ZL8205B Specification V1.0

N-Channel Trench Power MOSFET

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N-Channel Trench Power MOSFET

General Description

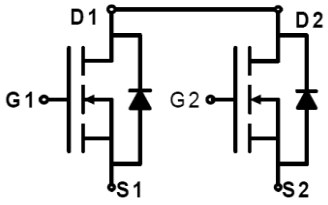
The ZL8205B uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching applications.

Features

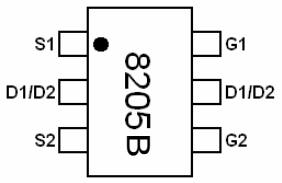
- V_{DS} = 20V,ID =5A
  $R_{DS(ON)}$ < 21mΩ @ V_{GS} =4.5V
  $R_{DS(ON)}$ < 28mΩ @ V_{GS} =2.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

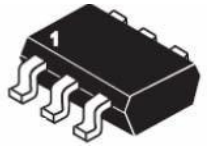
- Battery protection
- Load switch
- Power management



Schematic Diagram



Marking and pin Assignment



SOT23-6 top view

Table 1. Absolute Maximum Ratings (T_A=25℃)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	20	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±10	V
I_D	Drain Current-Continuous	5	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed **(Note 1)**	25	A
P_D	Maximum Power Dissipation	1.25	W
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

Table 2. Thermal Characteristic

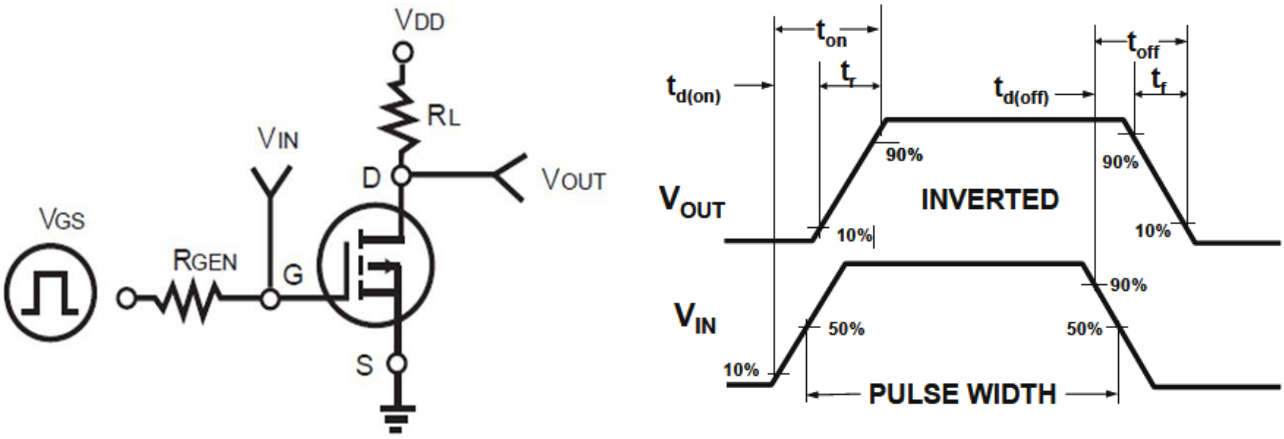
Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	100	℃/W

Table 3. Electrical Characteristics (T_A=25°Cunless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=20,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±10V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	0.5	0.7	1.1	V
g_{FS}	Forward Transconductance	V_{DS}=5V,I_D=5A	4			S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=4.5V, I_D=5A		15.5	21	mΩ
		V_{GS}=2.5V, I_D=3A		20	28	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=8V,V_{GS}=0V, f=1.0MHz		605		pF
C_{oss}	Output Capacitance			315		pF
C_{rss}	Reverse Transfer Capacitance			132		pF
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=10V,I_D=1A, V_{GS}=4.5V,R_G=6Ω		11		nS
t_r	Turn-on Rise Time			12		nS
$t_{d(off)}$	Turn-Off Delay Time			36		nS
t_f	Turn-Off Fall Time			32		nS
Q_g	Total Gate Charge	V_{DS}=10V,I_D=4A,V_{GS}=4.5V		10		nC
Q_{gs}	Gate-Source Charge			2.8		nC
Q_{gd}	Gate-Drain Charge			1.8		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current(Body Diode)				5	A
V_{SD}	Forward on Voltage **(Note 1)**	V_{GS}=0V,I_S=5A			1.2	V

Notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Switch Time Test Circuit and Switching Waveforms:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. Power Dissipation

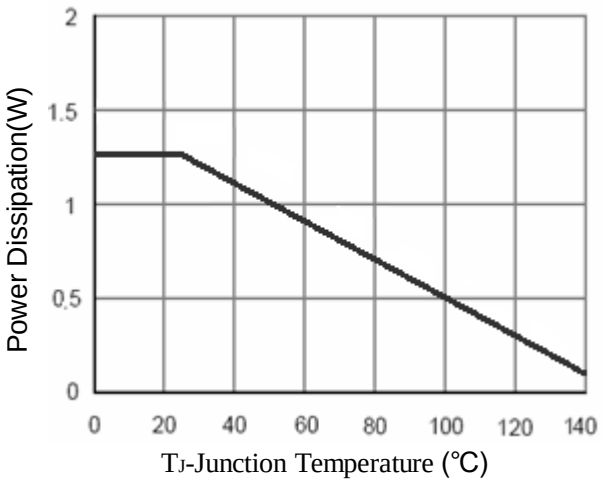


Figure2. Drain Current

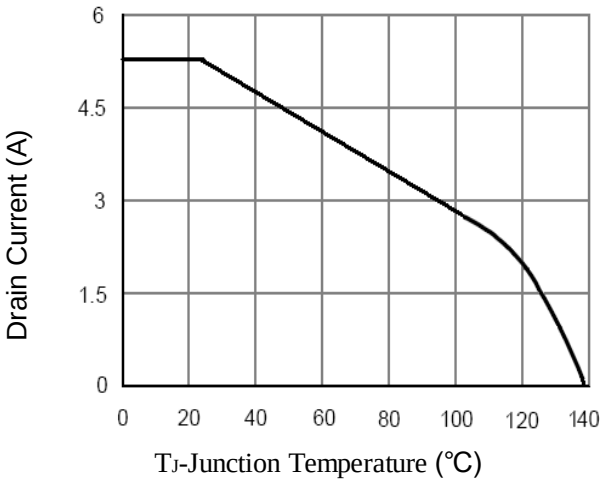


Figure3. Output Characteristics

