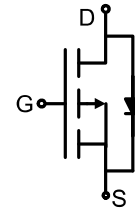


# AP3401D

## P-Channel Enhancement Mosfet

### Feature

- -30V,-4.2A  
 $R_{DS(ON)} < 59m\Omega @ V_{GS} = -10V$  TYP: 50 m $\Omega$   
 $R_{DS(ON)} < 74m\Omega @ V_{GS} = -4.5V$  TYP: 61 m $\Omega$   
 $R_{DS(ON)} < 100m\Omega @ V_{GS} = -4.5V$  TYP: 85 m $\Omega$
- Advanced Trench Technology
- Lead free product is acquired



Schematic diagram

### Application

- Interfacing Switching
- Load Switching
- Power management



SOT-23 top view

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
A19T	AP3401D	Sot-23	7 inch	-	3000

### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current ( $T_a = 25^\circ\text{C}$ )	$I_D$	-4.2	A
Continuous Drain Current ( $T_a = 70^\circ\text{C}$ )	$I_D$	-2.7	A
Pulsed Drain Current	$I_{DM}$	-16	A
Power Dissipation	$P_D$	1.0	W
Thermal Resistance from Junction to Ambient <sup>(4)</sup>	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

# AP3401D

## P-Channel Enhancement Mosfet



### MOSFET ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-30	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage <sup>(3)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-0.6	-0.85	-1.3	V
Drain-source on-resistance <sup>(3)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.2A	-	50	59	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3A	-	61	74	
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -1A	-	85	100	
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1MHz	-	511	-	pF
Output Capacitance	C <sub>oss</sub>		-	55	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	40	-	
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = -15V, I <sub>D</sub> = -1A, V <sub>GS</sub> = -10V, R <sub>G</sub> = 6Ω	-	6.5	-	ns
Turn-on rise time	t <sub>r</sub>		-	3.6	-	
Turn-off delay time	t <sub>d(off)</sub>		-	32	-	
Turn-off fall time	t <sub>f</sub>		-	11	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -15V, I <sub>D</sub> = -4.2A, V <sub>GS</sub> = -4.5V	-	9.2	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	2.1	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	2.9	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	V <sub>DS</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = -4.2A	-	-	-1.2	V
Diode Forward current <sup>(4)</sup>	I <sub>S</sub>		-	-	-4.2	A

#### Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width ≤ 300μs, duty cycle ≤ 2%
3. Surface Mounted on FR4 Board, t ≤ 10 sec

