

Dual N-Channel Enhancement Power Mosfet

General Description

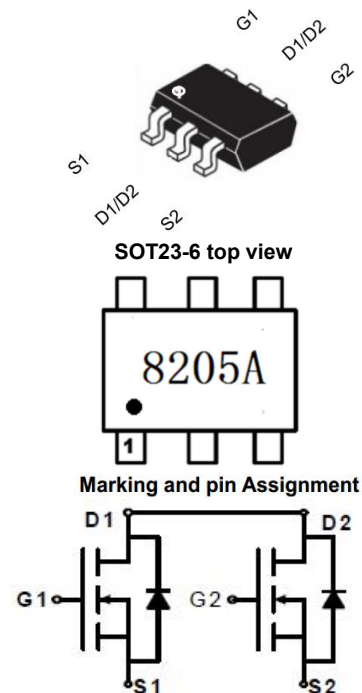
This device uses advanced trench technology to provide excellent $R_{DS(on)}$, low gate charge and operation with gate voltages as low as 2.5V.

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($T_A = 25^\circ C$ unless otherwise noted)

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

Thermal Resistance

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

Electrical Characteristics(T_J=25℃ unless otherwise noted)

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

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

DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C _{iss}	V _{DS} = 10V, V _{GS} = 0V, f=1MHz	-	466	-	pF
Output Capacitance	C _{oss}		-	65	-	
Reverse Transfer Capacitance	C _{rss}		-	58	-	

SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	T _{d(on)}	V _{GS} =4.5V, V _{DS} =10V, R _{GEN} =2.5Ω I _D =6A	-	15	-	ns
Rise Time	t _r		-	17	-	
Turn-Off Delay Time	T _{d(off)}		-	42	-	
Fall Time	t _f		-	10	-	
Total Gate Charge at 10V	Q _g	V _{DS} =10V, I _{DS} =6A, V _{GS} =10V	-	5.7	-	nC
Gate to Source Gate Charge	Q _{gs}		-	0.8	-	
Gate to Drain"Miller"Charge	Q _{gd}		-	1.4	-	

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _{DS} =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, V_{GATE}=20V, Start T_J=25℃.

