

## N-Channel Enhancement Mode Field E

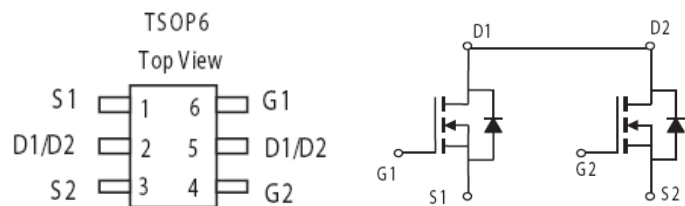
### FEATURES

- Super high dense cell design for low  $R_{DS(ON)}$
- Rugged and reliable
- Simple drive requirement
- TSSOP6 package

PRODUCT SUMMARY		
$V_{DSS}$	$I_D$	$R_{DS(ON)}$ (m $\Omega$ ) Typ
20V	4A	21 @ $V_{GS}=4.5V$
		35 @ $V_{GS}=2.5V$



NOTE: The SPS8205 is available in a lead-free package



### ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V
Drain Current-Continuous <sup>a</sup> @ $T_j=125^\circ C$	$I_D$	4	A
	$I_{DM}$	20	A
- Pulse $d^b$			
Drain-source Diode Forward Current <sup>a</sup>	$I_S$	1.7	A
Maximum Power Dissipation <sup>a</sup>	$P_D$	1.25	W
Operating Junction and Storage Temperature Range	$T_j, T_{STG}$	-55 to 150	$^\circ C$

### THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to Ambient <sup>a</sup>	$R_{th JA}$	80	$^\circ C/W$
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## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V			1	μA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V			±100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.5	0.8	1.5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A		21	25	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =2.8A		35	40	
Forward Transconductance	g <sub>FS</sub>	V <sub>GS</sub> =5V, I <sub>D</sub> =5A		5		S
<b>DAYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V f=1.0MHz		608		pF
Output Capacitance	C <sub>OSS</sub>			115		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			86		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =10V I <sub>D</sub> =6A, V <sub>GEN</sub> =4.5V R <sub>L</sub> =10ohm R <sub>GEN</sub> =10ohm		10		ns
Rise Time	t <sub>r</sub>			14		ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			39		ns
Fall Time	t <sub>f</sub>			26		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =1A V <sub>GS</sub> =4.5V		9.2		nC
Gate-Source Charge	Q <sub>gs</sub>			1.6		nC
Gate-Drain Charge	Q <sub>gd</sub>			2.6		nC

## ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1.7A		0.84	1.3	V

### Notes

- Surface Mounted on FR4 Board,  $t \leq 10\text{sec}$
- Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$
- Guaranteed by design, not subject to production testing.

