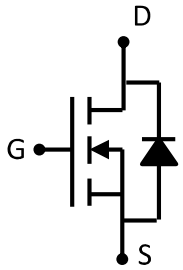
AP5040

N-Channel Enhancement Mosfet

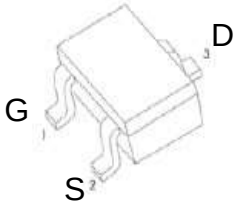
DATA SHEET

Features

- 40V,5A
  $R_{DS(ON)}$ <40mΩ @V_{GS}=10V TYP:30mΩ
  $R_{DS(ON)}$ <60mΩ @V_{GS}=4.5V TYP:40mΩ
- Lead free and Green Device Available
- Excellent RDS(ON) and Low Gate Charge
- Lead free product Fast switching speed
- HBM CLASS H1A
- CDM CLASS C1



Schematic diagram



SOT-23

Applications

- Load Switch
- PWM Application
- Power management

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
5040	AP5040	SOT-23	-	-	3000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (T_a =25℃)	I_D	5	A
Continuous Drain Current (T_a =100℃)	I_D	3	A
Pulsed Drain Current[1]	I_{DM}	20	A
Power Dissipation (T_a =25℃)	P_D	1.6	W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-40~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_a=25℃ 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	40	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =40V, V_{GS} = 0V,T_J=25℃	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.0	1.5	2.2	V
Drain-source on-resistance(2)	$R_{DS(on)}$	V_{GS} =10V, I_D =4A	-	30	40	mΩ
		V_{GS} =4.5V, I_D =3A		40	60	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =20V, V_{GS} =0V, f =1.0MHz	-	435	655	pF
Output Capacitance	C_{oss}		-	58	88	
Reverse Transfer Capacitance	C_{rss}		-	35	54	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V, I_D=4A, R_L=1Ω ,R_G=3Ω V_{GS}=10V	-	10	20	ns
Turn-on rise time	t_r		-	8	16	
Turn-off delay time	$t_{d(off)}$		-	29	58	
Turn-off fall time	t_f		-	12	24	
Total Gate Charge	Qg	V_{DS}=20V, I_D=3A, V_{GS}=10V	-	11	22	nC
Gate-Source Charge	Qgs		-	2	4	
Gate-Drain Charge	Qgd		-	2.5	5	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	T_J=25℃, V_{GS} =0V, I_S=5A	-	-	1.2	V
Diode Forward current	I_S	T_C=25℃	-	-	5	A
Body Diode Reverse Recovery Time	trr	T_J=25℃， IF=5A,di/dt=100A/us		20		ns
Body Diode Reverse Recovery Charge	Qrr	T_J=25℃， IF=5A,di/dt=100A/us		11		uc

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Typical Performance Characteristics

