

SuperMOS – SOT-23-6L 19.5V BV_{DSS}, 19.5mΩ R_{DS(ON)}, N-channel MOSFET

1. Description

The ES8205 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R_{DS(ON)} with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product ES8205 is Pb-free.

2. Features

- 19.5V, R_{DS(ON)}=19.5mΩ(TYP.) @V_{GS}=4.5V
R_{DS(ON)}=26.5mΩ(TYP.) @V_{GS}=2.5V
 - High density cell design for low R_{DS(on)}
 - Material: Halogen free
- Reliable and rugged
 - Avalanche Rated
 - Low leakage current

3. Applications

- PWM applications
 - Load switch
- Power management in portable/desktop PCs
 - DC/DC conversion

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
ES8205	SOT-23-6L	.8205	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

Table-1 Ordering information

5. Pin Configuration and Functions

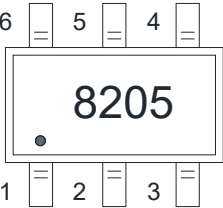
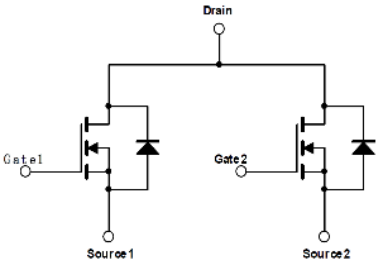
Pin	Function	Outline	Circuit Diagram
6	Gate1		
1	Source1		
2/5	Drain		
4	Gate2		
3	Source2		

Table-2 Pin configuration

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		BV_{DSS}	19.5	V
Gate-Source Voltage		V_{GS}	± 10	V
Continuous Drain Current ^a	$T_A=25^{\circ}\text{C}$	I_D	5.0	A
	$T_A=75^{\circ}\text{C}$		4.0	
Maximum Power Dissipation ^a	$T_A=25^{\circ}\text{C}$	P_D	1.12	W
	$T_A=75^{\circ}\text{C}$		0.67	
Pulsed Drain Current ^b		I_{DM}	20	A
Operating Junction Temperature		T_J	150	$^{\circ}\text{C}$
Lead Temperature		T_L	260	$^{\circ}\text{C}$
Storage Temperature Range		T_{stg}	-55 to 150	$^{\circ}\text{C}$

Thermal resistance ratings

Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ^a	$t \leq 10 \text{ s}$	$R_{\theta JA}$	90	112	$^{\circ}\text{C/W}$
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	63	78	

Note:

a: Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

b: Repetitive rating, pulse width limited by junction temperature, $t_p=10\mu\text{s}$, Duty Cycle=1%

Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	19.5			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =19.5V, V _{GS} =0V			1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±12V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	0.5	0.7	1.2	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =4A		19.5	29	mΩ
		V _{GS} =2.5V, I _D =3A		26.5	34	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, f=1MHz, V _{DS} =10V		550		pF
Output Capacitance	C _{OSS}			105		
Reverse Transfer Capacitance	C _{RSS}			88		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =4.5V, V _{DS} =10V, I _D =4.8A		8		nC
Gate-to-Source Charge	Q _{GS}			2.3		
Gate-to-Drain Charge	Q _{GD}			3.2		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =4.5V, V _{DS} =10V, R _L =1.5Ω, R _G =3Ω		0.5		ns
Rise Time	t _r			1		
Turn-Off Delay Time	t _{d(OFF)}			11		
Fall Time	t _f			5		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =1.0A		0.8	1.5	V

