

AP2012S

N-Channel Enhancement Mosfet

Feature

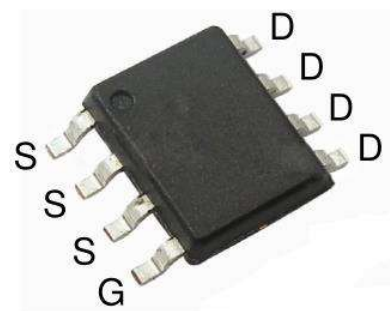
- 18V,12A
 $R_{DS(ON)} < 11m\Omega @ V_{GS}=4.5V$ TYP=9 m Ω
 $R_{DS(ON)} < 14m\Omega @ V_{GS}=2.5V$ TYP=12 m Ω
- Advanced Trench Technology
- Lead free product is acquired



Schematic Diagram

Application

- Interfacing Switching
- Load Switching
- Power management



SOP-8

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
2012S	AP2012S	SOP-8	13 inch	-	4000

ABSOLUTE MAXIMUM RATINGS ($T_a=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	18	V
Gate-Source Voltage	V_{GS}	± 10	V
Continuous Drain Current ($T_a=25^{\circ}C$)	I_D	12	A
Continuous Drain Current ($T_a=70^{\circ}C$)	I_D	7.2	A
Pulsed Drain Current	I_{DM}	36	A
Power Dissipation	P_D	2	W
Thermal Resistance from Junction to Ambient ⁽⁴⁾	$R_{\theta JA}$	62.5	$^{\circ}C/W$
Junction Temperature	T_J	150	$^{\circ}C$
Storage Temperature	T_{STG}	-55~ +150	$^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	18	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 18V, V_{GS} = 0V$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 10V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage ⁽³⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.3	0.8	1.1	V
Drain-source on-resistance ⁽³⁾	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 6A$	-	9	11	m Ω
		$V_{GS} = 2.5V, I_D = 3A$	-	12	14	
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	-	780	-	pF
Output Capacitance	C_{oss}		-	140	-	
Reverse Transfer Capacitance	C_{rss}		-	80	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 10V, I_D = 3.5A,$ $V_{GS} = 4.5V, R_G = 10\Omega$	-	9	-	ns
Turn-on rise time	t_r		-	30	-	
Turn-off delay time	$t_{d(off)}$		-	35	-	
Turn-off fall time	t_f		-	10	-	
Total Gate Charge	Q_g	$V_{DS} = 10V, I_D = 3.5A,$ $V_{GS} = 4.5V$	-	11	-	nC
Gate-Source Charge	Q_{gs}		-	2.3	-	
Gate-Drain Charge	Q_{gd}		-	2.9	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V_{DS}	$V_{GS} = 0V, I_S = 4A$	-	-	1.2	V
Diode Forward current ⁽⁴⁾	I_S		-	-	12	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. Surface Mounted on FR4 Board, $t_s \leq 10$ sec

