

## -30V P-Channel Enhancement Mode MOSFET

### Description

The AP30P03S 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.

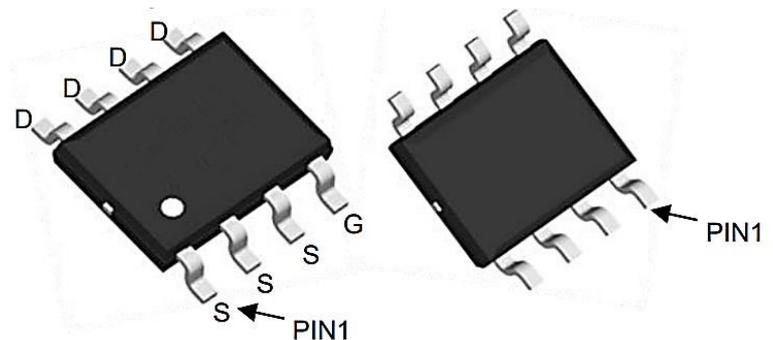
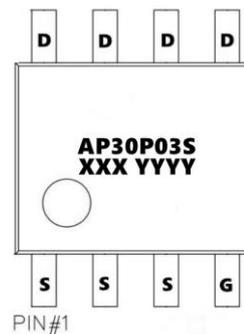
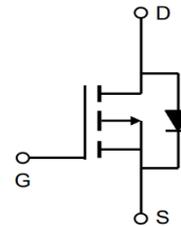
### General Features

$V_{DS} = -30V$   $I_D = -30A$

$R_{DS(ON)} < 6.5m\Omega$  @  $V_{GS} = -10V$  (Type: 4.9m $\Omega$ )

### Application

- Lithium battery protection
- Wireless impact
- Mobile phone fast charging



### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP30P03S	SOP-8L	AP30P03S XXX YYYY	3000

### Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	-30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D@TC=25°C</sub>	Continuous Drain Current, V <sub>GS</sub> @ -10V <sub>1</sub>	-30	A
I <sub>D@TC=100°C</sub>	Continuous Drain Current, V <sub>GS</sub> @ -10V <sub>1</sub>	-26.8	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	-80	A
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>3</sup>	250	mJ
P <sub>D@TC=25°C</sub>	Total Power Dissipation <sup>4</sup>	69	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C
R $\theta$ JA	Thermal Resistance Junction-Ambient <sup>1</sup>	85	°C/W
R $\theta$ JC	Thermal Resistance Junction-Case <sup>1</sup>	1.6	°C/W

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### Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)

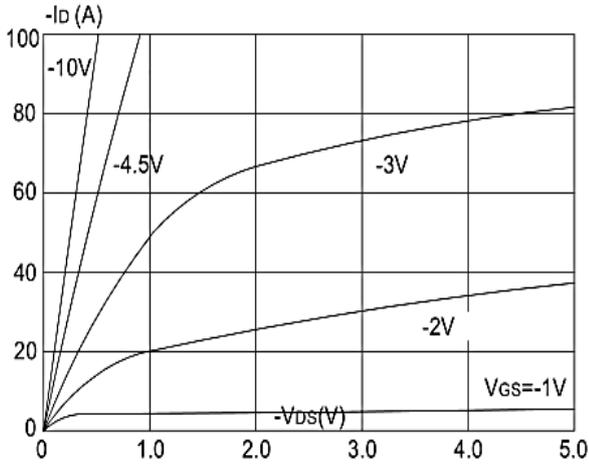
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	VGS=0V, ID= -250μA	-30	-33	-	V
IDSS	Zero Gate Voltage Drain Current	VDS= -30V, VGS=0V,	-	-	-1	μA
IGSS	Gate to Body Leakage Current	VDS=0V, VGS= ±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID= -250μA	-1.0	-1.6	-2.5	V
RDS(on)	Static Drain-Source on-Resistance	VGS= -10V, ID= -30A	-	4.9	6.4	mΩ
		VGS= -4.5V, ID= -20A	-	7.5	10.5	
Ciss	Input Capacitance	VDS= -15V, VGS=0V, f=1.0MHz	-	6800	-	pF
Coss	Output Capacitance		-	769	-	pF
Crss	Reverse Transfer Capacitance		-	726	-	pF
Qg	Total Gate Charge	VDS= -15V, ID= -30A, VGS= -10V	-	30	-	nC
Qgs	Gate-Source Charge		-	6	-	nC
Qgd	Gate-Drain("Miller") Charge		-	8	-	nC
td(on)	Turn-on Delay Time	VDD= -15V, ID= -30A, VGS= -10V, RGEN=2.5Ω	-	11	-	ns
tr	Turn-on Rise Time		-	13	-	ns
td(off)	Turn-off Delay Time		-	52	-	ns
tf	Turn-off Fall Time		-	21	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	-90	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-360	A
VSD	Drain to Source Diode Forward Voltage	VGS=0V, IS= -30 A		-0.8	-1.2	V

