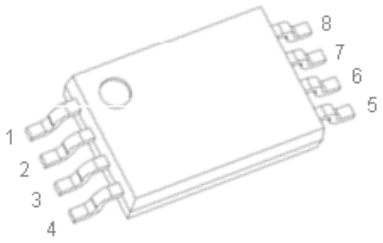
GP9004SA

20V N-Channel MOSFET

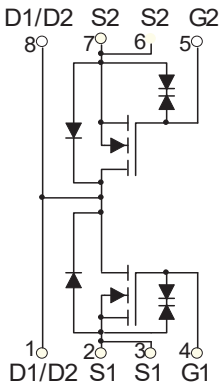
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
20V	8.5mΩ@4.5V	10A
	8.8mΩ@4.0V	
	9.0mΩ@3.8V	
	9.7mΩ@3.1V	
	11mΩ@2.5V	

TSSOP8



Schematic diagram



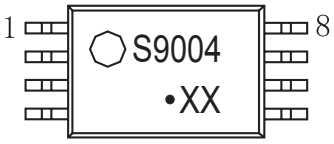
Feature

- Trench Technology Power MOSFET
- Low $R_{DS(ON)}$
- Low Gate Charge
- ESD Protected

Application

- Battery Protection Switch

MARKING:



S9004 = Device Code

XX = Date Code

ABSOLUTE MAXIMUM RATINGS (T_A = 25℃ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain - Source Voltage		V_{DS}	20	V
Gate - Source Voltage		V_{GS}	±12	V
Continuous Drain Current[1,5]	T_A = 25℃	I_D	10	A
Pulsed Drain Current[2]		I_{DM}	50	A
Power Dissipation[4,5]	T_A = 25℃	P_D	2	W
Thermal Resistance from Junction to Ambient[5]		$R_{\theta JA}$	62.5	℃/W
Junction Temperature		T_J	150	℃
Storage Temperature		T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS (T_J = 25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16V, V_{GS} = 0V			1	μA
Gate - Body Leakage Current	I_{GSS}	V_{GS} = ±8V, V_{DS} = 0V			±5	μA
On Characteristics[3]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	0.4	0.85	1	V
Drain-source On-resistance	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 3A	6.0	8.5	10.0	mΩ
		V_{GS} = 4.0V, I_D = 3A	7.0	8.8	10.5	
		V_{GS} = 3.8V, I_D = 3A	7.5	9.0	11.0	
		V_{GS} = 3.1V, I_D = 3A	8.0	9.7	11.5	
		V_{GS} = 2.5V, I_D = 3A	9.0	11	15.0	
Forward Transconductance	g_{FS}	V_{DS} = 4.5V, I_D = 3A	3			S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 10V, V_{GS} = 0V, f = 0.1MHz		1258		pF
Output Capacitance	C_{oss}			193		
Reverse Transfer Capacitance	C_{rss}			51		
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 10V, V_{GS} = 4.5V, I_D = 7A		15		nC
Gate-source Charge	Q_{gs}			3.4		
Gate-drain Charge	Q_{gd}			5.7		
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 10V, V_{GS} = 4.5V, R_L = 1.35Ω, R_G = 3Ω		30		ns
Turn-on Rise Time	t_r			54		
Turn-off Delay Ttime	$t_{d(off)}$			77		
Turn-off Fall Time	t_f			58		
Source - Drain Diode Characteristics						
Diode Forward Voltage[3]	V_{SD}	V_{GS} = 0V, I_S = 3A			1.2	V

Notes :

1.The maximum current rating is limited by package.

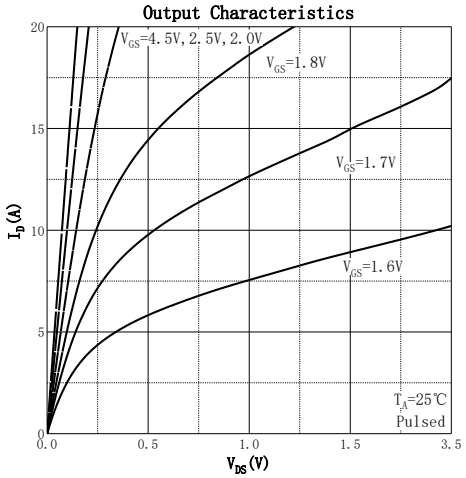
2.Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.

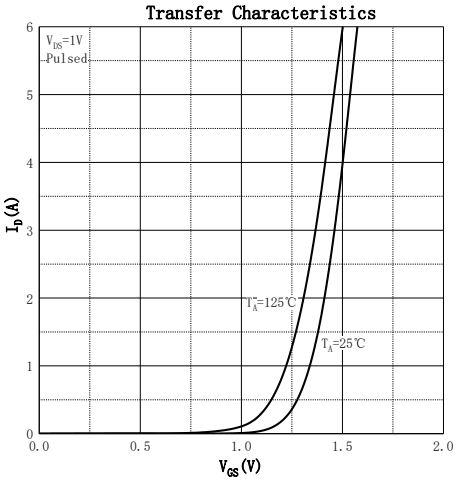
3.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.

