

## Features

$BV_{DSS}$	30V
$R_{DS(ON)}$	350mΩ
$I_D$	850mA

## Application

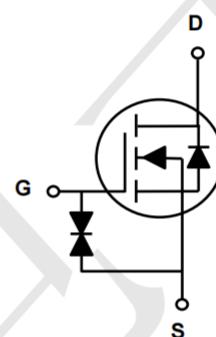
- Load/Power Switching
- Interfacing Switching
- Battery Management for Ultra Small Portable Electronics
- Logic Level Shift

## Package and Pin Configuration



SOT23

## Circuit diagram



Marking:WJ3

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

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous( $T_C=25^\circ C$ )	$I_D$	850	mA
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	2100	mA
Power Dissipation( $T_C=25^\circ C$ )	$P_D$	360	mW
Power Dissipation-Derate Above 25°C		1.25	mW/°C
Storage Temperature Range	$T_{STG}$	-55 To +150	°C
Operating Junction Temperature Range	$T_J$	-55 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	30	-	-	V
$\text{BV}_{\text{DSS}}$ Temperature Coefficient	$\Delta \text{BV}_{\text{DSS}}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_{\text{D}}=1\text{mA}$	-	-0.03	-	$\text{V}^\circ\text{C}$
Drain-Source Leakage Current	$I_{\text{DS}}^{\text{SS}}$	$V_{\text{DS}}=30\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$V_{\text{DS}}=24\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	-	10	$\mu\text{A}$
Gate-Source Leakage Current	$I_{\text{GSS}}$	$V_{\text{GS}}=\pm 12\text{V}, V_{\text{DS}}=0\text{V}$	-	-	$\pm 20$	$\mu\text{A}$
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	$R_{\text{DS(ON)}}$	$V_{\text{GS}}=4.5\text{V}, I_{\text{D}}=0.5\text{A}$	-	350	450	$\text{m}\Omega$
		$V_{\text{GS}}=2.5\text{V}, I_{\text{D}}=0.5\text{A}$	-	450	650	
Gate Threshold Voltage	$V_{\text{GS(th)}}$	$V_{\text{DS}}=V_{\text{GS}}, I_{\text{D}}=250\mu\text{A}$	0.5	0.8	1.2	V
$V_{\text{GS(th)}}$ Temperature Coefficient	$\Delta V_{\text{GS(th)}}$		-	-1.74	-	$\text{mV}^\circ\text{C}$
Forward Transconductance	$g_{\text{FS}}$	$V_{\text{DS}}=4\text{V}, I_{\text{D}}=0.3\text{A}$	-	1	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{\text{DS}}=15\text{V}, I_{\text{D}}=0.3\text{A}, V_{\text{GS}}=4.5\text{V}$	-	2.6	5.2	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{\text{gs}}$		-	0.9	1.8	
Gate-Drain Charge <sup>2,3</sup>	$Q_{\text{gd}}$		-	0.6	1.2	
Turn-On Delay Time <sup>2,3</sup>	$t_{\text{d(on)}}$	$V_{\text{DD}}=15\text{V}, R_{\text{G}}=10\Omega, V_{\text{GS}}=4.5\text{V}, I_{\text{D}}=0.3\text{A}$	-	5.5	11	nS
Rise Time <sup>2,3</sup>	$t_r$		-	4	8	
Turn-Off Delay Time <sup>2,3</sup>	$t_{\text{d(off)}}$		-	14.5	29	
Fall Time <sup>2,3</sup>	$t_f$		-	6.5	13	
Input Capacitance	$C_{\text{iss}}$		-	72.9	146	PF
Output Capacitance	$C_{\text{oss}}$	$V_{\text{DS}}=15\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	18.3	36.6	
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	7.4	14.8	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_s$	$V_G=V_D=0\text{V},$ Force Current	-	-	400	mA
Pulsed Source Current	$I_{\text{SM}}$		-	-	850	
Diode Forward Voltage	$V_{\text{SD}}$	$V_{\text{GS}}=0\text{V}, I_{\text{S}}=0.2\text{A}, T_J=25^\circ\text{C}$	-	-	1	V
Reverse Recovery Time	$T_{\text{rr}}$	$V_{\text{GS}}=0\text{V}, I_{\text{S}}=0.3\text{A}, d_i/d_t=100\text{A}/\mu\text{s}, T_J=25^\circ\text{C}$	-	13	-	nS
Reverse Recovery Charge	$Q_{\text{rr}}$		-	6	-	nC

