

## 20V Dual N-Channel Enhancement Mode MOSFET

### Description

The NP8205 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 application.

### General Features

- ◆  $V_{DS} = 20V, I_D = 6.5A$   
 $R_{DS(ON)} = 14.6m\Omega$  (typical) @  $V_{GS} = 4.5V$   
 $R_{DS(ON)} = 18.4m\Omega$  (typical) @  $V_{GS} = 2.5V$
- ◆ High power and current handling capability
- ◆ Lead free product is acquired
- ◆ Surface mount package

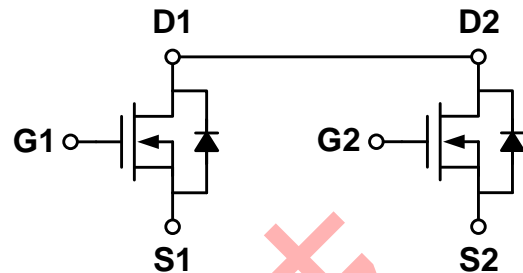
### Application

- ◆ Battery protection
- ◆ Load switch
- ◆ Power management

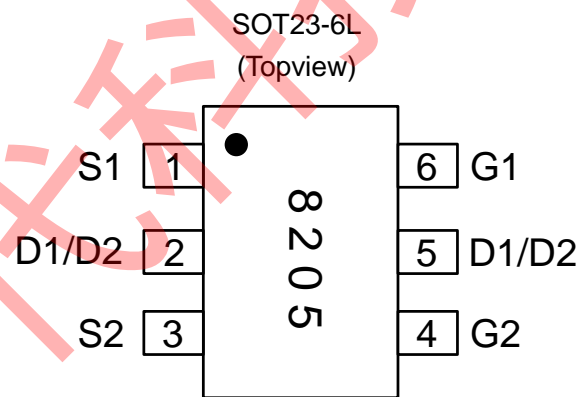
### Package

- ◆ SOT23-6L

### Schematic diagram



### Marking and pin assignment



### Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP8205MR	-55°C to +150°C	SOT23-6L	3000

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

parameter	symbol	limit	unit	
Drain-source voltage	$V_{DS}$	20	V	
Gate-source voltage	$V_{GS}$	±12	V	
Drain Current-Continuous (Silicon Limited)	$I_D$	$T_A = 25^\circ C$	6.5	A
		$T_A = 75^\circ C$	4	
Pulsed Drain Current (Package Limited)	$I_{DM}$	25	A	
Maximum power dissipation	$P_D$	$T_A = 25^\circ C$	1.5	W
		$T_A = 75^\circ C$	1	
Operating junction Temperature range	$T_j$	-55—150	°C	

**Electrical Characteristics** (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-body leakage	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 12V$	-	-	$\pm 100$	nA
<b>ON Characteristics</b>						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.7	1.2	V
Drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=6A$	-	14.6	22	m $\Omega$
		$V_{GS}=2.5V, I_D=5.5A$	-	18.4	27	
Forward transconductance	$g_{fs}$	$V_{DS}=5V, I_D=6A$	-	10	-	S
<b>Dynamic Characteristics</b>						
Input capacitance	$C_{ISS}$	$V_{DS}=10V, V_{GS}=0V$ $f=1.0MHz$	-	900	-	pF
Output capacitance	$C_{OSS}$		-	215	-	
Reverse transfer capacitance	$C_{RSS}$		-	105	-	
<b>Switching Characteristics</b>						
Turn-on delay time	$t_{D(ON)}$	$V_{DS}=10V$ $V_{GS}=4.5V$ $I_D=6A$ $R_{GEN}=6\Omega$	-	10	-	ns
Rise time	$t_r$		-	11	-	
Turn-off delay time	$t_{D(OFF)}$		-	34	-	
Fall time	$t_f$		-	29	-	
Total gate charge	$Q_g$	$V_{DS}=10V, I_D=6A$ $V_{GS}=4.5V$	-	12	-	nC
Gate-source charge	$Q_{gs}$		-	2.4	-	
Gate-drain charge	$Q_{gd}$		-	1	-	