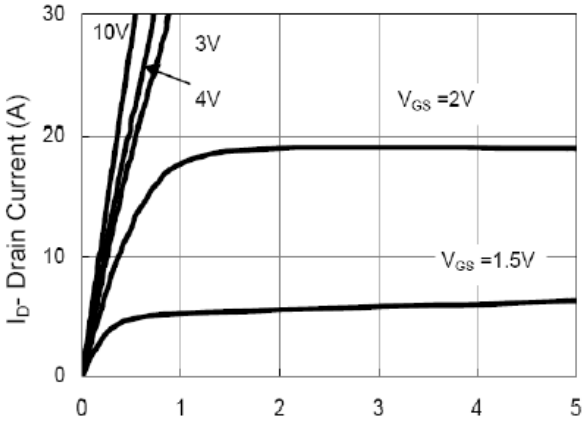


Figure4. Transfer Characteristics

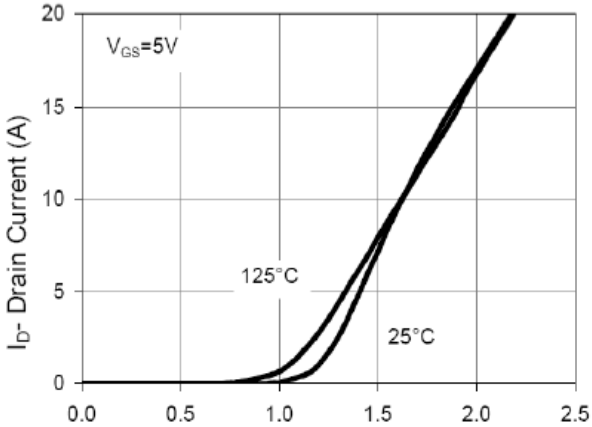


Figure5. Capacitance

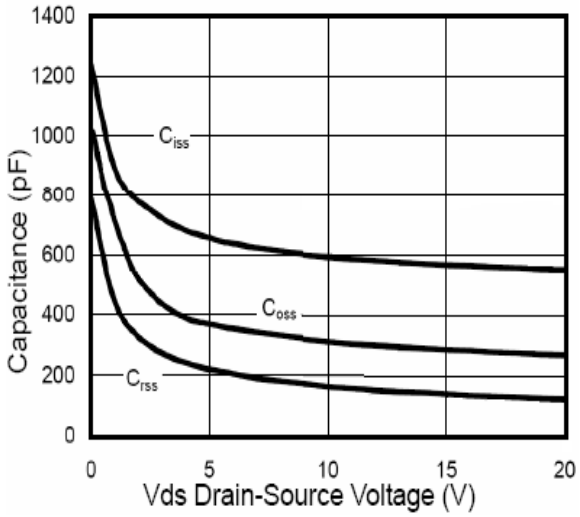


Figure6. $R_{DS(ON)}$ vs Junction Temperature

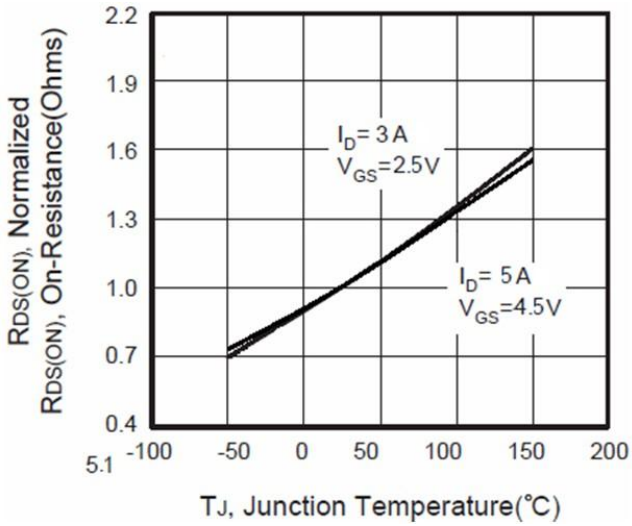


Figure7. Max BV_{DSS} vs Junction Temperature

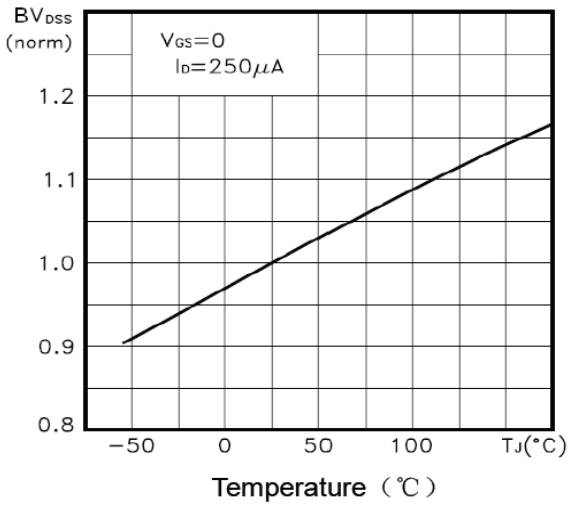


