

**DESCRIPTION**

The AM40P04PJ is available in PDFN8(5x6) Package.

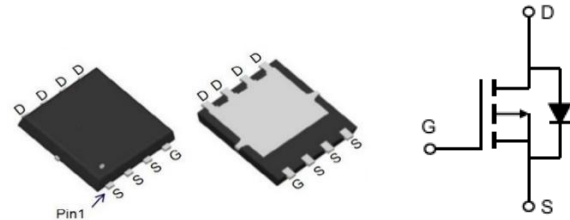
VDSS	RDS(ON)	ID
-40V	8.6mΩ	-40A

FEATURE

- -40V, -40A
- $R_{DS(ON)}$ Typ.= 8.6mΩ @ $V_{GS} = -10V$
- $R_{DS(ON)}$ Typ.= 13mΩ @ $V_{GS} = -4.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge

APPLICATIONS

- Load Switch
- PWM Application
- Power Management

PIN DESCRIPTION**ORDERING INFORMATION**

Package Type	Part Number	
PDFN8(5x6)	PJ	AM40P04PJ
Note	SPQ: 5,000/Reel	
AiT provides all RoHS products		

Pin #	Symbol	Function
1, 2, 3	S	Source
4	G	Gate
5,6,7,8	D	Drain

ABSOLUTE MAXIMUM RATINGS

$T_J = 25^\circ\text{C}$, unless otherwise specified.

V_{DS} , Drain-to-Source Voltage		-40V
V_{GS} , Gate-to-Source Voltage		$\pm 20V$
I_D , Continuous Drain Current	$T_C = 25^\circ\text{C}$	-40A
	$T_C = 100^\circ\text{C}$	-27A
I_{DM} , Pulsed Drain Current ⁽¹⁾		-160A
E_{AS} , Single Pulsed Avalanche Energy ⁽²⁾		169mJ
P_D , Power Dissipation	$T_C = 25^\circ\text{C}$	75W
$R_{\theta JC}$, Thermal Resistance, Junction-to-Case		1.67°C/W
T_{STG} , Storage Temperature Range		-55°C ~ +150°C
T_J , Junction Temperature Range		-55°C ~ +150°C

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

(1) Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

(2) E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = -20V$, $V_G = -10V$, $R_G = 25\text{ohm}$, $L = 0.5\text{mH}$, $I_{AS} = -19A$

**ELECTRICAL CHARACTERISTICS**T_J = 25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Off 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} = -32V, V _{GS} =0V	-	-	-1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D = -250μA	-1.2	-1.6	-2.6	V
Static Drain-Source ON-Resistance *	R _{DS(ON)}	V _{GS} = -10V, I _D = -10A	-	8.6	11.0	mΩ
		V _{GS} = -4.5V, I _D = -8A	-	13	18	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = -20V, V _{GS} =0V, f=1.0MHZ	-	3800	-	pF
Output Capacitance	C _{oss}		-	329	-	
Reverse Transfer Capacitance	C _{rss}		-	289	-	
Total Gate Charge	Q _g	V _{DS} = -20V , I _D = -10A V _{GS} =0V ~ -10V	-	69	-	nC
Gate-Source Charge	Q _{gs}		-	11	-	
Gate-Drain(“Miller”) Charge	Q _{gd}		-	13	-	
Switching Characteristics						
Turn-On Delay Time	t _{d(on)}	V _{DD} = -20V, I _D = -10A R _{GEN} =2.5Ω, V _{GS} = -10V	-	11	-	ns
Turn-On Rise Time	t _r		-	81	-	
Turn-Off Delay Time	t _{d(off)}		-	95	-	
Turn-Off Fall Time	t _f		-	73	-	
Drain-Source Diode Characteristics and Max Ratings						
Maximum Continuous Drain to Source Diode Forward Current	I _S	-	-	-	-40	A
Drain to Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S = -10A	-	-	-1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = -20A,	-	21	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs	-	12	-	nC

* Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.



