

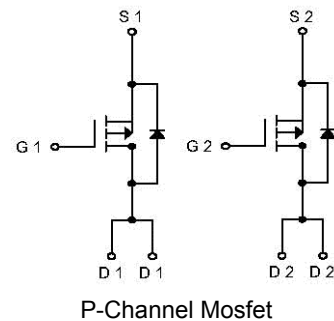
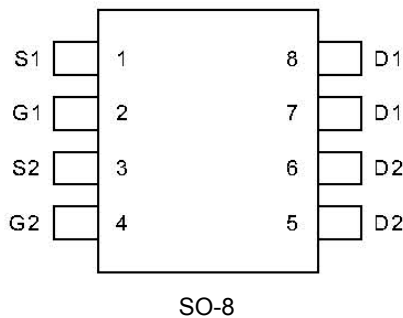
### Applications

Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems

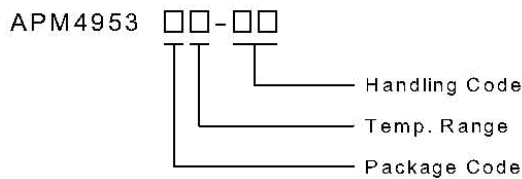
### Features

- 30V/-4.9A,  $R_{DS(on)}=53m\Omega(\text{typ.})@V_{GS}=-10V$
- $R_{DS(on)}=53m\Omega(\text{typ.})@V_{GS}=-4.5V$
- Supper High Density Cell Design
- Reliable and Rugged
- SO-8 Package

### Pin Description



### Ordering and Marking Information



APM4953K: APM4953  
XXXXXX

- Package Code
- K: SO-8
- Operation Junction Temp. Range
- C:-55 to 150
- Handling Code
- TU: Tube
- TR: Tape & Reel
- XXXXXX – Date Code

### Absolute Maximum Ratings ( $T_A=25$ unless otherwise noted)

Symbol	Parameter	Rating	Unit
$V_{DSS}$	Drain-Source Voltage	-30	V
$V_{GSS}$	Gate-Source Voltage	$\pm 25$	
$I_D^*$	Storage Temperature Range	-4.9	A
$I_{DM}$	Thermal Resistance – Junction to Ambient	-30	

\* Surface Mounted on FR4 Board,  $t \leq 10$  sec.

### Absolute Maximum Ratings (Cont.) ( $T_A=25$ unless otherwise noted)

Symbol	Parameter	Rating	Unit
$P_D$	Maximum Power Dissipation	$T_A=25$	2.5
		$T_A=100$	1.0
$T_J$	Maximum Junction Temperature	150	
$T_{STG}$	Storage Temperature Range	-55 to 150	
$R_{QJA}$	Thermal Resistance – Junction to Ambient	50	/W

**Electrical Characteristics** ( $T_A=25$  unless otherwise noted)

Symbol	Parameter	Test Condition	APM4953			Unit
			Min.	Typa.	Max	
<b>Static</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=-250\mu A$	-30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-24V, V_{GS}=0V$			-1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{GS}, I_{DS}=-250\mu A$	-1	-1.5	-2	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$			$\pm 100$	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance <sup>b</sup>	$V_{GS}=-10V, I_{DS}=-4.9A$		53	60	m $\Omega$
		$V_{GS}=-4.5V, I_{DS}=-3.6A$		80	95	
$V_{SD}$	Diode Forward Voltage <sup>b</sup>	$I_{SD}=-1.7A, V_{GS}=0V$		-0.7	-1.3	V
<b>Dynamic<sup>a</sup></b>						
$Q_g$	Total Gate Charge	$V_{DS}=-15V, V_{GS}=-10V$ $I_D=-4.6A$		22.3	29	nC
$Q_{gs}$	Gate-Source Charge			4.65		
$Q_{gd}$	Gate-Drain Charge			2		
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=-15V, I_D=-2A,$ $V_{GEN}=-10V, R_G=6\Omega$ $R_L=7.5\Omega$		10	18	ns
$T_r$	Turn-on Rise Time			15	20	
$t_{d(OFF)}$	Turn-off Delay Time			22	38	
$T_f$	Turn-off Fall Time			15	25	
$C_{iss}$	Input Capacitance	$V_{GS}=0V$		1260		pF
$C_{oss}$	Output Capacitance	$V_{DS}=-25V$		340		
$C_{rss}$	Reverse Transfer Capacitance	Frequency=1.0MHz		220		

