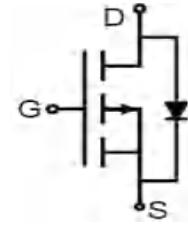


# AP85P04G

P-Channel Enhancement Mosfet

## Features

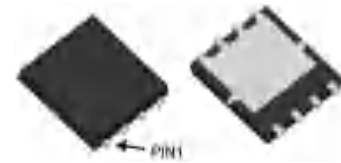
- -40V, -85A  
 $R_{DS(ON)} < 5.3m\Omega @ V_{GS} = -10V$  TYP:4.3m $\Omega$   
 $R_{DS(ON)} < 7.6m\Omega @ V_{GS} = -4.5V$  TYP:5.9m $\Omega$
- Advanced Trench Technology
- High Power and current handing capability
- Lead free product is acquired



Schematic Diagram

## Applications

- Load Switch
- PWM Application
- Power management



PDFN5X6

## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
85P04G	AP85P04G	PDFN5X6	13inch	-	5000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_c = 25^\circ\text{C}$ )	$I_D$	-85	A
Continuous Drain Current ( $T_c = 100^\circ\text{C}$ )	$I_D$	-60	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	-340	A
Single Pulsed Avalanche Energy <sup>(2)</sup>	$E_{AS}$	576	mJ
Drain Power Dissipation	$P_D$	70	W
Thermal Resistance from Junction to Case <sup>(2)</sup>	$R_{\theta JC}$	2.15	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	60	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