**Test Circuit**

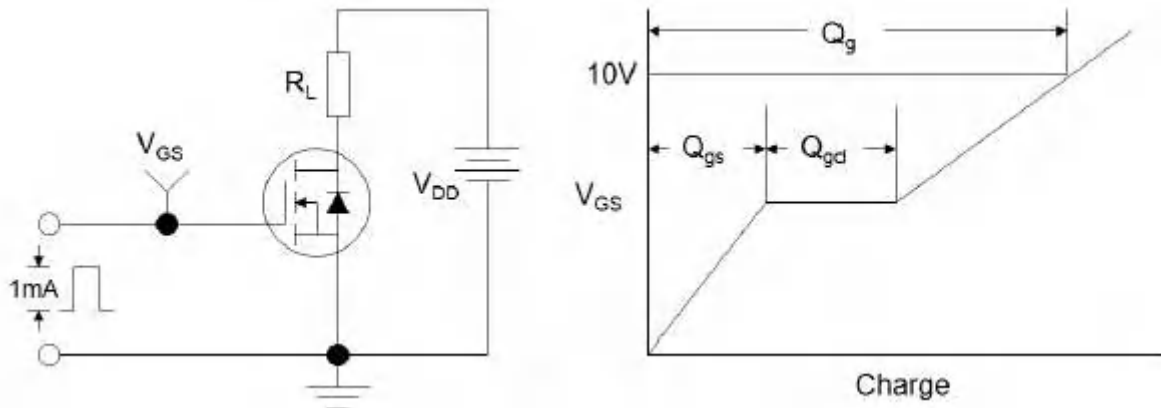


Figure1:Gate Charge Test Circuit & Waveform

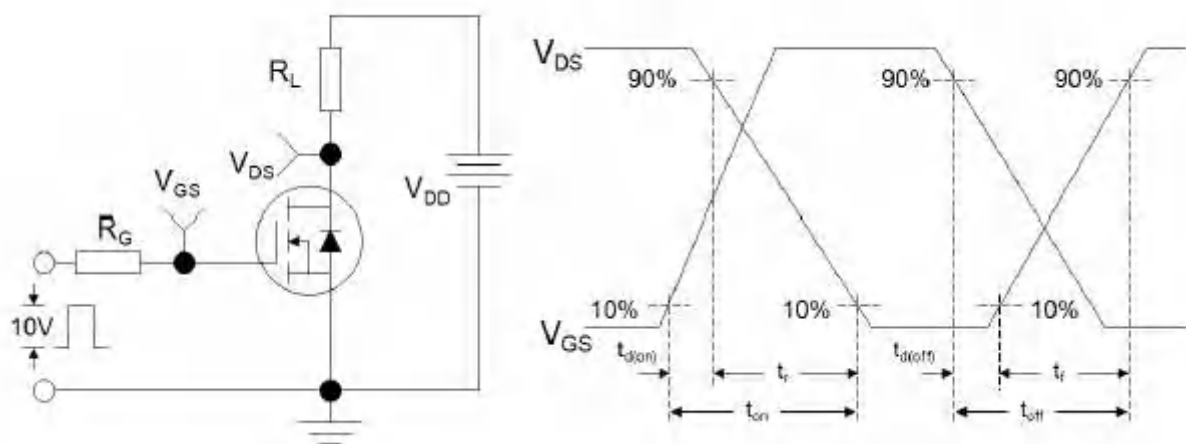


Figure 2: Resistive Switching Test Circuit & Waveforms

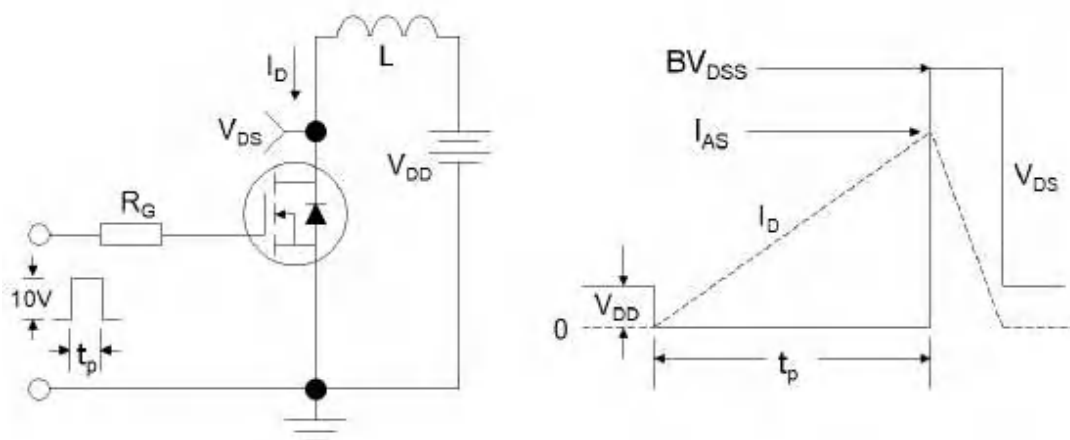


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

### Typical Performance Characteristics

Figure 1. Output Characteristics

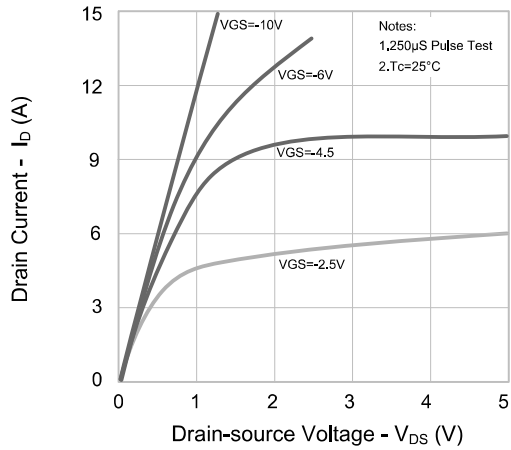


Figure 2. Transfer Characteristics

