

AP70P03K

P-Channel Power MOSFET

● General Description

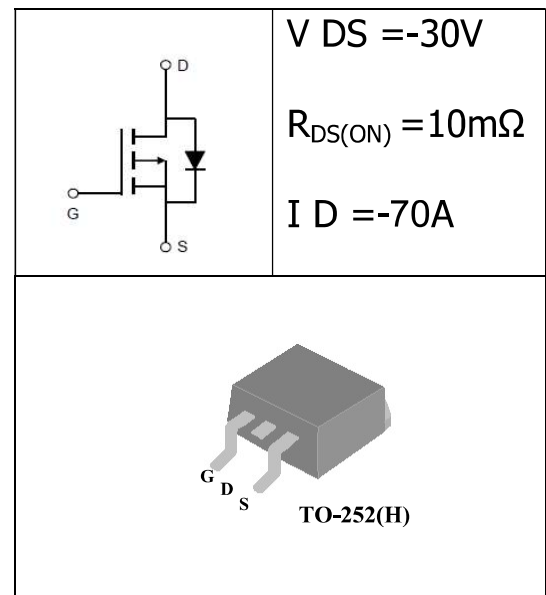
The AP70P03K combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

● Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

● Application

- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver



● Ordering Information:

Marking	70P03
Packing	REEL TAPE
Basic ordering unit (pcs)	2500
Normal Package Material Ordering Code	AP70P03K-TAP
Halogen Free Ordering Code	AP70P03K-TAP-HF

● Absolute Maximum Ratings ($T_c = 25^\circ\text{C}$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_c = 25^\circ\text{C}$)	I_D	-70	A
Pulsed Drain Current ^①	I_{DM}	-120	A
Total Power Dissipation ^②	$P_D @ T_c = 25^\circ\text{C}$	40	W
Total Power Dissipation	$P_D @ T_a = 25^\circ\text{C}$	3.2	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 to 150	$^\circ\text{C}$

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•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case ^②	R _{thJC}	-	-	34	° C/W
Thermal resistance, junction - ambient	R _{thJA}	-	-	180	° C/W
Soldering temperature, wavesoldering for 10s	T _{sold}	-	-	265	° C

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = -250uA	-30			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = -250uA	-0.8		-2.0	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = -30V, V _{GS} = 0V			-1.0	uA
Gate- Source Leakage Current	I _{GSS}	V _{GS} = ±12V, V _{DS} = 0V			±100	nA
Static Drain-source On Resistance	R _{DS(ON)}	V _{GS} = -10V, I _D = -30A		7	10	mΩ
		V _{GS} = -4.5V, I _D = -20A		10	13	mΩ
Forward Transconductance	g _{FS}	V _{DS} = -10V, I _D = -5A		9		s

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C _{iss}	f = 1MHz	-	2150	-	pF
Output capacitance	C _{oss}		-	430	-	
Reverse transfer capacitance	C _{rss}		-	320	-	

•Gate Charge characteristics(T_a = 25°C)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q _g	V _{DD} = 15V	-	35	-	nC
Gate - Source charge	Q _{gs}	I _D = 15A	-	5	-	
Gate - Drain charge	Q _{gd}	V _{GS} = 10V	-	10	-	

Note: ① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;

② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;

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Typical Electrical and Thermal Characteristics

