General Description

The WST3416 uses advanced trench technology to provi de excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.1V. This device is suitable for use as a load switch or in PWM applications. It is ESD protected.

Product Summery

BV_{DSS}	R_{DSON}	I_D
20V	18mΩ	6.5A

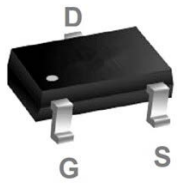
Applications

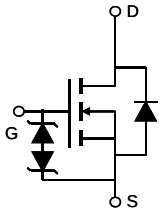
- High Frequency Point-of-Load Synchronous Small power switching for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Green Device Available

SOT-23-3L Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±8	V
I_D@T_c=25℃	Continuous Drain Current, V_{GS} @ 4.5V[1]	6.5	A
I_D@T_c=70℃	Continuous Drain Current, V_{GS} @ 4.5V[1]	5.2	A
I_{DM}	Pulsed Drain Current[2]	30	A
P_D@T_A=25℃	Total Power Dissipation[3]	1.4	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	125	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	80	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	20	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.018	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=6.5A	---	18	24	mΩ
		V_{GS}=2.5V , I_D=5.5A	---	22	28	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.4	0.7	1.1	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-3.1	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=16V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=16V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=6.5A	---	50	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.8	3	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=6.5A	---	10	15.0	nC
Q_{gs}	Gate-Source Charge		---	4.2	8.9	
Q_{gd}	Gate-Drain Charge		---	2.6	5.2	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=10V , V_{GS}=4.5V , R_G=3Ω RL=1.54Ω	---	280	---	ns
T_r	Rise Time		---	328	---	
$T_{d(off)}$	Turn-Off Delay Time		---	3.76	---	us
T_f	Fall Time		---	2.24	---	
C_{iss}	Input Capacitance	V_{DS}=10V , V_{GS}=0V , f=1MHz	---	1295	---	pF
C_{oss}	Output Capacitance		---	160	---	
C_{rss}	Reverse Transfer Capacitance		---	87	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	2.0	A
I_{SM}	Pulsed Source Current[2,4]		---	---	10	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.1	V
t_{rr}	Reverse Recovery Time	I_F=6.5A,dI/dt=100A/μs , T_J=25℃	---	31	41	nS
Q_{rr}	Reverse Recovery Charge		---	6.8	---	nC

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper,t<=10sec.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

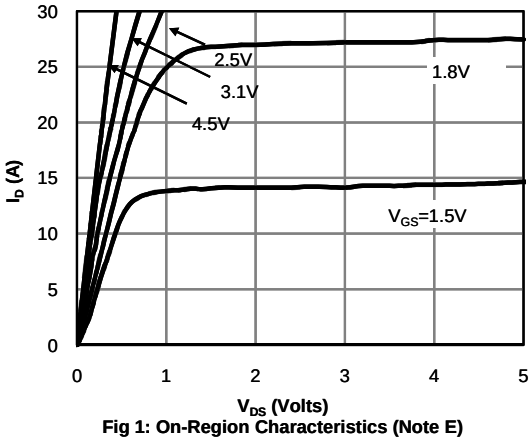


Fig 1: On-Region Characteristics (Note E)

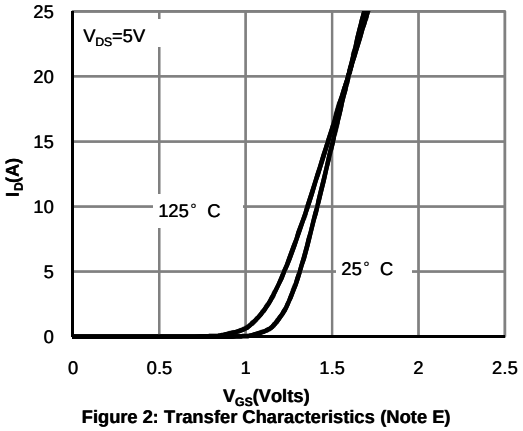


Figure 2: Transfer Characteristics (Note E)

