

AP3002S

N-Channel Enhancement Mosfet

Feature

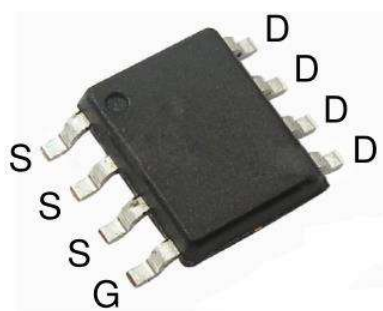
- 30V,30A
 $R_{DS(ON)} < 4.0m\Omega @ V_{GS}=10V$ TYP:3.2 m Ω
 $R_{DS(ON)} < 5.8m\Omega @ V_{GS}=4.5V$ TYP:4.7 m Ω
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge



Schematic Diagram

Application

- PWM applications
- Load Switch
- Power management



SOP-8

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
3002S	AP3002S	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}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_a=25^{\circ}C$)	I_D	30	A
Continuous Drain Current ($T_a=100^{\circ}C$)	I_D	18	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	100	A
Singel Pulsed Avalanche Energy ⁽²⁾	E_{AS}	100	mJ
Power Dissipation	P_D	3	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	42	$^{\circ}C/W$
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 =250μA	30	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =30V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage ⁽³⁾	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.5	2.5	V
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} =10V, I _D =15A	-	3.2	4.0	mΩ
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} =4.5V, I _D =10A	-	4.7	5.8	mΩ
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, f =1MHz	-	2680	-	pF
Output Capacitance	C _{oss}		-	393	-	
Reverse Transfer Capacitance	C _{rss}		-	330	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =15V, I _D =30A, R _L =1Ω V _{GS} =10V, R _G =3Ω	-	23	-	ns
Turn-on rise time	t _r		-	28	-	
Turn-off delay time	t _{d(off)}		-	74	-	
Turn-off fall time	t _f		-	36	-	
Total Gate Charge	Q _g	V _{DS} =15V, I _D =30A, V _{GS} =10V	-	30	-	nC
Gate-Source Charge	Q _{gs}		-	7.2	-	
Gate-Drain Charge	Q _{gd}		-	10.4	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V _{DS}	V _{GS} =0V, I _S =1A	-	-	1.2	V
Diode Forward current ⁽⁴⁾	I _S		-	-	30	A
Body Diode Reverse Recovery Time	trr	T _J =25° , IF=20A,di/dt=100A/us		28		ns
Body Diode Reverse Recovery Charge	Qrr	T _J =25° , IF=20A,di/dt=100A/us		21		nc

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: $T_J = 25^{\circ}\text{C}, V_{DD} = 20V, R_G = 25\Omega, L = 0.5mH$
3. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
4. Surface Mounted on FR4 Board, $t \leq 10\text{ sec}$