Figure8. $V_{GS(th)}$ vs Junction Temperature

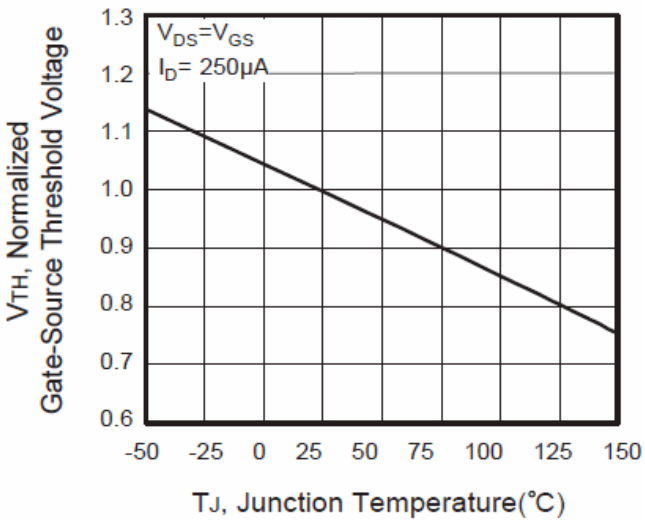


Figure9. Gate Charge Waveforms

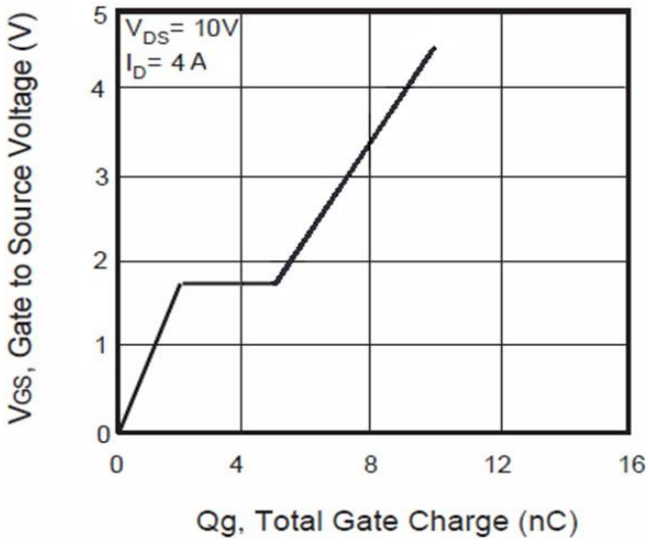


Figure10. Maximum Safe Operating Area

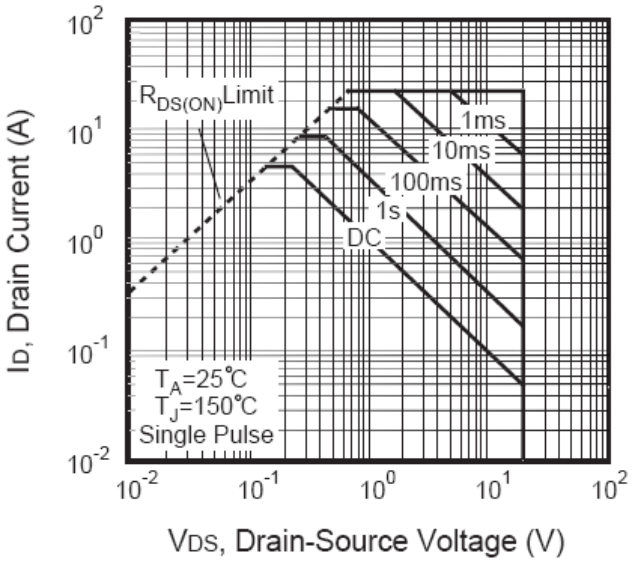
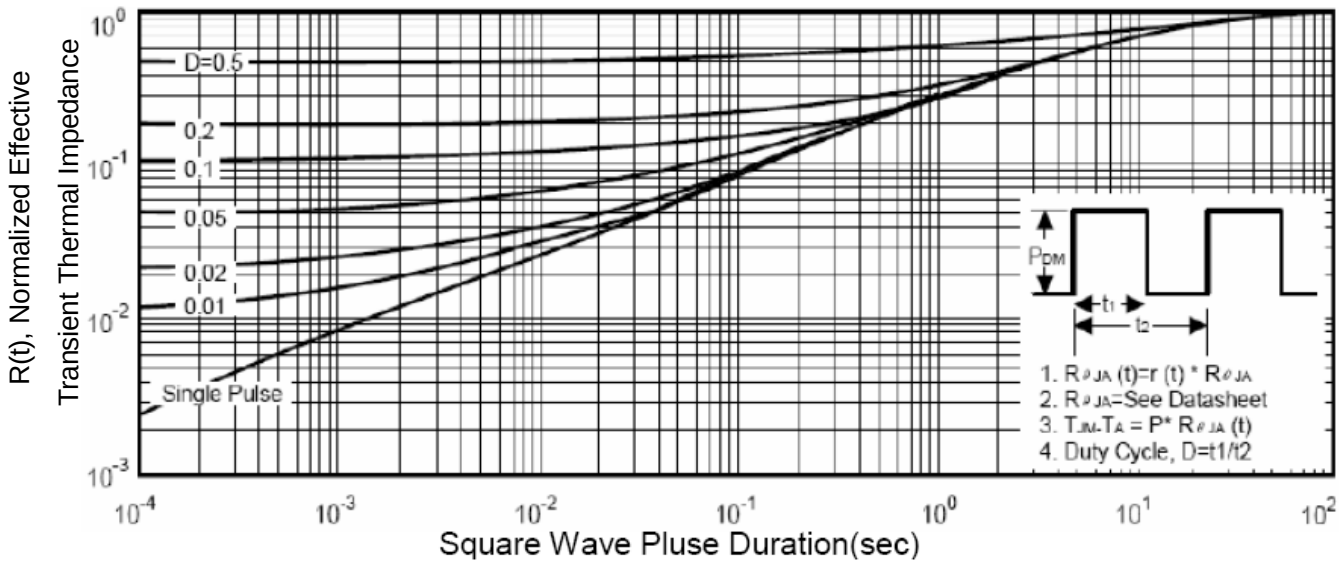
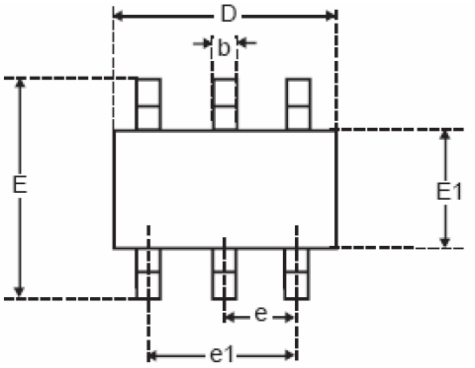


