

N-Channel Super Trench Power MOSFET

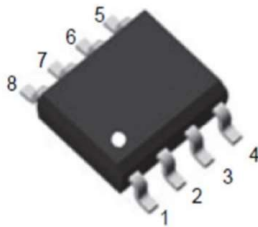
Features

- $V_{DS} = 150V$, $I_D = 5.1A$
- $R_{DS(ON)} < 55\text{ m}\Omega$ @ $V_{GS} = 10V$
- $R_{DS(ON)} < 65\text{ m}\Omega$ @ $V_{GS} = 4.5V$

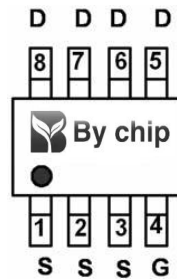
General Features

- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free and Green Available

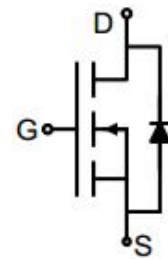
100% UIS TESTED!
100% ΔV_{ds} TESTED!



SOP-8



pin assignment



Schematic diagram

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

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V_{DS}	150	V	
Gate-Source Voltage	V_{GS}	± 20	V	
Drain Current-Continuous	I_D	5.1	A	
Drain Current-Continuous($T_C = 100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	3.6	A	
Pulsed Drain Current ^(Note 1)	I_{DM}	20	A	
Single pulse avalanche energy ^(Note 5)	E_{AS}	60	mJ	
Maximum Power Dissipation	P_D	$T_C = 25^\circ\text{C}$	5	W
		$T_A = 25^\circ\text{C}$	3	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ\text{C}$	

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	41.7	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	25	

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

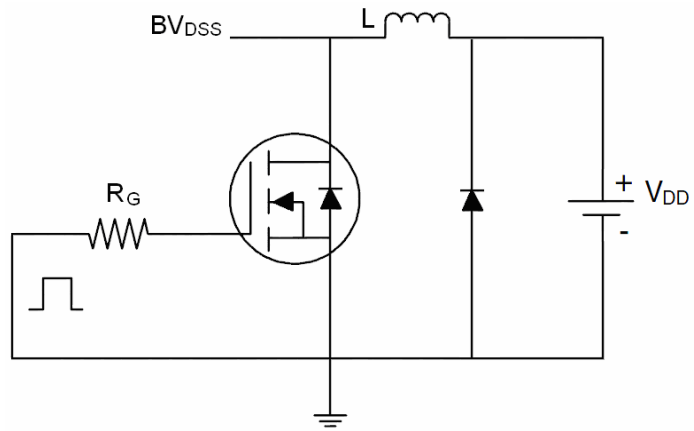
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	150	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=150V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5.1A$	-		55	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=5.1A$	-	12.5	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=75V, V_{GS}=0V,$ $F=1.0MHz$	-	618	850	PF
Output Capacitance	C_{oss}		-	81	105	PF
Reverse Transfer Capacitance	C_{rss}		-	6.5	9	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=75V, I_D=5.1A$ $V_{GS}=10V, R_G=3\Omega$	-	12.8	14	nS
Turn-on Rise Time	t_r		-	1.4	8.5	nS
Turn-Off Delay Time	$t_{d(off)}$		-	12.5	21	nS
Turn-Off Fall Time	t_f		-	2.5	8.0	nS
Total Gate Charge	Q_g	$V_{DS}=75V, I_D=5.1A,$ $V_{GS}=10V$	-	12.8	18.0	nC
Gate-Source Charge	Q_{gs}		-	5		nC
Gate-Drain Charge	Q_{gd}		-	3.6		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=5.1A$	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	5.1	A
Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}, I_F = I_S$	-	58	95	nS
Reverse Recovery Charge	Q_{rr}	$di/dt = 100A/\mu s$ (Note 3)	-	69	110	nC

Notes:

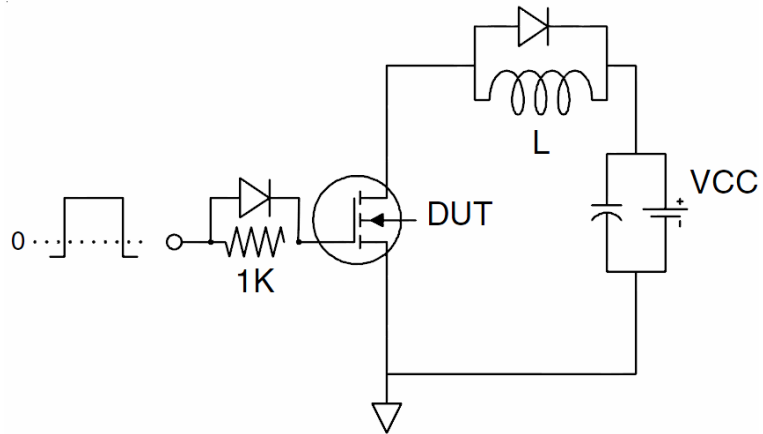
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^{\circ}\text{C}$. The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=50V, V_G=10V, L=0.5mH, R_g=25\Omega$

Test Circuit

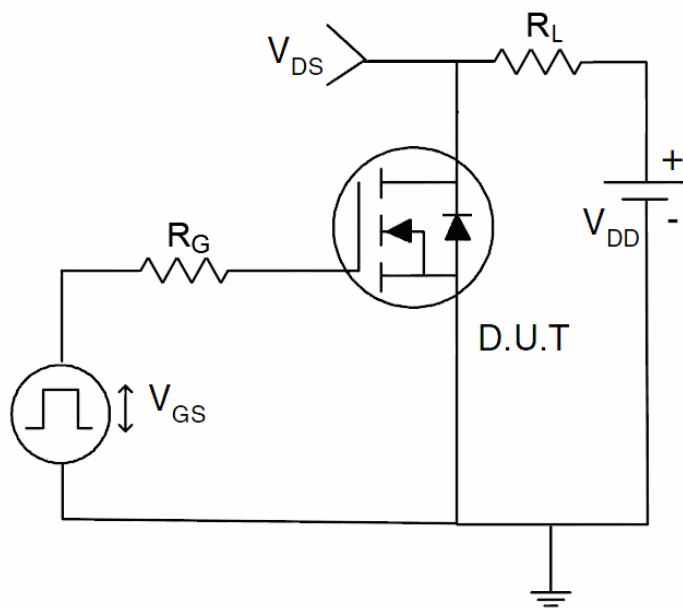
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