**Thermal Characteristics**

Thermal Resistance junction-to ambient	$R_{th JA}$	100	$^{\circ}C/W$
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Typical Performance Characteristics

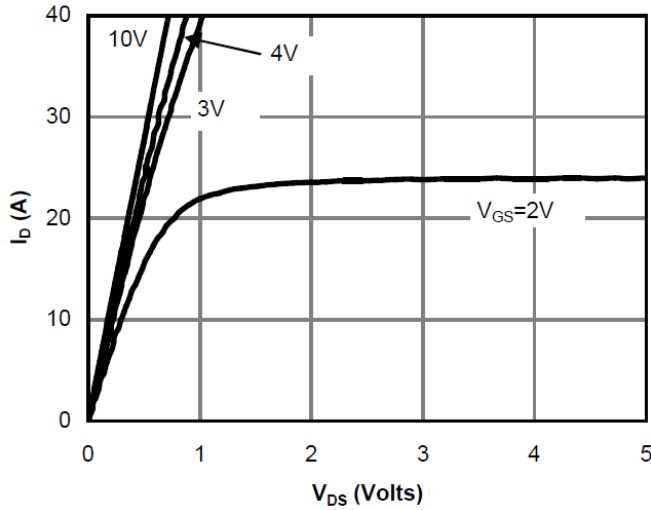


Fig 1: On-Region Characteristics (Note E)

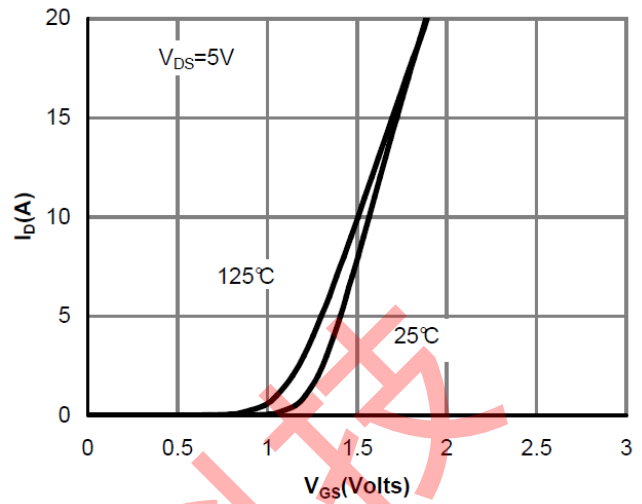


Figure 2: Transfer Characteristics (Note E)