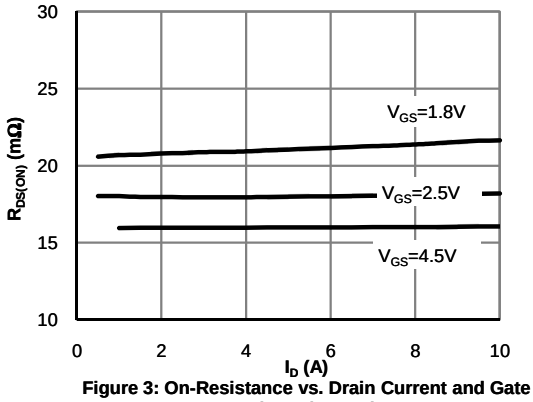


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

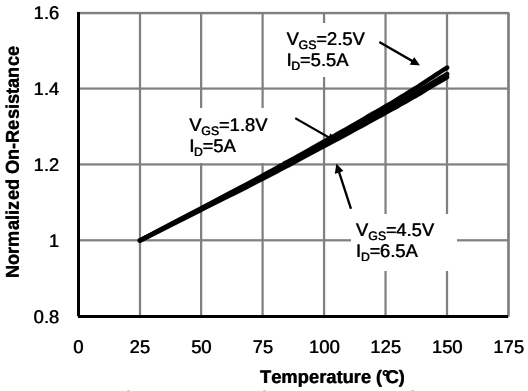


Figure 4: On-Resistance vs. Junction Temperature (Note E)