Test Circuit

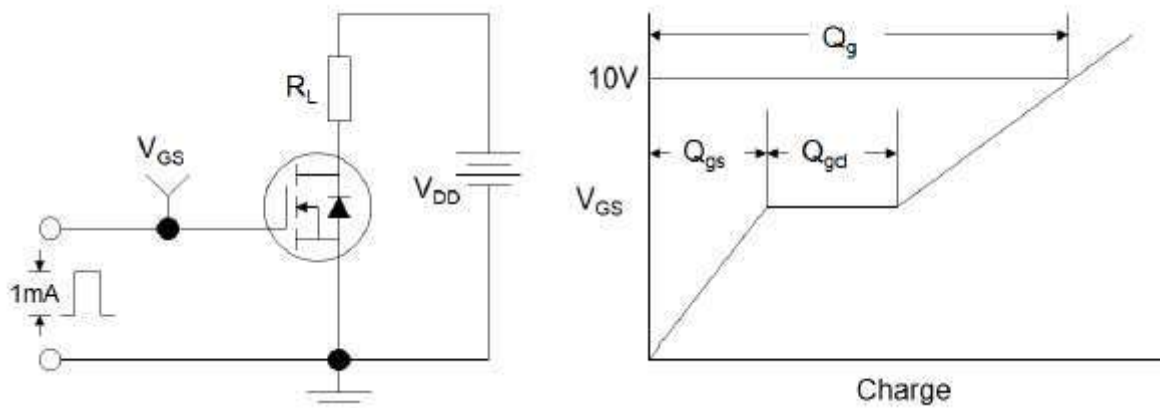


Figure1:Gate Charge Test Circuit & Waveform

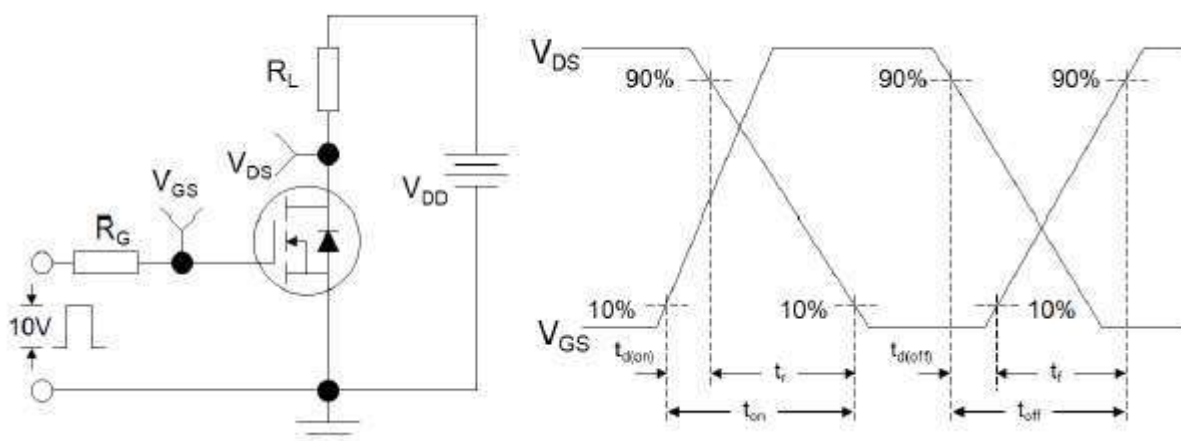


Figure 2: Resistive Switching Test Circuit & Waveforms

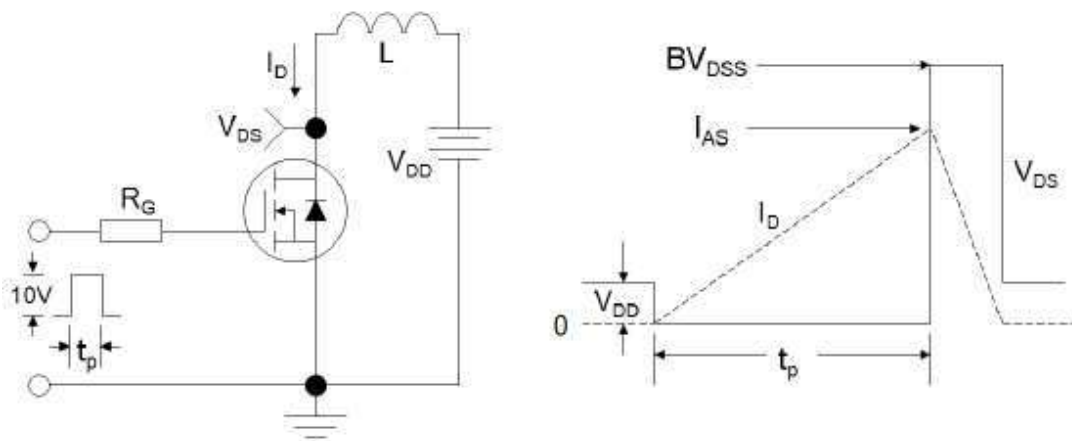


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Figure1: Output Characteristics

