

TM09V03S

P+P-Channel Enhancement Mode Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

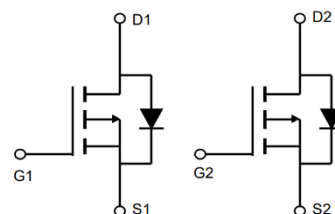
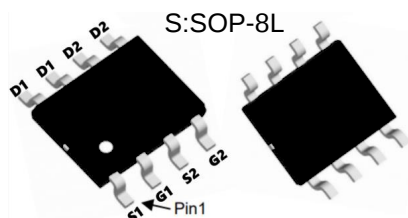
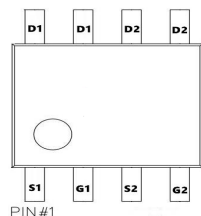
Product Summary

$V_{DS} = -30V$ $I_D = -9.0A$

$R_{DS(ON)} = 18m\Omega (typ.) @ V_{GS} = -10V$

100% UIS Tested

100% R_g Tested



Marking: 9V03 OR 4805

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

Symbol	Parameter		Max.	Units
V_{DSS}	Drain- Source Voltage		-30	V
V_{GSS}	Gate- Source Voltage		± 20	V
I_D	Continuous Drain Current	$T_A = 25^\circ C$	-9.0	A
		$T_A = 100^\circ C$	-5.9	A
I_{DM}	Pulsed Drain Current ^{note1}		-36	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}		25	mJ
P_D	Power Dissipation	$T_A = 25^\circ C$	3.3	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient		38	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to + 150	$^\circ C$

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Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain- Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1\text{mA}$	---	-0.022	---	V/ $^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain- Source On-Resistance ²	$V_{GS}=-10V$, $I_D=-6A$	---	18	25	$\text{m}\Omega$
		$V_{GS}=-4.5V$, $I_D=-4A$	---	25	42	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.0	---	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.6	---	mV/ $^{\circ}\text{C}$
I_{DSS}	Drain- Source Leakage Current	$V_{DS}=-24V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	-1	μA
		$V_{DS}=-24V$, $V_{GS}=0V$, $T_J=55^{\circ}\text{C}$	---	---	-5	
I_{GSS}	Gate- Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-5V$, $I_D=-6A$	---	17	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	13	---	Ω
Q_g	Total Gate Charge (-4.5V)	$V_{DS}=-15V$, $V_{GS}=-4.5V$, $I_D=-6A$	---	12.6	---	nC
Q_{gs}	Gate- Source Charge		---	4.8	---	
Q_{gd}	Gate- Drain Charge		---	4.8	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V$, $V_{GS}=-10V$, $R_G=3.3\Omega$, $I_D=-6A$	---	4.6	---	ns
T_r	Rise Time		---	14.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	41	---	
T_f	Fall Time		---	19.6	---	
C_{iss}	Input Capacitance	$V_{DS}=-15V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	1345	---	pF
C_{oss}	Output Capacitance		---	194	---	
C_{rss}	Reverse Transfer Capacitance		---	158	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-9.0	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	-26	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^{\circ}\text{C}$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-6A$, $dI/dt=100A/\mu s$, $T_J=25^{\circ}\text{C}$	---	16.3	---	nS
Q_{rr}	Reverse Recovery Charge		---	5.9	---	nC

Note :

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is $V_{DD}=-25V$, $V_{GS}=-10V$, $L=0.1\text{mH}$, $I_{AS}=-38A$
4. The power dissipation is limited by 150°C junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Typical Performance Characteristics

