

## Dual N-Channel Enhancement Power Mosfet

### General Description

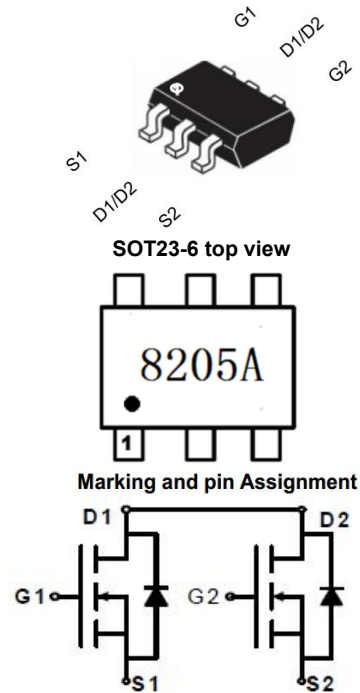
This device uses advanced trench technology to provide excellent  $R_{DS(on)}$ , low gate charge and operation with gate voltages as low as 2.5V.

### Features

- $V_{DS} = 20V, I_D = 6A$   
 $R_{DS(on)}, 19.5m\Omega (Typ) @ V_{GS} = 4.5V$   
 $R_{DS(on)}, 25m\Omega (Typ) @ V_{GS} = 2.5V$
- Trench Power Technology
- Low  $R_{DS(on)}$
- Low Gate Charge
- Optimized for Fast-switching Applications

### Application

- Synchronous Rectification in DC/DC and AC/DC Converters
- Isolated DC/DC Converters in Telecom and Industrial



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
8205A	8205A	SOT23-6	233mm	8mm	3000

### Absolute Maximum Ratings(TA=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 10$	V
Drain Current-Continuous <sup>Note3</sup>	$I_D$	TC=25°C	6
		TC=70°C	4.8
Drain Current-Pulsed <sup>Note1</sup>	$I_{DM}$	24	A
Avalanche Energy <sup>Note4</sup>	$E_{AS}$	7.4	mJ
Maximum Power Dissipation	$P_D$	1.5	W
Storage Temperature Range	$T_{STG}$	-55 to +150	°C
Operating Junction Temperature Range	$T_J$	-55 to +150	°C

### Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	14.4	-	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	-	83	-	°C/W

**Electrical Characteristics(T<sub>J</sub>=25°C unless otherwise noted)**

OFF CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>DS</sub> =250uA	20	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	-	-	1	uA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V	-	-	±100	nA

ON CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250uA	0.5	0.7	1.2	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>DS</sub> =3A	-	19.5	25	mΩ
		V <sub>GS</sub> =2.5V, I <sub>DS</sub> =3A	-	25	31.5	

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f=1MHz	-	466	-	pF
Output Capacitance	C <sub>OSS</sub>		-	65	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	58	-	

SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =10V, R <sub>GEN</sub> =2.5Ω I <sub>D</sub> =6A	-	15	-	ns
Rise Time	t <sub>r</sub>		-	17	-	
Turn-Off Delay Time	T <sub>d(off)</sub>		-	42	-	
Fall Time	t <sub>f</sub>		-	10	-	
Total Gate Charge at 10V	Q <sub>g</sub>	V <sub>DS</sub> =10V, I <sub>DS</sub> =6A, V <sub>GS</sub> =10V	-	5.7	-	nC
Gate to Source Gate Charge	Q <sub>gs</sub>		-	0.8	-	
Gate to Drain“Miller”Charge	Q <sub>gd</sub>		-	1.4	-	

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>DS</sub> =6A	-	-	1.2	V

**Notes:**

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: EAS condition: VDD=20V, VG=10V, VGATE=20V, Start T<sub>J</sub>=25°C.