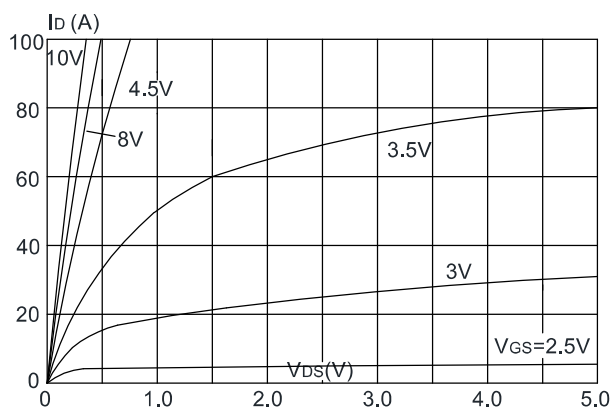


Figure 2: Typical Transfer Characteristics

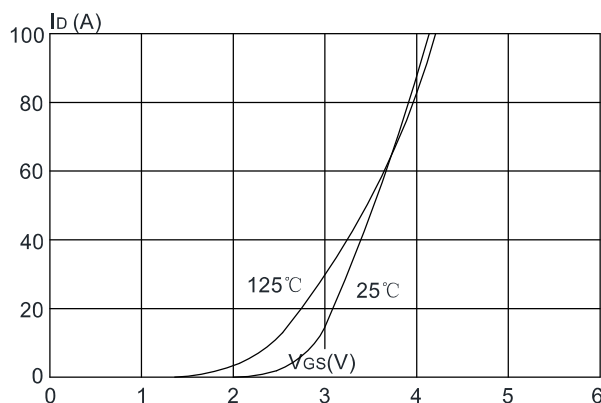


Figure 3: On-resistance vs. Drain Current

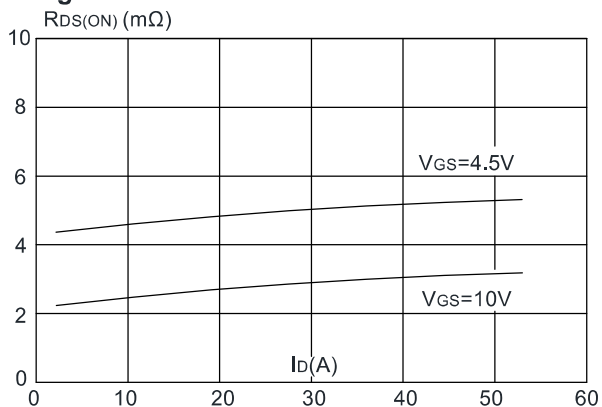


Figure 4: Body Diode Characteristics

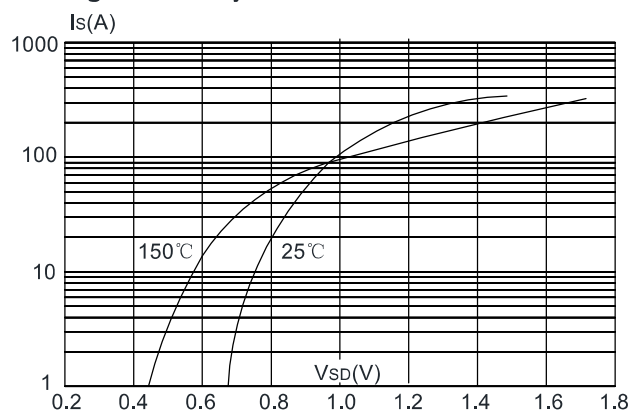


Figure 5: Gate Charge Characteristics