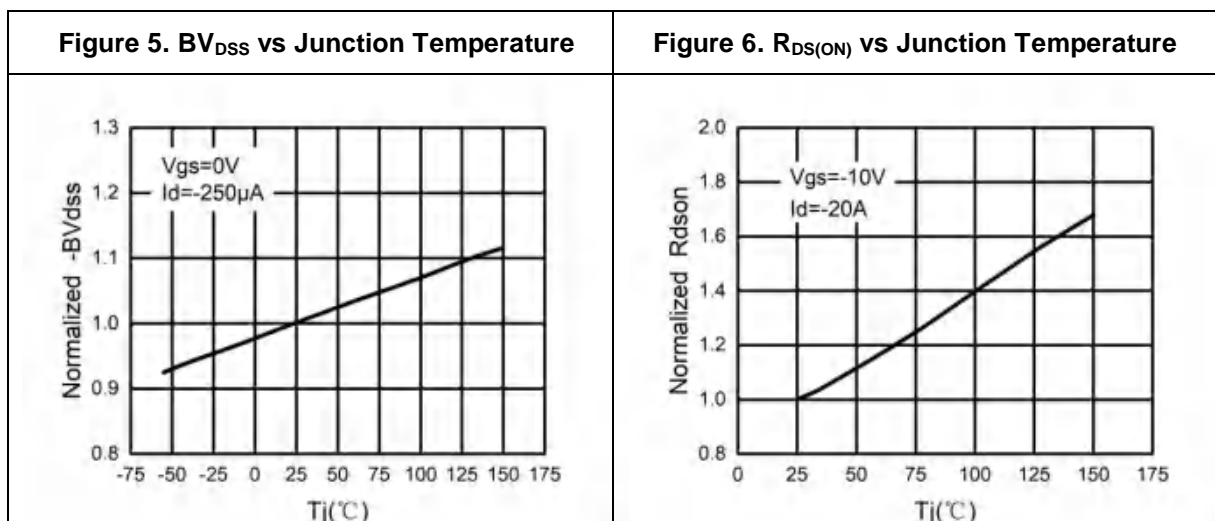
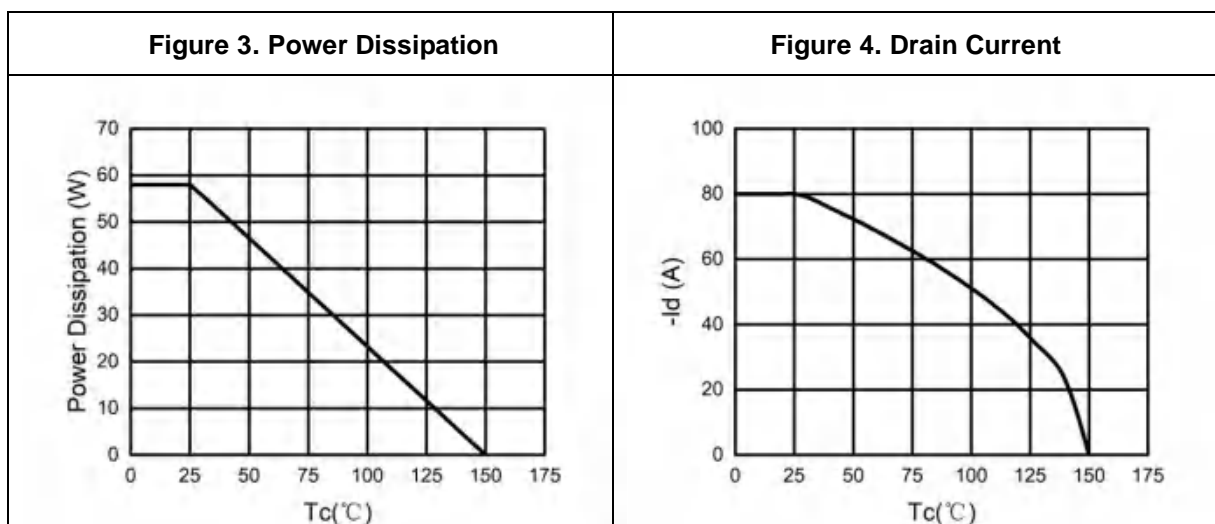
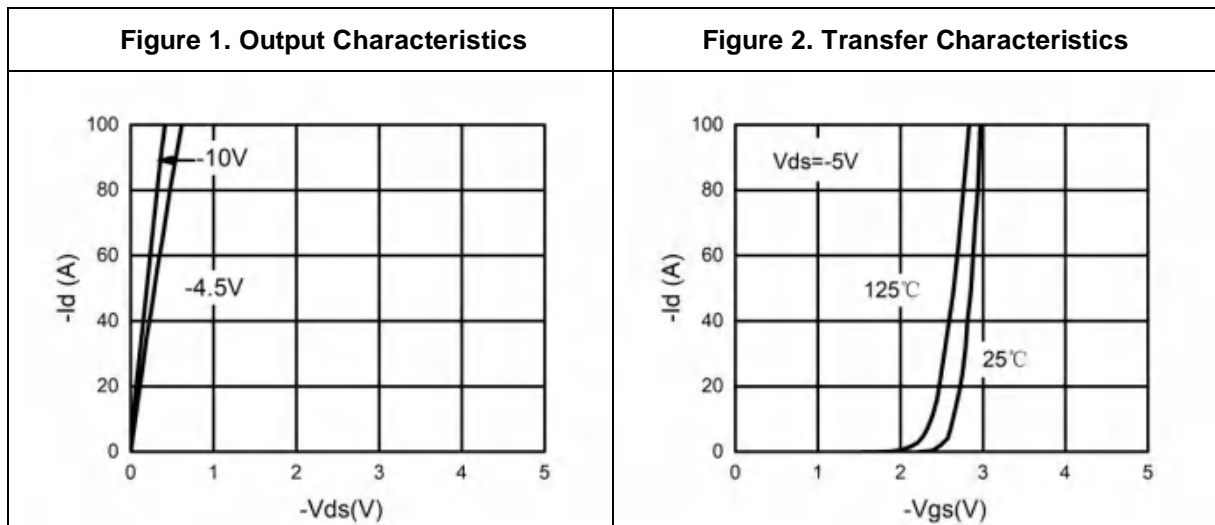
**MOSFET ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise noted)**

