

-20V P+P-Channel Enhancement Mode MOSFET

Description

The AP4953B uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = -20V$ $I_D = -6.5A$

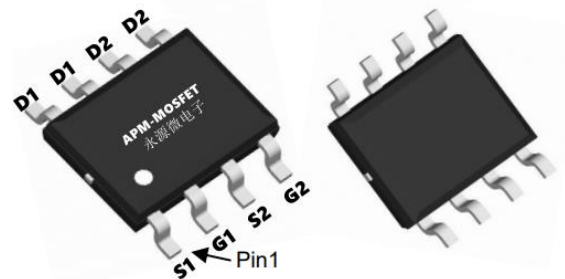
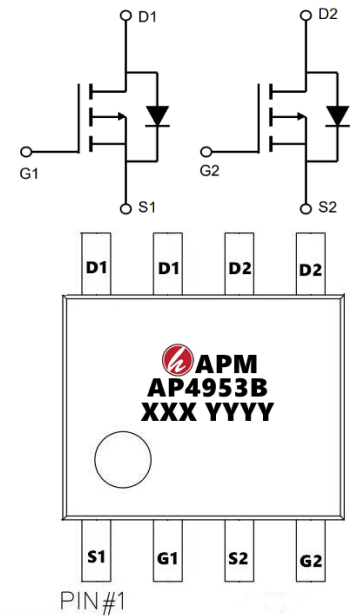
$R_{DS(ON)} < 55m\Omega @ V_{GS}=4.5V$ (Type: 43m Ω)

Application

Lithium battery protection

Wireless impact

Mobile phone fast charging



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP4953B	SOP-8L	AP4953B XXX YYYY	3000

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_A=25^\circ\text{C}$	Continuous Drain Current, $-V_{GS} @ -10V^1$	-6.5	A
$I_D @ T_A=70^\circ\text{C}$	Continuous Drain Current, $-V_{GS} @ -10V^1$	-3.9	A
I_{DM}	Pulsed Drain Current ²	-14	A
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation ⁴	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	85	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	25	$^\circ\text{C/W}$



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Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BVDSS	Drain-Source Breakdown Voltage	VGS=0V, ID=-250μA	-20			V
IDSS	Zero Gate Voltage Drain Current	VDS=-20V, VGS=0V			-1	μA
IGSS	Gate-Body Leakage Current	VGS=±10V, VDS=0V			±100	nA
VGS(th)	Gate Threshold Voltage	VDS= VGS, ID=-250μA	-0.4	-0.62	-1.2	V
RDS(ON)	Static Drain-Source On-Resistance	VGS=-4.5V, ID=-3.4A		42	55	mΩ
		VGS=-2.5V, ID=-3.0A		55	75	
		VGS=-1.8V, ID=-2.5A		85	100	
VSD	Diode Forward Voltage	IS=-3.4A, VGS=0V			-1.2	V
Ciss	Input Capacitance	VDS=-10V, VGS=0V, f=1MHZ		438		pF
Coss	Output Capacitance			76		
Crss	Reverse Transfer Capacitance			62		
Qg	Total Gate Charge	VGS=-10V, VDS=-10V, ID=-3.4A		5.41		nC
Qgs	Gate-Source Charge			1.17		
Qgd	Gate-Drain Charge			1.24		
Qrr	Reverse Recovery Charge	IF=-3.4A, di/dt=100A/us		4		
trr	Reverse Recovery Time			24.5		
tD(on)	Turn-on Delay Time	VGS=-4.5V, VDS=-10V, ID=-1A, RGEN=3Ω		6.4		ns
tr	Turn-on Rise Time			21.8		
tD(off)	Turn-off Delay Time			37.4		
tf	Turn-off fall Time			34		

Note :

- 1、 The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width Δ 300us , duty cycle Δ 2%
- 3、 The power dissipation is limited by 150°C junction temperature
- 4、 The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