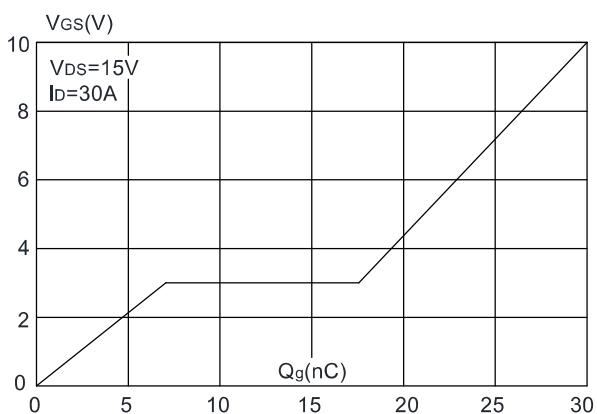


Figure 6: Capacitance Characteristics

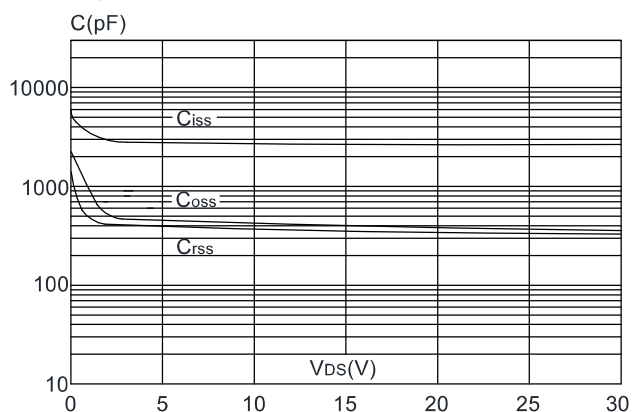


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

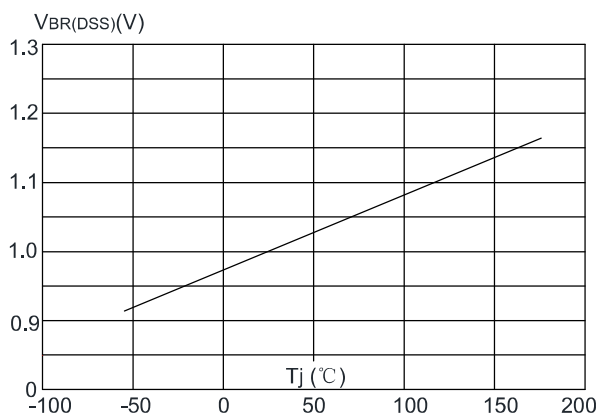


Figure 8: Normalized on Resistance vs. Junction Temperature

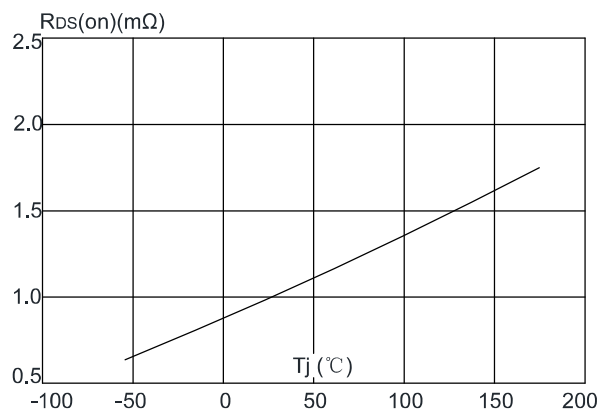


Figure 9: Maximum Safe Operating Area

