

N-Channel Super Trench Power MOSFET

Features

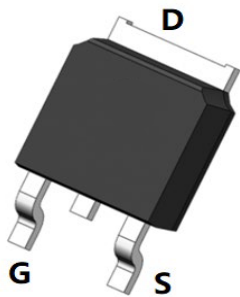
- $V_{DS} = 250V$, $I_D = 15A$
 $R_{DS(ON)} < 200\text{ m}\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)} < 245\text{ m}\Omega$ @ $V_{GS} = 4.5V$

General Features

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

100% UIS TESTED!

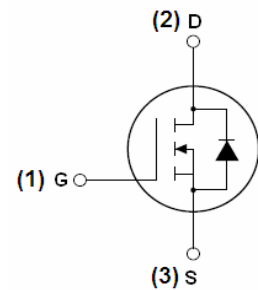
100% ΔV_{ds} TESTED!



TO-252-2L Top View



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}	250	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	15	A
Drain Current-Continuous($T_C = 100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	10.6	A
Pulsed Drain Current	I_{DM}	60	A
Maximum Power Dissipation	P_D	140	W
Derating factor		0.93	W/ $^\circ\text{C}$
Single pulse avalanche energy ^(Note 1)	E_{AS}	80	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ\text{C}$

Thermal Characteristic

Thermal Résistance, Junction-to-Case	$R_{\theta JC}$	1.1	$^\circ\text{C/W}$
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Electrical Characteristics (T_A=25°C unless otherwise noted)

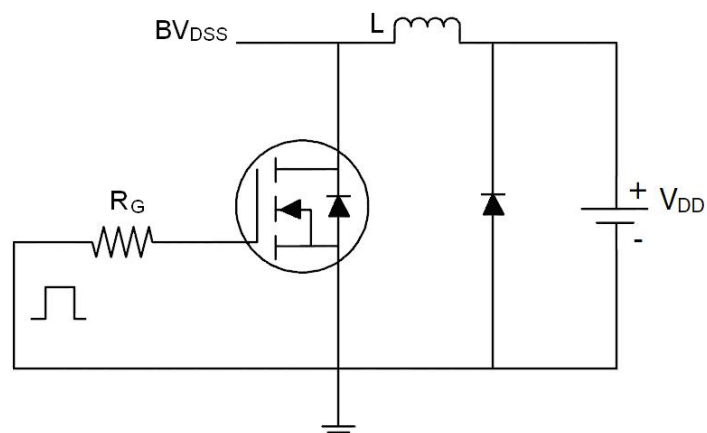
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	250	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =250V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =7.5A	-		200	mΩ
Gate resistance	R _G		-	4.5	-	Ω
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =15A	15	-	-	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =125V, V _{GS} =0V, F=1.0MHz	-	475		PF
Output Capacitance	C _{oss}		-	34		PF
Reverse Transfer Capacitance	C _{rss}		-	1.2		PF
Switching Characteristics (Note 2)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =125V, R _L =8Ω V _{GS} =10V, R _G =3Ω	-	4	-	nS
Turn-on Rise Time	t _r		-	5	-	nS
Turn-Off Delay Time	t _{d(off)}		-	10	-	nS
Turn-Off Fall Time	t _f		-	2	-	nS
Total Gate Charge	Q _g	V _{DS} =125V, I _D =15A, V _{GS} =10V	-	8.9	-	nC
Gate-Source Charge	Q _{gs}		-	3.3	-	nC
Gate-Drain Charge	Q _{gd}		-	2.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =15A	-	-	1.2	V
Diode Forward Current	I _S		-	-	15	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = I _S	-	25	-	nS
Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs	-	110	-	nC

Notes:

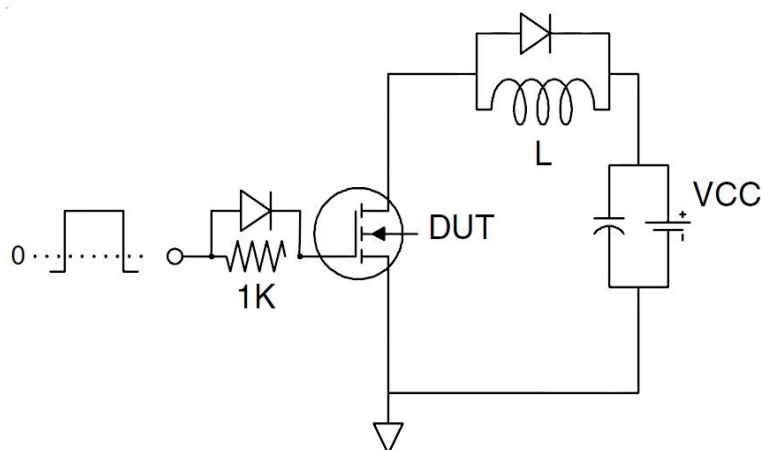
1. EAS condition : T_J=25°C, V_{DD}=50V, V_G=10V, L=0.5mH, R_G=25Ω
2. Guaranteed by design, not subject to production
3. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_J(MAX)=175°C. The SOA curve provides a single pulse rating.

Test Circuit

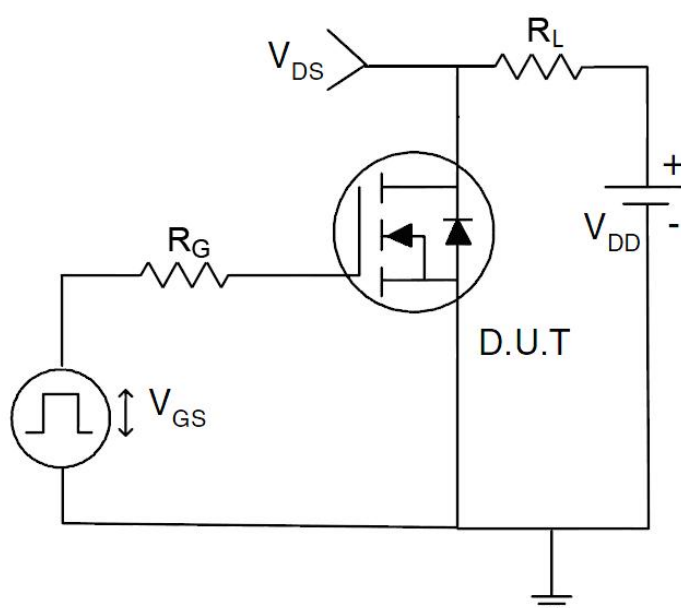
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics

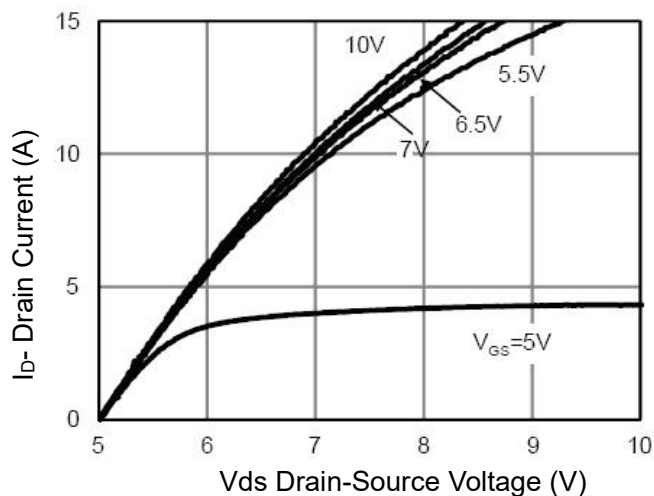


Figure 1 Output Characteristics

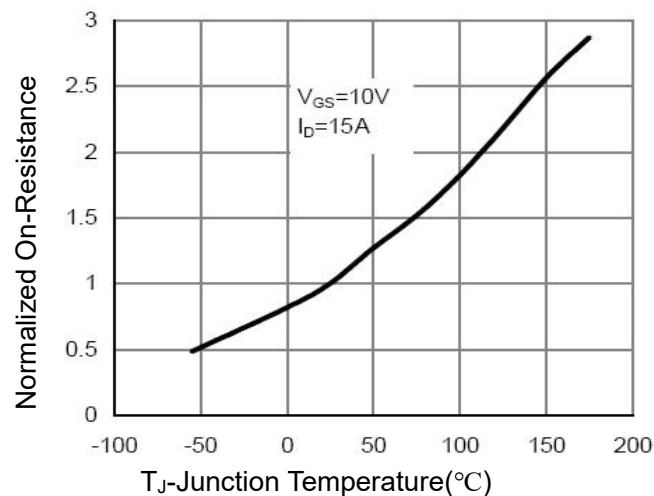


Figure 4 Rdson-Junction Temperature

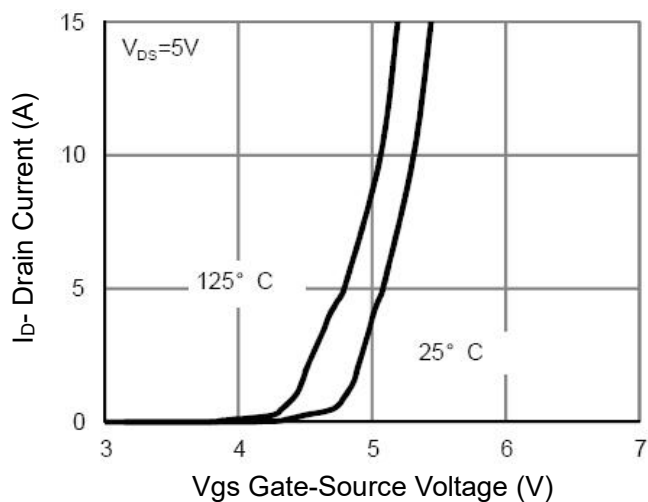


Figure 2 Transfer Characteristics

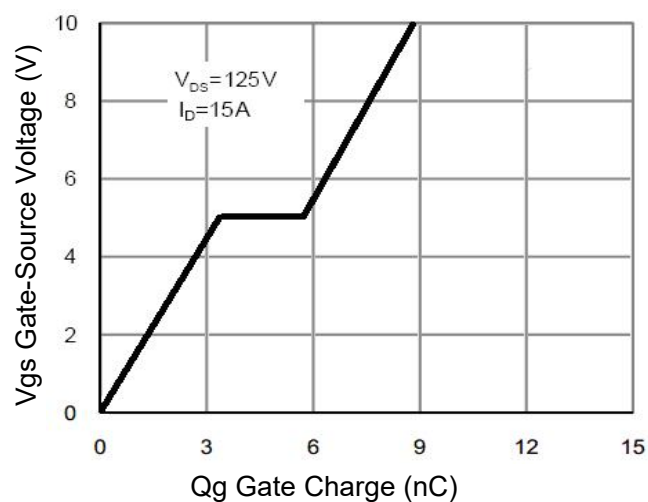