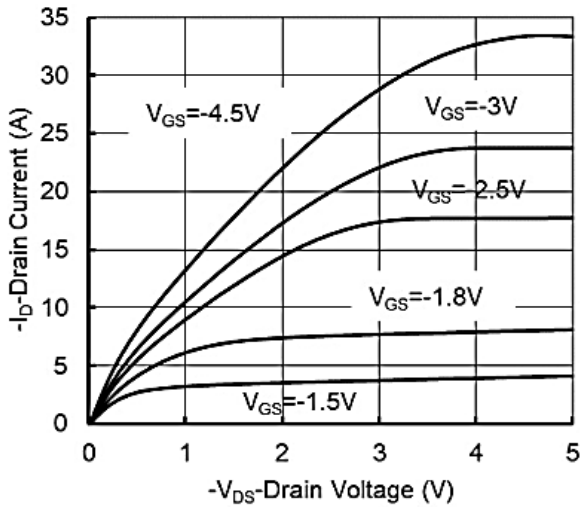


Figure1. Output Characteristics

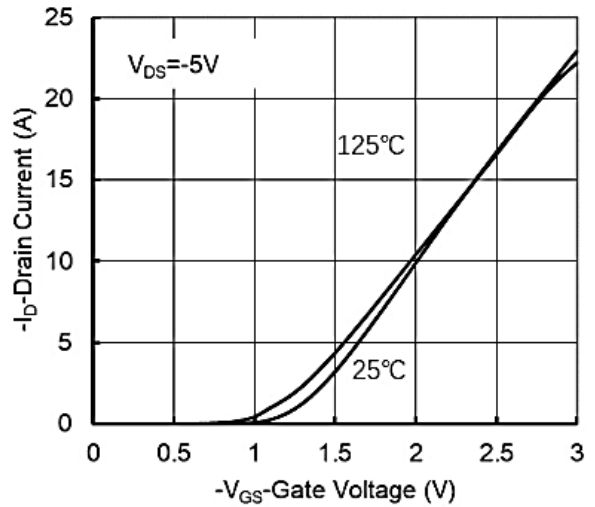


Figure2. Transfer Characteristics

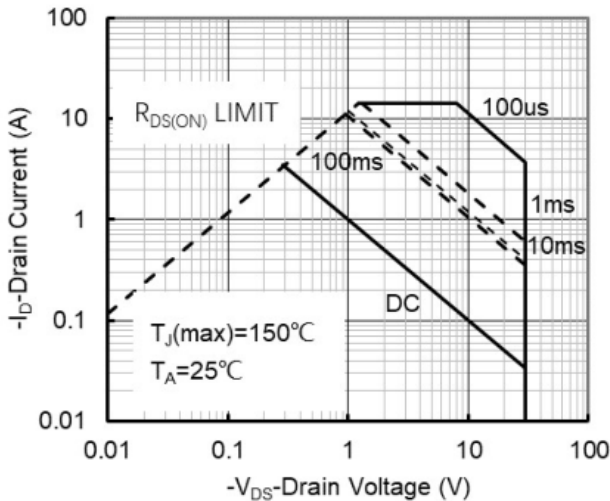


Figure7. Safe Operation Area

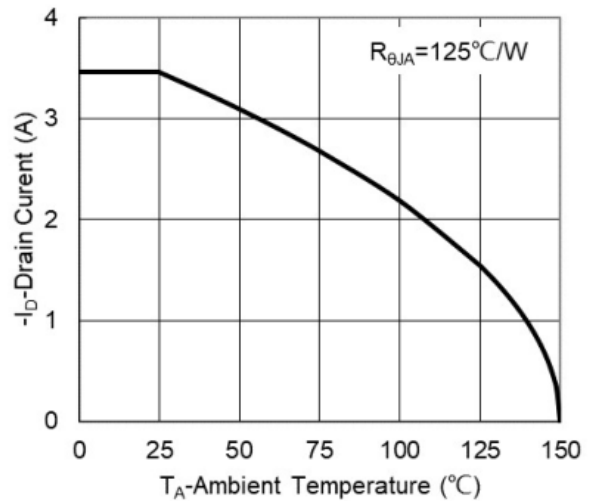