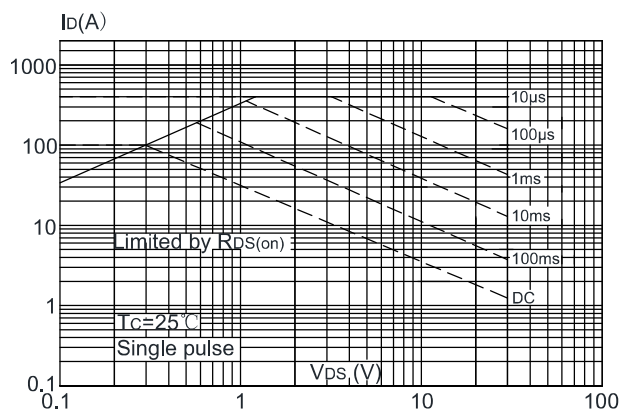


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

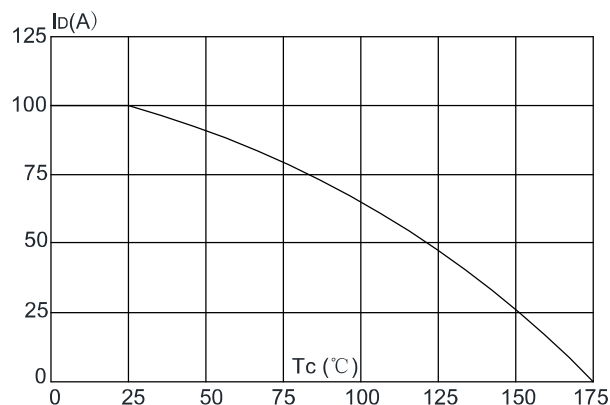
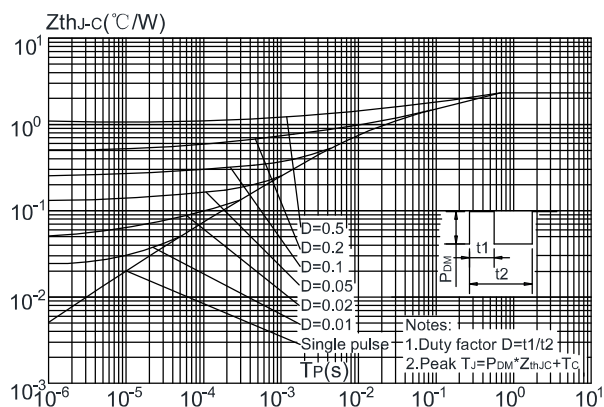
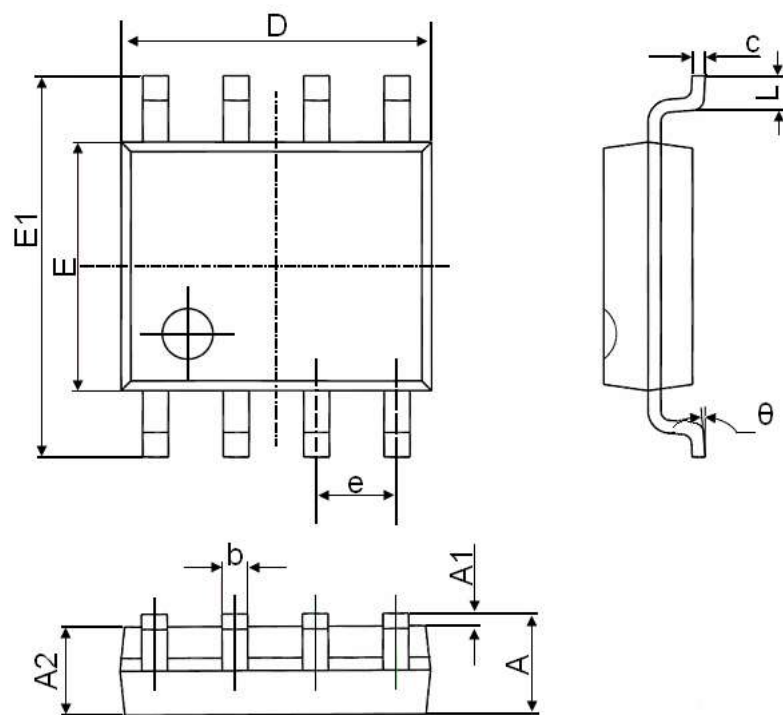


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



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°