TYPICAL CHARACTERISTICS

Fig 1. Output Characteristics

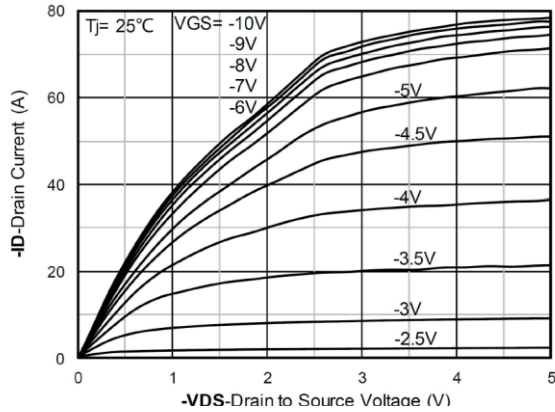


Fig 2. Transfer Characteristics

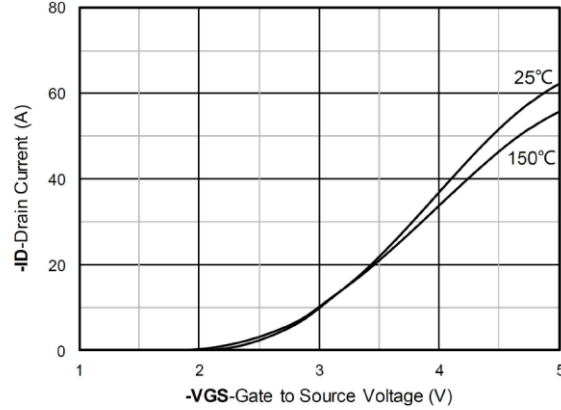


Fig 3. Capacitance Characteristics

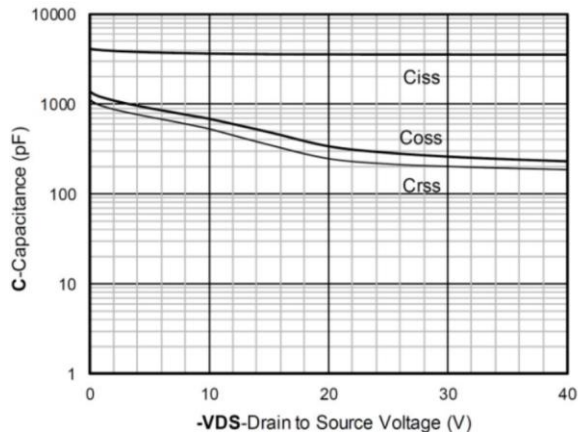


Fig 4. Gate Charge

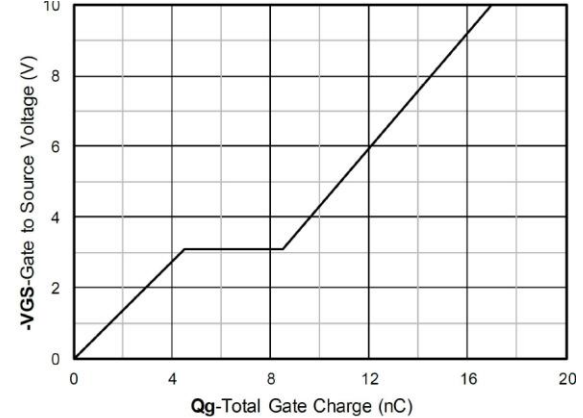


Fig 5. Current Dissipation

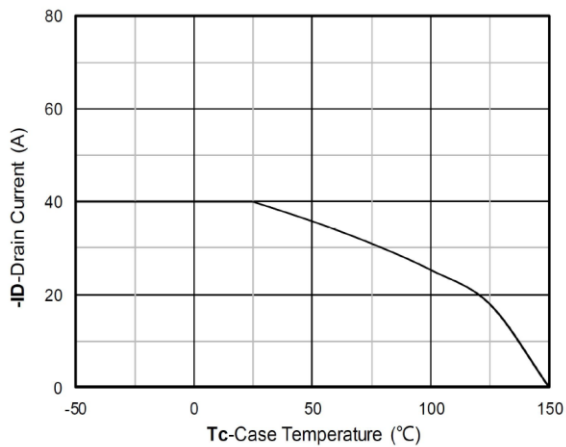