Typical Performance Characteristics

Figure 1. Output Characteristics

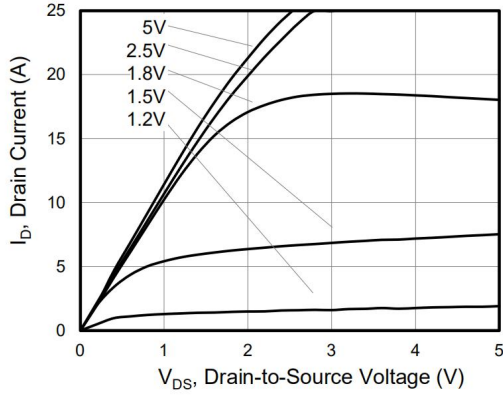


Figure 2. Transfer Characteristics

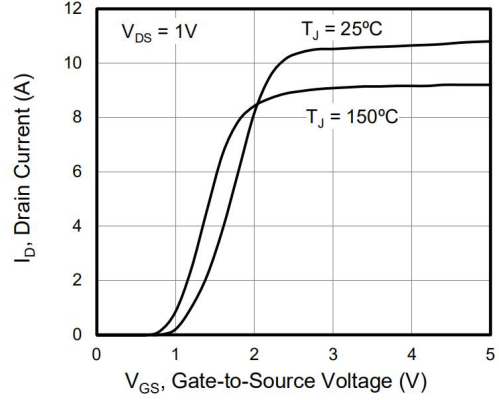


Figure 3. On-Resistance vs. Drain Current

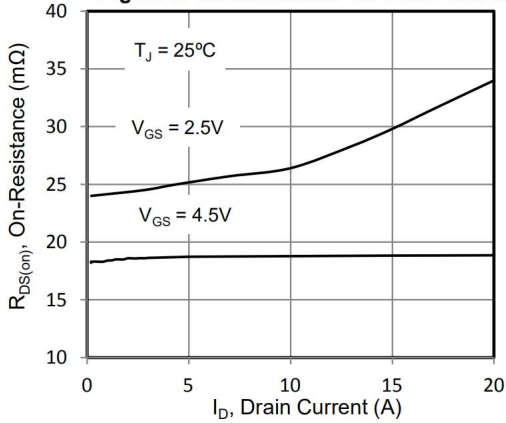


Figure 4. Capacitance

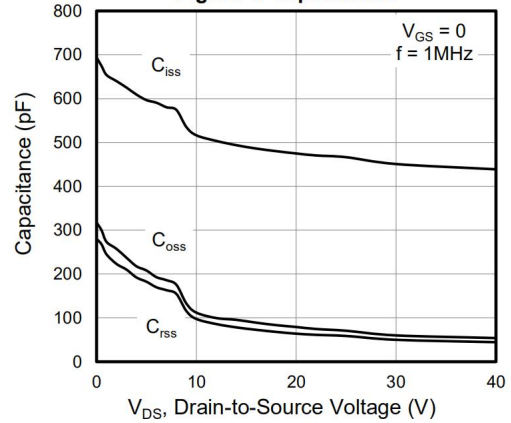


Figure 5. Gate Charge

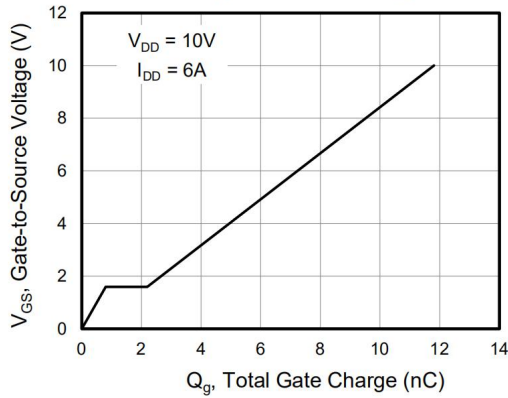
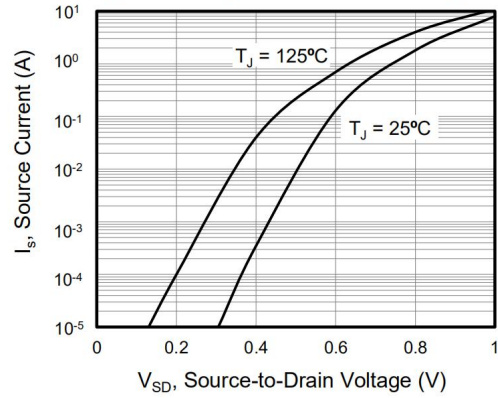
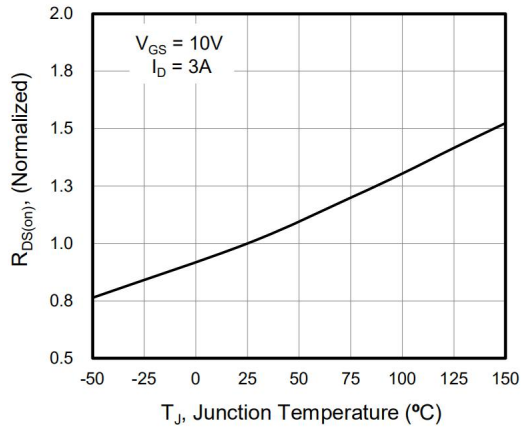


