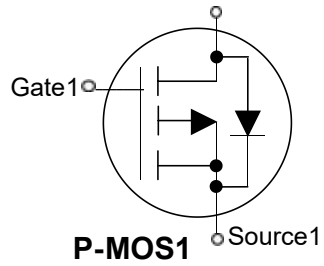
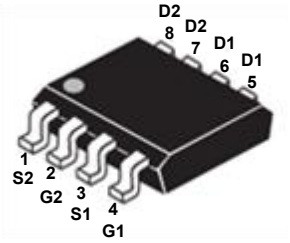
General Description

The APMAPM4953 has dual P-channel MOSFET in one package, uses advanced trench technology to provide excellent Rds(on) with low gate charge. This device is suitable for use as a load switch or in PWM applications.





1. Source 2
2. Gate 2
3. Source 1
4. Gate 1
8. Drain 2
7. Drain 2
6. Drain 1
5. Drain 1

Pb-Free

Green Available

Features

- V_{DSS}=-20V
- I_D=-4.0A@V_{GS}=-10V
- $R_{DS(on)}$=75ma(Typ.)@V_{GS}=-10V
- $R_{DS(on)}$=86ma(Typ.)@V_{GS}=-4.5V
- $R_{DS(on)}$=105ma(Typ.)@V_{GS}=-2.5V
- Advanced high cell density Trench technology
- Excellent CdV/dt effect decline
- Super Low Gate Charge
- High Power and current handing capability
- Package: SOP-8L
- Pb-Free and Green devices are available

Applications

- Load Switch
- Battery Switch
- PWM Applications
- Power Management

Ordering Information

Orderable Part Number	Package Type	Form	Minimum Order Quantity
APMAPM4953	SOP8	Tape & Reel	3000

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

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±10	V
Drain Current [a]	T_C = 25°C	I_D	-4.0	A
	T_C = 70°C		-2.4	
Drain Current – Pulsed [a]		I_{DM}	-16.0	A
Power Dissipation (T_C=25°C)		P_D	3.0	W
Power Dissipation (T_C=75°C)			2.0	
Storage Temperature Range		T_{STG}	-55 ~ +150	°C
Operating Junction Temperature Range		T_J	-55 ~ +150	°C
Thermal Resistance, Junction-to-Ambient (t ≤ 10s)		$R_{\theta JA}$	62.5	°C/W

Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=-250uA	-20	---	---	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-16V, V_{GS}=0V, T_J=25°C	---	---	-1	uA
Gate-Body Leakage	I_{GSS}	V_{GS}=±12V, V_{DS}=0V	---	---	±100	nA
ON CHARACTERISTICS [a]						

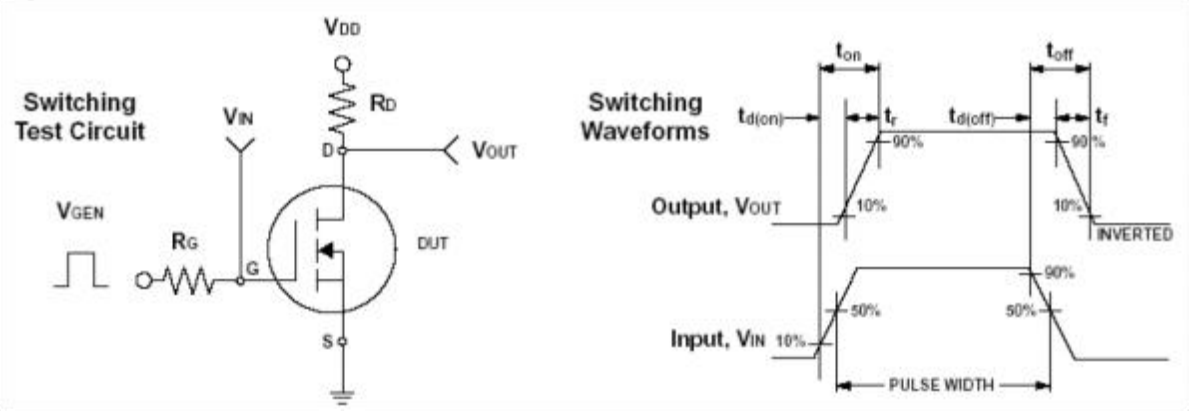
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} , I_D=-250uA	-0.4	-0.65	-1.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=-10V , I_D=-4.0A	---	75	88	mΩ
	$R_{DS(on)}$	V_{GS}=-4.5V , I_D=-3.0A	---	86	105	mΩ
	$R_{DS(on)}$	V_{GS}=-2.5V , I_D=-2.0A	---	105	137	mΩ
	$R_{DS(on)}$	V_{GS}=-1.8V , I_D=-1.0A	---	135	200	mΩ
Forward Transconductance	gfs	V_{DS}=-10V, I_D=-4.0A	---	8	---	S
Drain-Source Diode Characteristics [a]						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	---	---	-4.0	A
Pulsed Source Current	I_{SM}		---	---	-16.0	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-1.0A, T_J=25°C	---	---	-1.2	V
Dynamic Characteristics [b]						
Input Capacitance	Ciss	V_{DS}=-10V, V_{GS}=0V, F=1MHz	---		---	pF
Output Capacitance	Coss		---		---	pF
Reverse Transfer Capacitance	Crss		---		---	pF
Switching Characteristics [b]						
Total Gate Charge	Qg	V_{DS}=-10V, V_{GS}=-4.5V, I_D=-4.0A	---		---	nC
Gate-Source Charge	Qgs		---		---	nC
Gate-Drain Charge	Qgd		---		---	nC
Turn-On Delay Time	Td(on)	V_{DD}=-10V, V_{GS}=-10V, R_G=1Ω I_D=-1A, R_L=2.8Ω	---		---	ns
Rise Time	Tr		---		---	ns
Turn-Off Delay Time	Td(off)		---		---	ns
Fall Time	Tf		---		---	ns