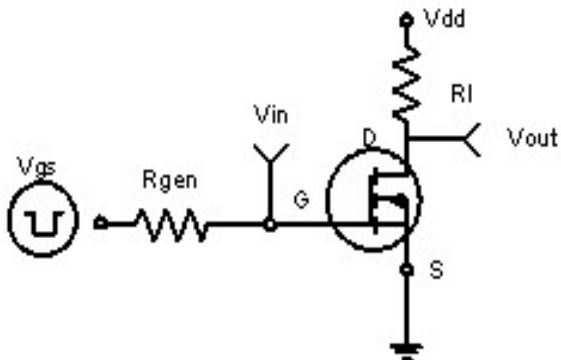


Figure 1 Switching Test Circuit

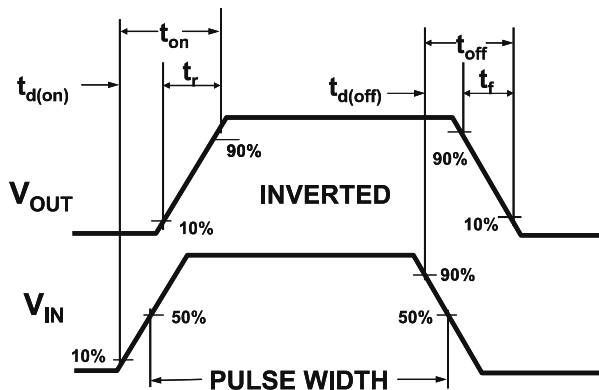


Figure 2 Switching Waveforms



Figure 3 Power Dissipation

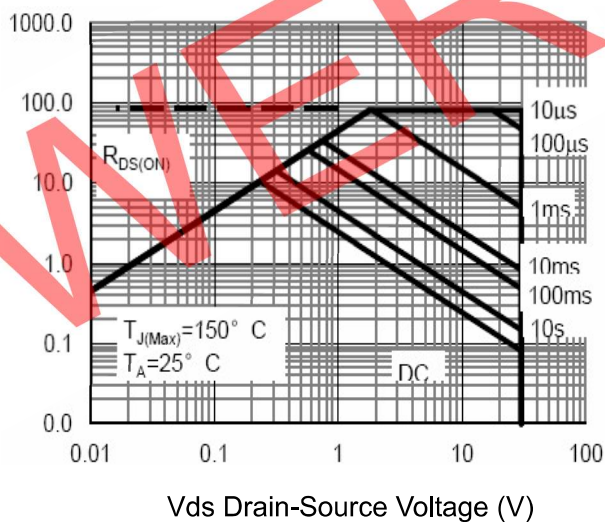


Figure 4 Safe Operation Area

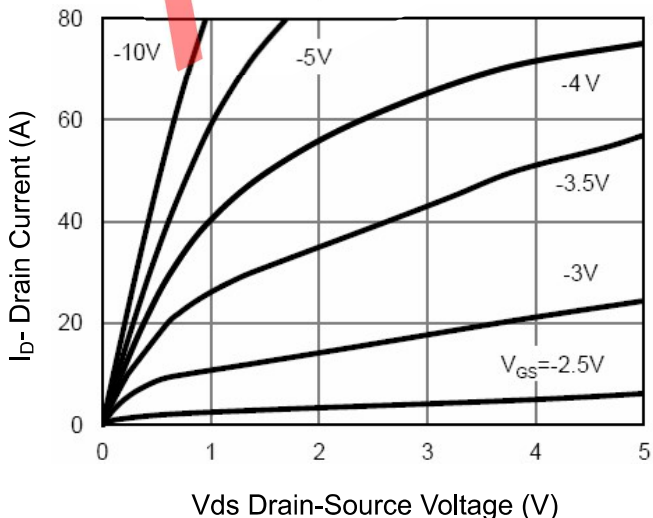


Figure 5 Output Characteristics

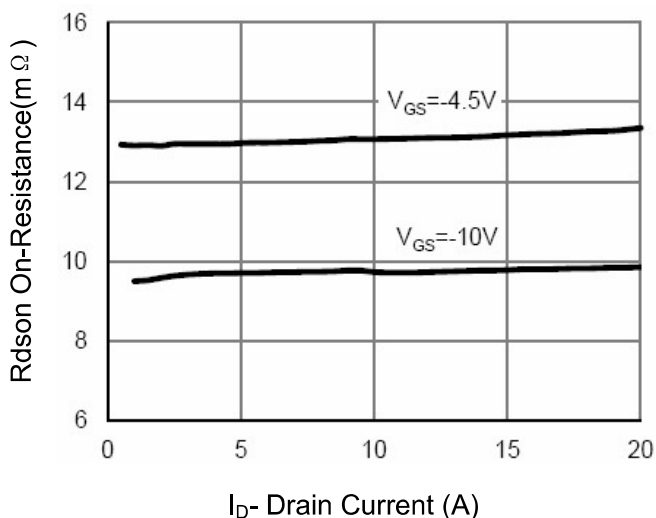


Figure 6 Drain-Source On-Resistance

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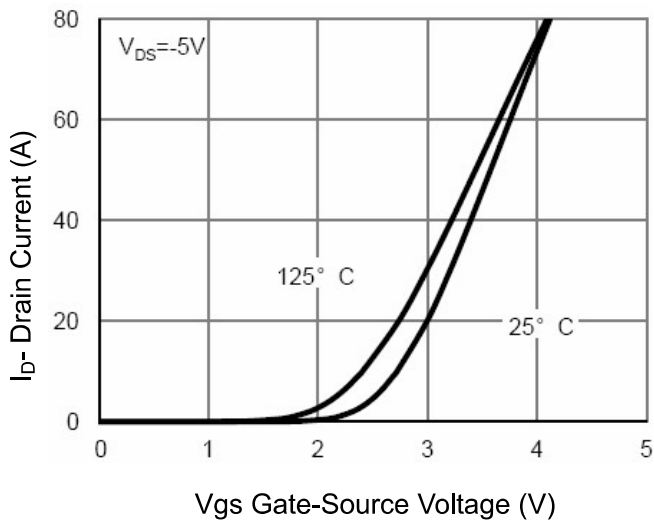