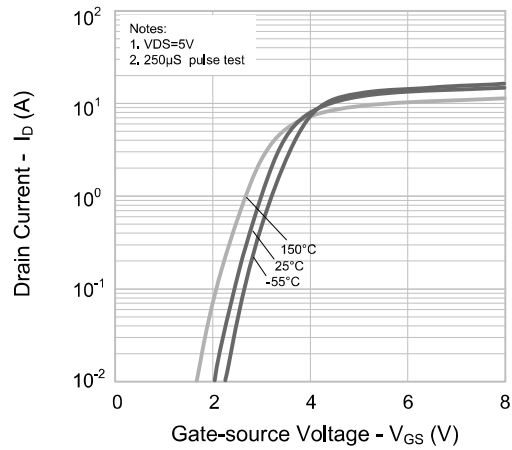


Figure 3. On-resistance vs. Drain Current

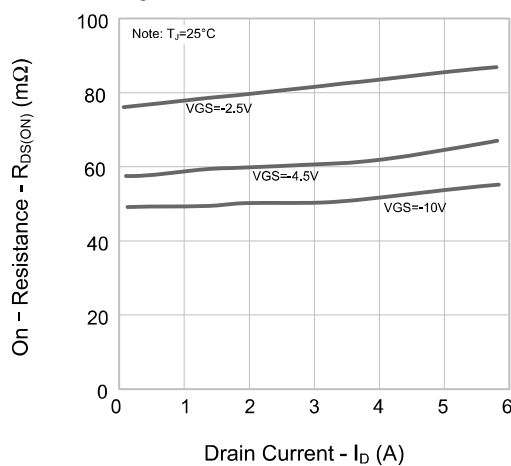


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

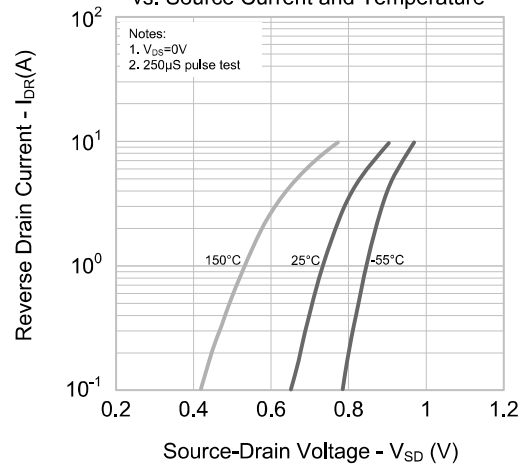


Figure 5. Capacitance Characteristics

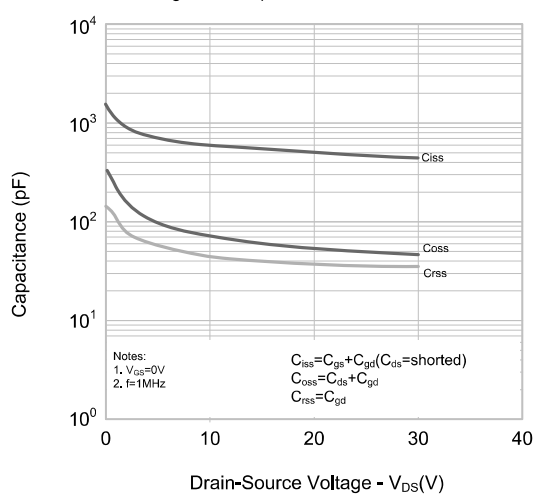
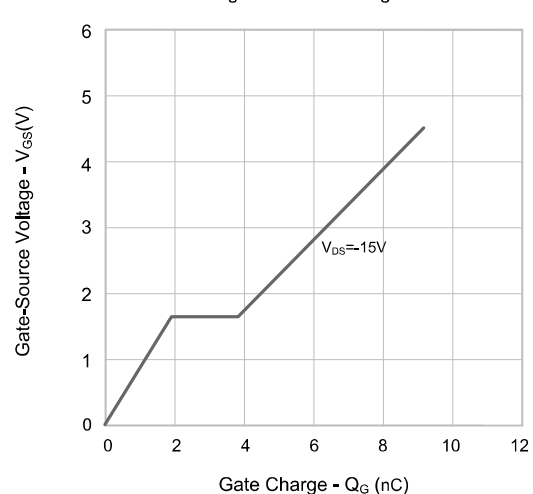
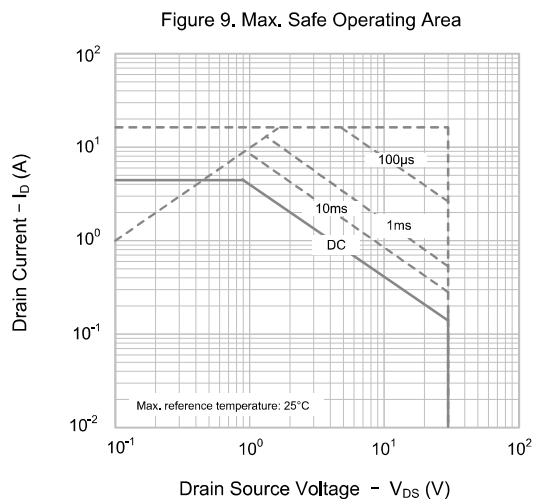
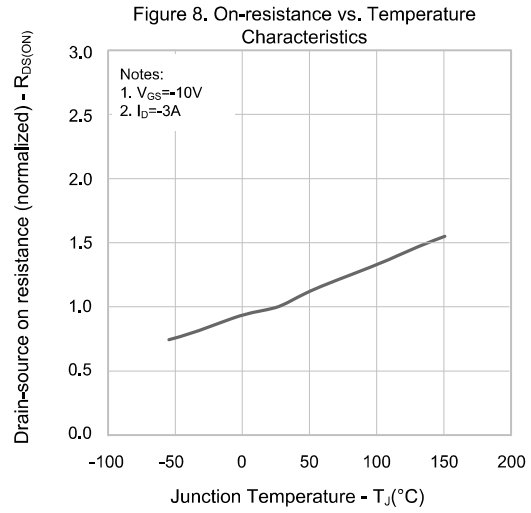
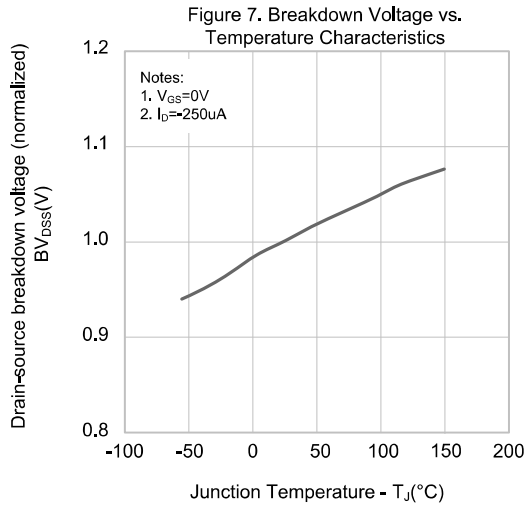


