

SuperMOS – SOP8 -30V BV_{DSS}, 39mΩ R_{DS(on)}, -5.8A I_D P-channel MOSFET

1. Description

The APM4953 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R_{DS(ON)} with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product APM4953 is Pb-free.

2. Features

- -30V, R_{DS(ON)}=39mΩ(Typ), V_{GS}=-10V
R_{DS(ON)}=55mΩ(Typ), V_{GS}=-4.5V
- Fast Switching
- High density cell design for low R_{DS(on)}
- Material : Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

- PWM applications 100% UIS TESTED
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

4. Ordering Information

Part Number	Package	Marking	Material	Quantity per reel	Flammability Rating
APM4953	SOP8	ES4803A/lot	Halogen free	3,000 PCS	UL 94V-0

Table-1 Ordering information

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
1	Source1		
2	Gate1		
7/8	Drain1		
3	Source2		
4	Gate2		
5/6	Drain2		

Table-2 Pin configuration

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	BV_{DSS}	-30	V	
Gate-Source Voltage	V_{GS}	± 20	V	
Continuous Drain Current	I_D	$T_A=25^\circ\text{C}$	-5.8	A
		$T_A=75^\circ\text{C}$	-4.5	
Maximum Power Dissipation	P_D	$T_A=25^\circ\text{C}$	3.2	W
		$T_A=75^\circ\text{C}$	1.9	
Pulsed Drain Current	I_{DM}	-23.2	A	
Avalanche Current, Single Pulsed ^a	I_{AS}	11	A	
Avalanche Energy, Single Pulsed ^a	E_{AS}	18	mJ	
Operating Junction Temperature	T_J	150	°C	
Storage Temperature Range	T_{stg}	-55 to +150	°C	

Thermal resistance ratings

Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ^a ($t \leq 10\text{s}$)	$R_{\theta JA}$	32	40	°C/W

Note:

a: $T_J=25^\circ\text{C}, V_{DD}=-30\text{V}, V_G=-10\text{V}, L=0.3\text{mH}, R_g=25\Omega$

Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V$			-1	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.5	-2.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-5A$		39	60	m Ω
		$V_{GS}=-4.5V, I_D=-4A$		55	80	
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-5A$			40	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS}=0V$ $V_{DS}=-15V$ $f=1MHz$		520		pF
Output Capacitance	C_{OSS}			100		
Reverse Transfer Capacitance	C_{RSS}			65		
Gate Resistance	R_g	$f=1MHz$		7.5		Ω
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=-10V$ $V_{DS}=-15V$ $I_D=-5A$		9.2	11	nC
Gate-to-Source Charge	Q_{GS}			1.6		
Gate-to-Drain Charge	Q_{GD}			2.2		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=-10V$ $V_{DS}=-15V$ $R_L=3\Omega$ $R_G=3\Omega$		7.5		ns
Rise Time	t_r			5.5		
Turn-Off Delay Time	$t_{d(OFF)}$			19		
Fall Time	t_f			7		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=-1.0A$		-0.7	-1	V