Figure1: Output Characteristics

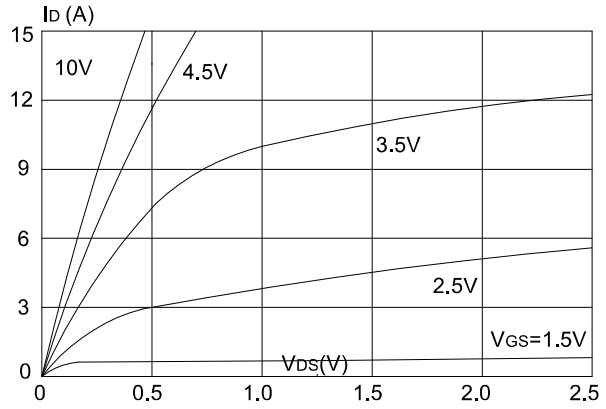


Figure 2: Typical Transfer Characteristics

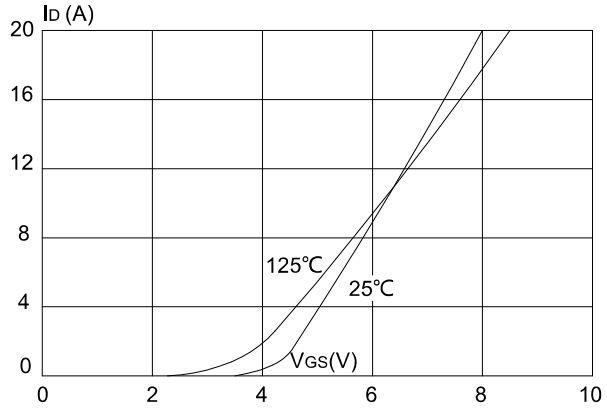


Figure 3: On-resistance vs. Drain Current

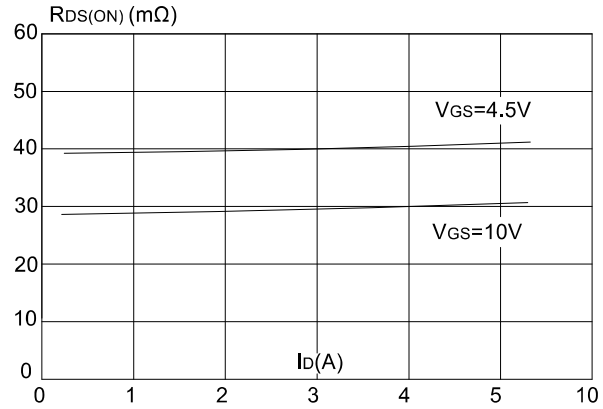


Figure 4: Body Diode Characteristics

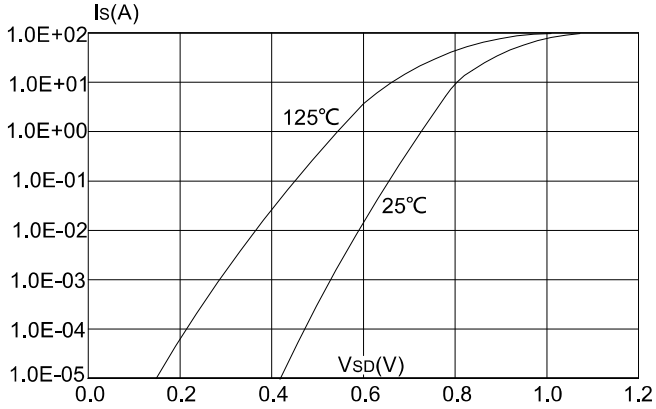


Figure 5: Gate Charge Characteristics

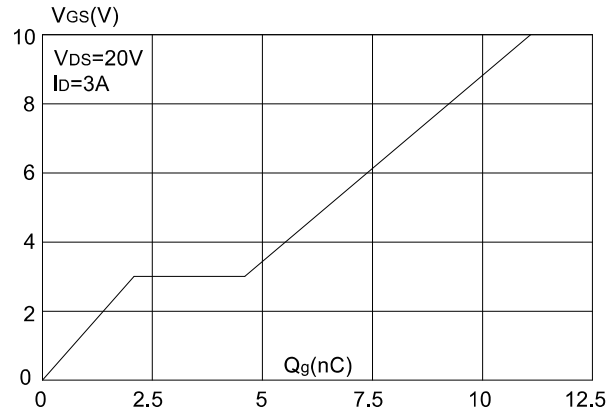


Figure 6: Capacitance Characteristics