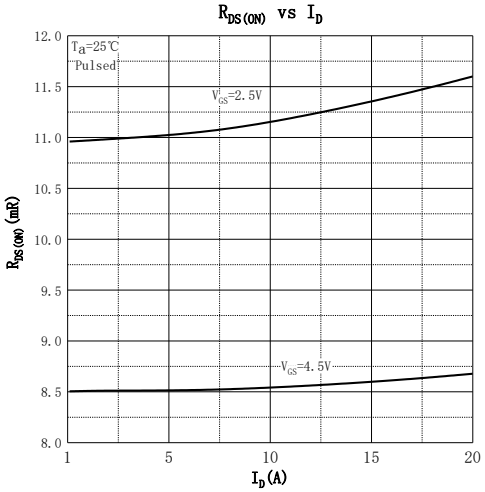
4.The power dissipation P_D is limited by $T_{J(MAX)}$ = 150°C.

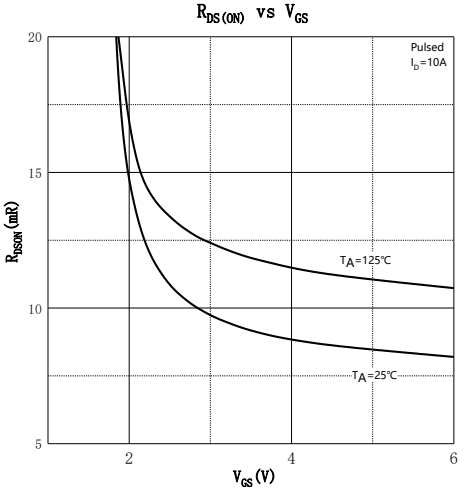
5.Device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

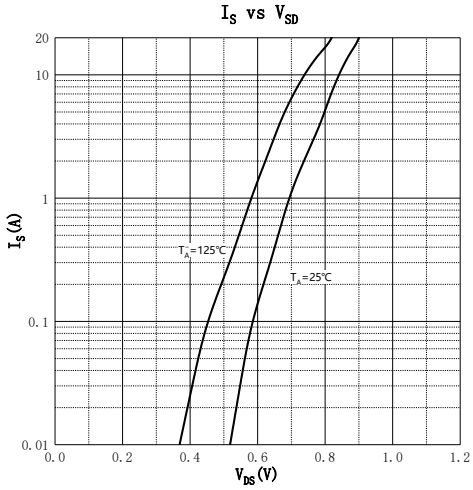
Typical Characteristics

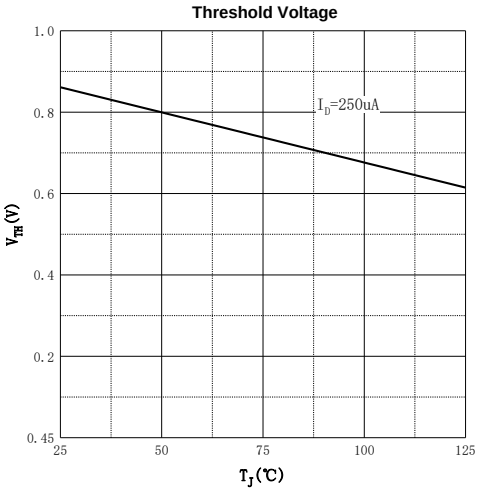




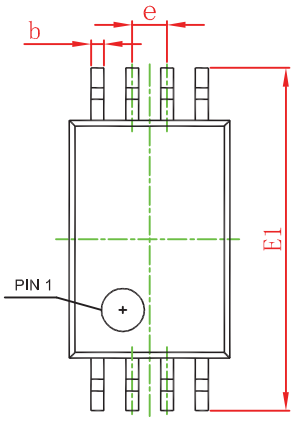


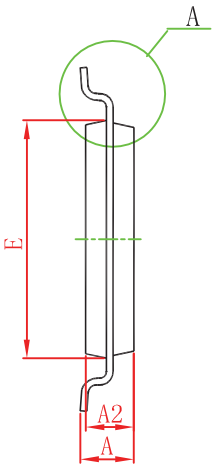


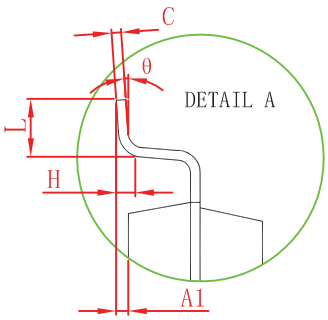


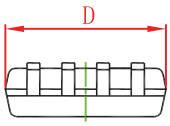


SOP8 Package Information









Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
D	2.900	3.100	0.114	0.122
E	4.300	4.500	0.169	0.177
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
E1	6.250	6.550	0.246	0.258
A		1.200		0.047
A2	0.800	1.000	0.031	0.039
A1	0.050	0.150	0.002	0.006
e	0.65 (BSC)		0.026(BSC)	
L	0.500	0.700	0.020	0.028
H	0.25(TYP		0.01(TYP	
θ	1°	7°	1°	7°