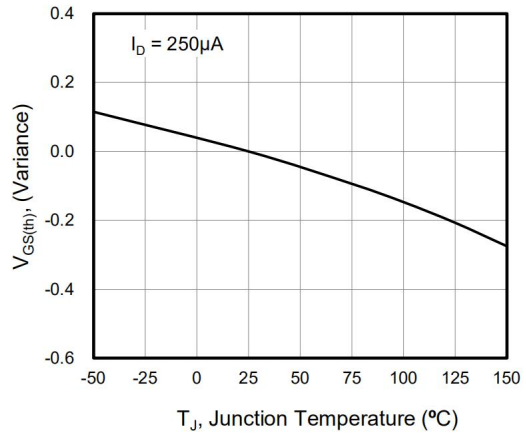
Figure 6. Body Diode Forward Voltage



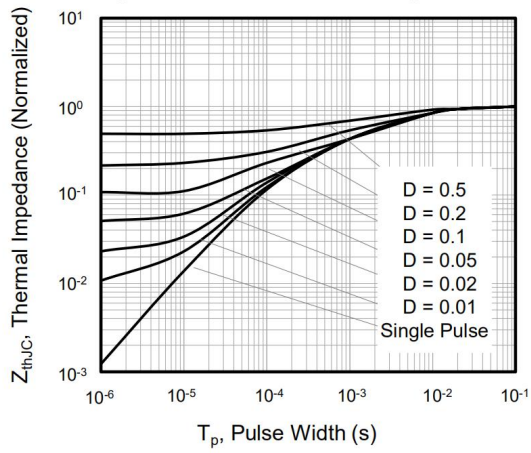
**Figure 7. On-Resistance vs. Junction Temperature**