### Typical Electrical and Thermal Characteristic Curves

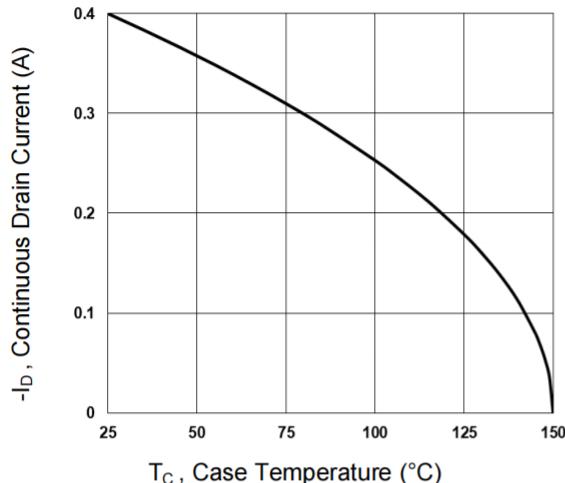


Figure 1. Continuous Drain Current vs.  $T_c$

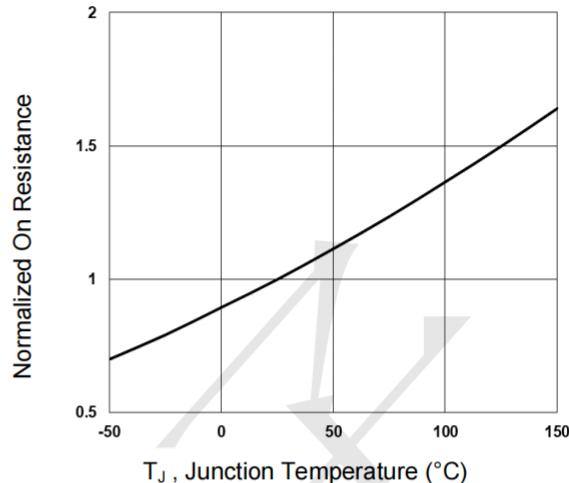


Figure 2. Normalized  $R_{DS(on)}$  vs.  $T_j$

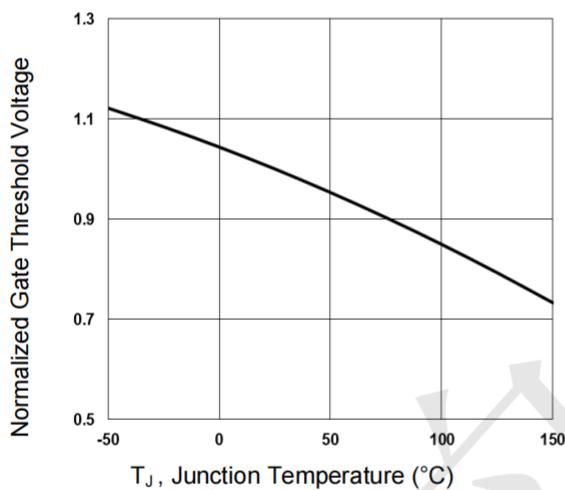


Figure 3. Normalized  $V_{th}$  vs.  $T_j$

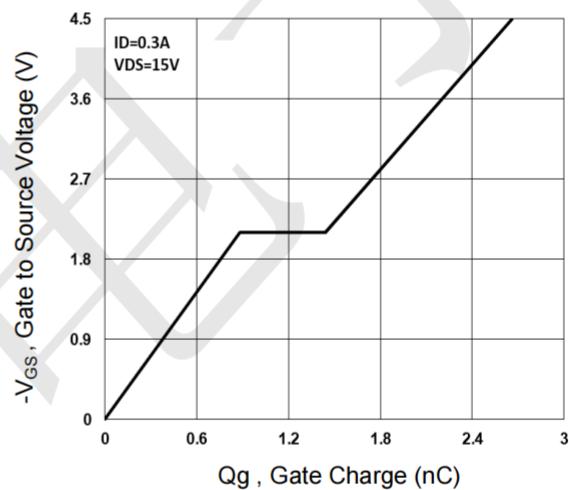


Figure 4. Gate Charge Waveform

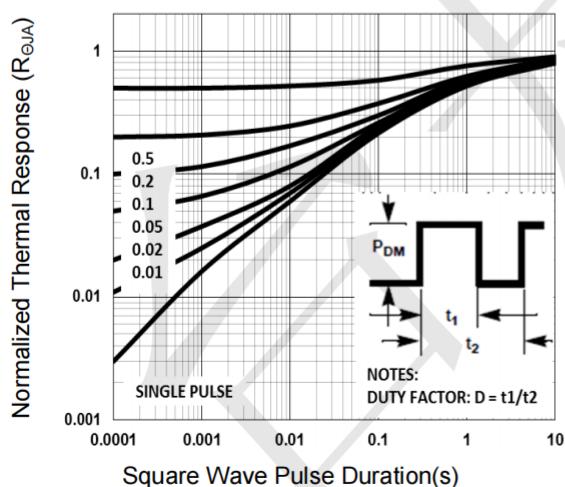


Figure 5. Normalized Transient Response