Typical Performance Characteristics

Figure 1. Output Characteristics

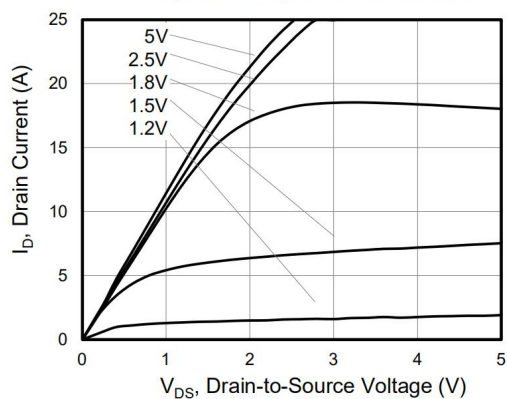


Figure 2. Transfer Characteristics

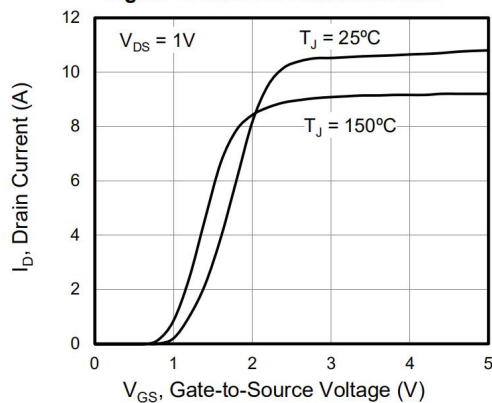


Figure 3. On-Resistance vs. Drain Current

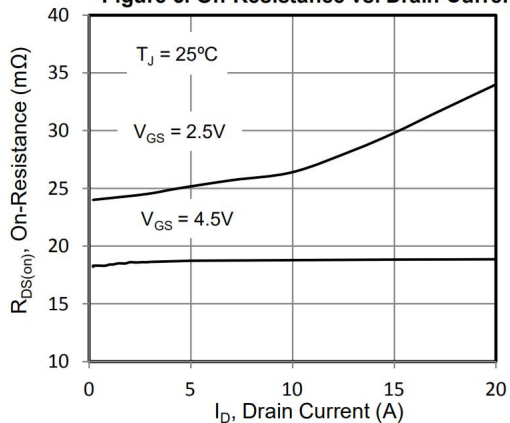


Figure 4. Capacitance

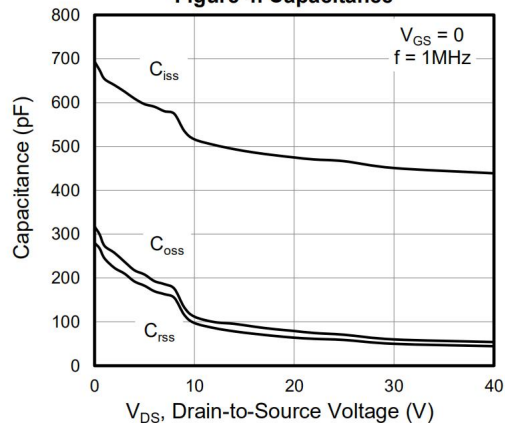


Figure 5. Gate Charge

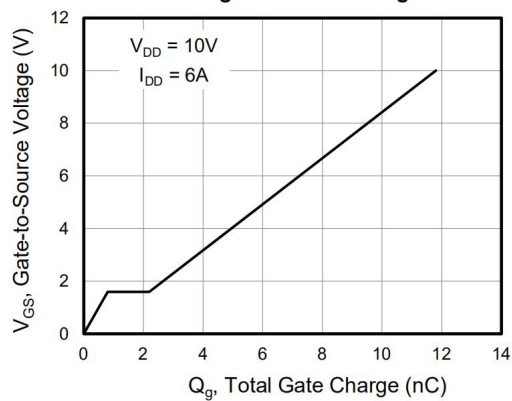