**Figure 8. Threshold Voltage vs. Junction Temperature**



**Figure 9. Transient Thermal Impedance**



**Figure 10. Safe operation area**

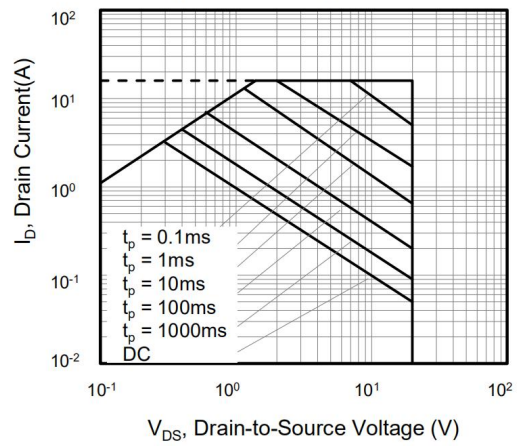


Figure A: Gate Charge Test Circuit and Waveform

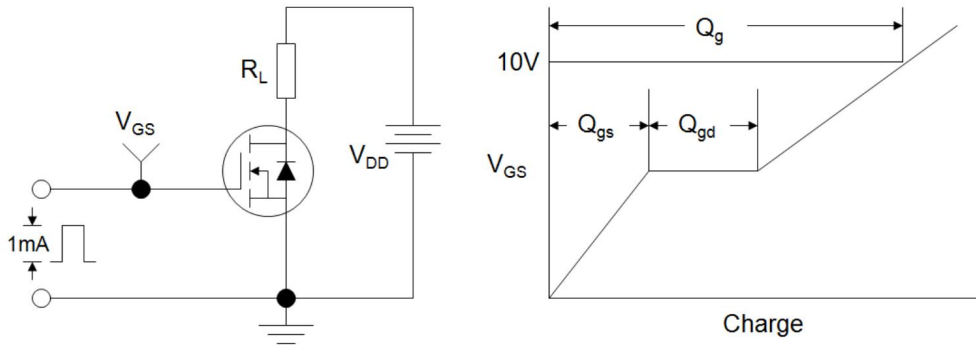


Figure B: Resistive Switching Test Circuit and Waveform

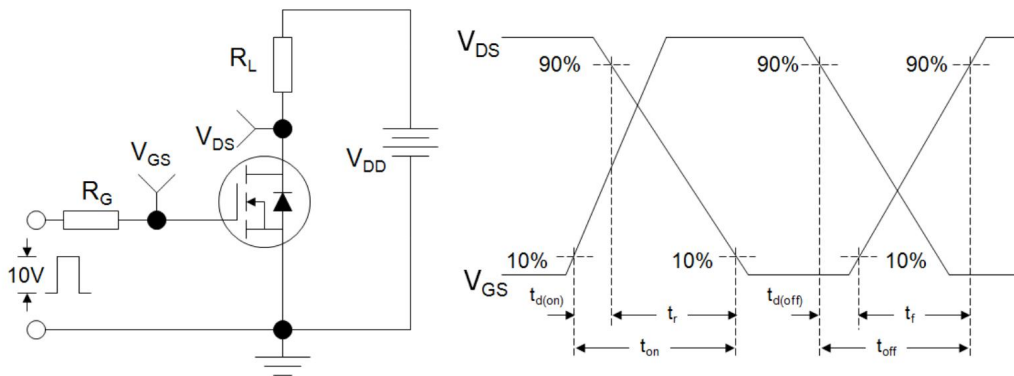
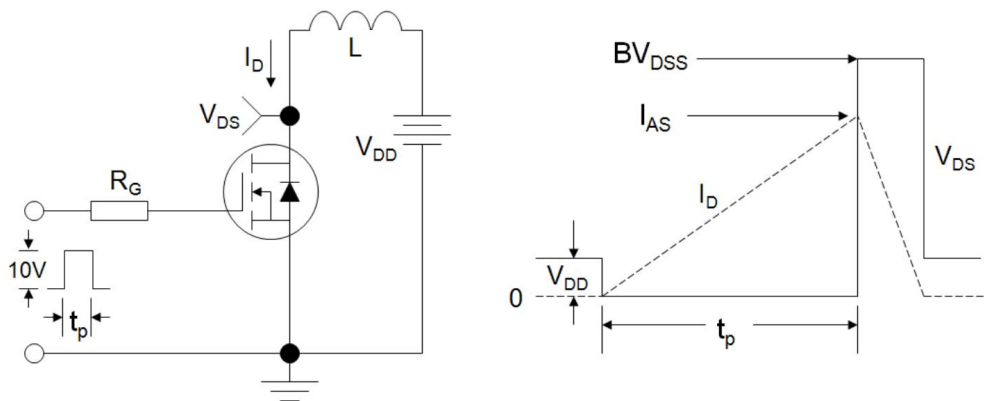
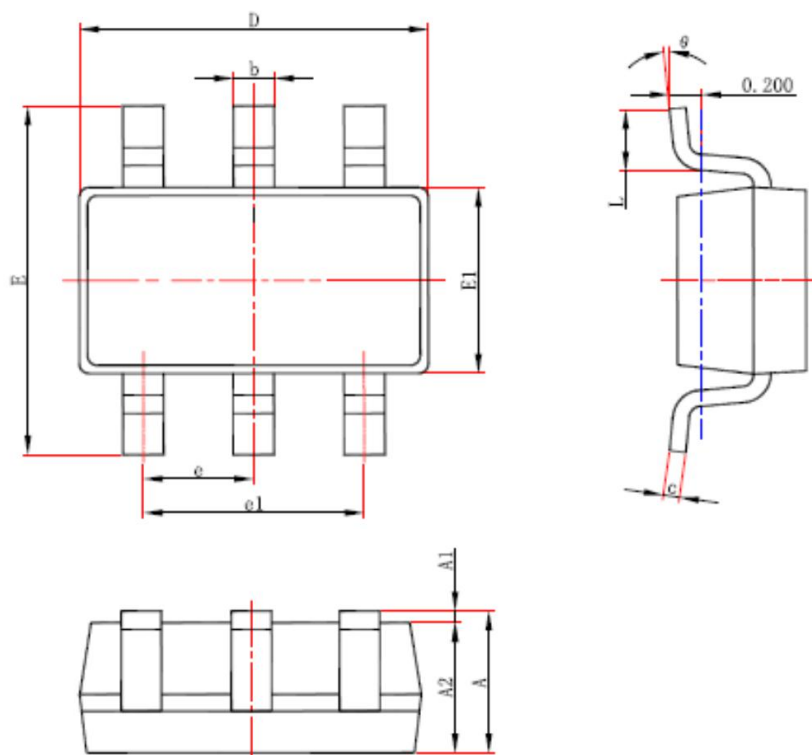


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



SOT23-6



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°