7. Typical Characteristic

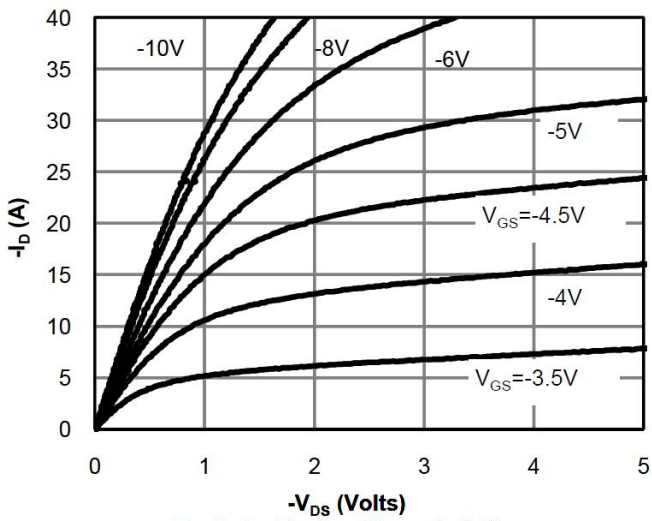


Fig 1: On-Region Characteristics

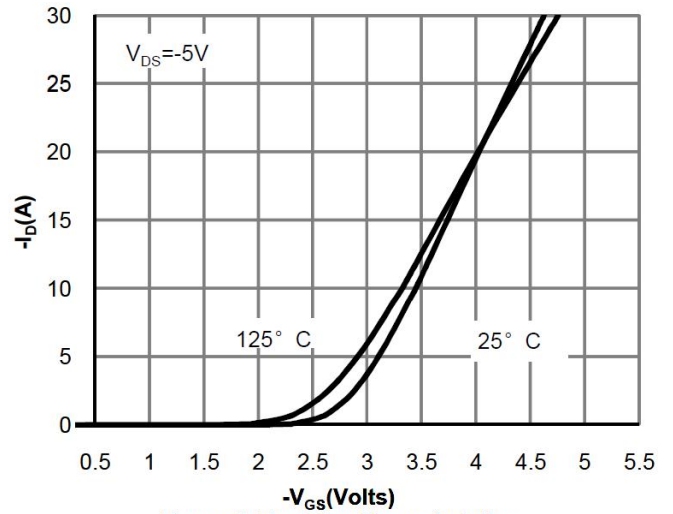


Figure 2: Transfer Characteristics

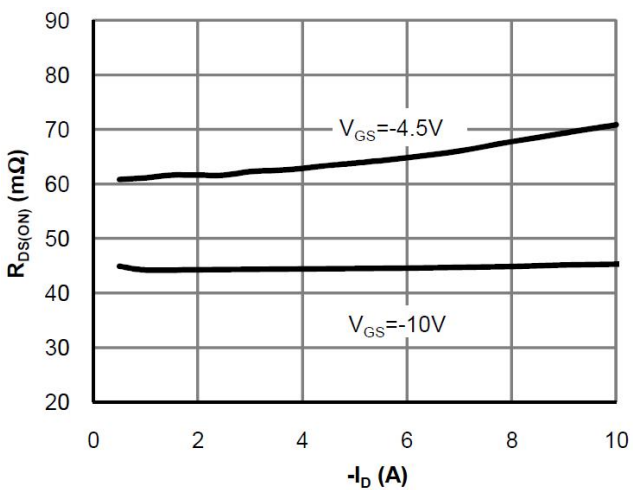


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

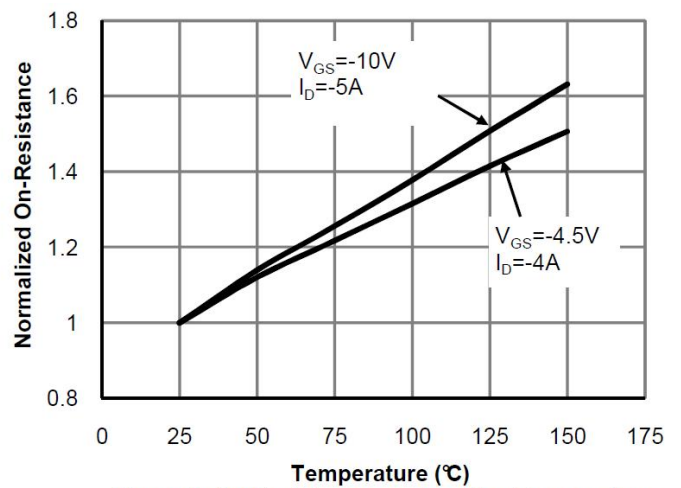