Figure 7 Transfer Characteristics

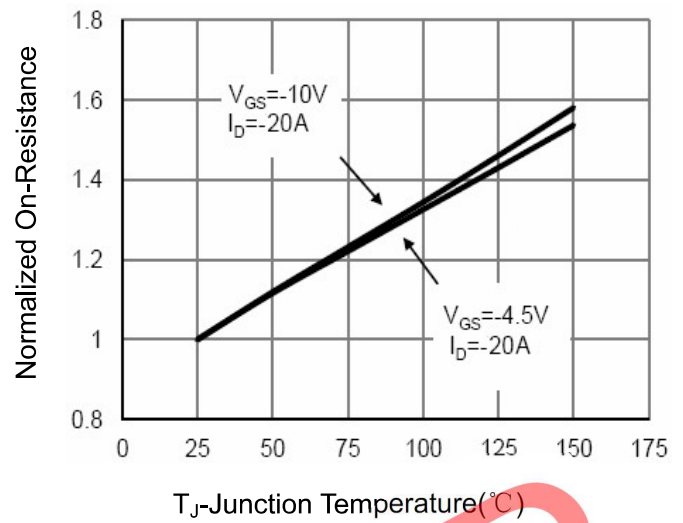


Figure 8 Drain-Source On-Resistance

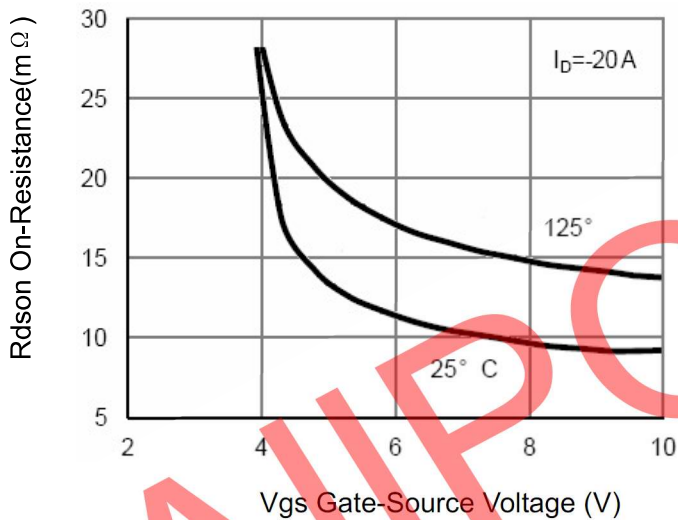


Figure 9 Rdson vs Vgs

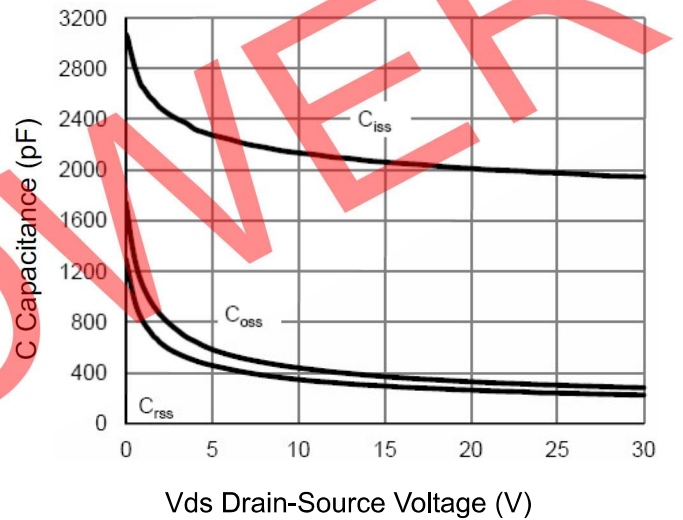


Figure 10 Capacitance vs Vds

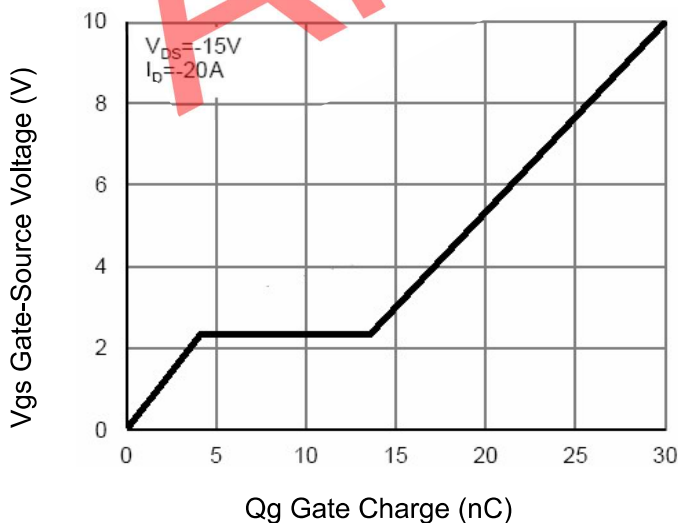


Figure 11 Gate Charge

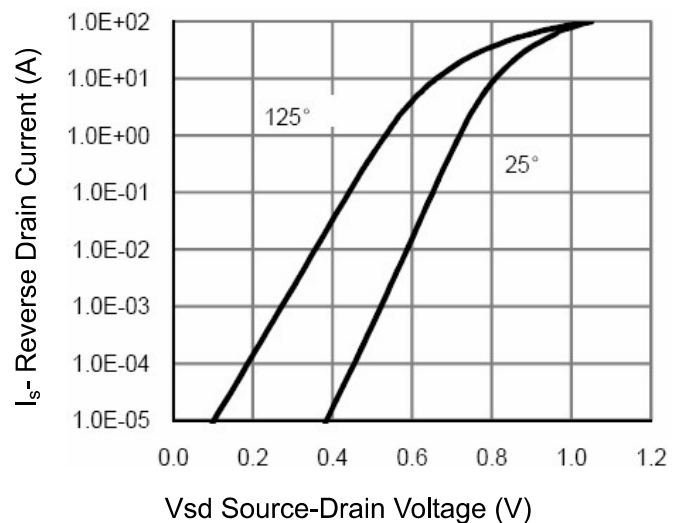