Figure1 : Output Characteristics

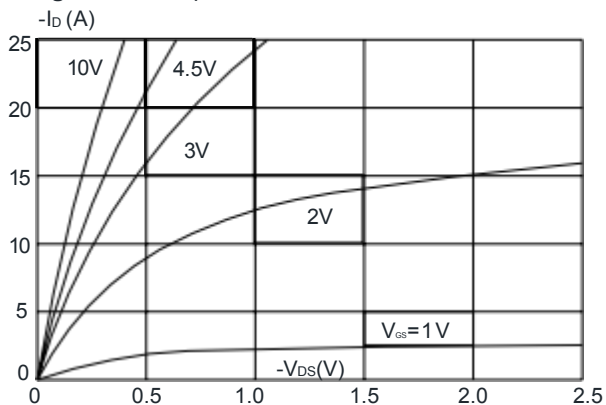


Figure 2 : Typical Transfer Characteristics

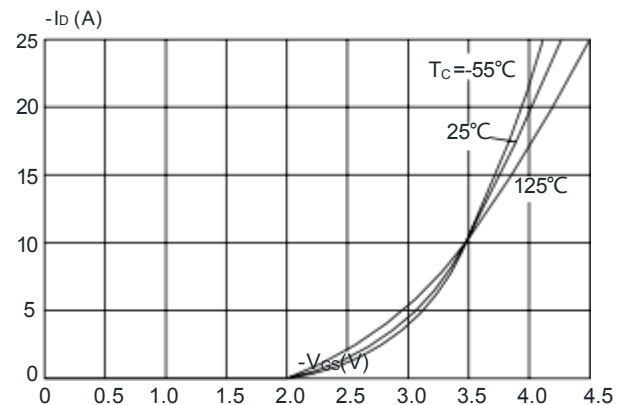


Figure 3: On-resistance vs. Drain Current

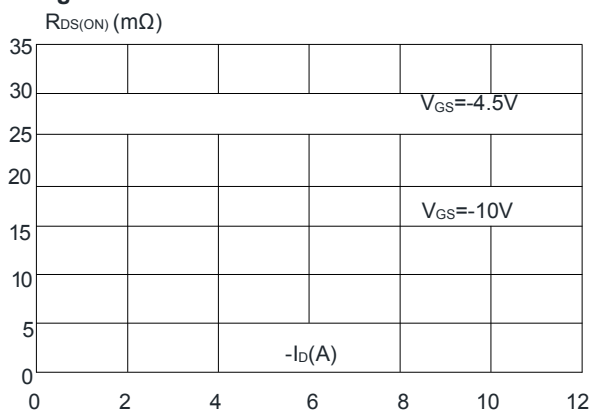


Figure 4 : Body Diode Characteristics

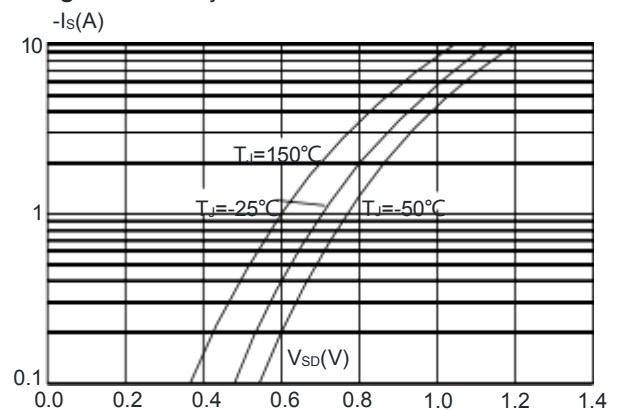


Figure 5: Gate Charge Characteristics

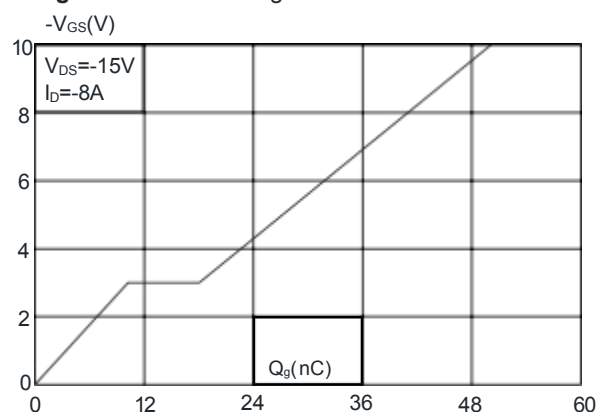
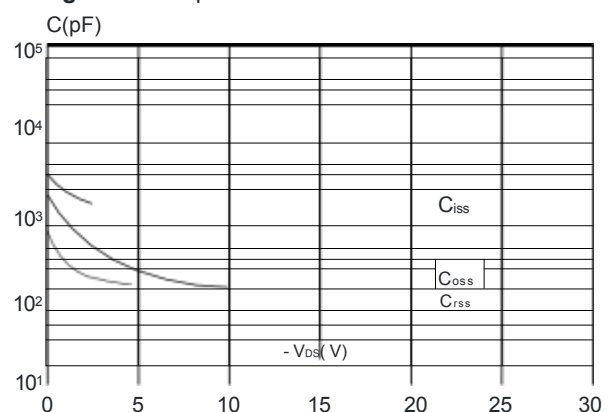


Figure 6: Capacitance Characteristics



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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