Figure 6. Gate Charge



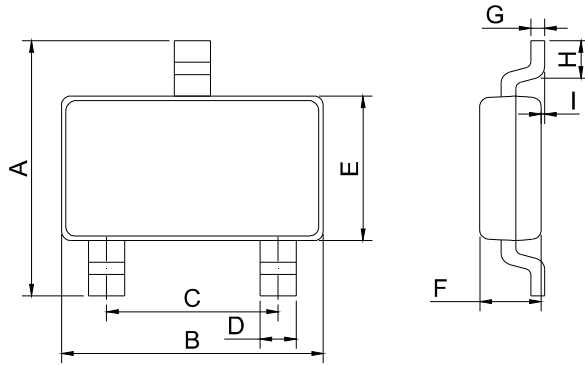
### Typical Performance Characteristics



# AP3401D

P-Channel Enhancement Mosfet

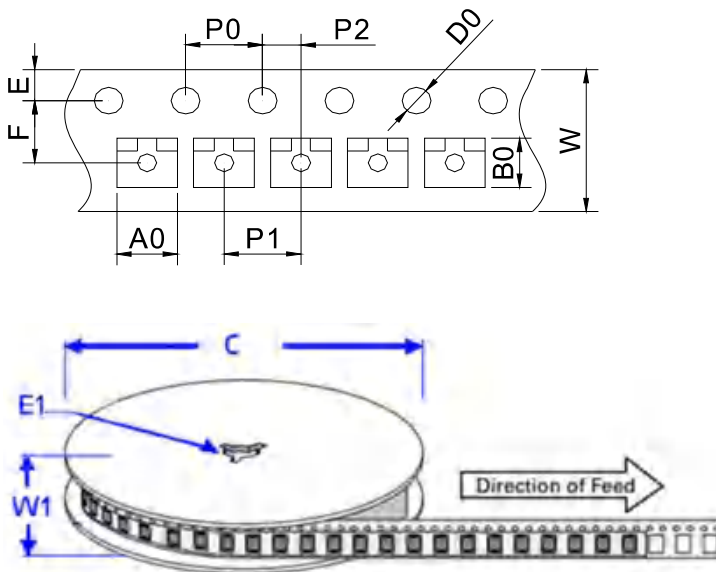
## SOT-23 Package Information



SOT-23

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.30	2.40	2.50	0.091	0.095	0.098
B	2.80	2.90	3.00	0.110	0.114	0.118
C	1.90 REF			0.075 REF		
D	0.35	0.40	0.45	0.014	0.016	0.018
E	1.20	1.30	1.40	0.047	0.051	0.055
F	0.90	1.00	1.10	0.035	0.039	0.043
G		0.10	0.15		0.004	0.006
H	0.20			0.008		
I	0		0.10	0		0.004

## Package Information-SOT-23



Ref.	Dimensions	
	Millimeters	Inches
A0	3.15 ± 0.3	0.124 ± 0.012
B0	2.77 ± 0.3	0.109 ± 0.012
C	178	7.0
D0	1.50±0.1	0.059 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3±0.3	0.524± 0.012
F	3.5 ± 0.2	0.138 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	4.00 ± 0.2	0.157 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	8.00 ± 0.2	0.315 ± 0.008
W1	11.5±1.0	0.453 ± 0.039