Test Circuit

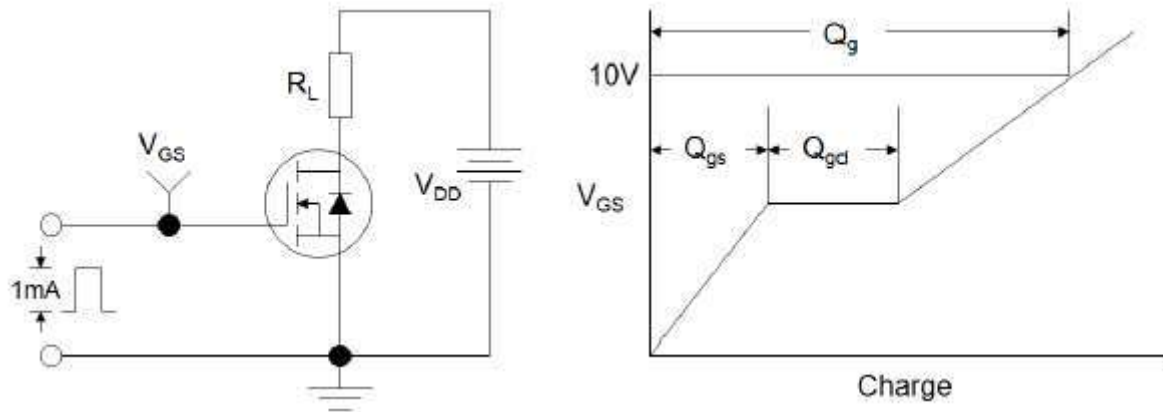


Figure1:Gate Charge Test Circuit & Waveform

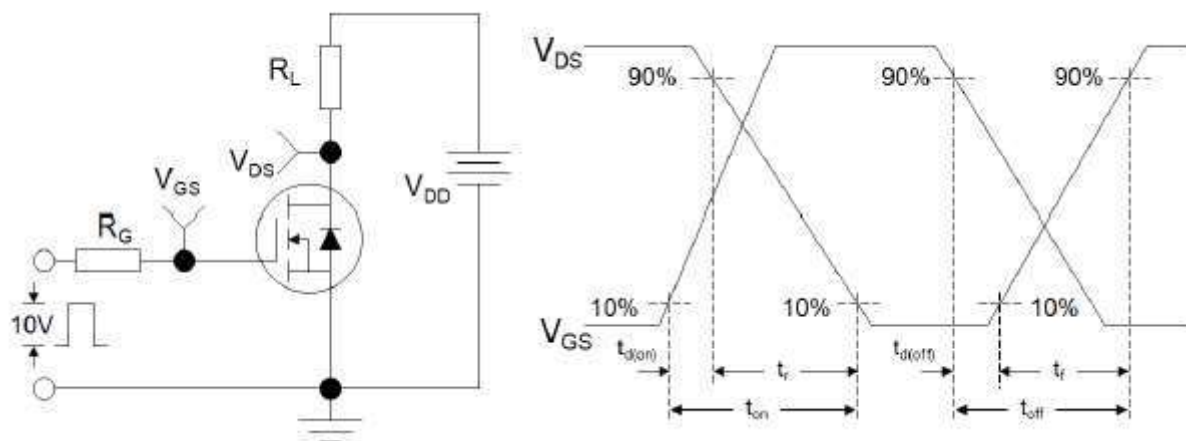


Figure 2: Resistive Switching Test Circuit & Waveforms

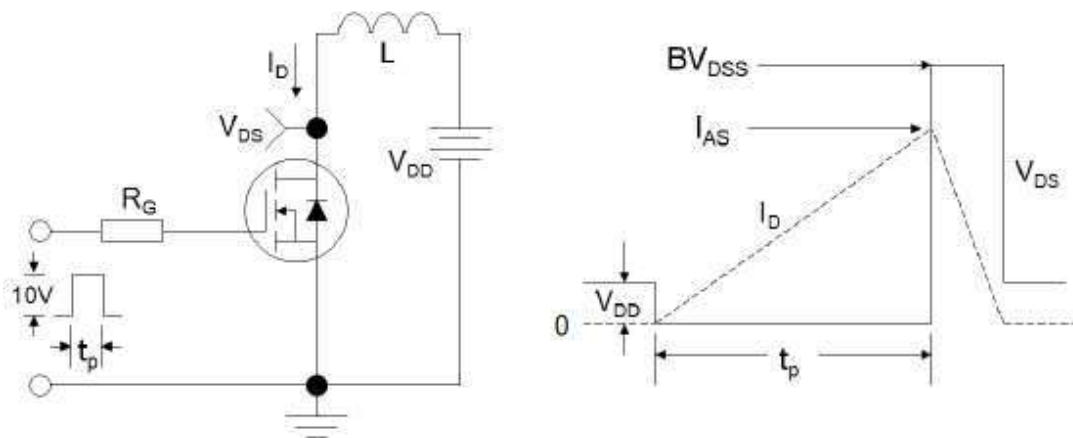


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Typical Performance Characteristics