#### Note :

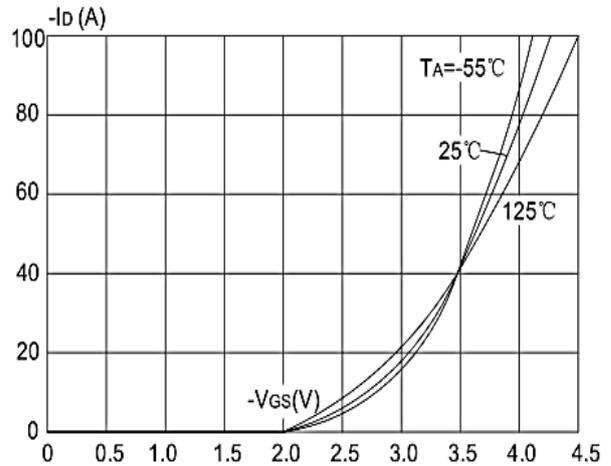
- 1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width .The EAS data shows Max. rating .
- 3、The power dissipation is limited by 175°C junction temperature
- 4、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

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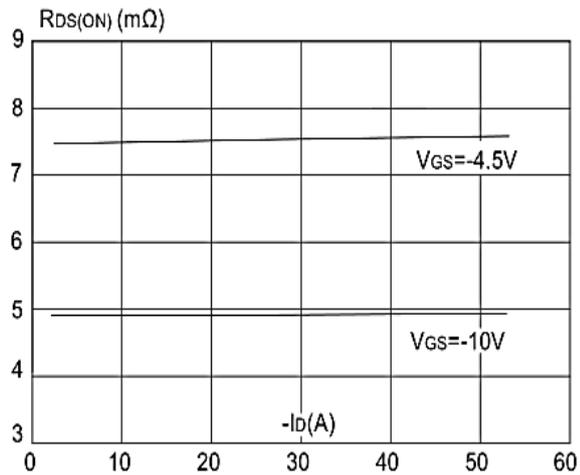
**Typical Characteristics**



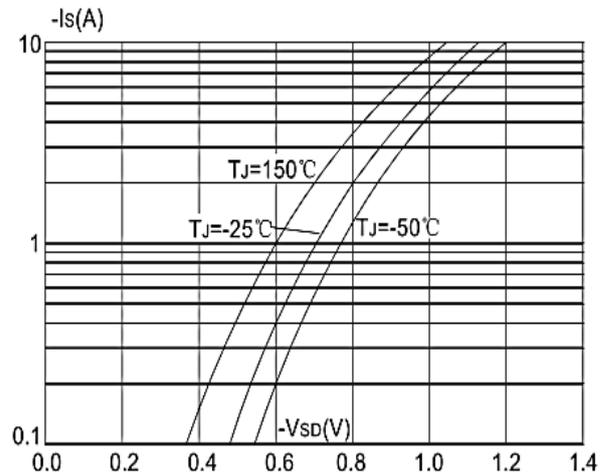
**Figure1: Output Characteristics**



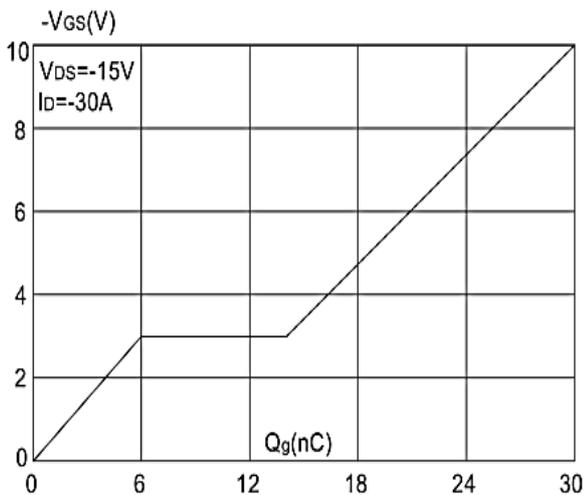
**Figure 2: Typical Transfer Characteristics**



