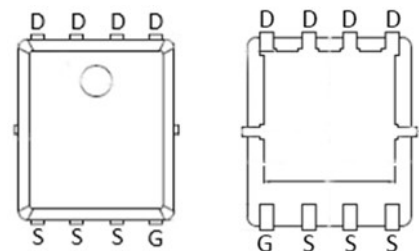
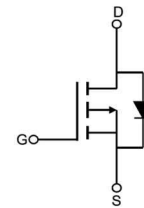


Feature

- -40V,-40A
 $R_{DS(on)} < 13m\Omega @ V_{GS} = -10V$ TYP:10 mΩ
 $R_{DS(on)} < 22m\Omega @ V_{GS} = -4.5V$ TYP:15 mΩ
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(on)}$ and Low Gate Charge
- $T_{jmax} = 175^{\circ}C$
- AEC-Q101 qualified

Application

- PWM applications
- Load Switch
- Power management



PDFN5X6

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
40P04G-AU	AP40P04G-AU	PDFN5X6	13 inch	-	5000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_c = 25^{\circ}C$)	I_D	-40	A
Continuous Drain Current ($T_c = 100^{\circ}C$)	I_D	-26	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	-160	A
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	144	mJ
Power Dissipation	P_D	41.6	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	3.6	$^{\circ}C/W$
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	60	$^{\circ}C/W$
Junction Temperature	T_J	175	$^{\circ}C$
Storage Temperature	T_{STG}	-55~ +175	$^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS(T_J=25°C unless otherwise noted)

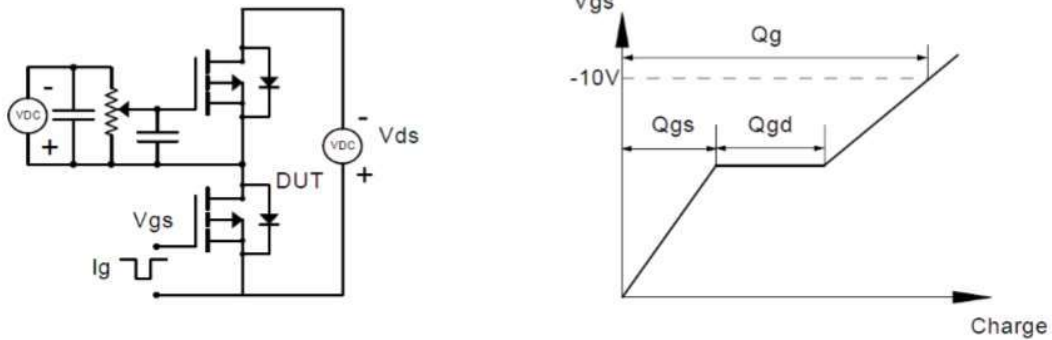
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-40	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -40V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage ⁽³⁾	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1	-1.6	-2.5	V
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} = -10V, I _D = -20A	-	10	13	mΩ
		V _{GS} = -4.5V, I _D = -10A	-	15	22	
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} = -20V, V _{GS} = 0V, f = 1MHz	-	2700	-	pF
Output Capacitance	C _{oss}		-	350	-	
Reverse Transfer Capacitance	C _{rss}		-	265	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} = -20V, I _D = -20A, R _L = 1Ω V _{GS} = -10V, R _G = 3Ω	-	10	-	ns
Turn-on rise time	t _r		-	21	-	
Turn-off delay time	t _{d(off)}		-	53	-	
Turn-off fall time	t _f		-	29	-	
Total Gate Charge	Q _g	V _{DS} = -20V, I _D = -20A, V _{GS} = -10V	-	42	-	nC
Gate-Source Charge	Q _{gs}		-	7.3	-	
Gate-Drain Charge	Q _{gd}		-	8.5	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V _{DS}	V _{GS} = 0V, I _S = -20A	-	-	-1.2	V
Diode Forward current ⁽⁴⁾	I _S		-	-	-40	A

Notes:

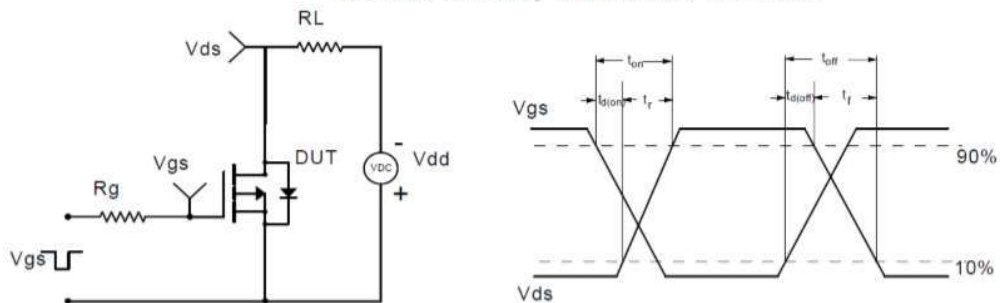
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: T_J = 25°C, V_{DD} = -20V, R_G = 25 Ω, L = 0.5mH, I_{AS} = -24A
3. Pulse Test: pulse width ≤ 300μs, duty cycle ≤ 2%
4. Surface Mounted on FR4 Board, t ≤ 10 sec

Test Circuit

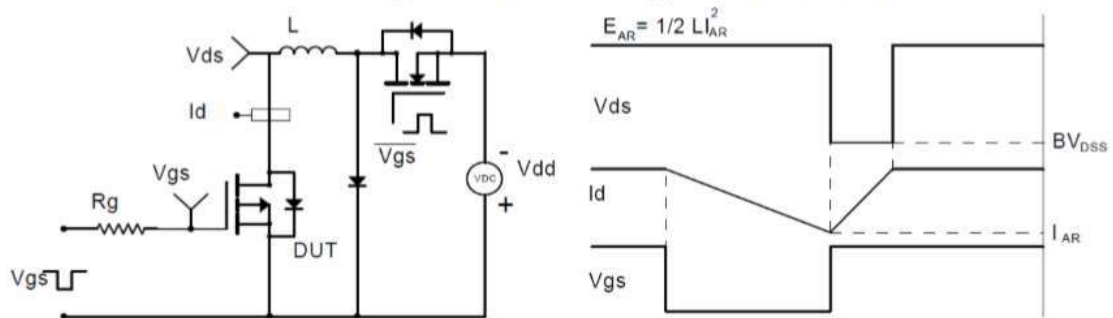
Gate Charge Test Circuit & Waveform



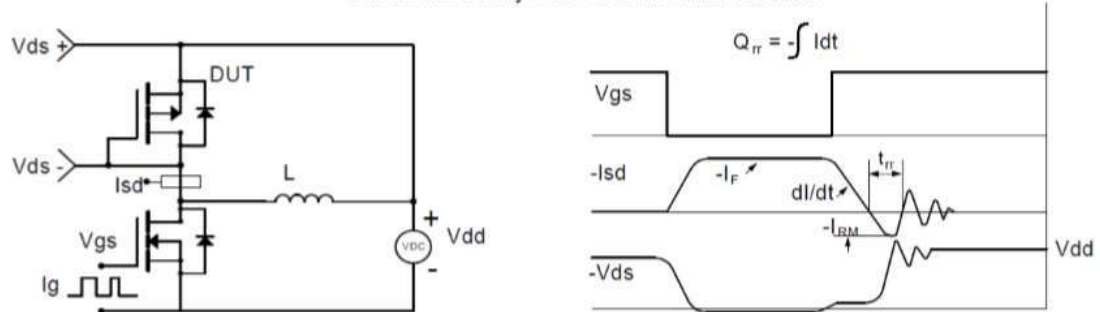
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Performance Characteristics