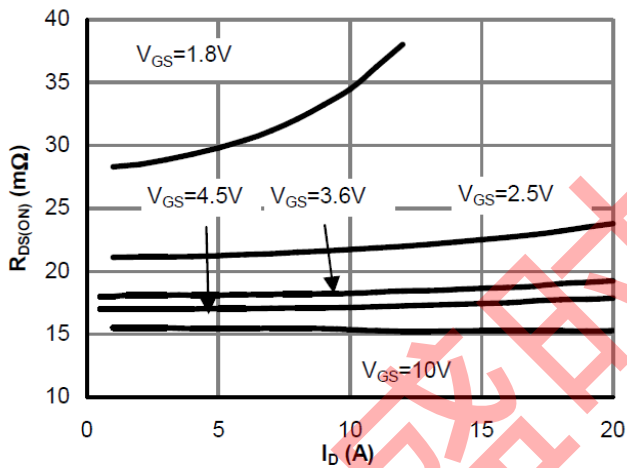


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

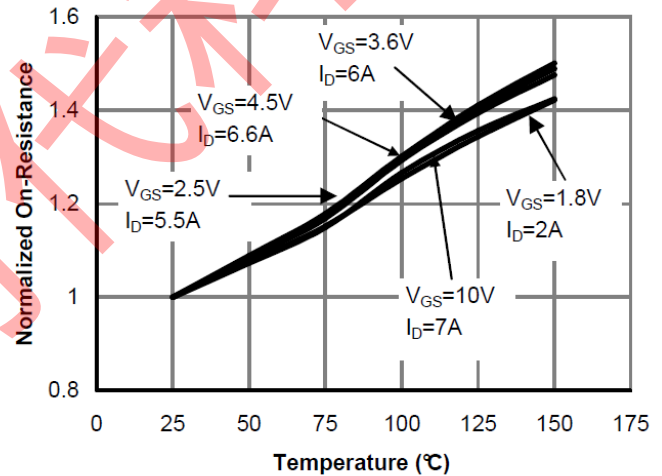


Figure 4: On-Resistance vs. Junction Temperature (Note E)

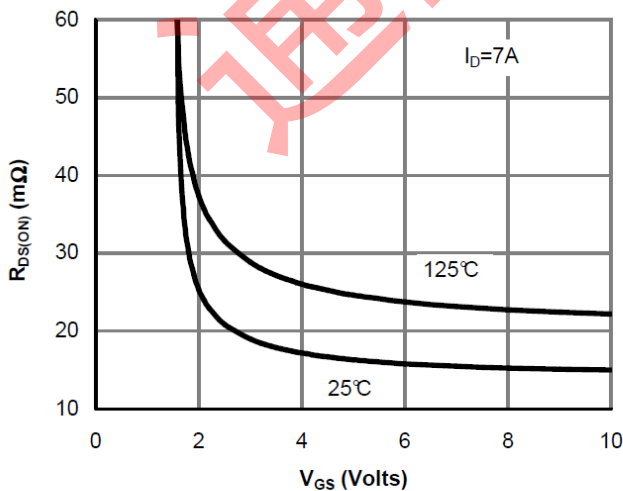


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

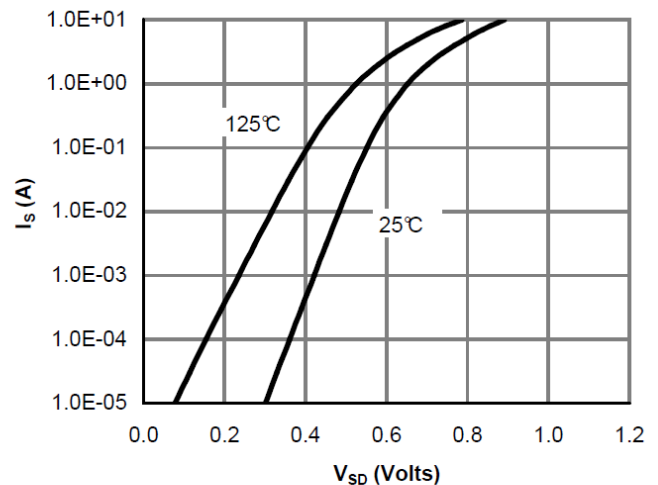


Figure 6: Body-Diode Characteristics (Note E)