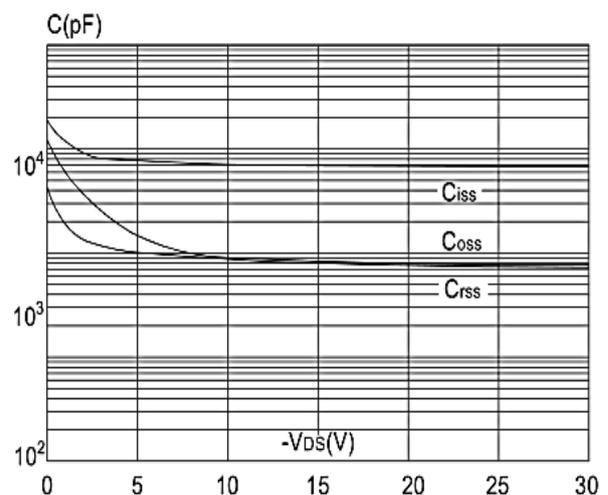
**Figure 3: On-resistance vs. Drain Current**



**Figure 4: Body Diode Characteristics**

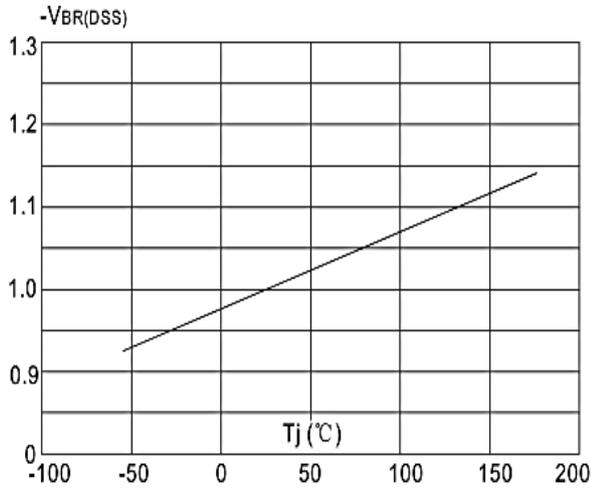


**Figure 5: Gate Charge Characteristics**

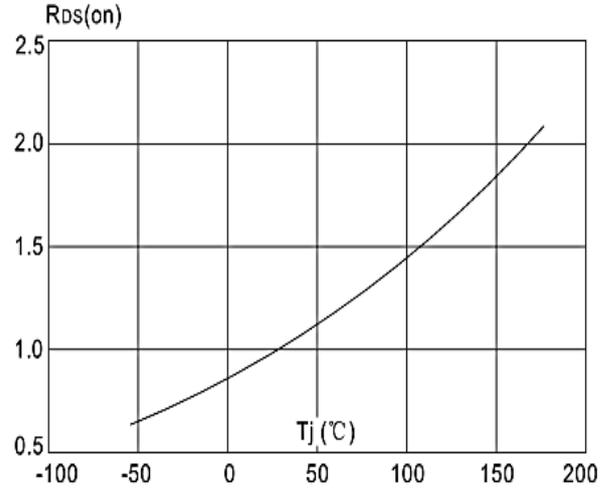


**Figure 6: Capacitance Characteristics**

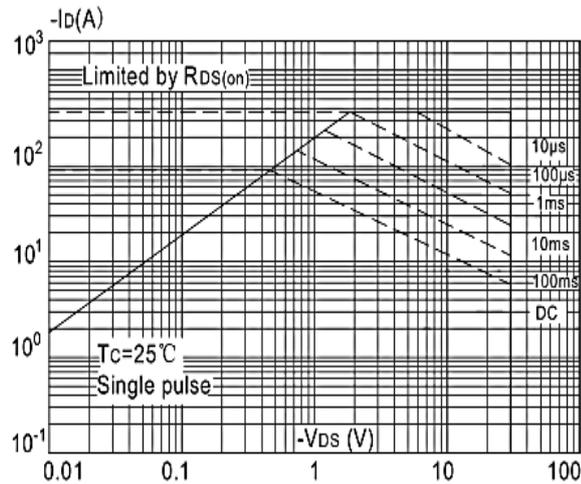
**-30V P-Channel Enhancement Mode MOSFET**



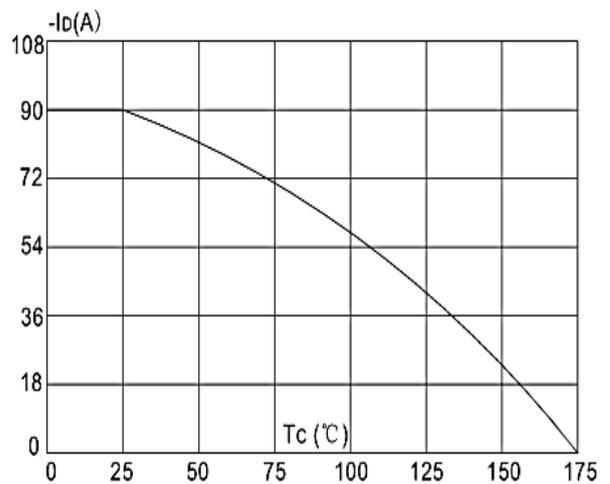
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