Figure 1: Output Characteristics

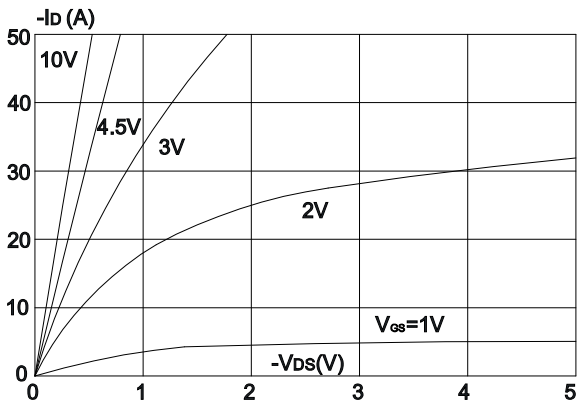


Figure 2: Typical Transfer Characteristics

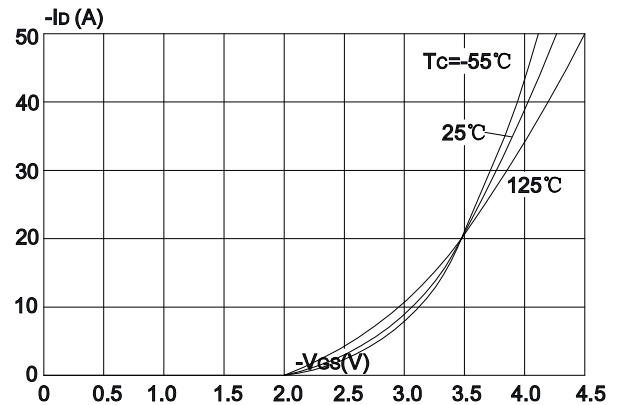


Figure 3: On-resistance vs. Drain Current

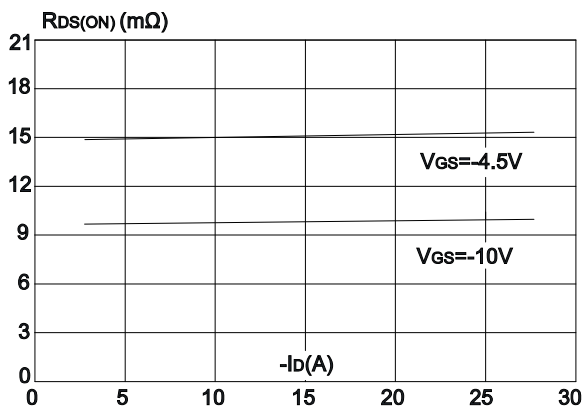


Figure 4: Body Diode Characteristics

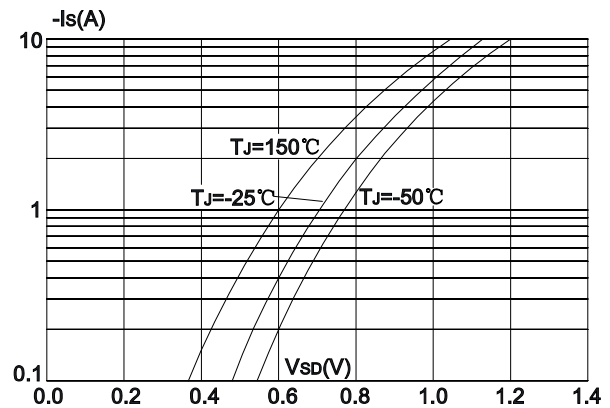


Figure 5: Gate Charge Characteristics