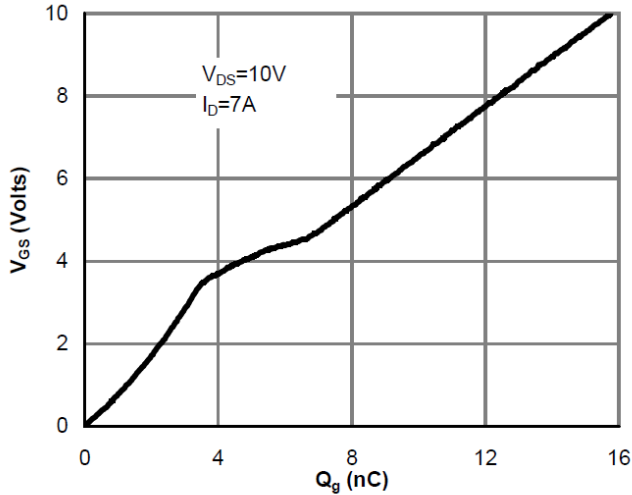


Figure 7: Gate-Charge Characteristics

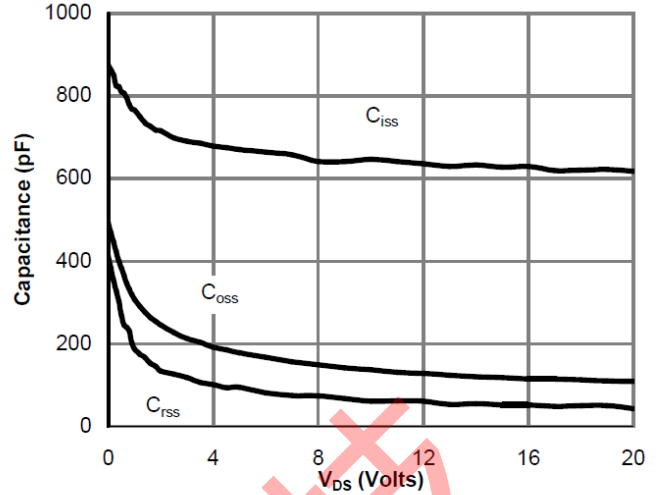


Figure 8: Capacitance Characteristics

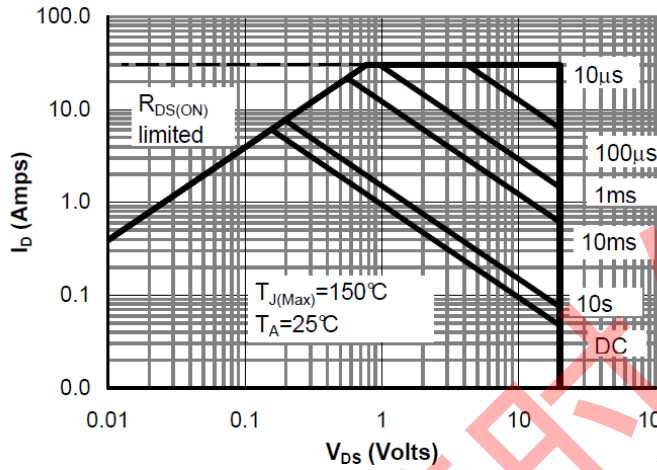


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