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	-40	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V	-	-	-1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1.0	-1.7	-2.5	V
Drain-source on-resistance <sup>(3)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -20A	-	4.3	5.3	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -20A		5.9	7.6	mΩ
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iSS</sub>	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V, f = 1.0MHz	-	6638	-	pF
Output Capacitance	C <sub>oss</sub>		-	545	-	
Reverse Transfer Capacitance	C <sub>rSS</sub>		-	345	-	
Gate resistance	R <sub>g</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz		2.2		Ω
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DS</sub> = -20V, I <sub>D</sub> = -20A, R <sub>G</sub> = 3Ω, V <sub>G</sub> = -10V	-	16	-	ns
Turn-on rise time	t <sub>r</sub>		-	17	-	
Turn-off delay time	t <sub>d(off)</sub>		-	68	-	
Turn-off fall time	t <sub>f</sub>		-	31	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = -20V, I <sub>D</sub> = -20A, V <sub>GS</sub> = -10V	-	118	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	13	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	22	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(a)</sup>	V <sub>SD</sub>	T <sub>J</sub> = 25°C, V <sub>GS</sub> = 0V, I <sub>S</sub> = -20A	-	-	-1.2	V
Diode Forward current	I <sub>S</sub>	T <sub>C</sub> = 25°C	-	-	-85	A
Body Diode Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = -20A, di/dt = 100A/us		24		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = -20A, di/dt = 100A/us		140		nc