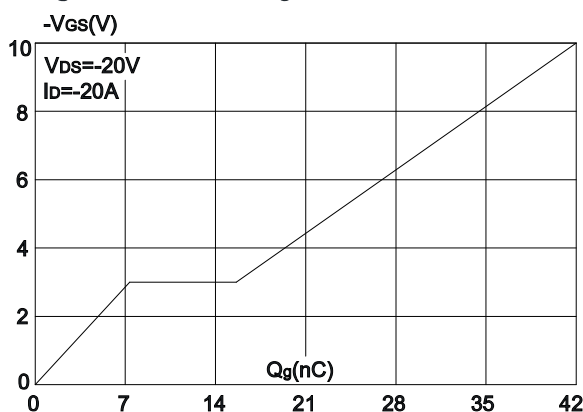


Figure 6: Capacitance Characteristics

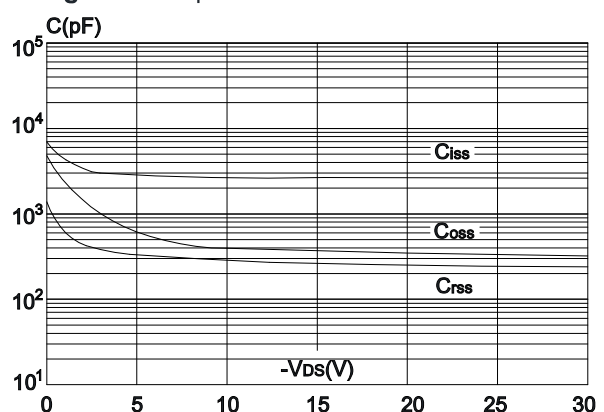


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

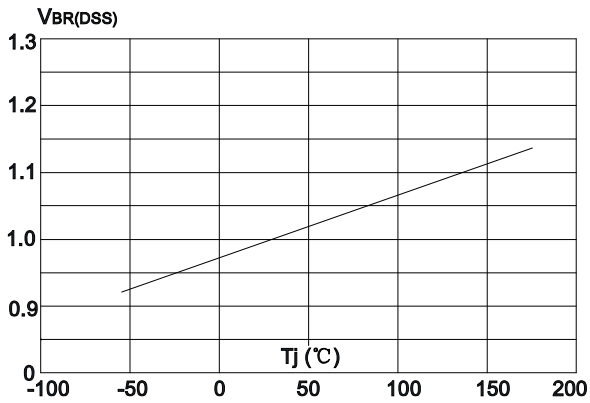


Figure 8: Normalized on Resistance vs. Junction Temperature

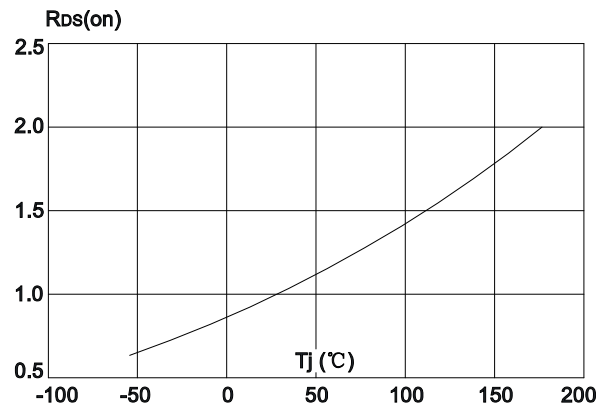


Figure 9: Maximum Safe Operating Area