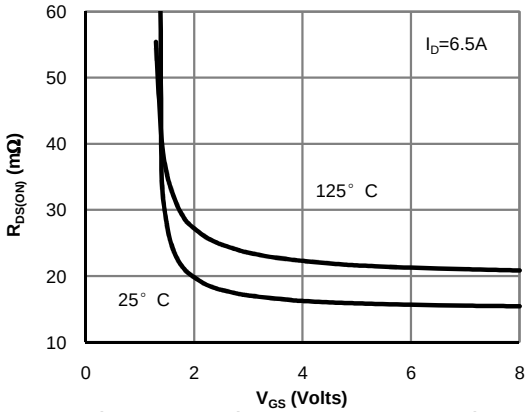


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

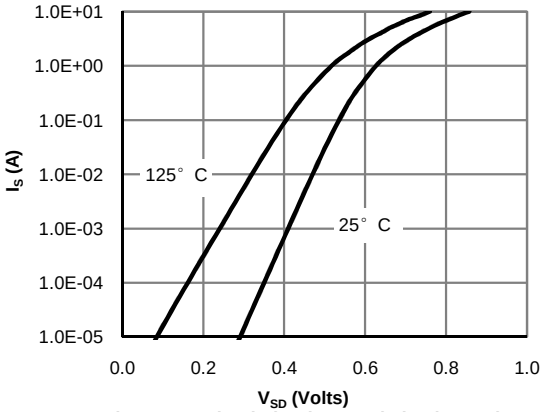


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

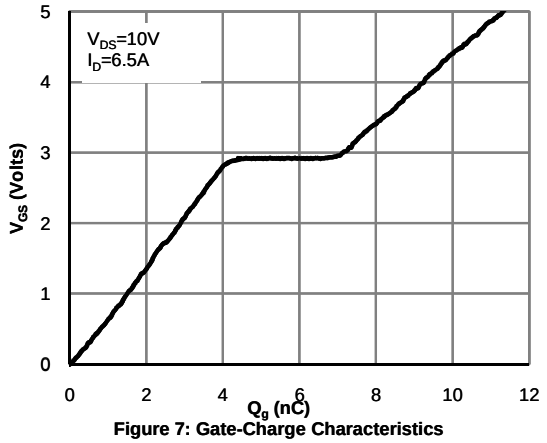


Figure 7: Gate-Charge Characteristics

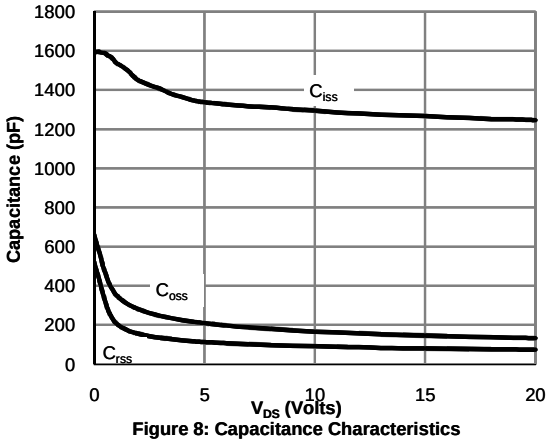


Figure 8: Capacitance Characteristics

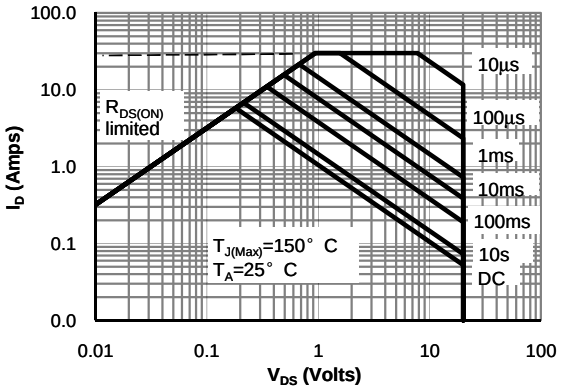


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

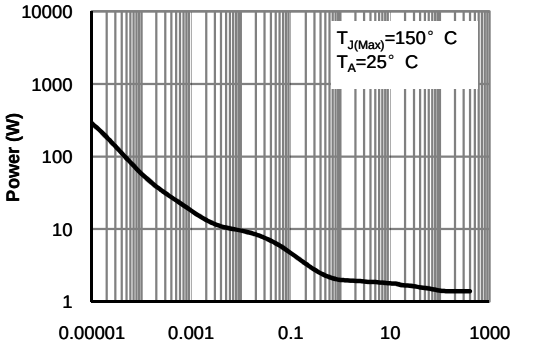


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

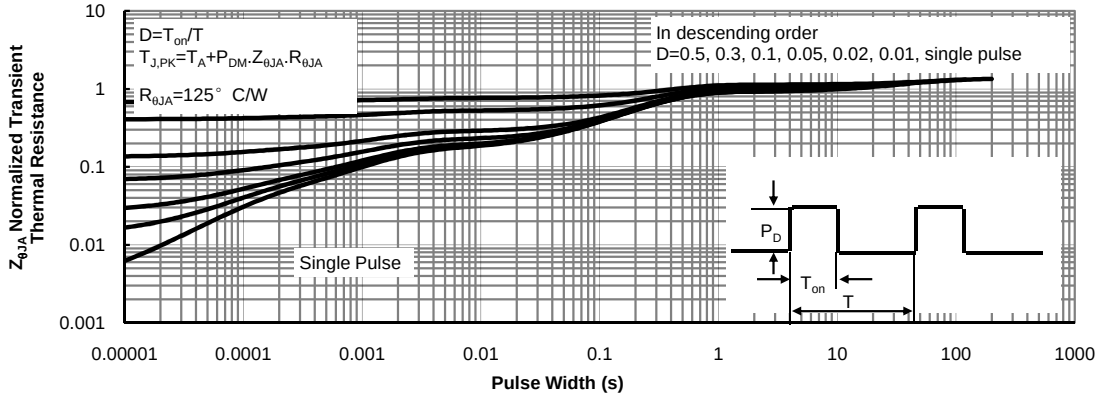


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

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