency
- Low Threshold Voltage ,1.5V Rated
- ESD Protected Gate
- Pb-Free Packages are Available

## APPLICATION

- Load/Power Switches
- Power Supply Converter Circuits
- Battery Management
- Portables like Cell Phones, PDAs, Digital Cameras, Pagers,etc

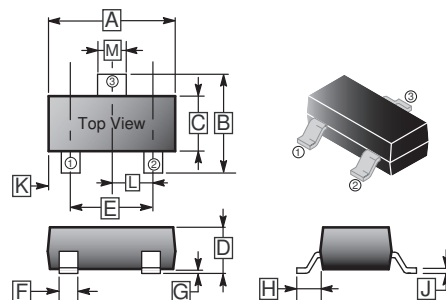
## MARKING

X

## PACKAGE INFORMATION

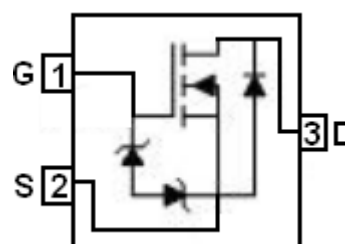
Package	MPQ	Leader Size
SOT-523	3K	7 inch

### SOT-523



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	1.5	1.7	G	-	0.1
B	1.45	1.75	H	0.55 REF.	
C	0.7	0.9	J	0.1	0.2
D	0.7	0.9	K	-	
E	0.9	1.1	L	0.5 TYP.	
F	0.15	0.35	M	0.25	0.35

### Top View



## MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 6$	V
Continuous Drain Current <sup>1</sup>	$I_D$	0.915	A
Total Power Dissipation <sup>1</sup>	$P_D$	150	mW
Operating Junction & Storage Temperature Range	$T_J, T_{STG}$	150, -55~150	$^\circ\text{C}$
Thermal Resistance Ratings			
Thermal Resistance Junction-ambient <sup>1</sup>	$R_{\theta JA}$	833	$^\circ\text{C} / \text{W}$

**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise specified)

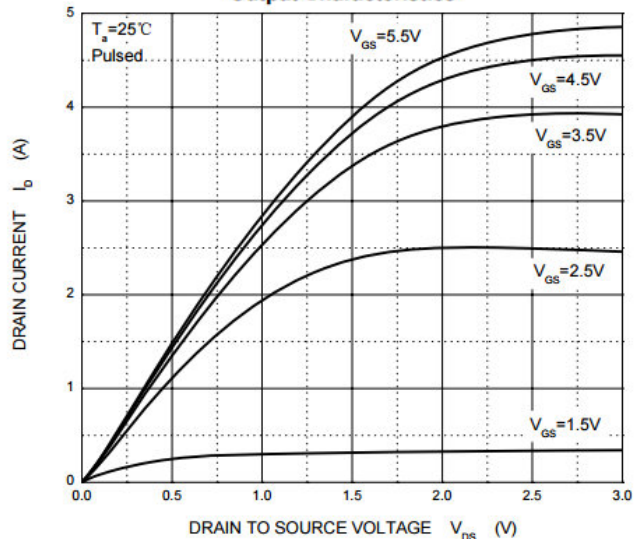
Parameter	Symbol	Min.	Typ.	Max.	Unit	Teat Conditions
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	20	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	100	nA	$V_{DS}=16\text{V}, V_{GS}=0$
Gate-Body Leakage Current	$I_{GSS}$	-	-	$\pm 1$	$\mu\text{A}$	$V_{DS}=0, V_{GS}=\pm 4.5\text{V}$
Gate Threshold Voltage <sup>2</sup>	$V_{GS(th)}$	0.45	-	1.1	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	-	-	570	m $\Omega$	$V_{GS}=4.5\text{V}, I_D=600\text{mA}$
		-	-	620		$V_{GS}=2.5\text{V}, I_D=500\text{mA}$
		-	-	700		$V_{GS}=1.8\text{V}, I_D=350\text{mA}$
		-	-	9500		$V_{GS}=1.5\text{V}, I_D=40\text{mA}$
Forward Transfer conductance <sup>2</sup>	$g_{fs}$	-	0.5	-	S	$V_{DS}=10\text{V}, I_D=400\text{mA}$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	-	110	-	pF	$V_{DS}=16\text{V}$ $V_{GS}=0$ $f=1\text{MHz}$
Output Capacitance	$C_{oss}$	-	16	-		
Reverse Transfer Capacitance	$C_{rss}$	-	12	-		
Total Gate Charge	$Q_g$	-	1.82	-	nC	$V_{DS}=10\text{V}$ $V_{GS}=4.5\text{V}$ $I_D=200\text{mA}$
Gate-Source Charge	$Q_{gs}$	-	0.3	-		
Gate-Drain Charge	$Q_{gd}$	-	0.42	-		
<b>Switching Characteristics <sup>3</sup></b>						
Turn-On Delay Time	$T_{d(on)}$	-	3.7	-	nS	$V_{DD}=10\text{V}$ $I_D=200\text{mA}$ $V_{GS}=4.5\text{V}$ $R_{GEN}=10\Omega$
Rise Time	$T_r$	-	4.4	-		
Turn-Off Delay Time	$T_{d(off)}$	-	25	-		
Fall Time	$T_f$	-	7.6	-		
<b>Drain-Source Diode Characteristics</b>						
Body Diode Voltage	$V_{SD}$	-	-	1.1	V	$I_S=0.2\text{A}, V_{GS}=0\text{V}$