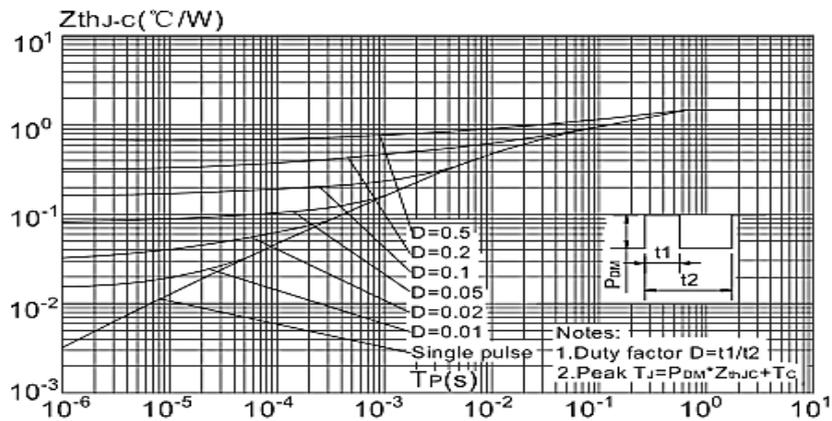
**Figure 8: Normalized on Resistance vs. Junction Temperature**



**Figure 9: Maximum Safe Operating Area**



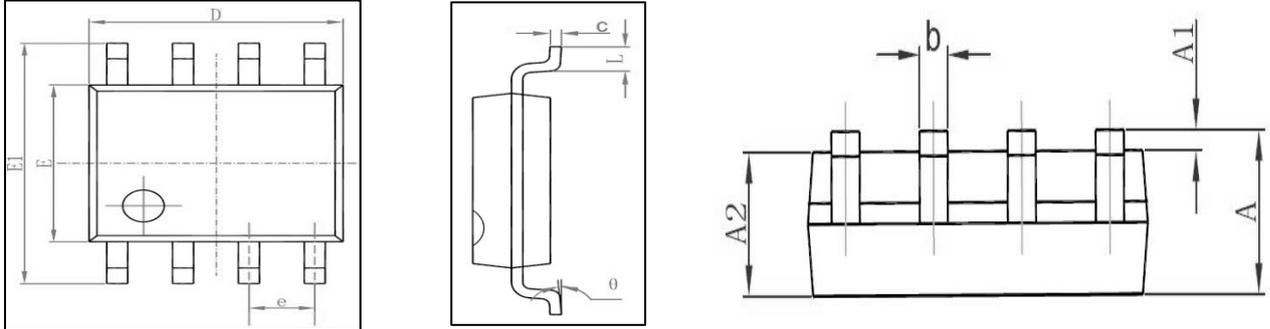
**Figure 10: Maximum Continuous Drain Current vs. Case Temperature**



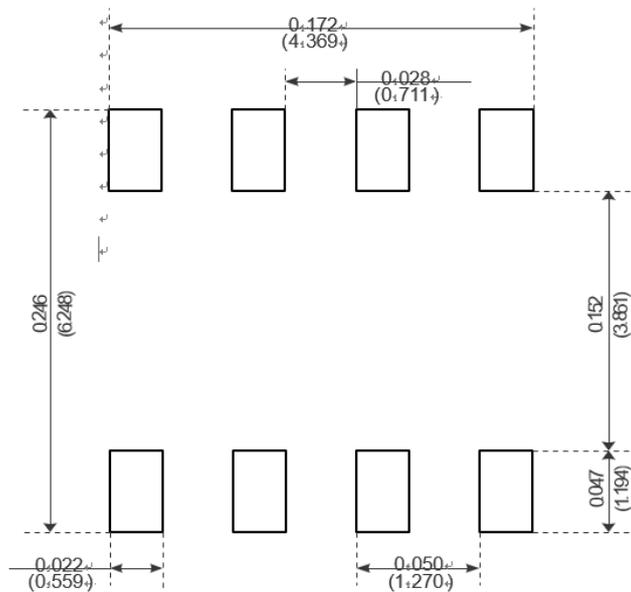
**Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case**

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### Package Mechanical Data-SOP-8L



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