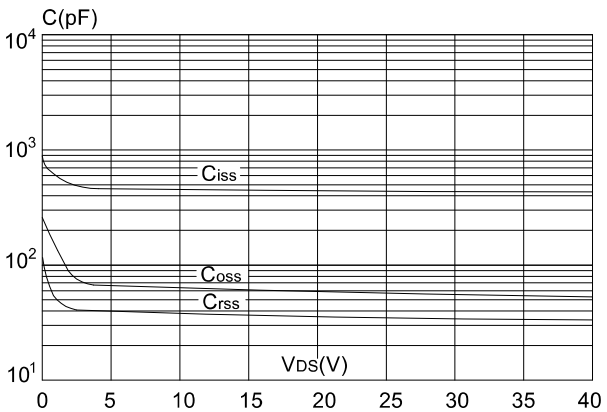


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

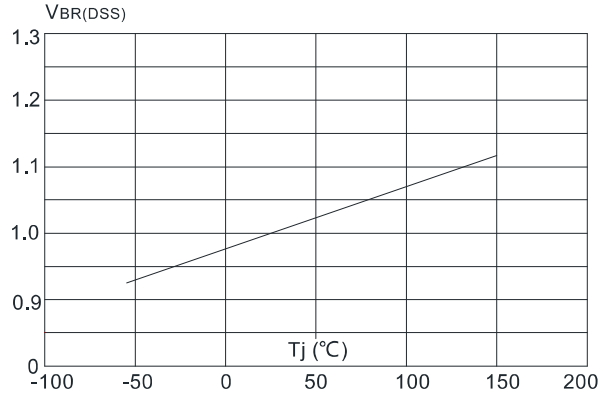


Figure 8: Normalized on Resistance vs. Junction Temperature

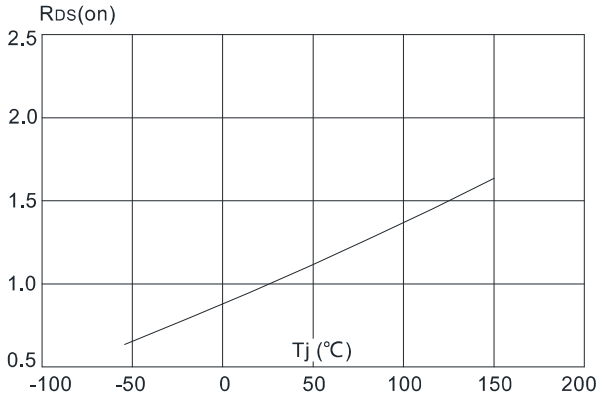


Figure 9: Maximum Safe Operating Area

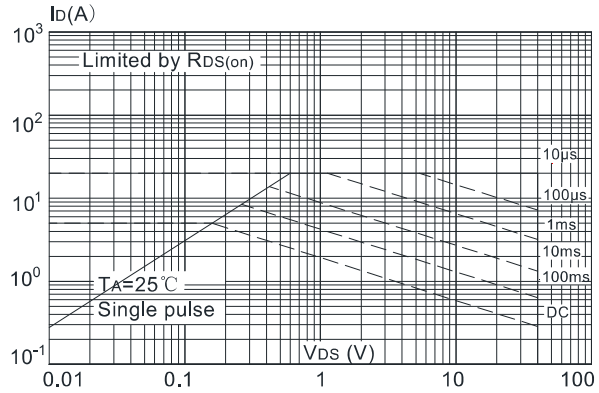


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

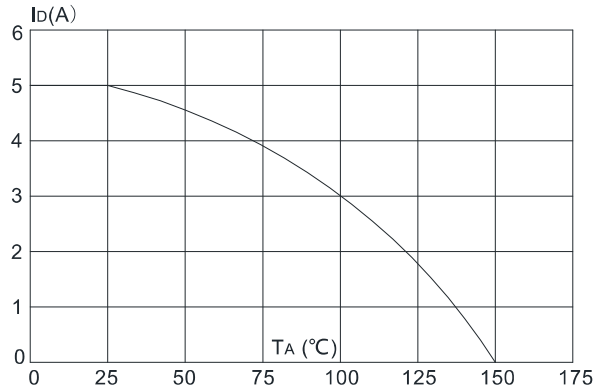
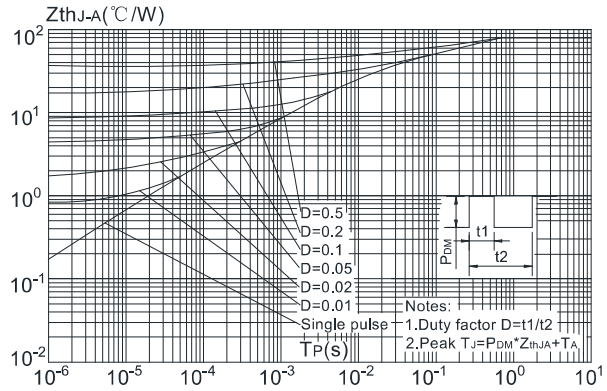