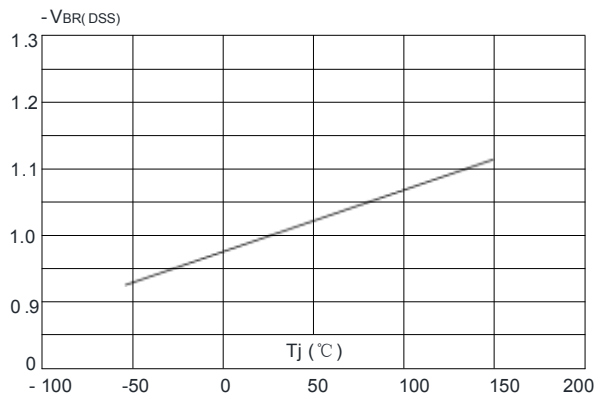


Figure 8: Normalized on Resistance vs. Junction Temperature

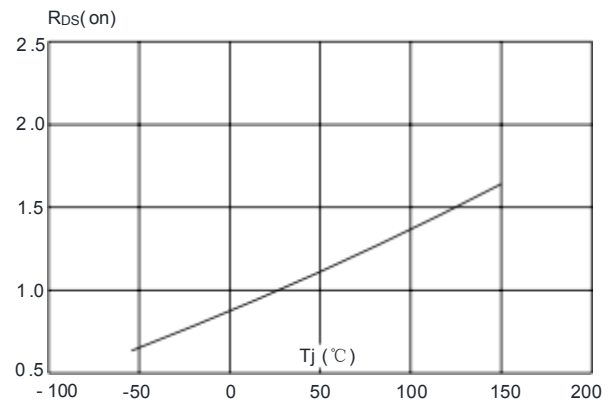


Figure 9: Maximum Safe Operating Area

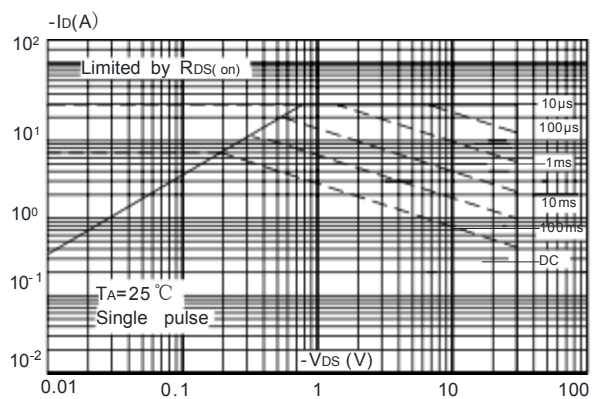
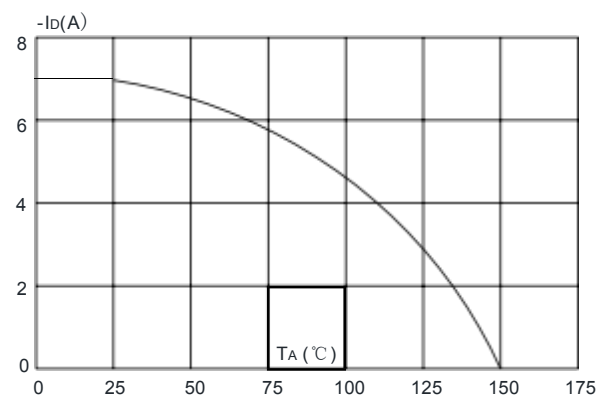
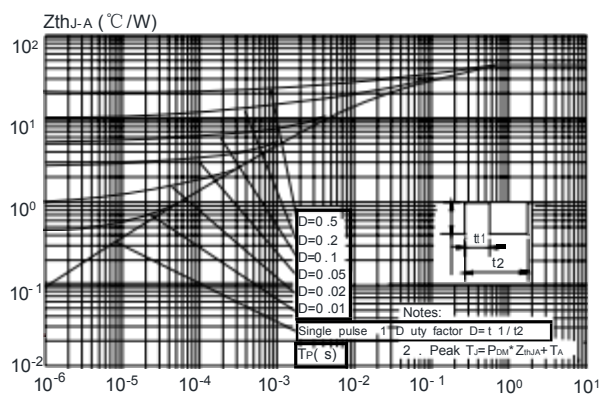


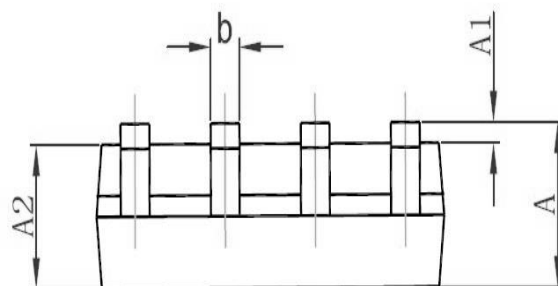