7. Typical Characteristic

Figure1: Output Characteristics

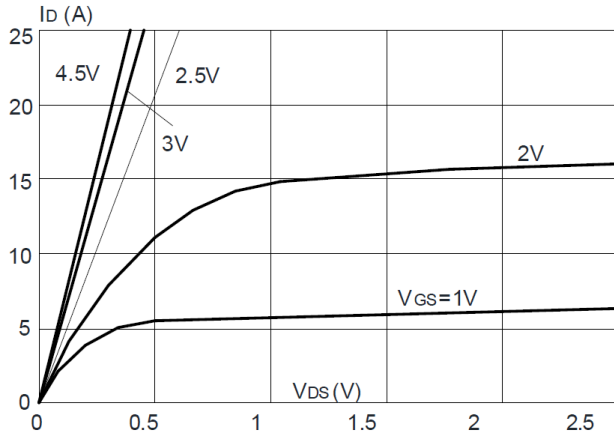


Figure 2: Typical Transfer Characteristics

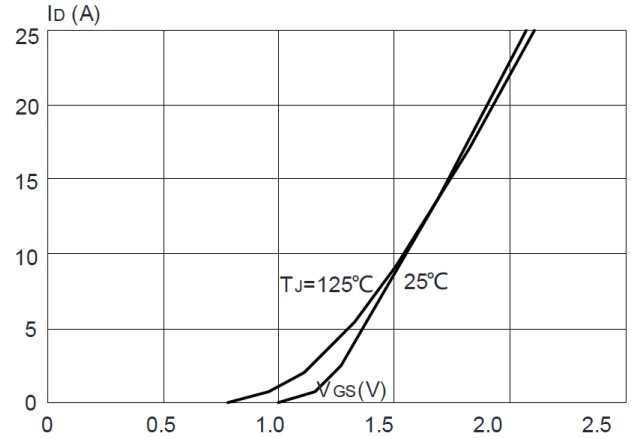


Figure 3: On-resistance vs. Drain Current

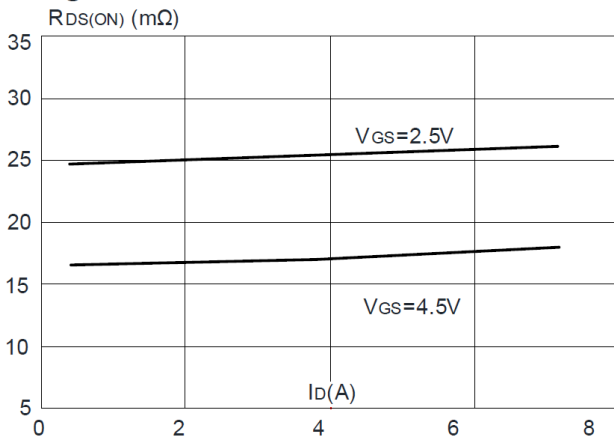


Figure 4: Body Diode Characteristics

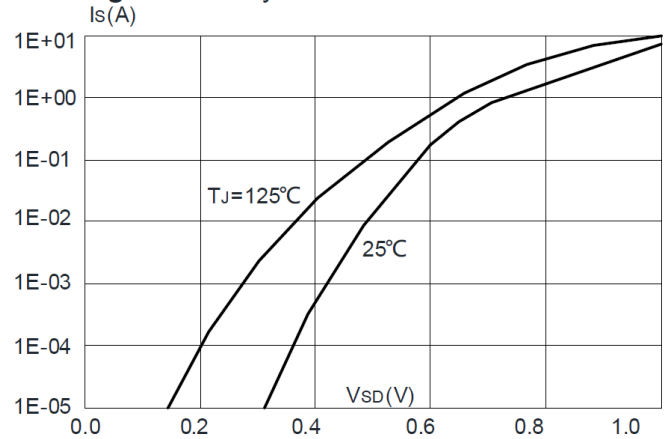


Figure 5: Gate Charge Characteristics

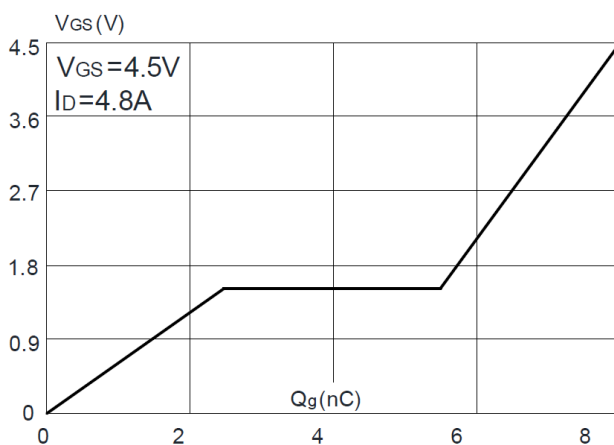