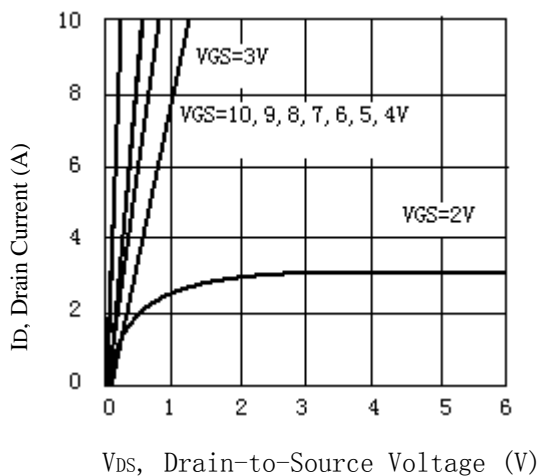


Figure 1. Output Characteristics

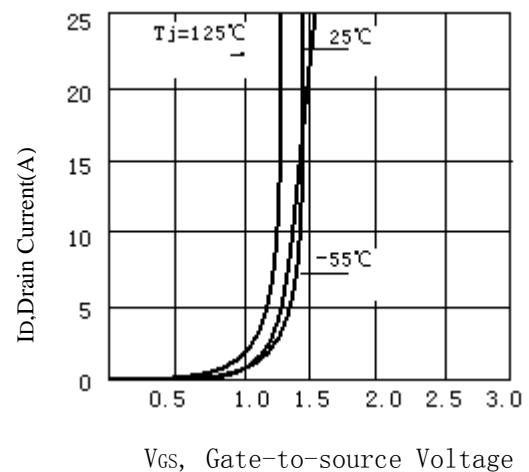


Figure 2. Transfer Characteristics

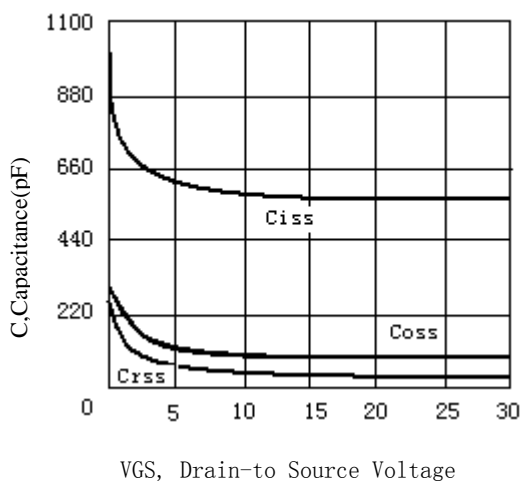


Figure 3. Capacitance

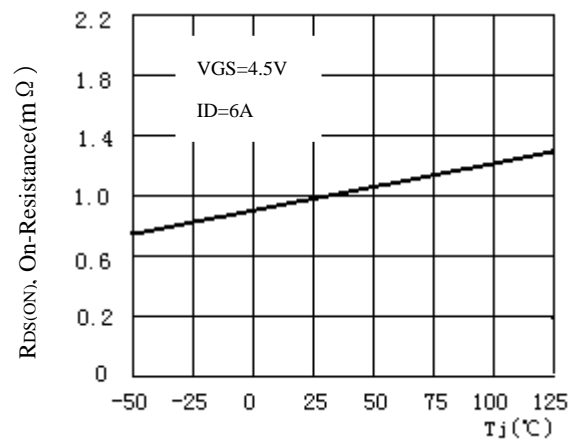
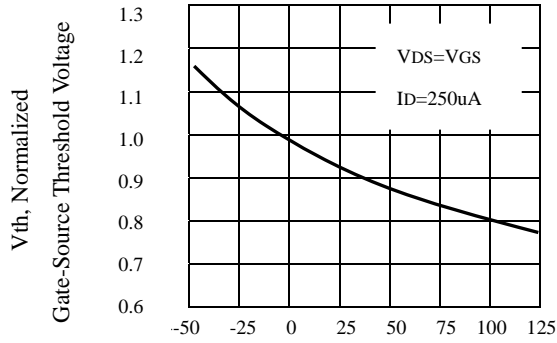
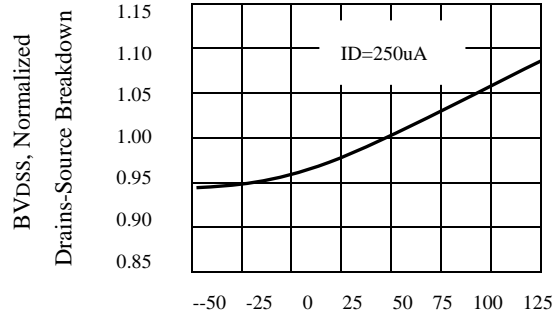


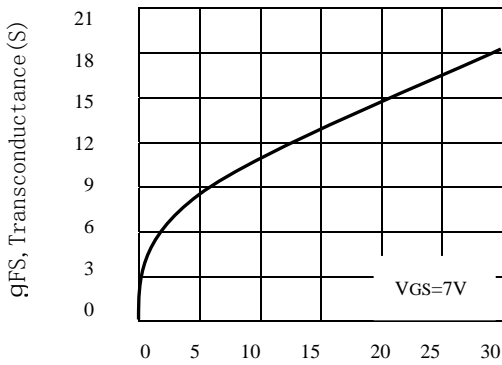
Figure 4. On-Resistance Variation with Temperature



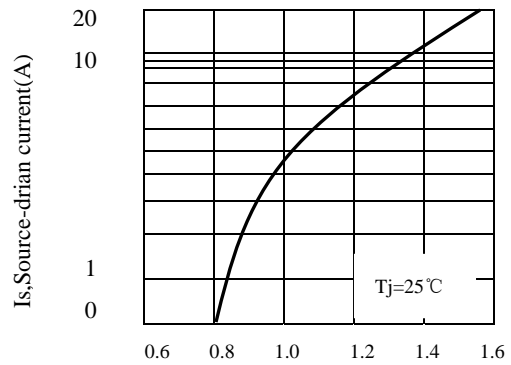
Tj, Junction Temperature(°C)  
**Figure5. Gate Threshold Variation With Temperature**



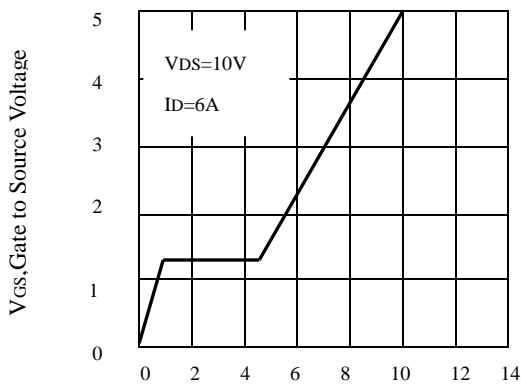
Tj, Junction Temperature (°C)  
**Figure6. Breakdown Voltage Variation With Temperature**



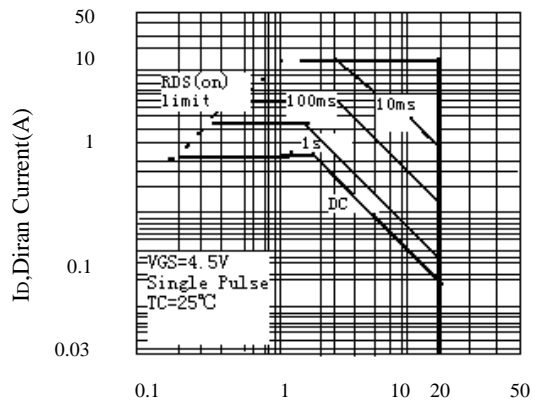
Ids, Drain-Source Current (A)  
**Figure7. Transconductance Variation With Drain Current**



VSD, Body Diode Forward Voltage  
**Figure8. Body Diode Forward Voltage Variation with Source Current**



Qg, Total Gate Charge (nC)  
**Figure9. Gate Charge**



VDS, Drain-Source Voltage(V)  
**Figure10. Maximum Safe Operating Area**