Figure 1: Output Characteristics

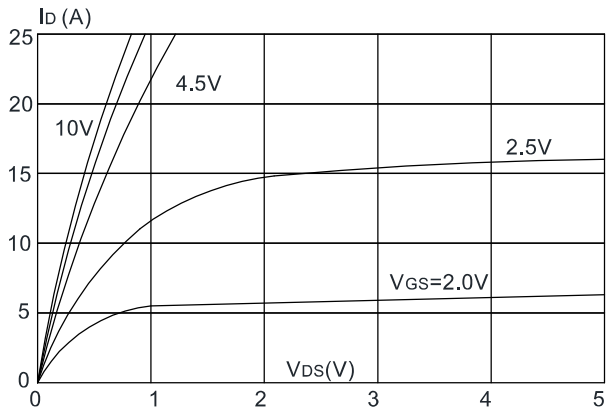


Figure 2: Typical Transfer Characteristics

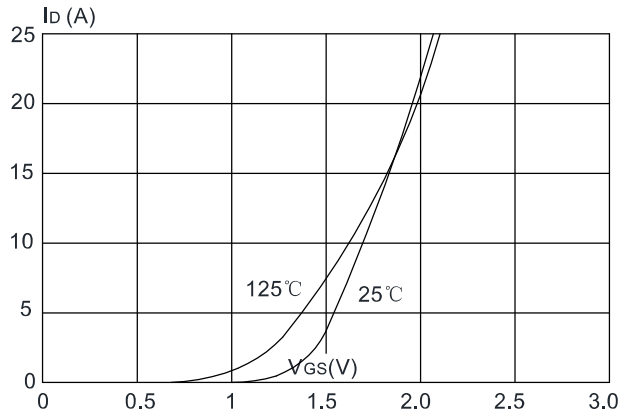


Figure 3: On-resistance vs. Drain Current

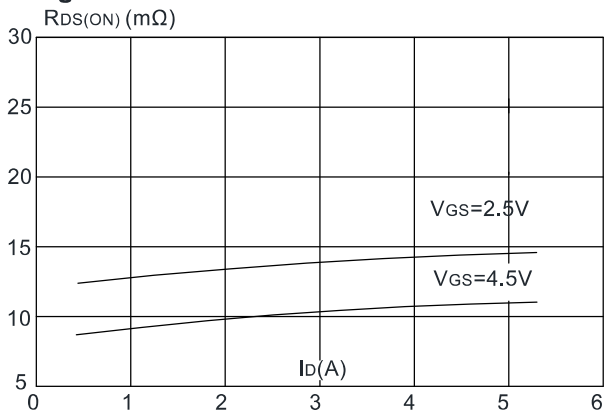


Figure 4: Body Diode Characteristics

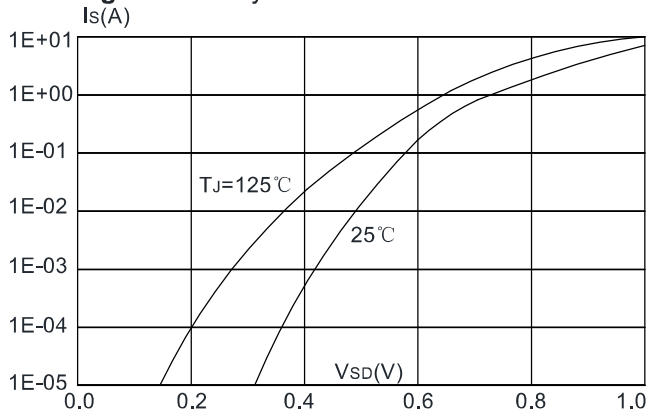


Figure 5: Gate Charge Characteristics