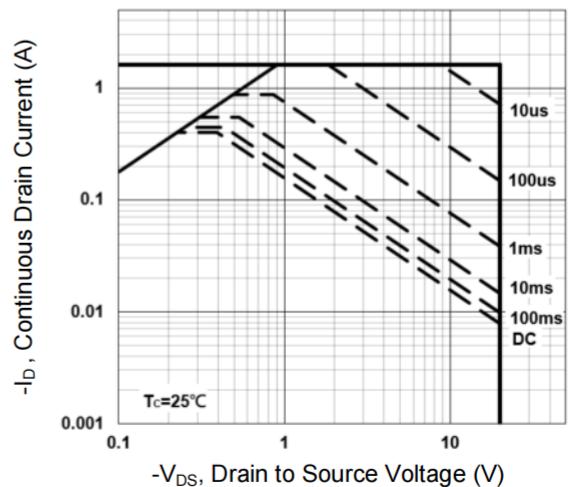


Figure 6. Maximum Safe Operation Area

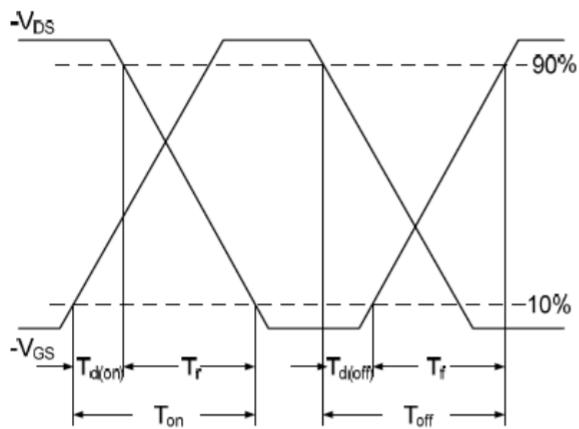


Figure 7. Switching Time Waveform

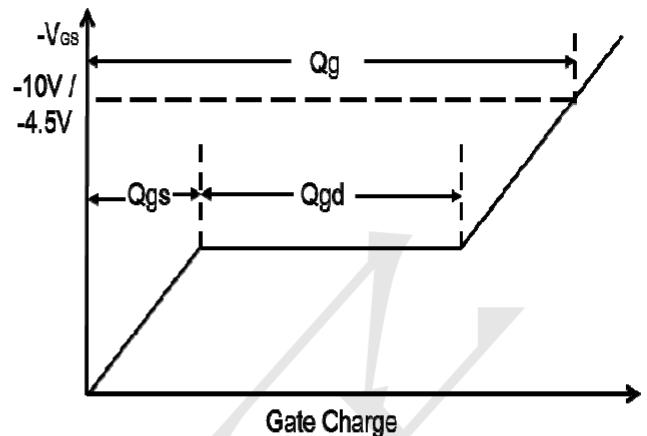
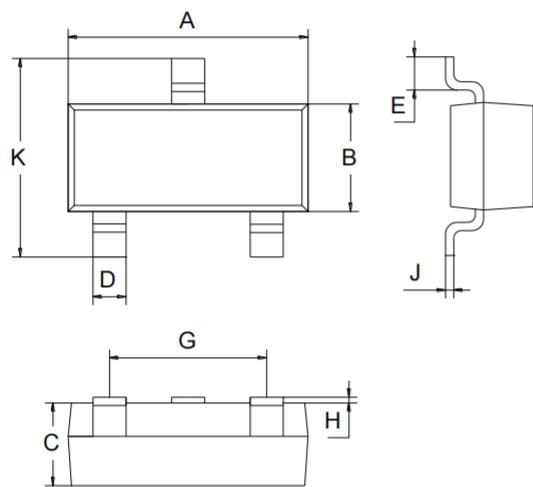


Figure 8. Gate Charge Waveform

## Outline Drawing - SOT23



SOT-23		
Dimension	Min.	Max.
A	2.70	3.10
B	1.10	1.50
C	0.90	1.10
D	0.30	0.50
E	0.35	0.48
G	1.80	2.00
H	0.02	0.10
J	0.05	0.15
K	2.20	2.60

## Land Pattern - SOT23