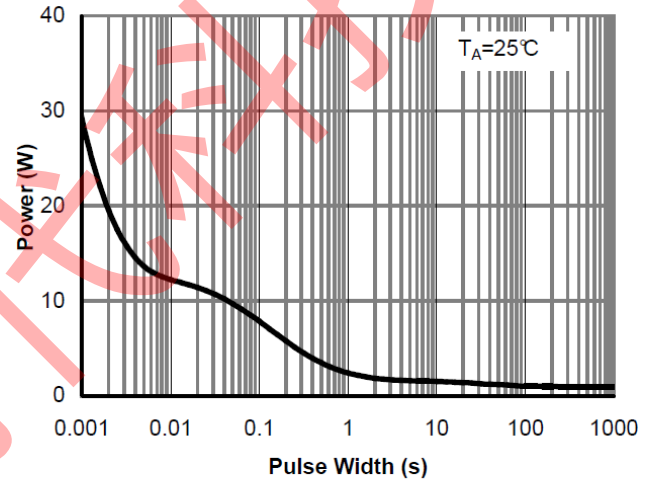


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

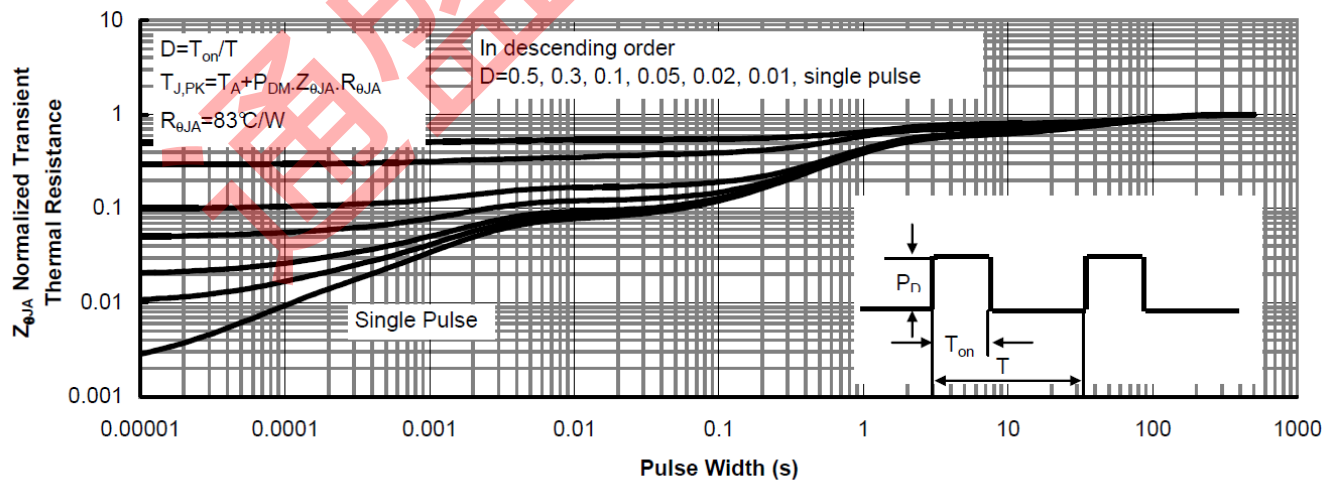
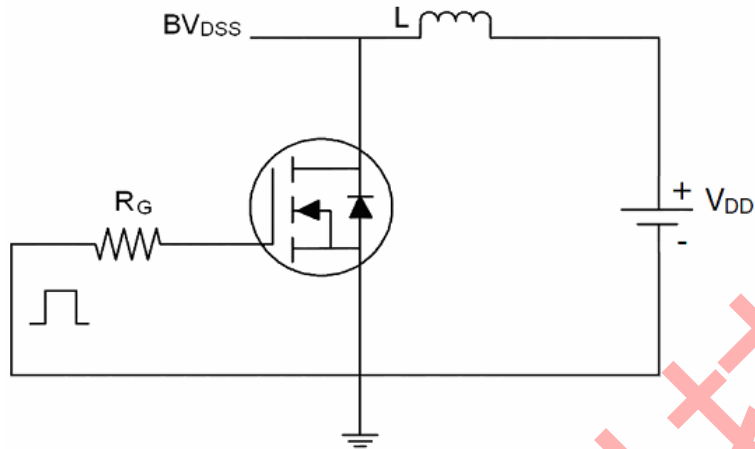


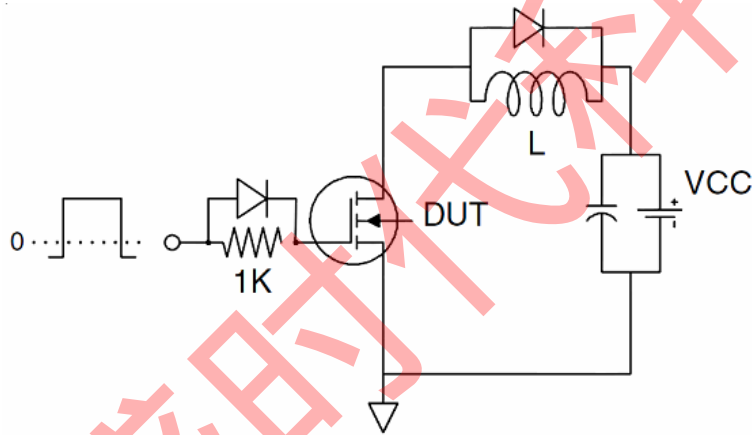
Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