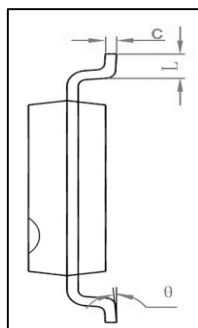
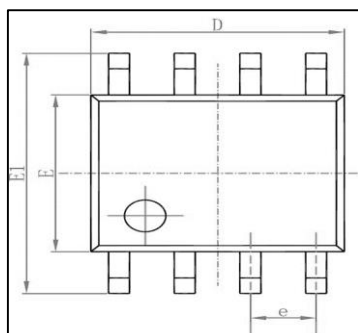
Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature



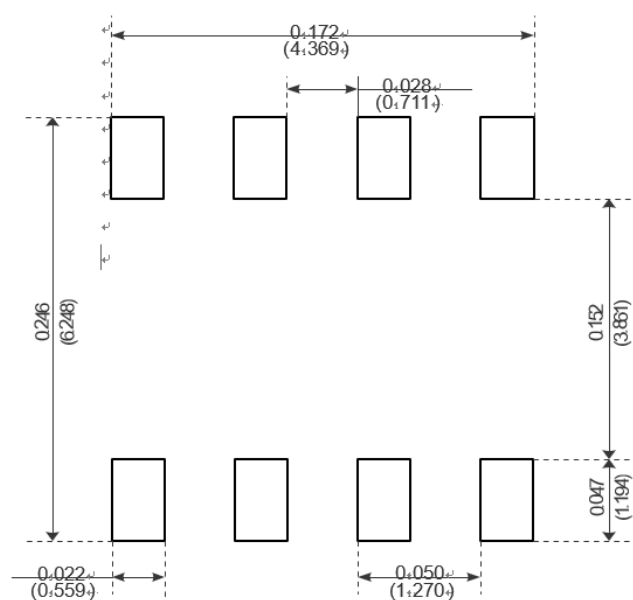
Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Package Mechanical Data:SOP-8L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Recommended Minimum Pads