Figure 4: On-Resistance vs. Junction Temperature

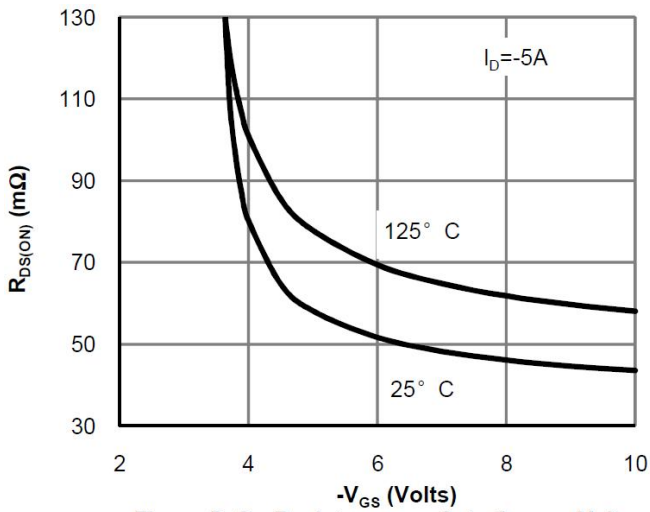


Figure 5: On-Resistance vs. Gate-Source Voltage

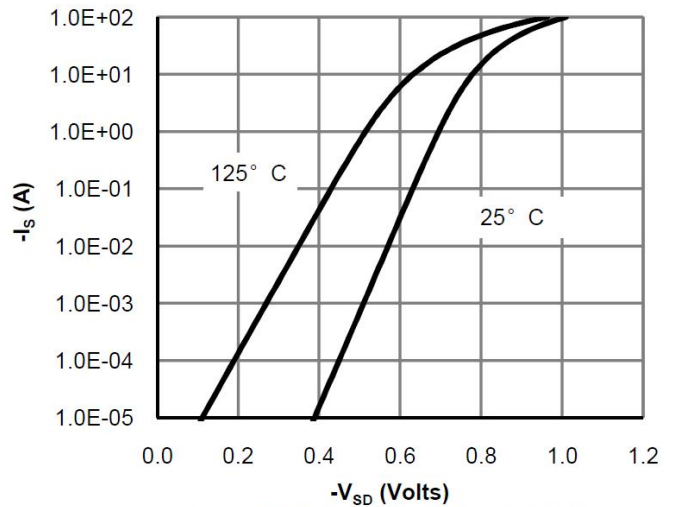


Figure 6: Body-Diode Characteristics

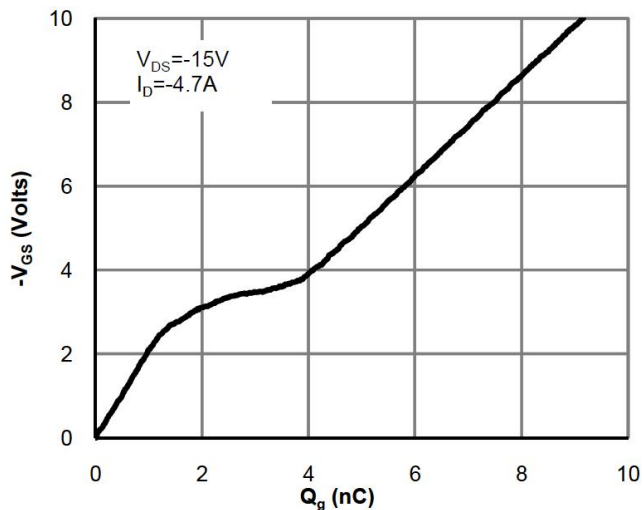


Figure 7: Gate-Charge Characteristics

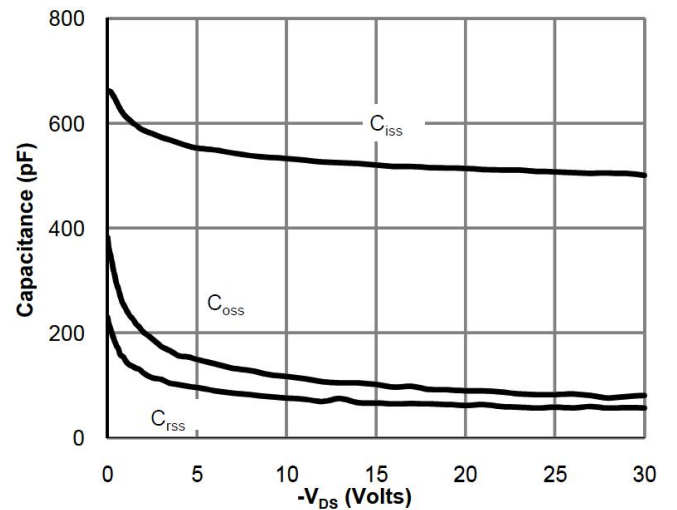