Figure 5 Gate Charge

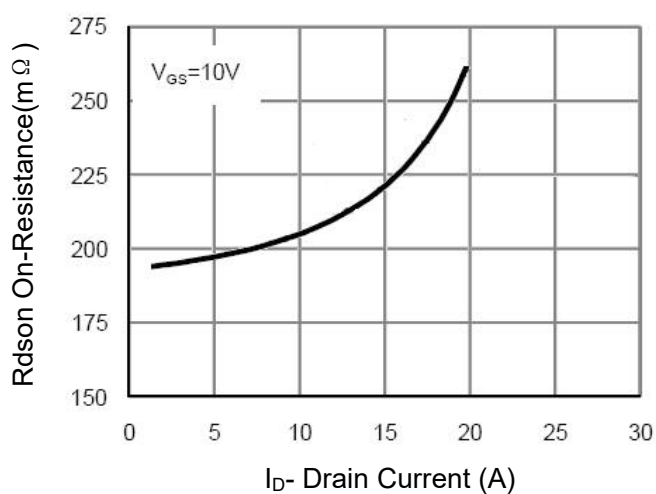


Figure 3 Rdson- Drain Current

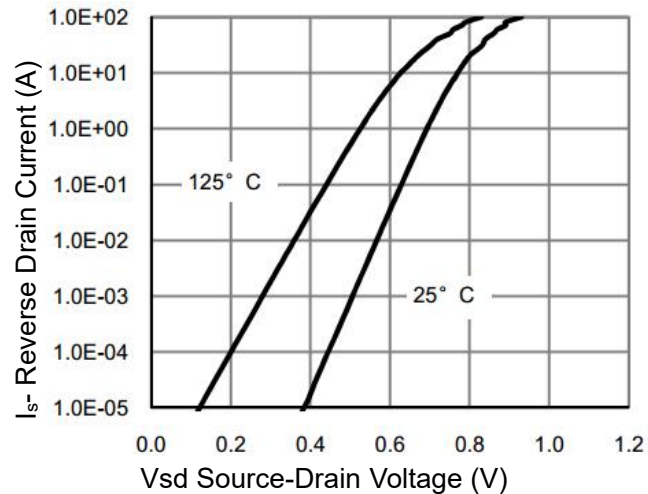


Figure 6 Source- Drain Diode Forward

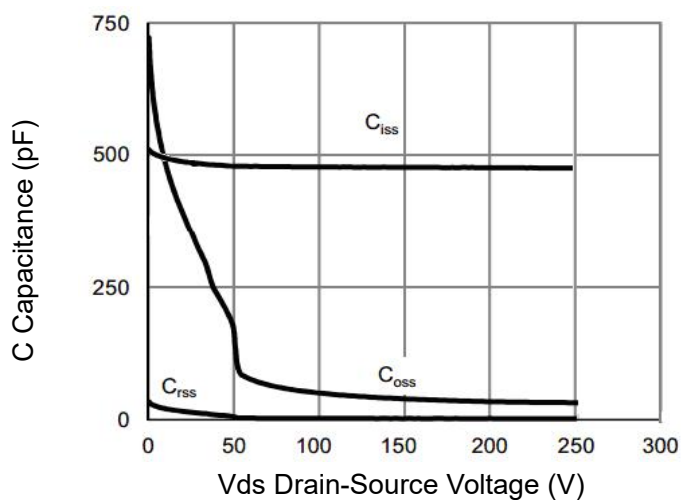


Figure 7 Capacitance vs Vds

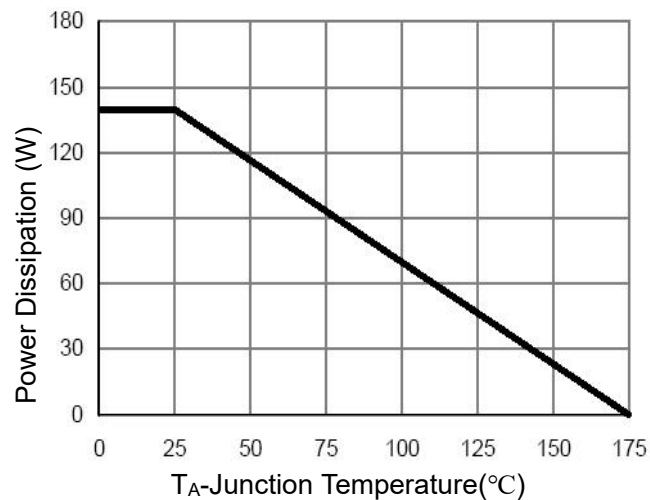