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Test Circuit

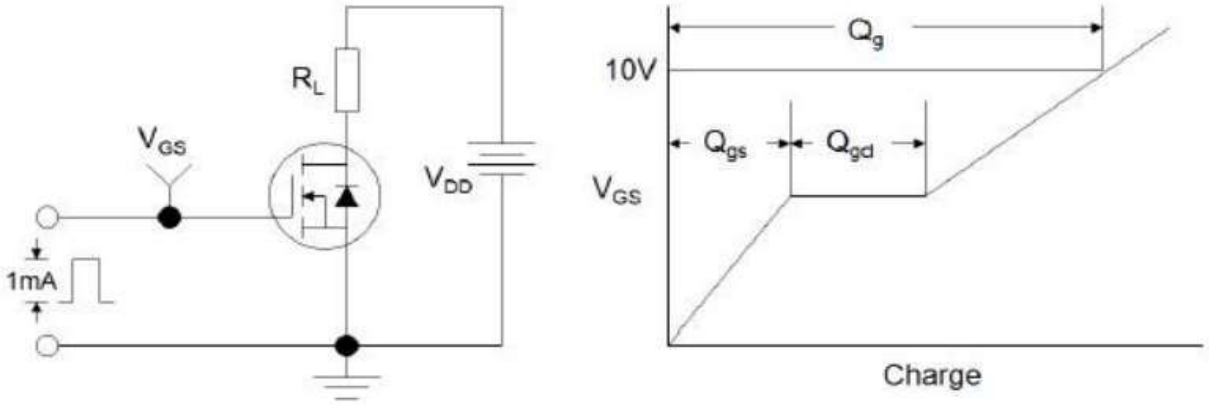


Figure1:Gate Charge Test Circuit & Waveform

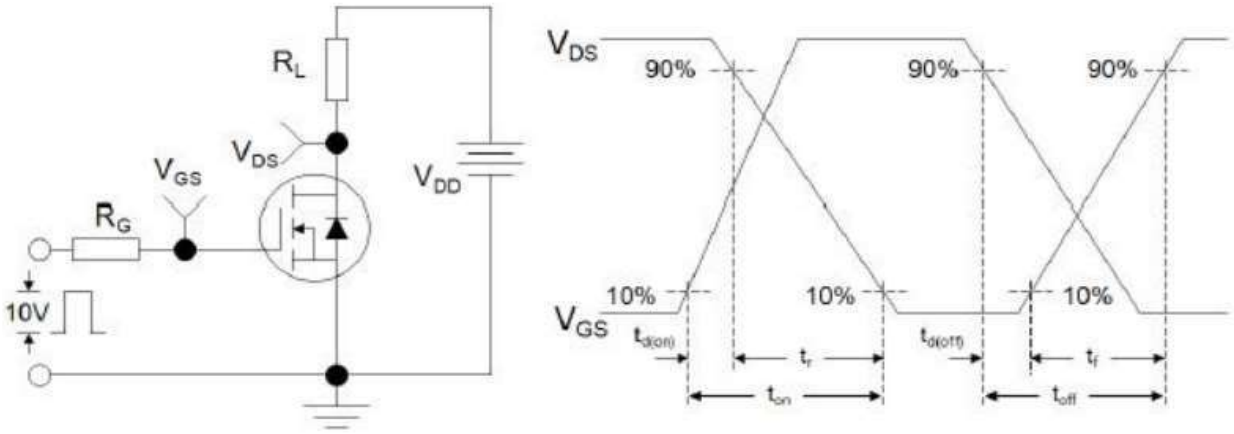


Figure 2: Resistive Switching Test Circuit & Waveforms