Figure 6. Body Diode Forward Voltage

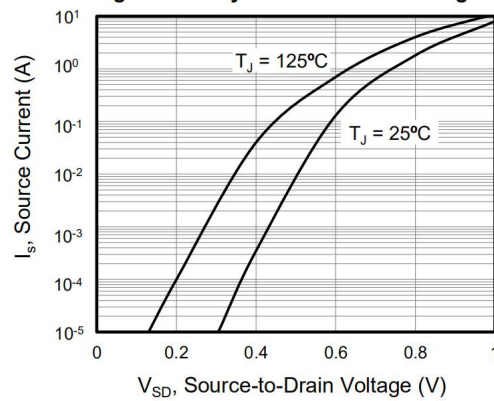


Figure 7. On-Resistance vs. Junction Temperature

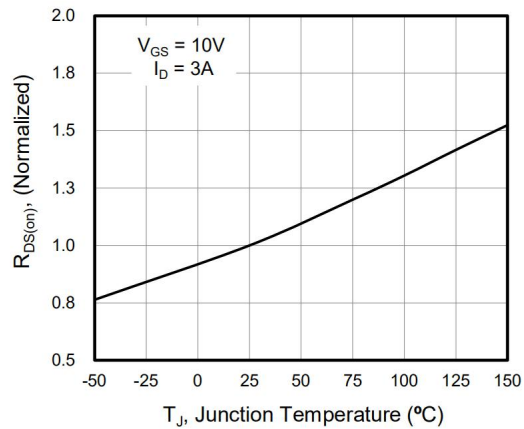


Figure 8. Threshold Voltage vs. Junction Temperature

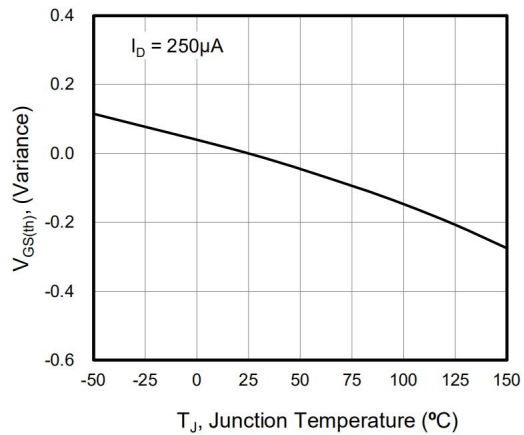


Figure 9. Transient Thermal Impedance

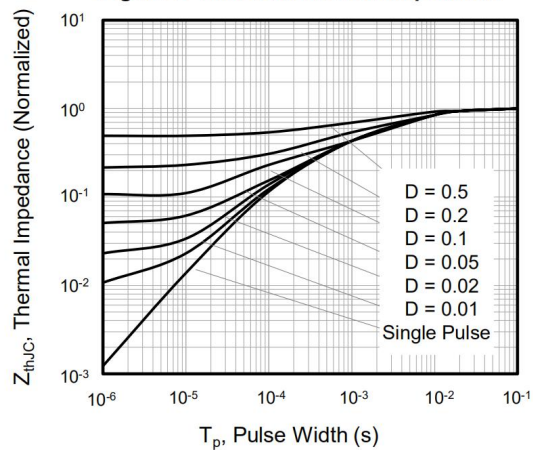


Figure 10. Safe operation area

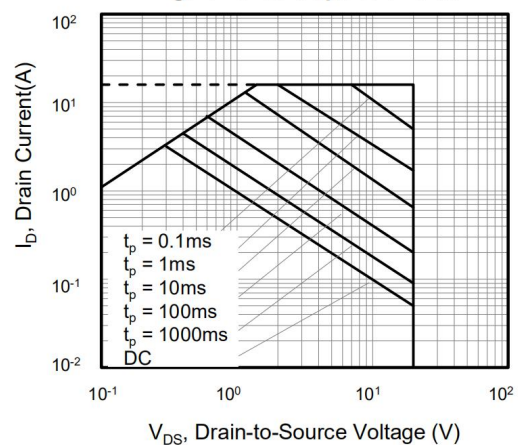