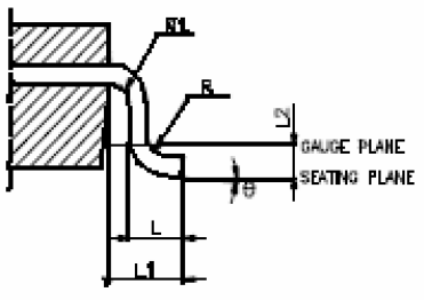
Figure11. Normalized Maximum Transient Thermal Impedance

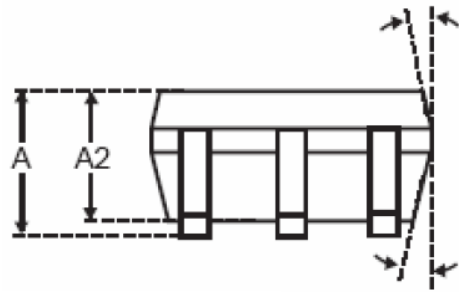


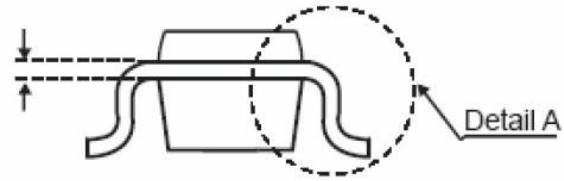
SOT23-6 PACKAGE INFORMATION

Dimensions in Millimeters (UNIT:mm)









SYMBOLS	MILLMETERS		
	MIN.	NOM.	MAX.
A			1.45
A1			0.15
A2	0.90	1.15	1.30
b	0.30		0.50
c	0.08		0.22
D		2.90 BSC.	
E		2.80 BSC.	
E1		1.60 BSC.	
e		0.95 BSC.	
e1		1.90 BSC.	
L	0.30	0.45	0.60
L1		0.60 REF	
L2		0.25 BSC.	
R	0.10		
R1	0.10		0.25
θ	0°	4°	8°
$\theta 1$	5°	10°	15°

NOTES:

1. All dimensions are in millimeters.
2. Dimensions are inclusive of plating
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 6 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.