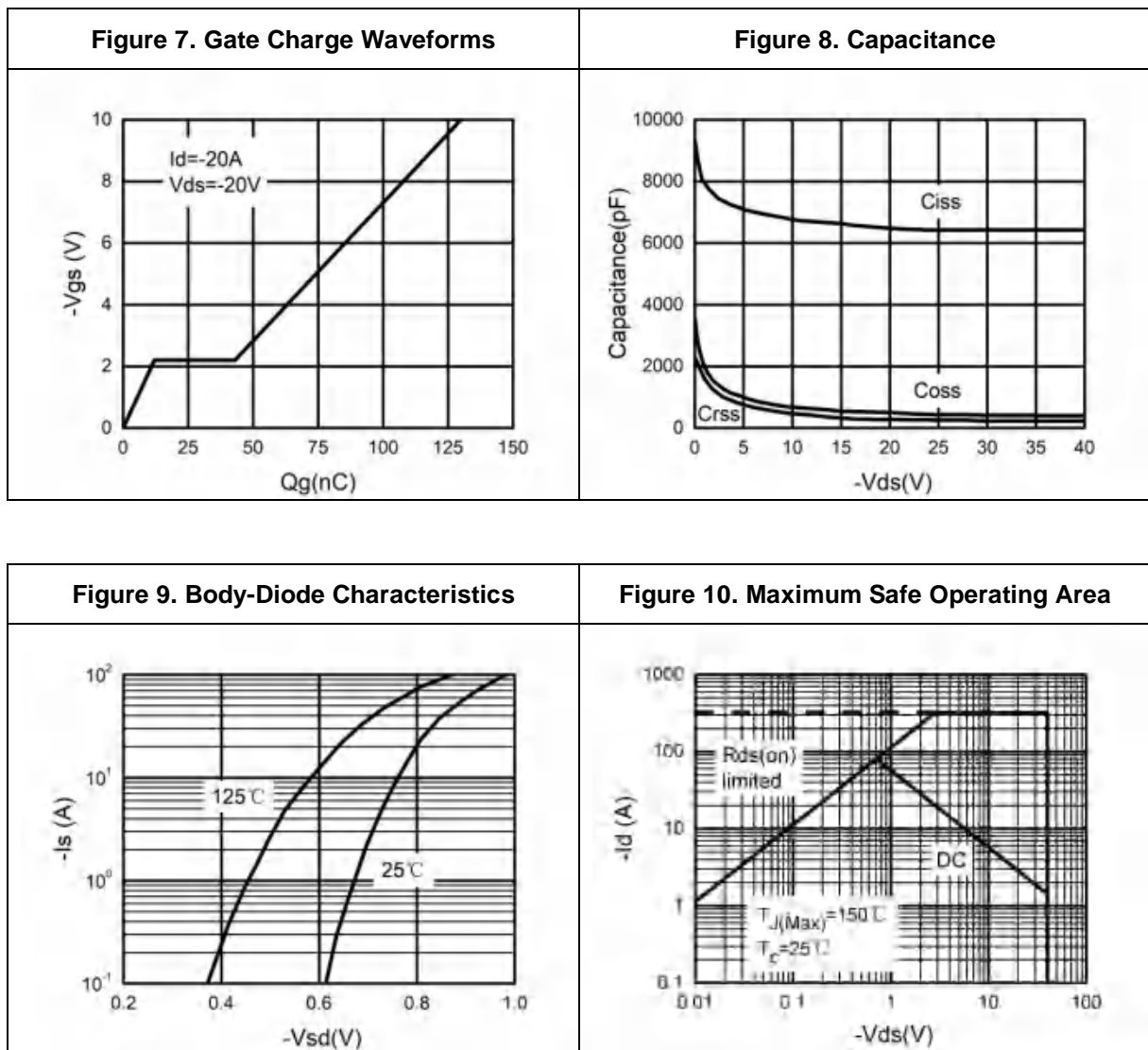
**Notes:**

- Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
- EAS condition: T<sub>J</sub> = 25°C, V<sub>DD</sub> = -15V, V<sub>G</sub> = -10V, R<sub>G</sub> = 25Ω, L = 0.5mH
- Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%

**Typical Electrical And Thermal Characteristics (Curves)**

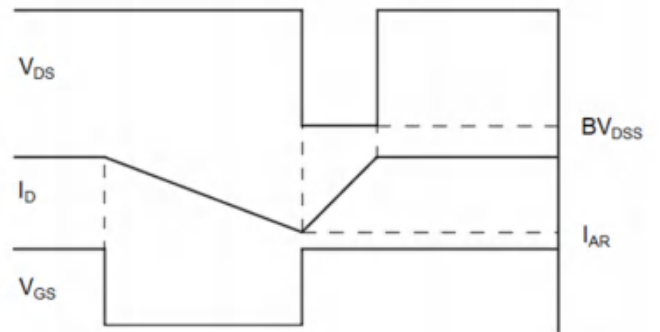
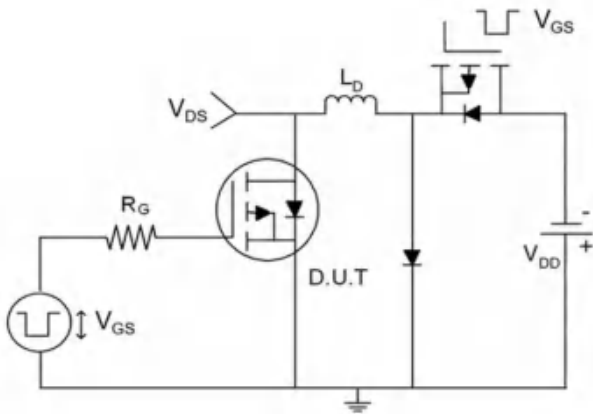


**Typical Electrical And Thermal Characteristics (Curves)**

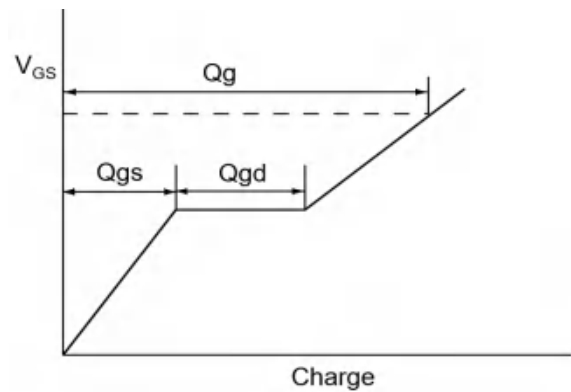
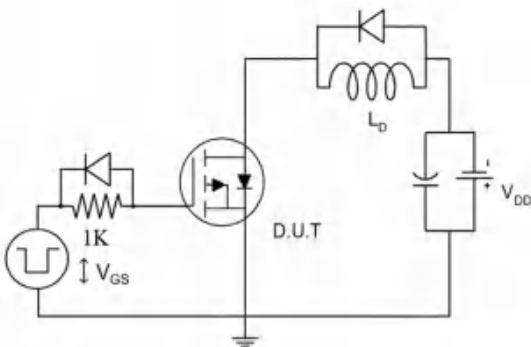