Figure 6: Capacitance Characteristics

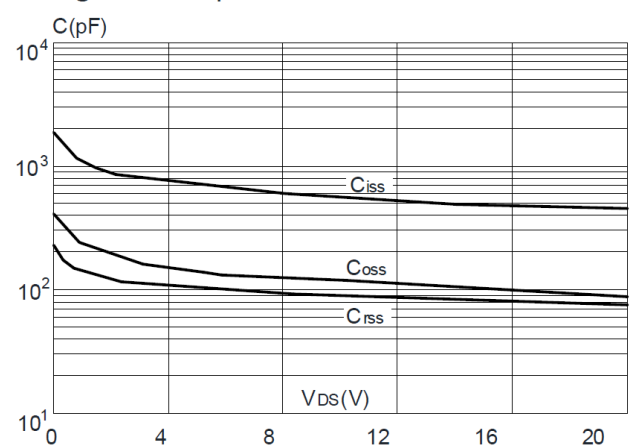


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

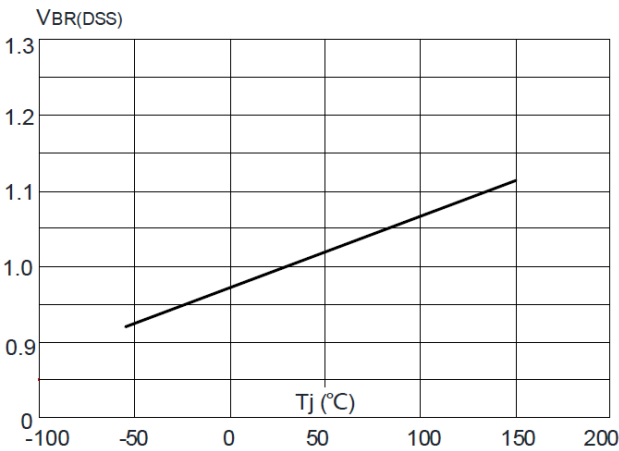


Figure 8: Normalized on Resistance vs. Junction Temperature

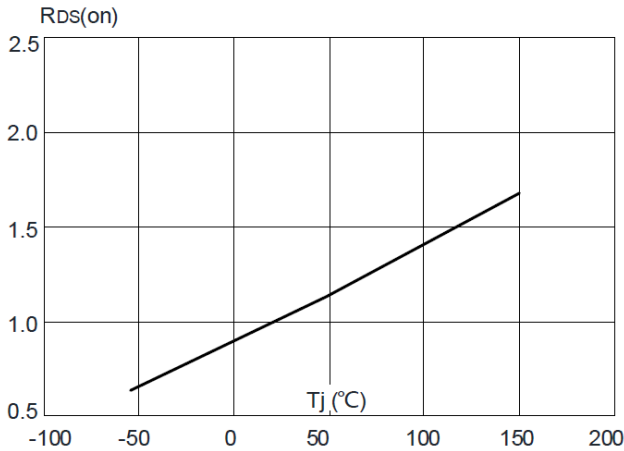


Figure 9: Maximum Safe Operating Area

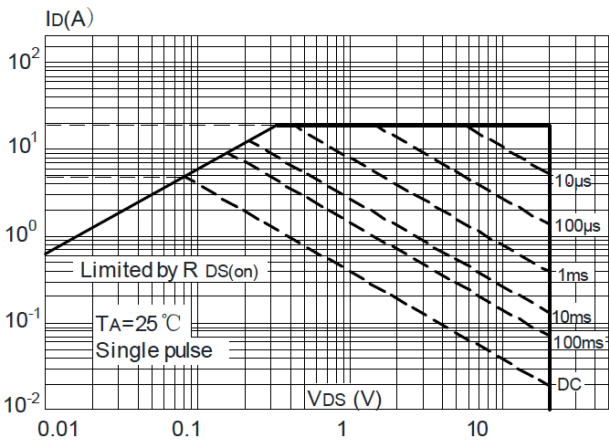


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

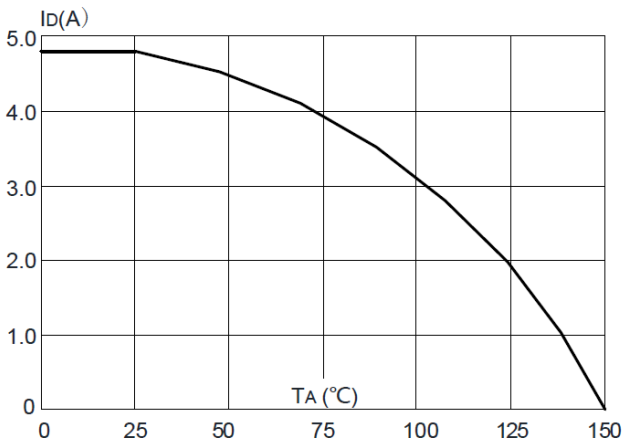