Figure 8: Capacitance Characteristics

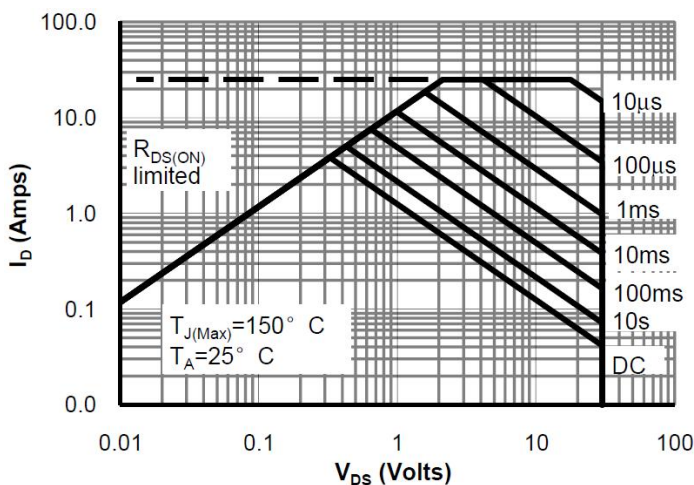


Figure 9: Maximum Forward Biased Safe Operating Area

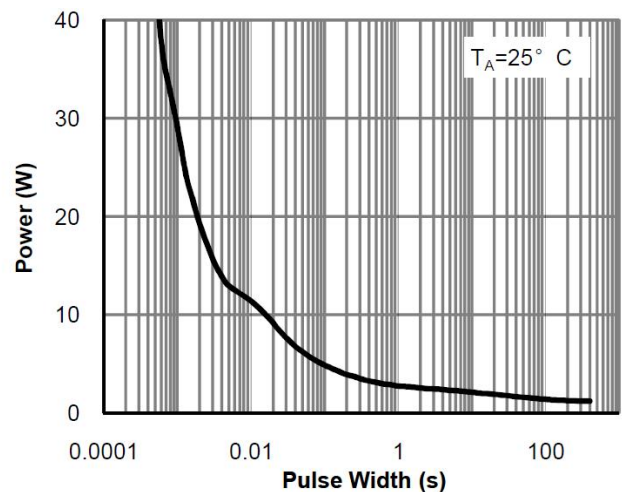


Figure 10: Single Pulse Power Rating Junction-to-Ambient

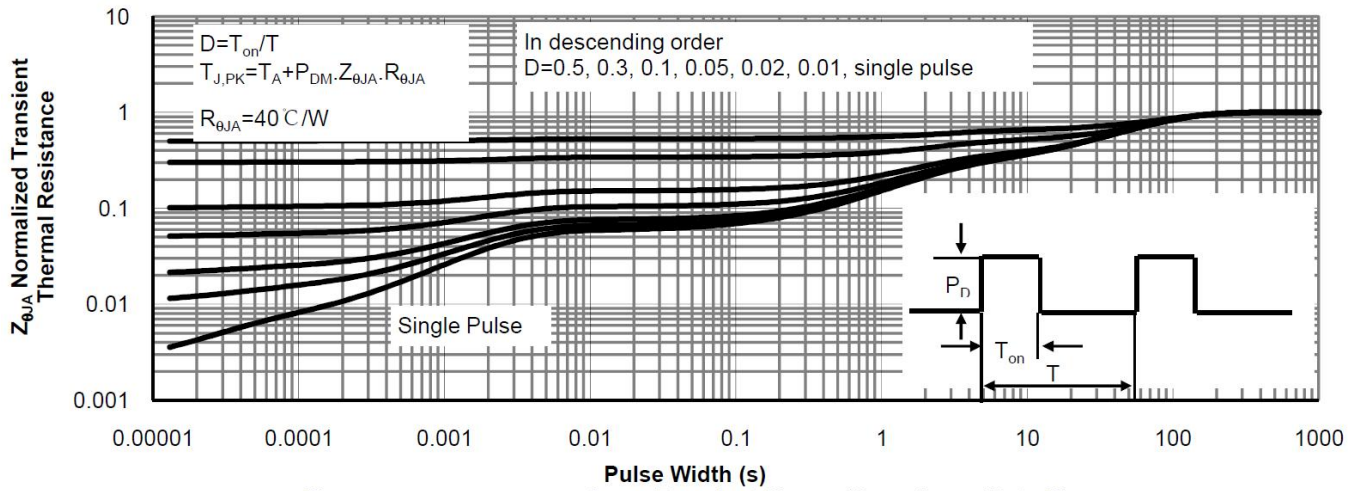
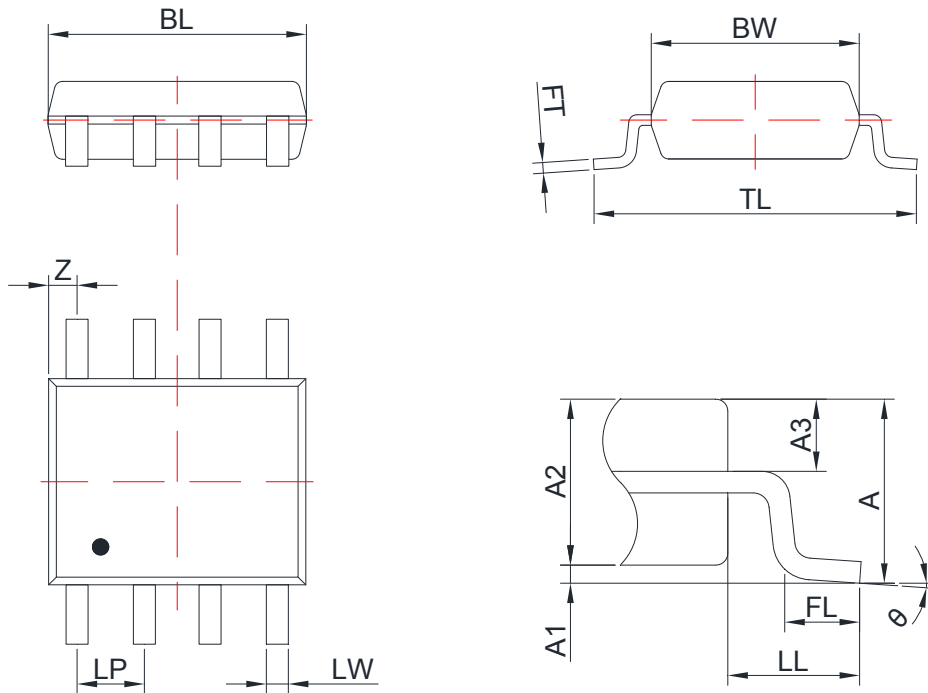


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

8. Dimension (SOP8)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	1.75		FL	0.50	0.80
A1	0.05	0.15	LP	1.25	1.30
A2	1.40	1.50	LL	1.1 BSC	
A3	0.623 BSC		LW	0.38	0.43
BL	4.92	5.80	TL	5.90	6.10
BW	3.70	4.10	Z	0.54	
FT	0.20	0.21	θ	0°	8°

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