Notes: a. Repetitive Rating: Pulsed width limited by maximum junction temperature.

b. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%. Essential independent of operating temperature.

c. Guaranteed by design, not subject to production testing.

Switching Time Test Circuit and Waveforms

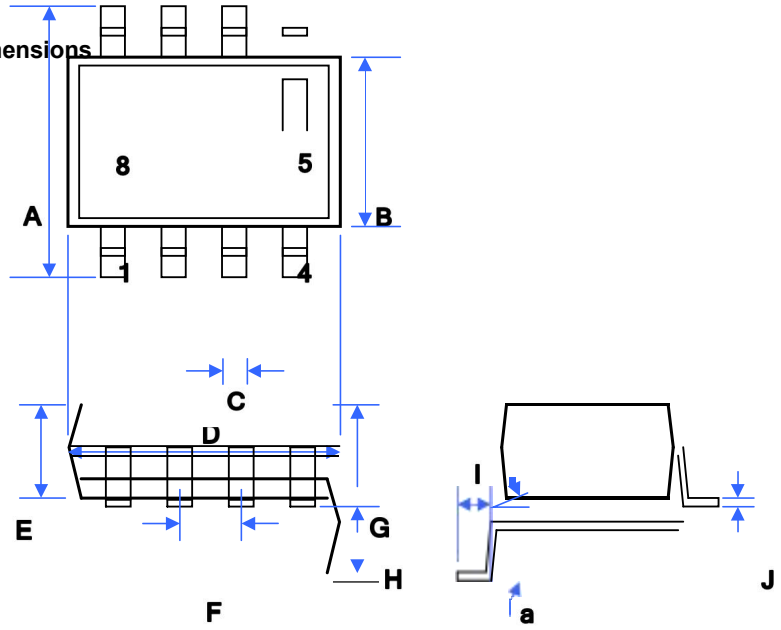


Marking Description

- ● --- Part Number Code
- APMAPM4953 --- Vendor Code
- ● v --- Assembly House Code
- ● a --- Year Code
- ● y --- Lot Code
- ● b --- Checking Code
- ● cc

Package Information

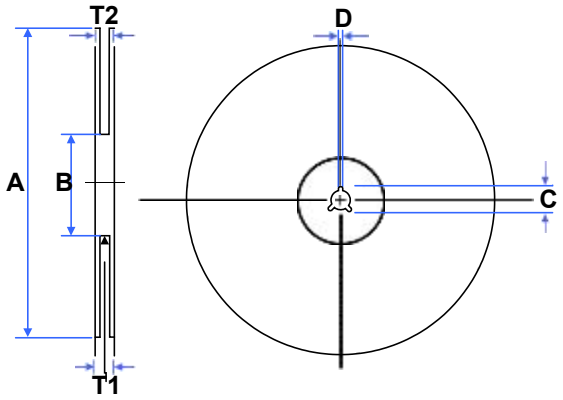
8-pin SOP Outline Dimensions



Symbol	Dimension In Millimeters (mm)		Dimension In Inches	
	Min.	Max.	Min.	Max.
A	5.800	6.300	0.228	0.248
B	3.800	4.000	0.150	0.157
C	0.330	0.510	0.013	0.020
D	4.780	5.000	0.188	0.197
E	1.350	1.550	0.053	0.061
F	1.270(Typ.)		0.050(Typ.)	
G	1.350	1.750	0.053	0.069
H	0.100	0.250	0.004	0.010
I	0.400	1.270	0.016	0.050
J	0.170	0.250	0.007	0.010
“	0°	8°	0°	8°