**Test Circuit:**

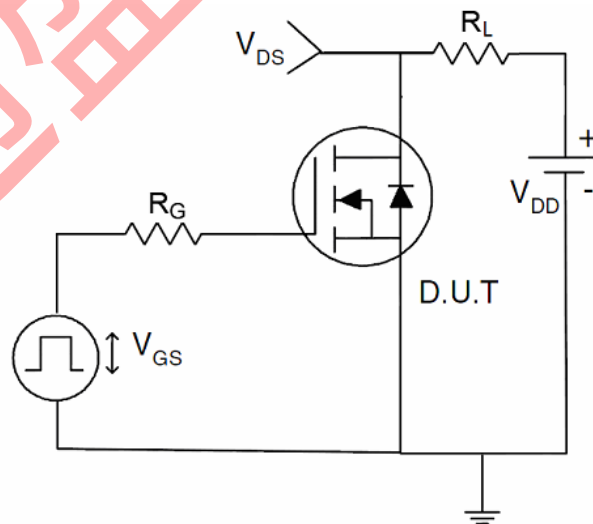
(1)、EAS Test Circuit



(2)、Gate Charge Test Circuit

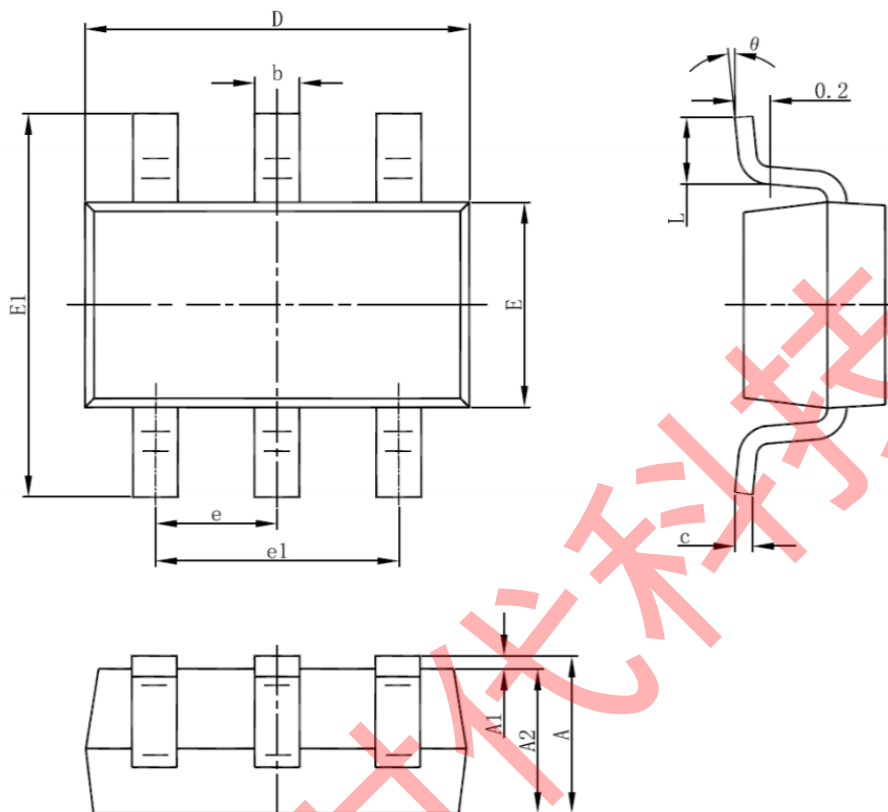


(3)、Switch Time Test Circuit



**Package Information**

- SOT23-6L



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
E	1.500	1.700	0.059	0.067
E1	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°