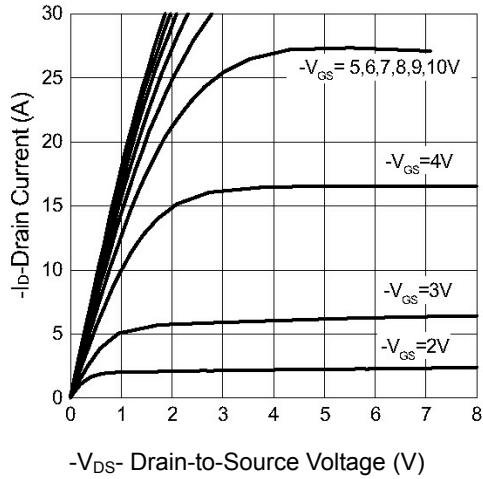
**Notes**

a: Pulse test; pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$

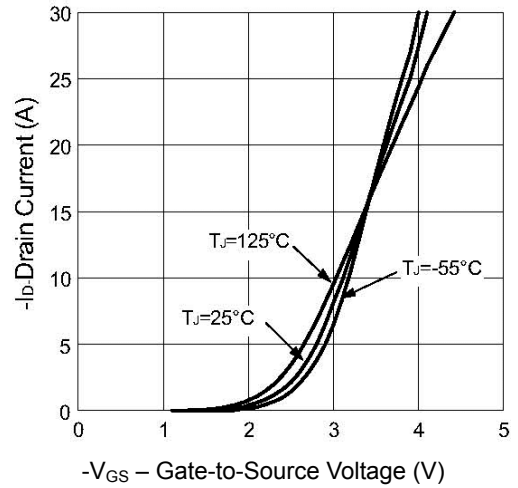
b: Guaranteed by design, not subject to production testing

Typical Characteristics

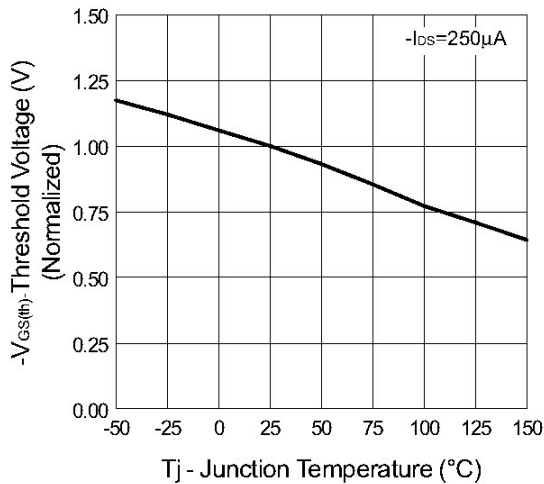
Output Characteristics



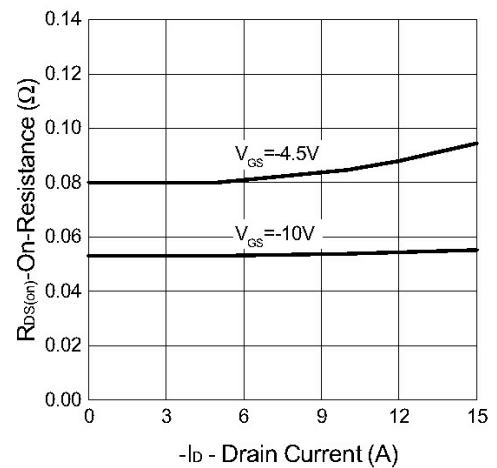
Transfer Characteristics



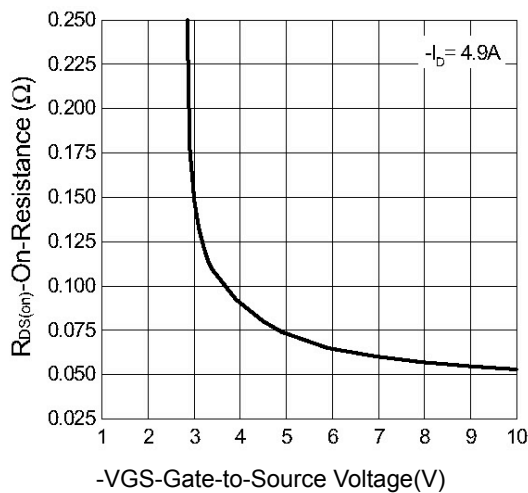
Threshold Voltage vs. Junction Temperature