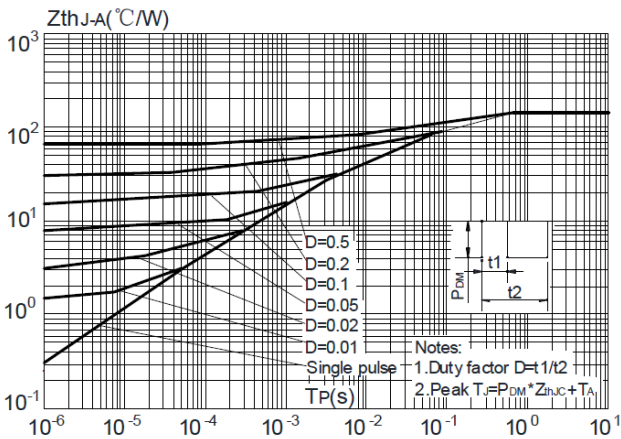
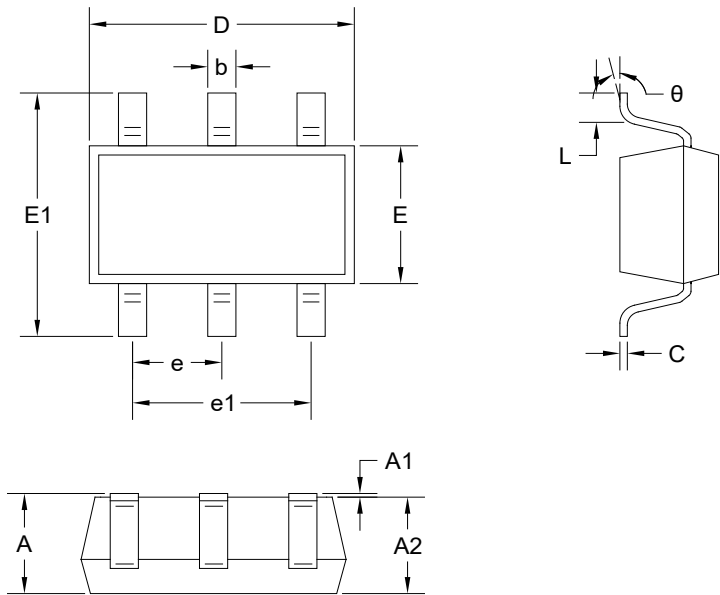


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



8. Dimension (SOT-23-6L)



Unit: mm

Symbol		A	A1	A2	b	c	D
Spec	Min	1.050	0.000	1.050	0.300	0.100	2.820
	Max	1.250	0.100	1.150	0.500	0.200	3.020
Symbol		E	E1	e	e1	L	θ
Spec	Min	1.500	2.650	0.950BSC	1.800	0.300	0°
	Max	1.700	2.950		2.000	0.600	8°

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