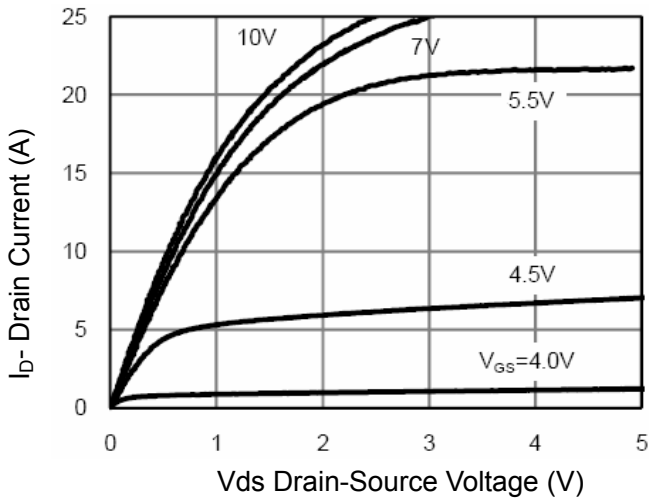


Figure 1 Output Characteristics

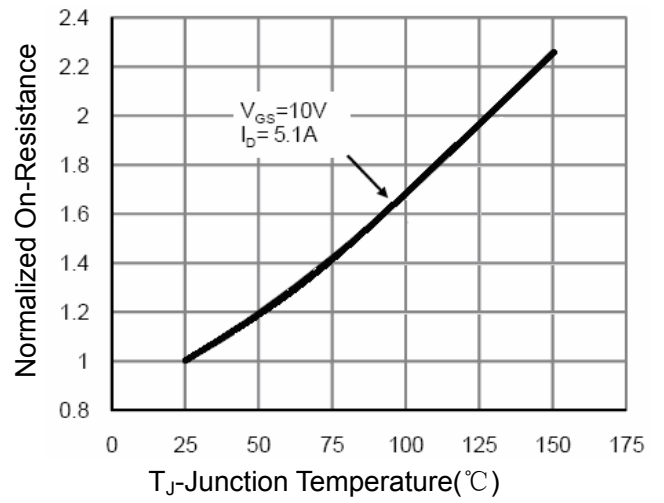


Figure 4 R_{dson} -Junction Temperature

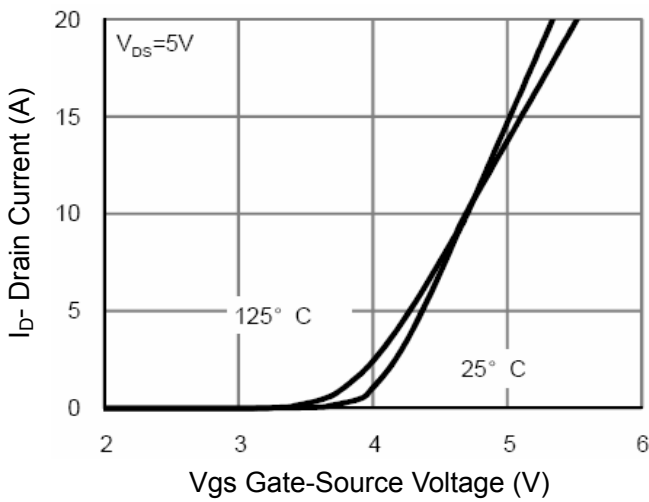


Figure 2 Transfer Characteristics

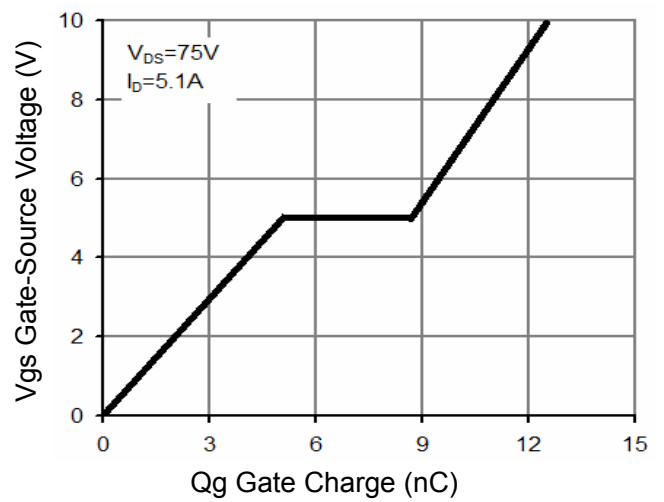