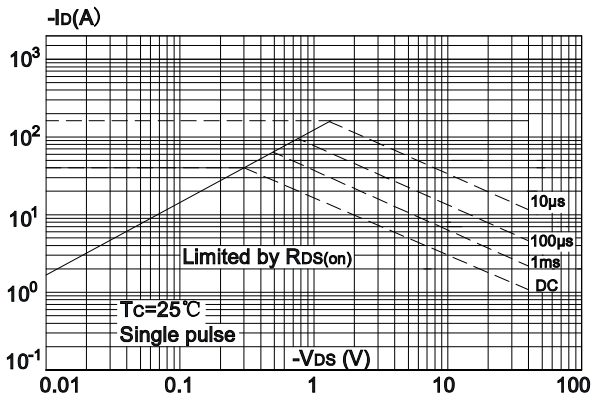


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

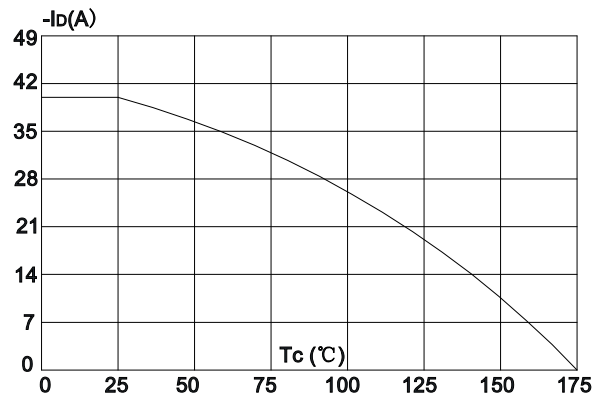
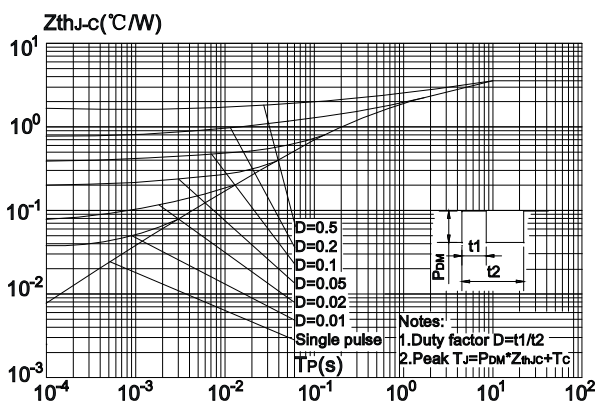
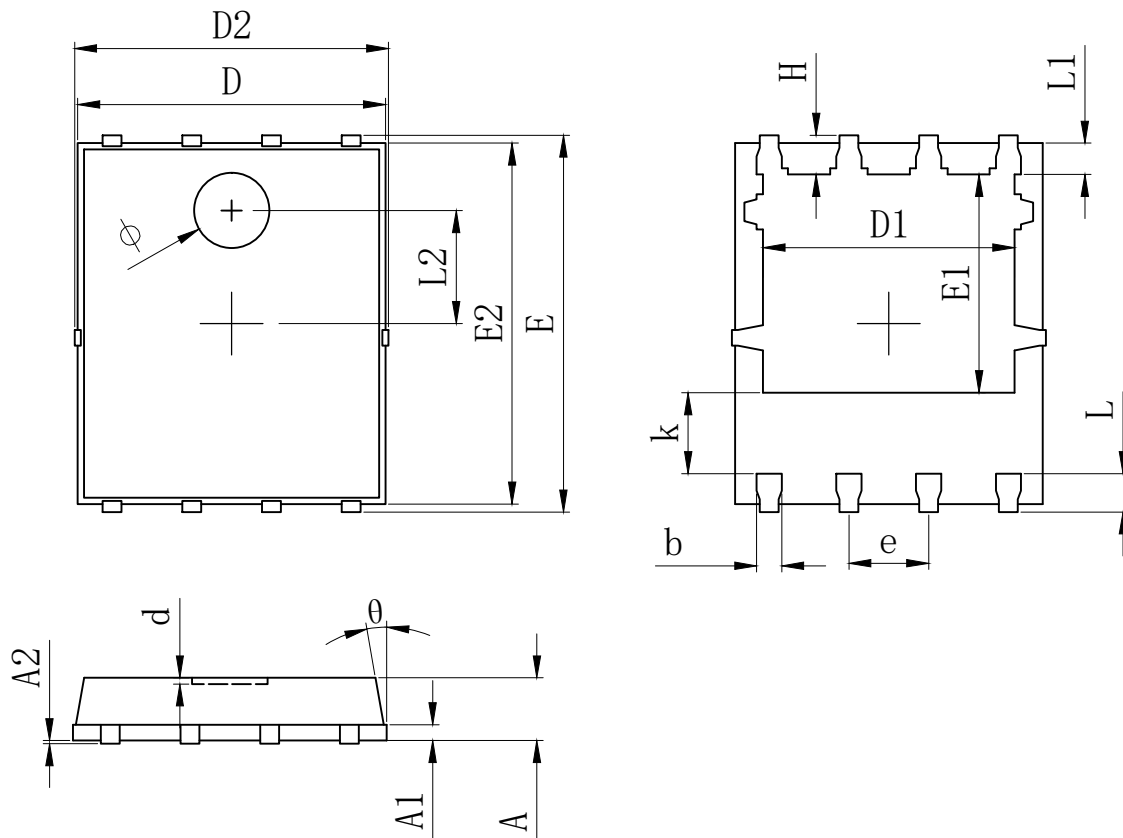


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



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
θ	8°	10°	12°
ϕ	1.100	1.200	1.300
d			0.100