Notes:

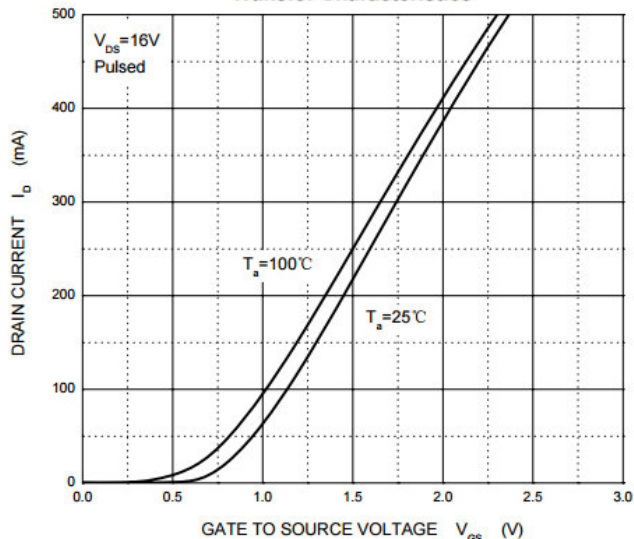
1. Surface mounted on FR4 board using 1 in sq pad size.
2. Pulse Test : Pulse Width=300 $\mu\text{s}$ , Duty Cycle=2%.
3. Switching characteristics are independent of operating junction temperatures.

**TYPICAL CHARACTERISTICS**

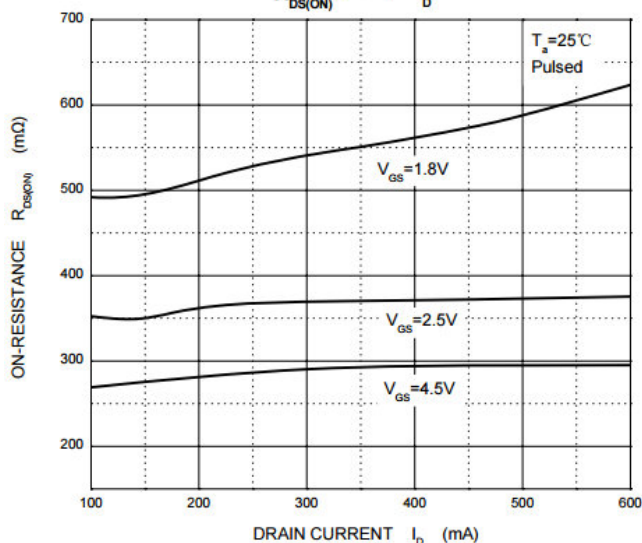
**Output Characteristics**



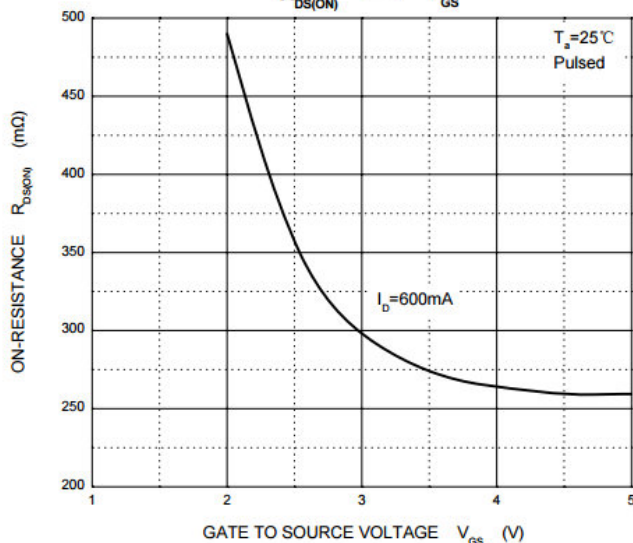
**Transfer Characteristics**



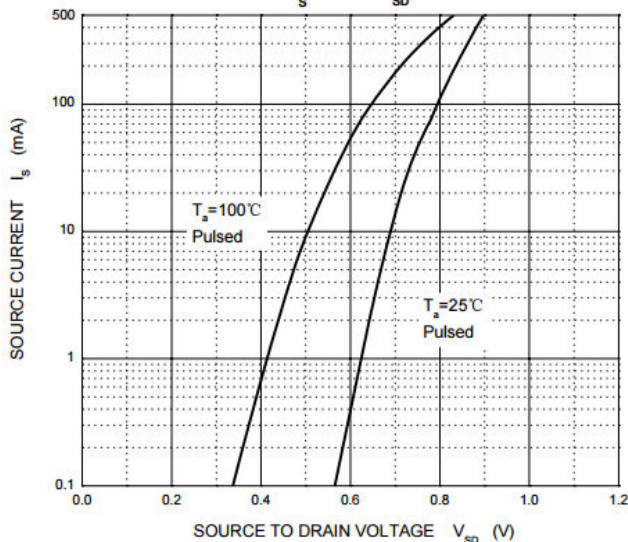
**$R_{DS(ON)}$  —  $I_D$**



**$R_{DS(ON)}$  —  $V_{GS}$**



**$I_S$  —  $V_{SD}$**



**Threshold Voltage**