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

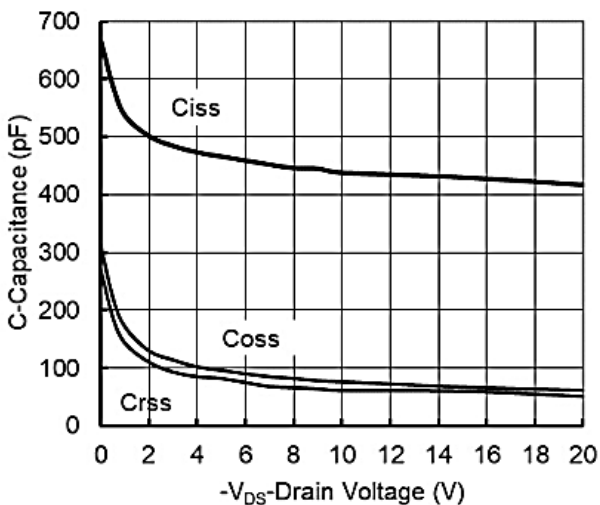


Figure5. Capacitance Characteristics

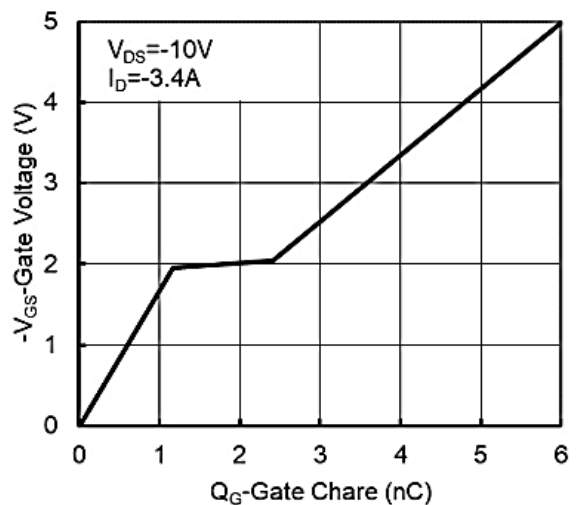


Figure6. Gate Charge

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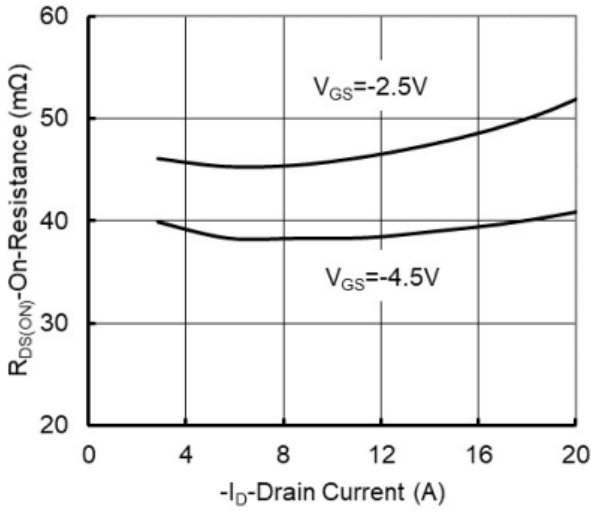