**Test Circuit**

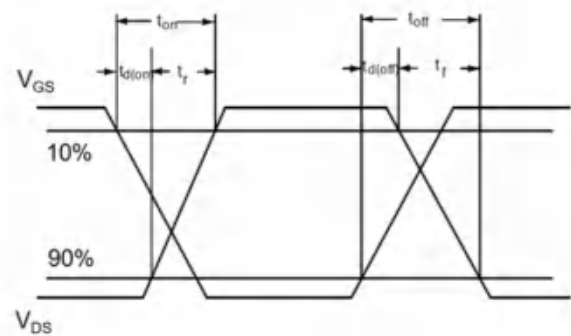
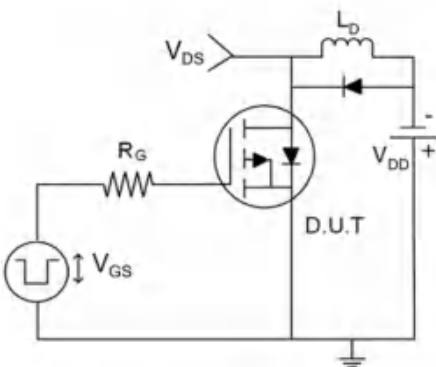
**1)  $E_{AS}$  Test Circuits**



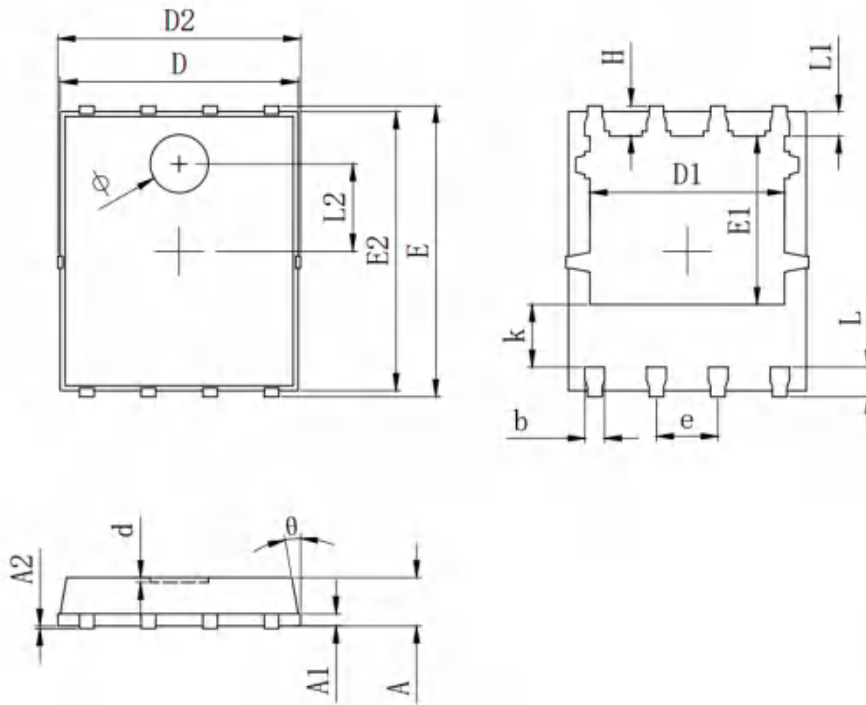
**2) Gate Charge Test Circuit**



**3) Switch Time Test Circuit**



**PDFN5X6 Package Information**



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.900	1.000	1.100
A1	0.254 REF.		
A2	0°0.05		
D	4.824	4.900	4.976
D1	3.910	4.010	4.110
D2	4.924	5.000	5.076
E	5.924	6.000	6.076
E1	3.375	3.475	3.575
E2	5.674	5.750	5.826
b	0.350	0.400	0.450
e	1.270 TYP.		
L	0.534	0.610	0.686
L1	0.424	0.500	0.576
L2	1.800 REF.		
k	1.190	1.290	1.390
H	0.549	0.625	0.701
$\theta$	8°	10°	12°
$\phi$	1.100	1.200	1.300
d			0.100