Figure 5 Gate Charge

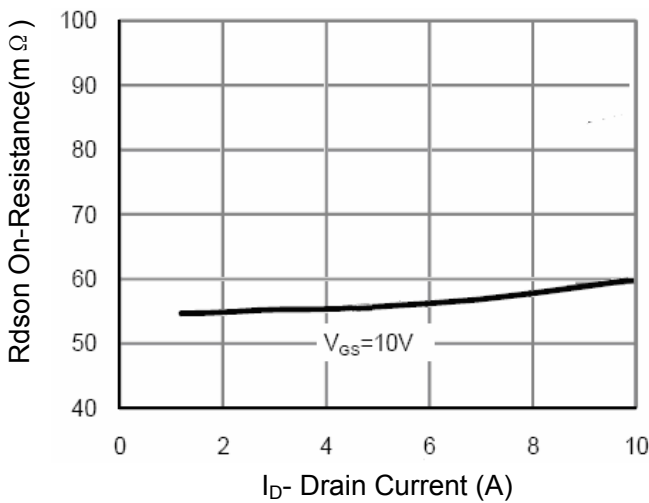


Figure 3 R_{dson} - Drain Current

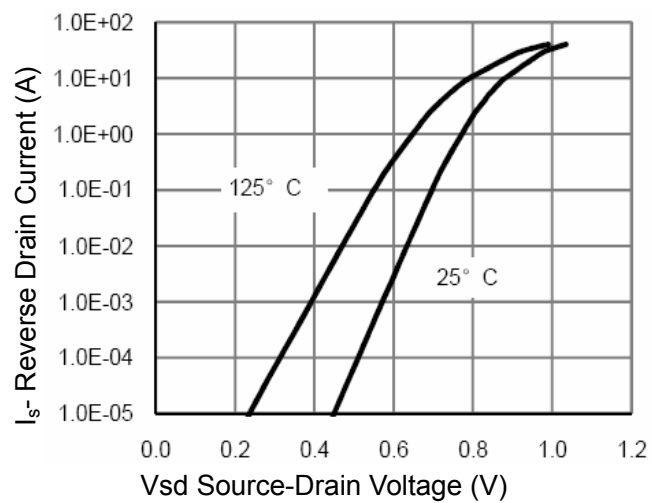


Figure 6 Source- Drain Diode Forward

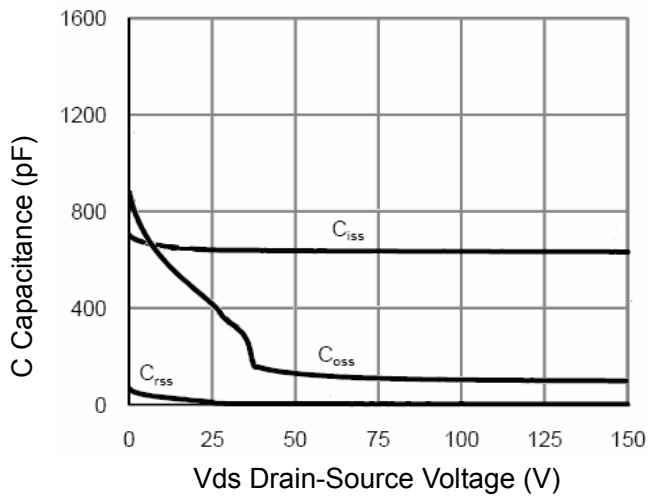


Figure 7 Capacitance vs Vds

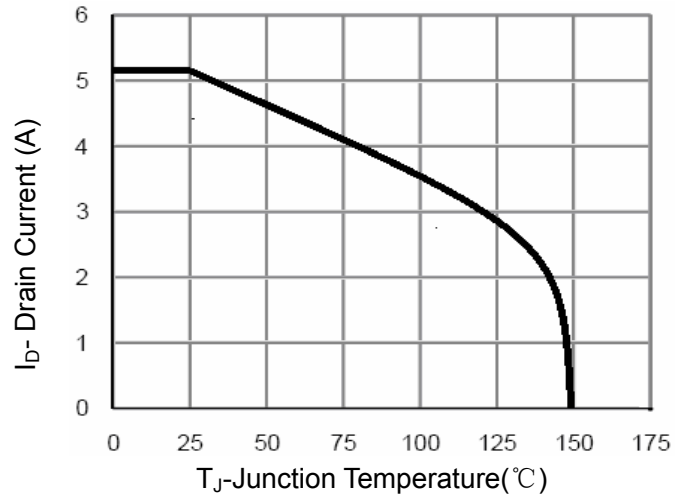