Figure A: Gate Charge Test Circuit and Waveform

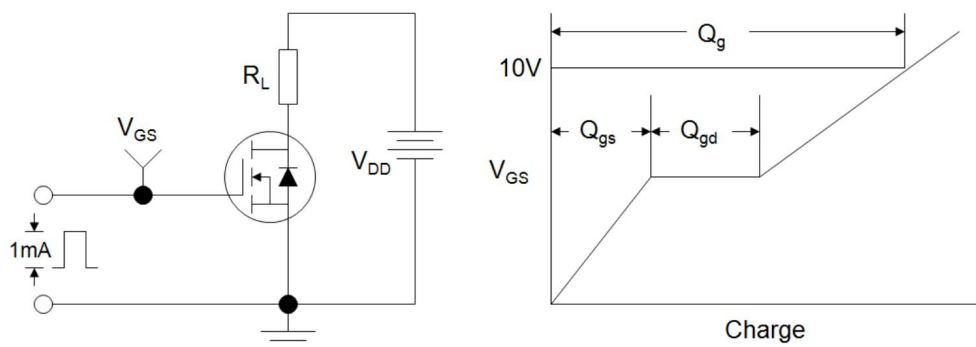


Figure B: Resistive Switching Test Circuit and Waveform

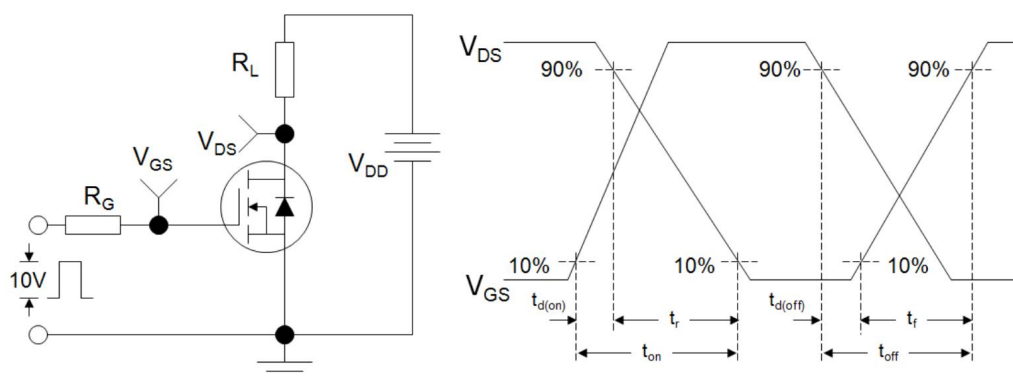
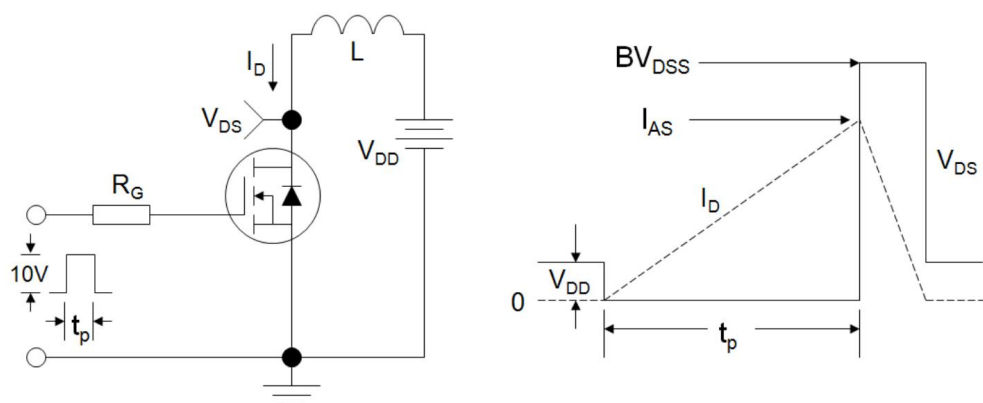
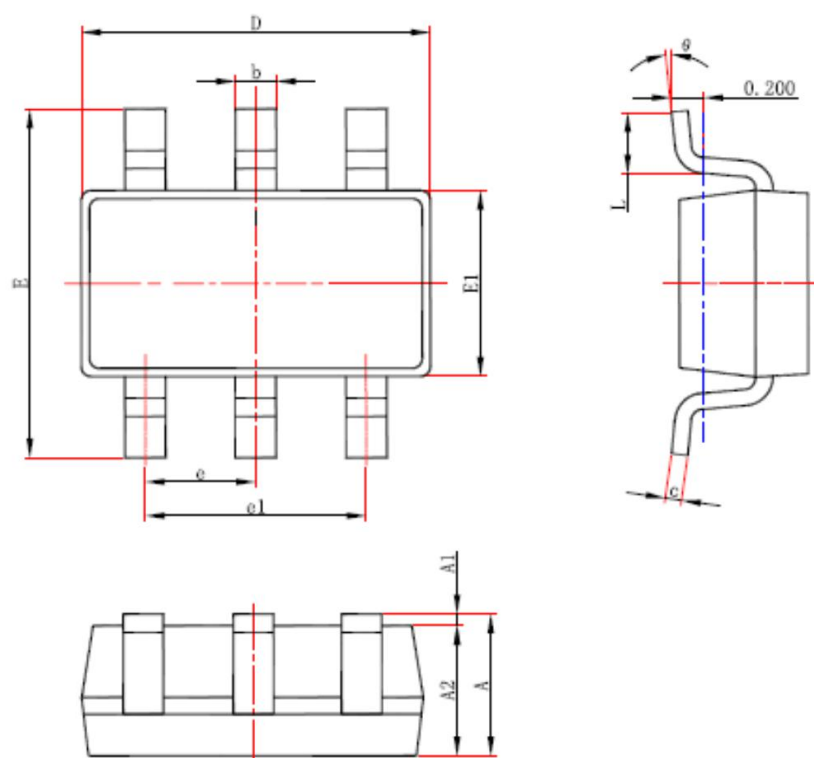


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



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
θ	0°	8°	0°	8°