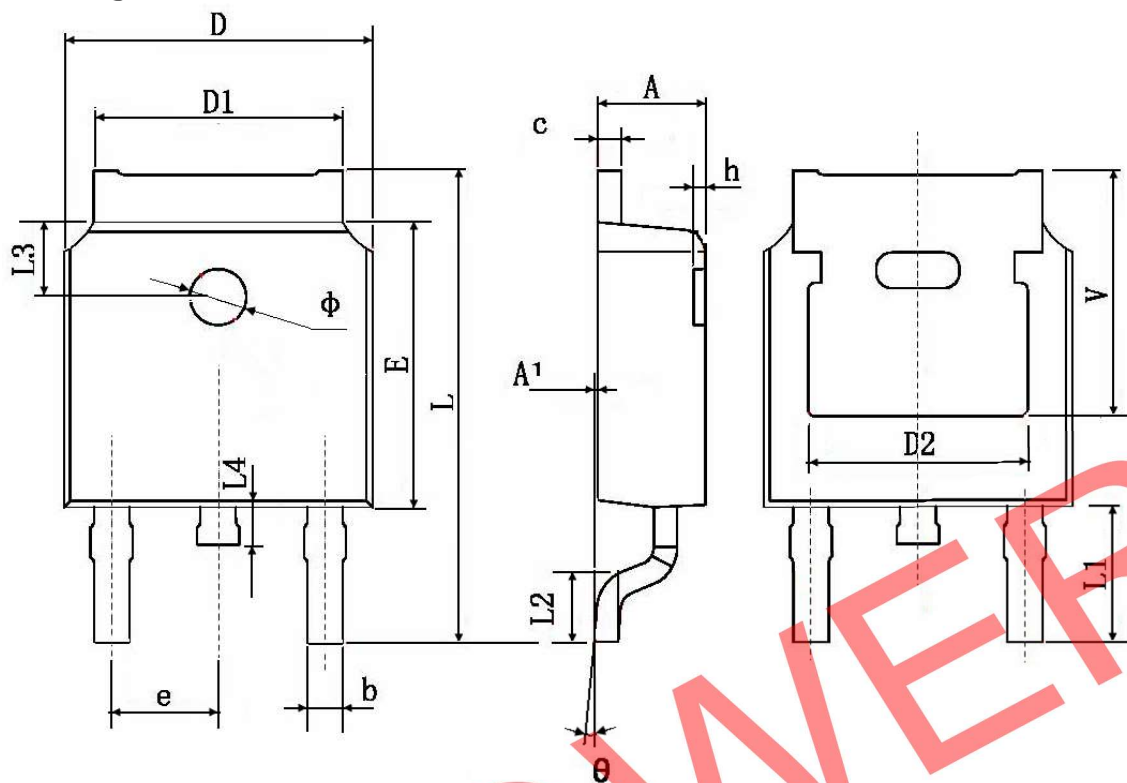


Figure 12 Source- Drain Diode Forward

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TO-252 Package Information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
phi	1.100	1.300	0.043	0.051
theta	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
v	5.350 TYP.		0.211 TYP.	