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

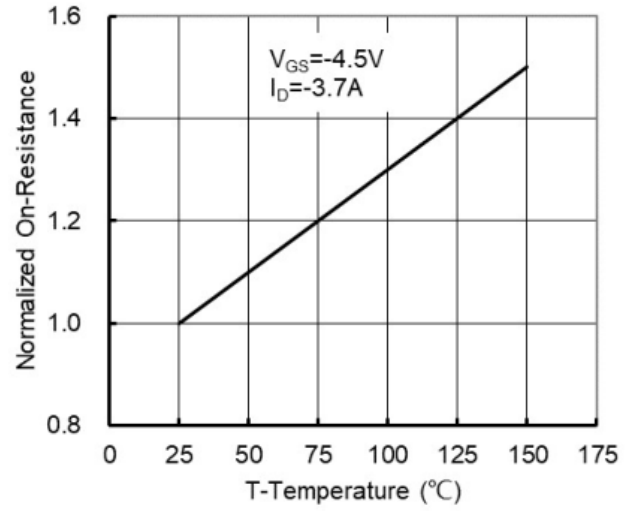


Figure 4: On-Resistance vs. Junction Temperature

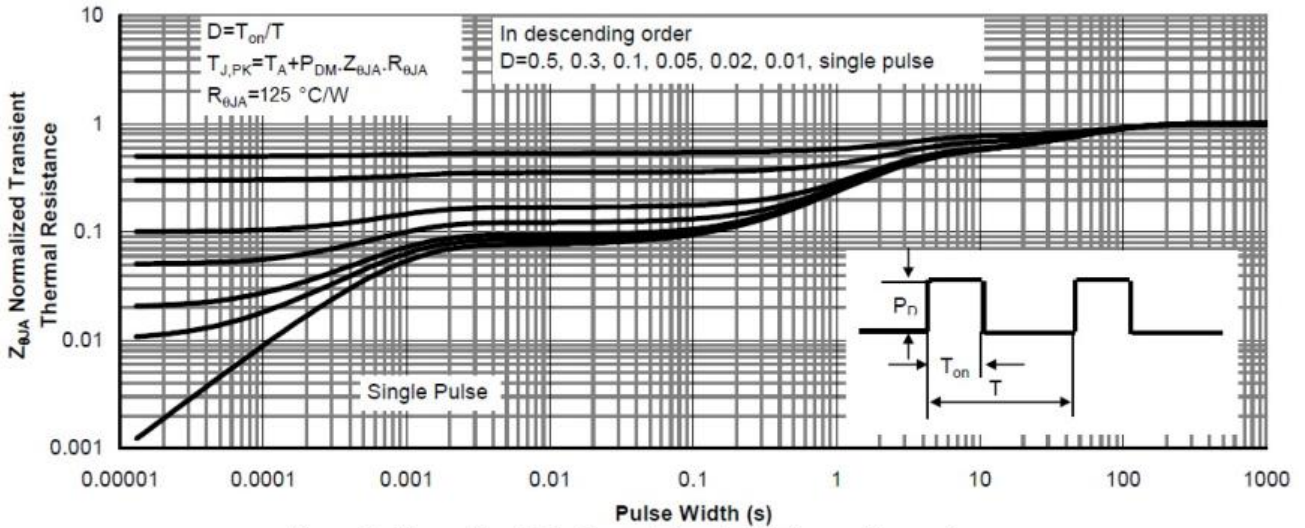
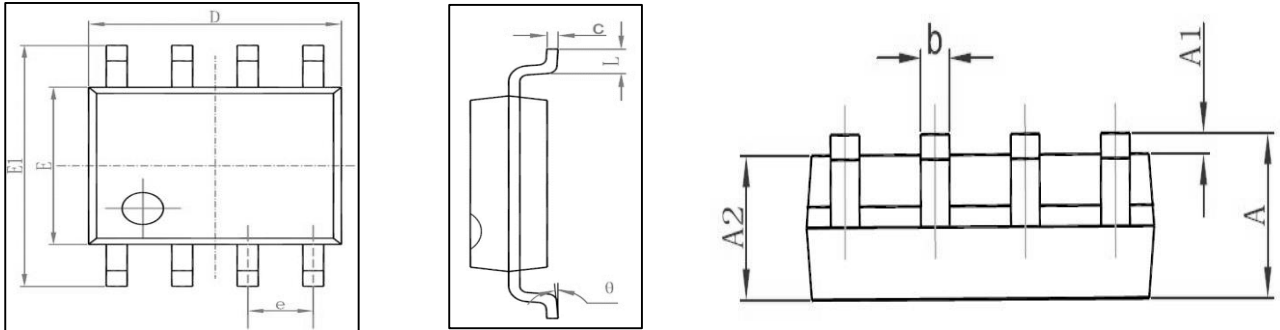
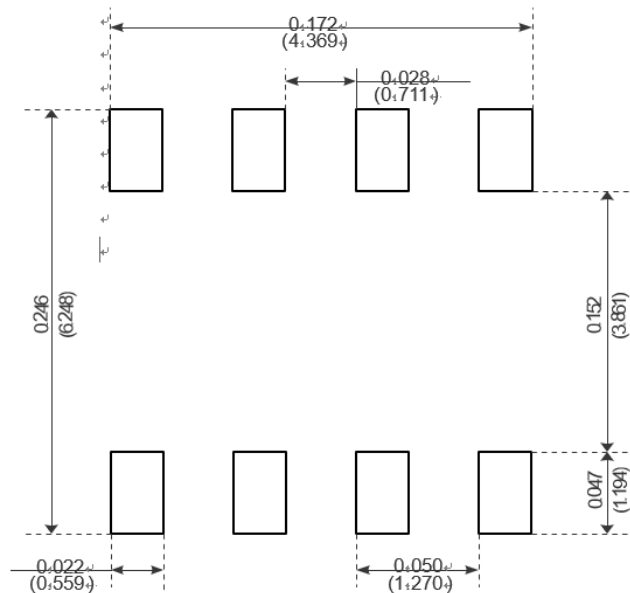


Figure 9. Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-SOP-8



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°



Recommended Minimum Pads

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Edition	Date	Change
Rve1.0	2020/01/31	Initial release

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