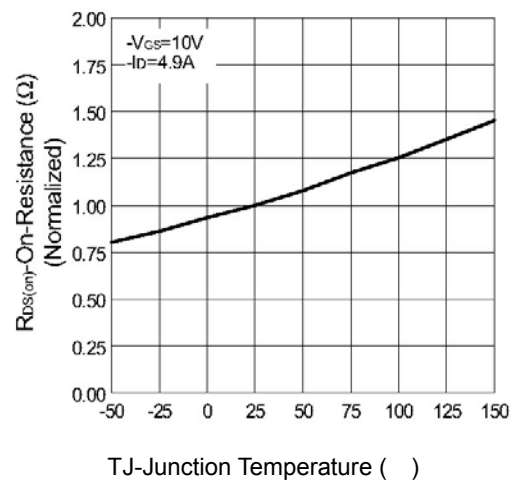
On-Resistance vs. Drain Current



On-Resistance vs. Gate-to-Source Voltage

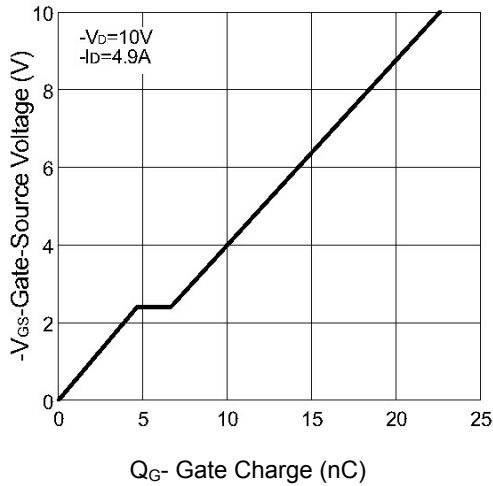


On-Resistance Vs. Junction Temperature

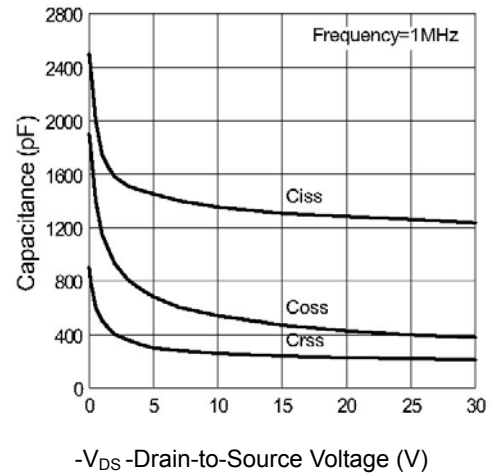


Typical Characteristics (Cont.)