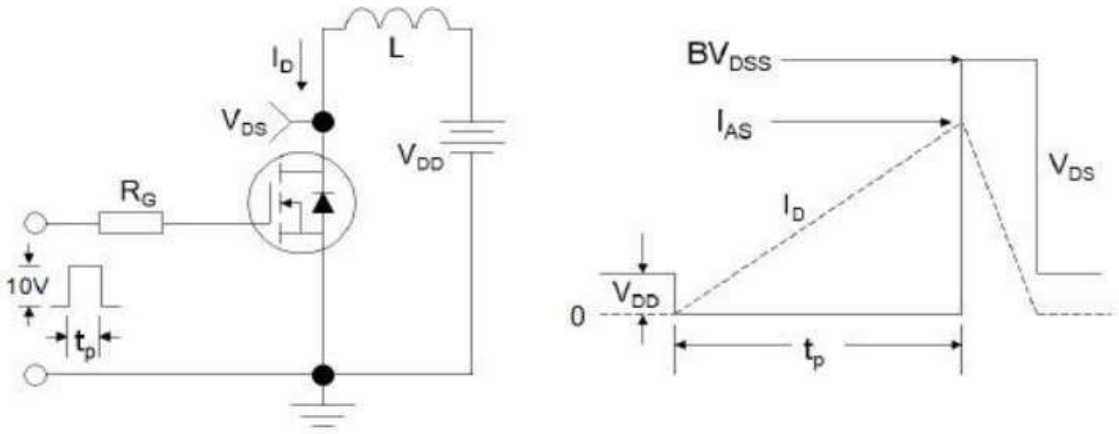
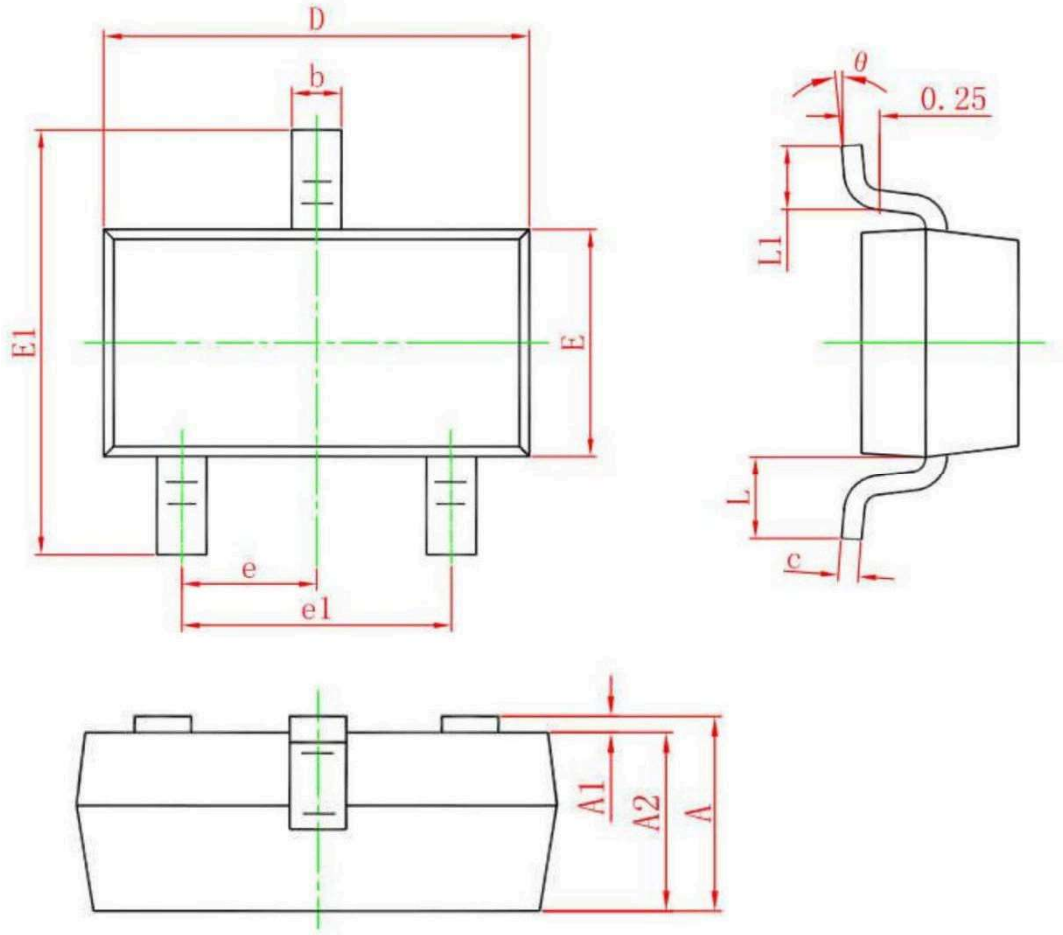


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

SOT-23 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Package Information