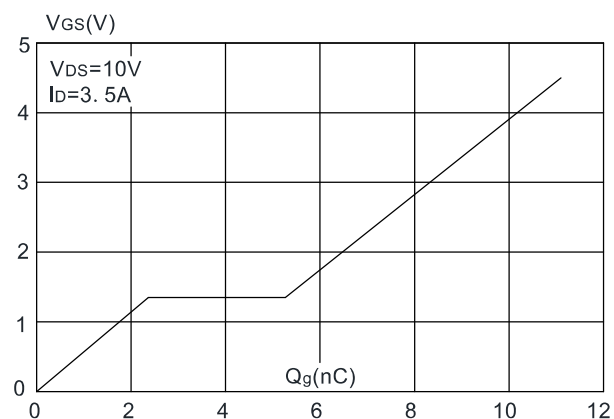


Figure 6: Capacitance Characteristics

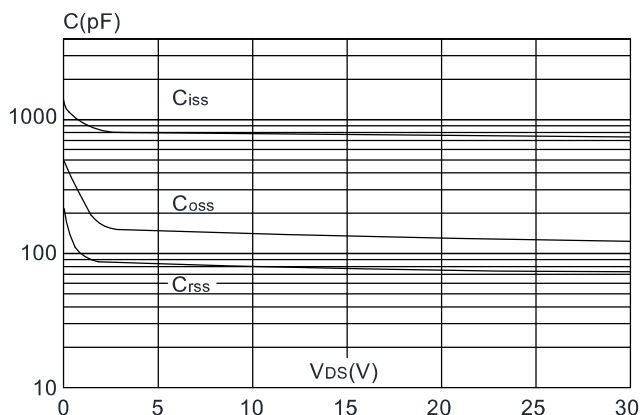


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

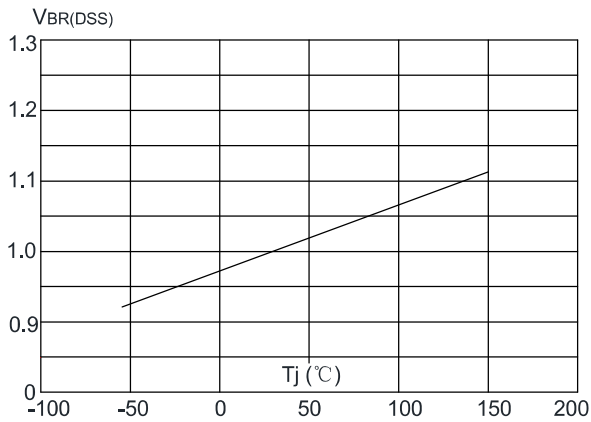


Figure 8: Normalized on Resistance vs. Junction Temperature

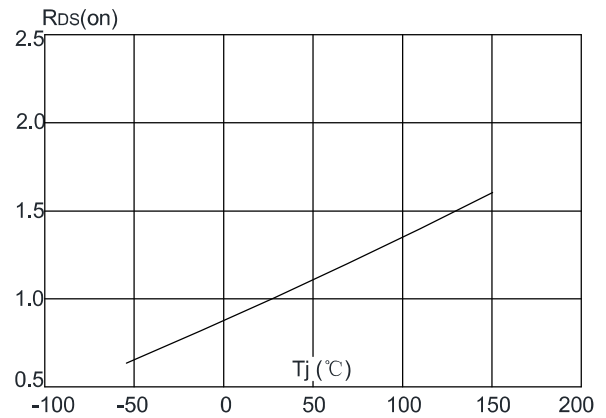


Figure 9: Maximum Safe Operating Area

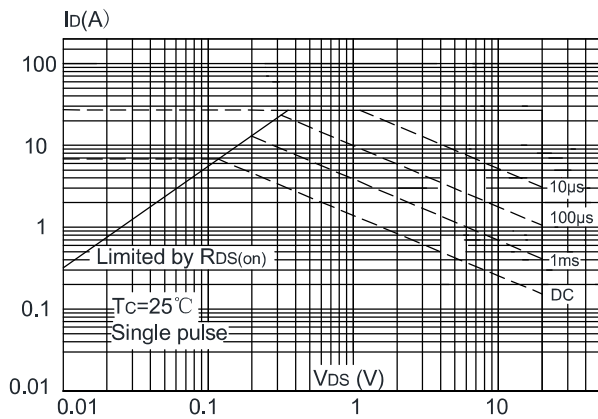