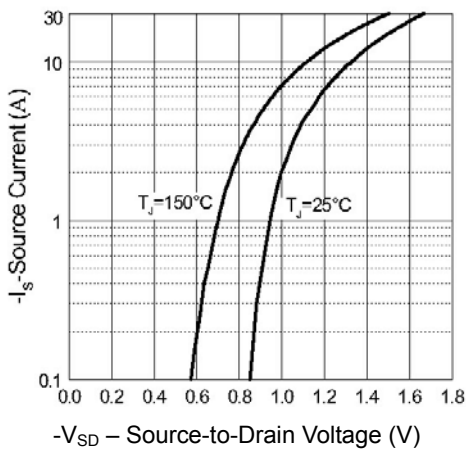
Gate Charge



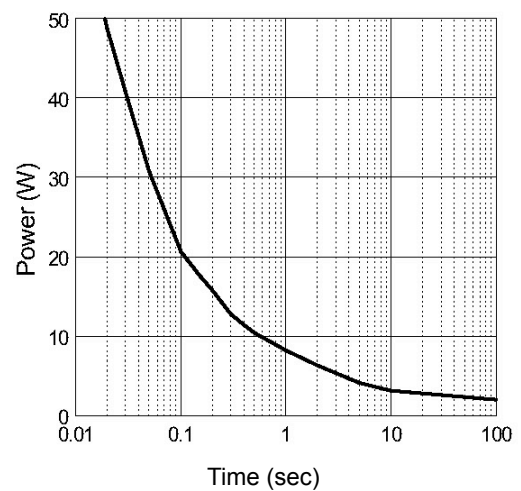
Capacitance



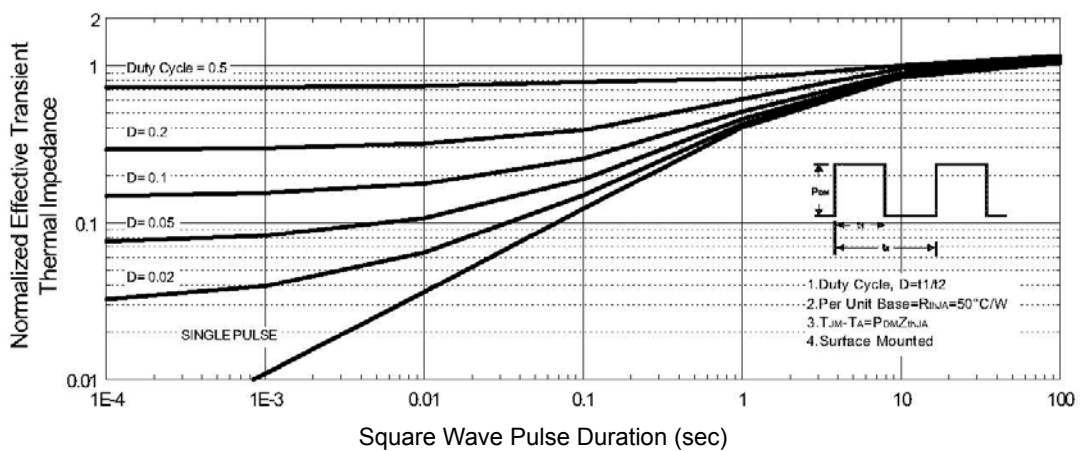
Source-Drain Diode Forward Voltage



Single Pulse Power

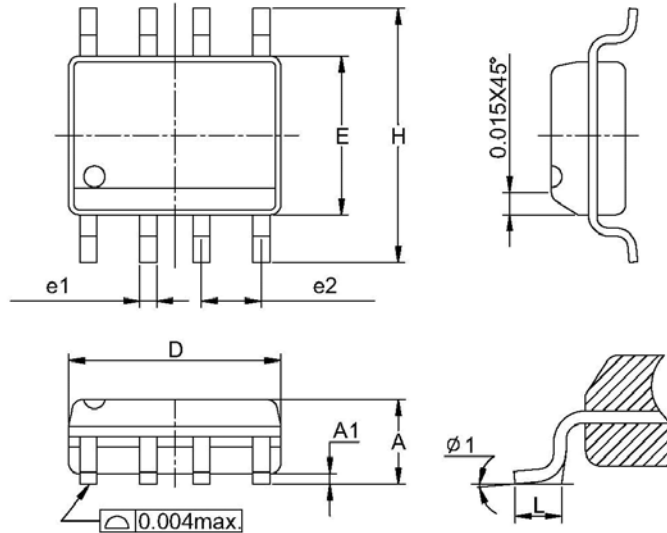


Normalized Thermal Transient Impedance, Junction to Ambient



**Packaging Information**

SOP-8 pin (Reference JEDEC Registration MS-012)

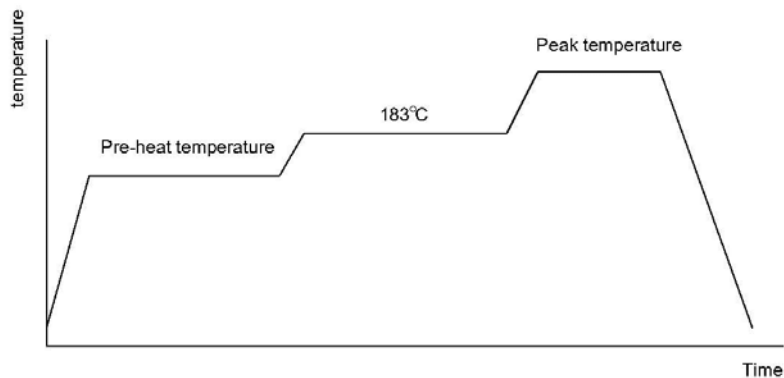


Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	5.00	0.189	0.197
E	3.80	4.00	0.150	0.157
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
e1	0.33	0.51	0.013	0.020
e2	1.27BSC		0.50BSC	
Φ1	8°		8°	

**Physical Specifications**

Terminal Material	Solder-Plated Copper (Solder Material: 90/10 or 63/37 SnPb)
Lead Solderability	Meets EIA Specification RS186-91, ANSI/J-STD-002 Category 3.