Figure 9 Current De-rating

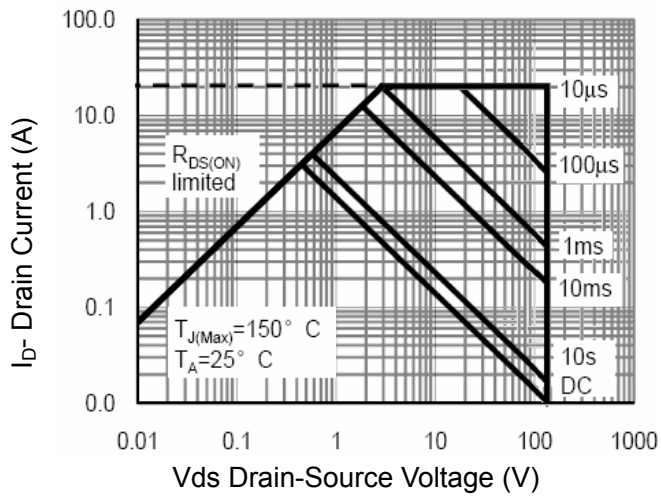


Figure 8 Safe Operation Area

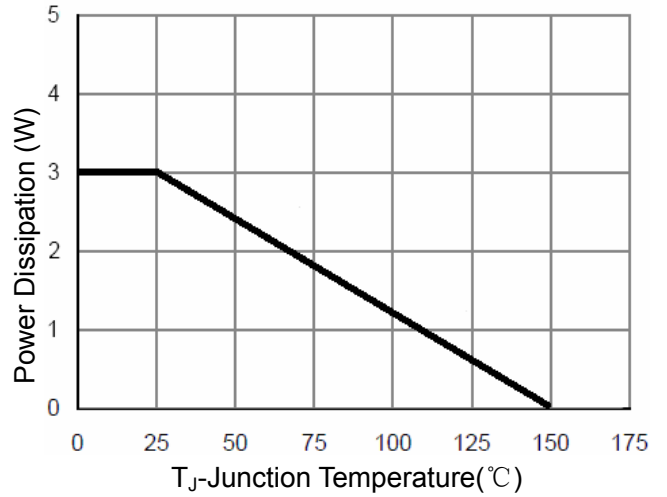


Figure 10 Power De-rating

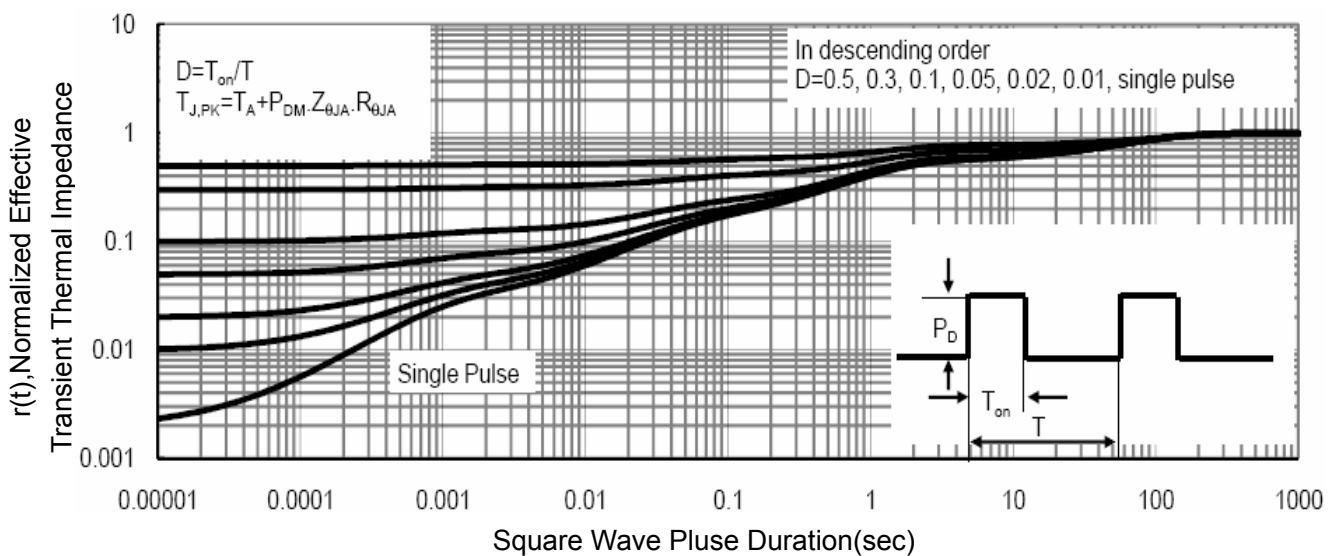


Figure 11 Normalized Maximum Transient Thermal Impedance