Figure 9 Power De-rating

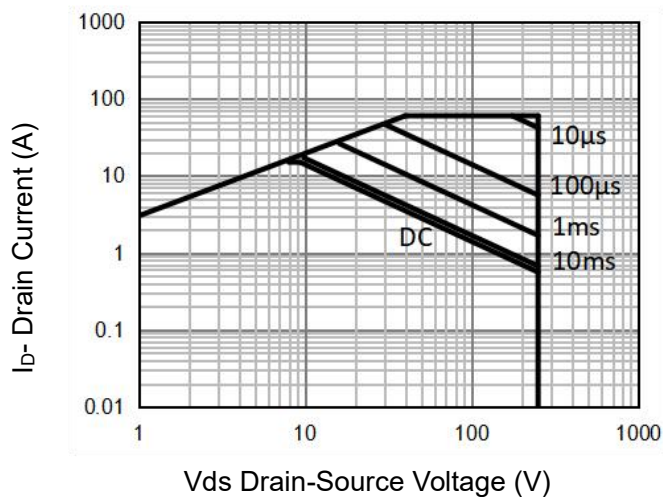


Figure 8 Safe Operation Area (Note 3)

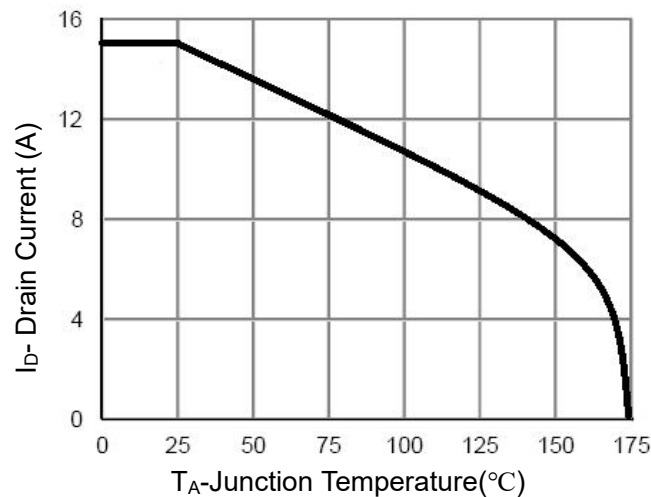


Figure 10 Current De-rating

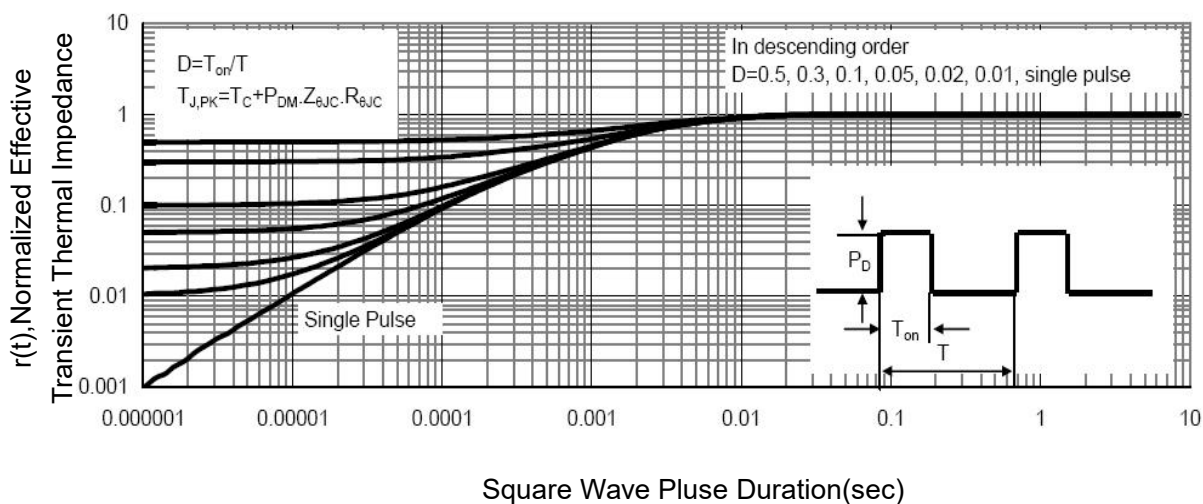


Figure 11 Normalized Maximum Transient Thermal Impedance