Reflow Condition (IR/Convection or VPR Reflow)



**Classification Reflow Profiles**

	Convection or IR/Convection	VPR
Average ramp-up rate (183 to Peak)	3 /second max.	10 /second max.
Preheat temperature 125 ±25	120 seconds max	
Temperature maintained above 183	60-150 seconds	
Time within 5 of actual peak temperature	10-20 seconds	60 seconds
Peak temperature range	220 +5/-0 or 235 +5/-0	215-219 or 235 +5/-0
Ramp-down rate	6 /second max.	10 /second max.
Time 25 to peak temperature	6 minutes max.	

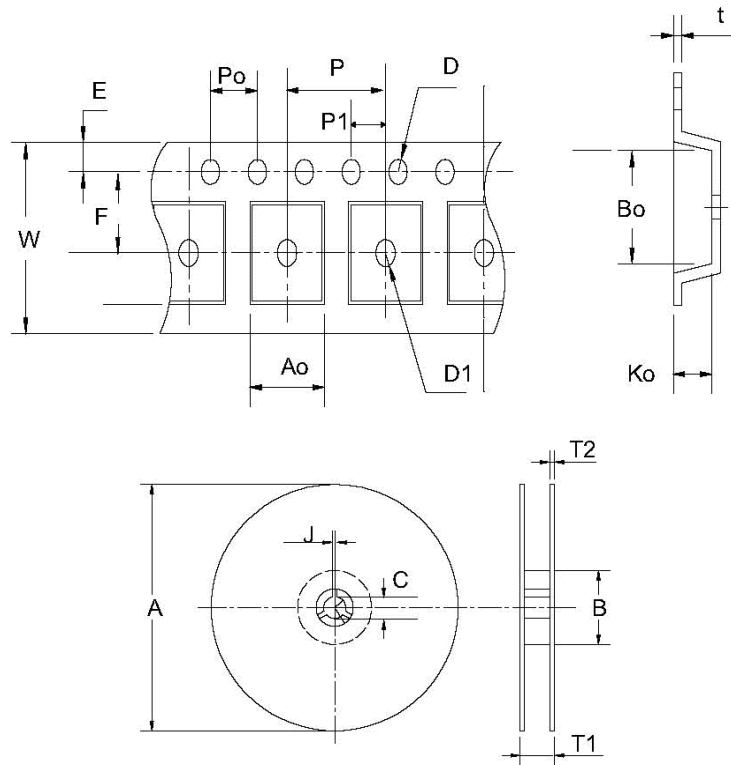
**Package Reflow Conditions**

Pkg. thickness ≥2.5mm And all bgas	Pkg. thickness <2.5mm and pkg. volume ≥350mm <sup>3</sup>	Pkg. thickness < 2.5mm and pkg. Volume <350mm <sup>3</sup>
Convection 220 +5/-0		Convection 235 +5/-0
VPR 215-219		VPR 235 +5/-0
IR/Convection 220 +5/-0		IR/Convection 235 +5/-0

**Reliability test program**

Test item	Method	Description
SOLDERABILITY	MIL-STD-883D-2003	245 , 5 SEC
HOLT	MIL-STD 883D-1005.7	1000 Hrs Bias @ 125
PCT	JESD-22-B, A102	168 Hrs, 100% RH,121
TST	MIL-STD 883D-1011.9	-65 ~ 150 , 200 Cycles

**Carrier Tape & Reel Dimensions**





**APM4953**  
**Dual P-Channel Enhancement Mode Mosfet**

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Application	A	B	C	J	T1	T2	W	P	E
SOP-8	330±1	62+1.5	12.75+0.15	2±0.5	12.4±0.2	2±0.2	12±0.3	8±0.1	1.75±0.1
	F	D	D1	Po	P1	Ao	Bo	Ko	t
	5.5±1	1.55+0.1	1.55+0.25	4.0±0.1	2.0±0.1	6.4±0.1	5.2±0.1	2.1±0.1	0.3±0.013

**Cover Tape Dimensions**

Application	Carrier Width	Cover Tape Width	Devices Per Reel
SOP-8	12	9.3	2500