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

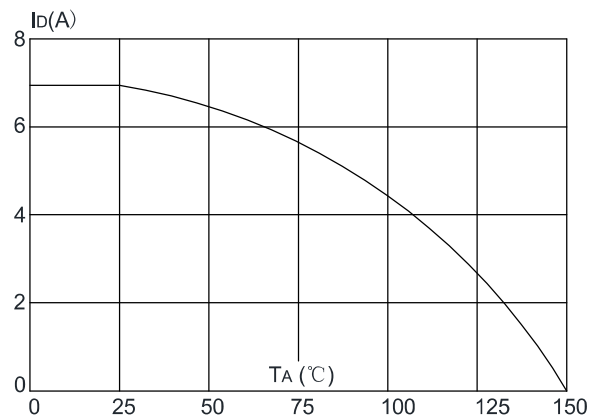
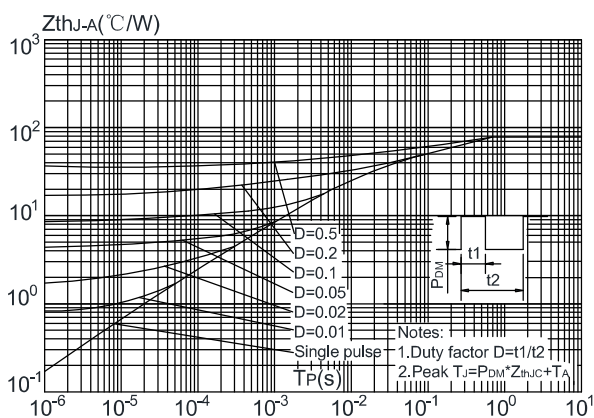
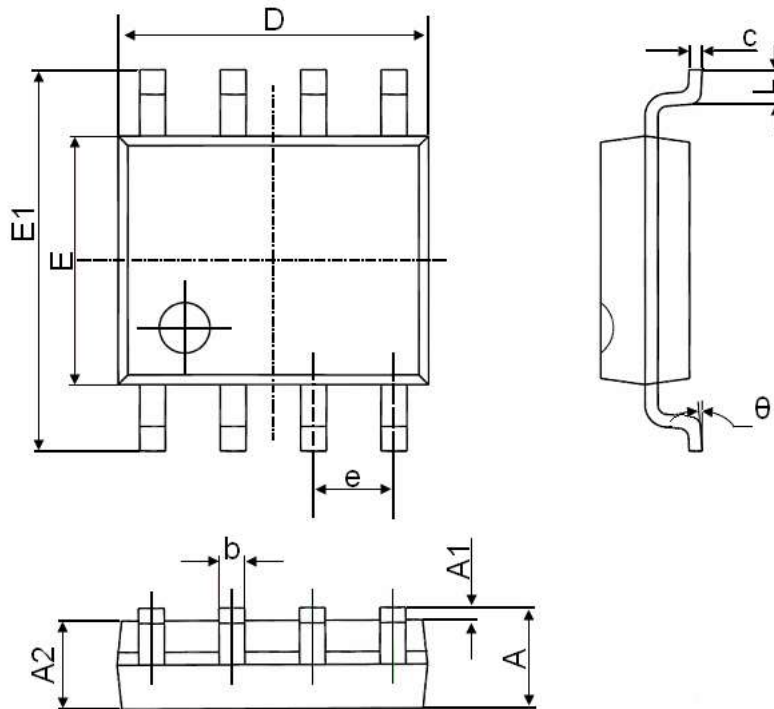


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



SOP-8 Package Information



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°

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