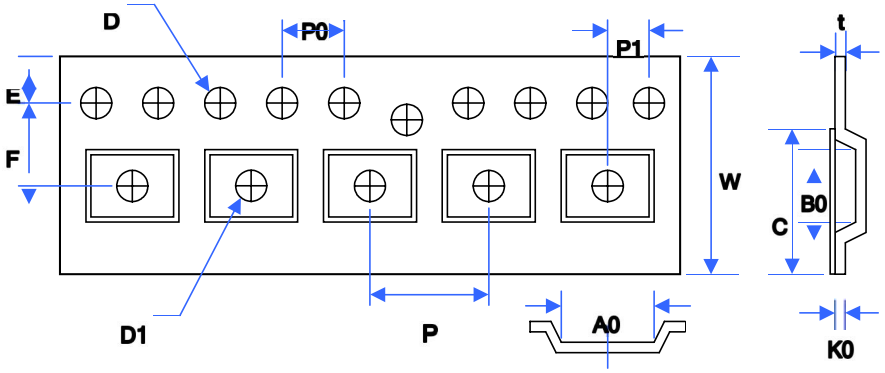
Product Tape and Reel Specifications

Reel Dimensions



Symbol	Description	SOP-8 : Dimensions in mm
A	Reel Outer Diameter	330±1.0
B	Reel Inner Diameter	62±1.5
C	Spindle Hole Diameter	13.0±0.5
D	Key Slit Width	2.0±0.15
T1	Space Between Flange	12.8±0.3
T2	Reel Thickness	12.8±0.2

Carrier Tape Dimensions



Symbol	Description	SOP-8 : Dimensions in mm
W	Carrier Tape Width	12.0±0.3
P	Cavity Pitch	8.0±0.1
E	Perforation Position	1.75±0.1
F	Cavity to Perforation (Width Direction)	5.5±0.1
D	Perforation Diameter	1.55±0.1
D1	Cavity Hole Diameter	1.5+0.25
P0	Perforation Pitch	4.0±0.1
P1	Cavity to Perforation (Length Direction)	2.0±0.1
A0	Cavity Length	6.4±0.1
B0	Cavity Width	5.20±0.1
K0	Cavity Depth	2.1±0.1
t	Carrier Tape Thickness	0.3±0.05
C	Cover Tape Width	9.3

※Unit Per Reel: 3000pcs(3K pcs)

Soldering Methods For Products

1. Storage environment : Temperature=10ºC~35ºC, Humidity=65%±15%
2. Reflow soldering of surface mount devices

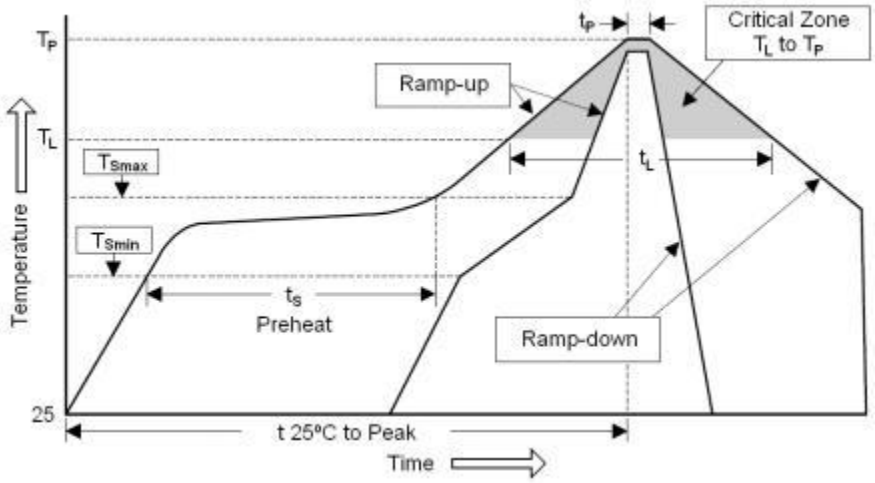


Figure : Temperature Profile

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	< 3ºC/sec	< 3ºC/sec
Preheat - Temperature Min (TSmin) - Temperature Max (TSmax) - Time (Min to Max) (ts)	 100ºC 150ºC 60 ~ 120 sec	 100ºC 200ºC 60 ~ 180 sec
TSmax to T_L - Ramp-up rate	 < 3ºC/sec	 < 3ºC/sec
Time maintained above: - Temperature (T_L) - Time (t_L)	 183ºC 60 ~ 150 sec	 217ºC 60 ~ 150 sec
Peak Temperature (T_P)	240ºC +0/-5ºC	260ºC +0/-5ºC
Time within 5ºC of actual Peak Temperature (t_P)	10 ~ 30 sec	20 ~ 40 sec
Ramp-down rate	< 6ºC/sec	< 6ºC/sec
Time 25ºC to Peak Temperature	< 6 minutes	< 8 minutes

3. Flow (wave) soldering (solder dipping)

Product	Peak Temperature	Dipping Time
Pb devices	245ºC ±5ºC	5sec ±1sec
Pb-Free devices	260ºC +0/-5ºC	5sec ±1sec

- 经锡炉或回焊炉的温度切勿超过 260 ºC (Max safe temperature: 260℃)。

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- MOS 管电路是静电敏感元器件， 且对生产环境要求较严，建议在存放、 运输及生产操作时一定要避免静电干扰。
- 由于每个 PCB 版图和设计都不同， 每个 MOSFET 的结构也不同， 因此， 没有通用的流程可用来计算每个应用的最大允许电流，建议在选用 MOS 管器件时考虑到余量，以免 MOS 管因此而造成损坏。