Fig 6. Power Dissipation

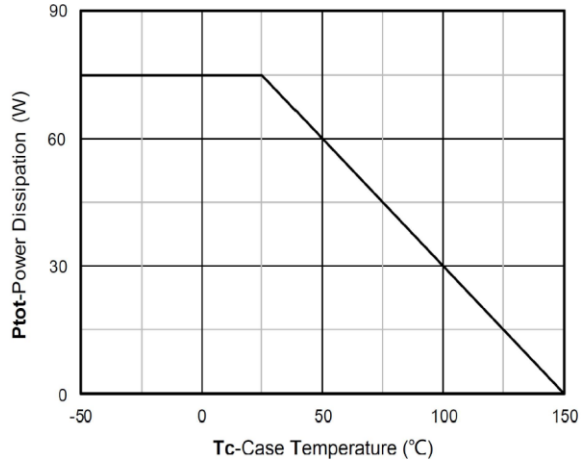




Fig 7. $R_{DS(on)}$ vs Drain Current

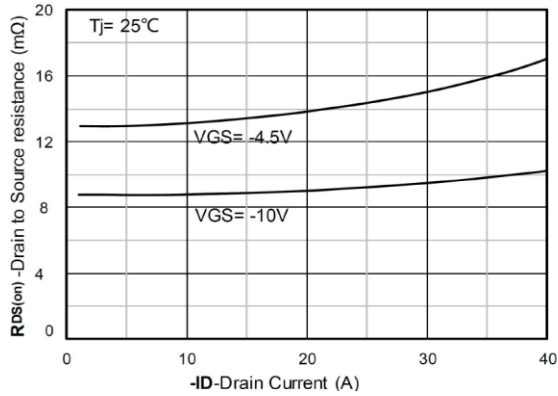


Fig 9. Normalized Breakdown Voltage

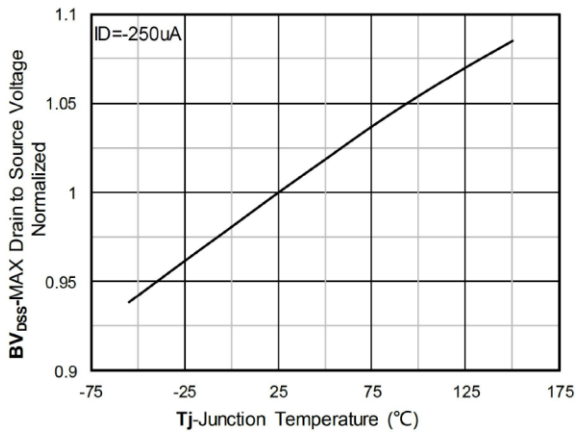


Fig 11. Maximum Transient Thermal Impedance

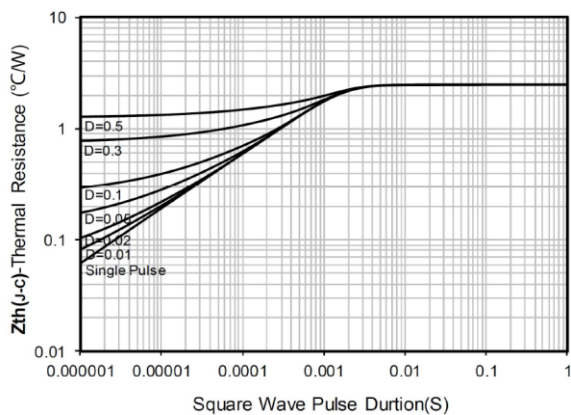


Fig 8. Forward Characteristics of Reverse Diode

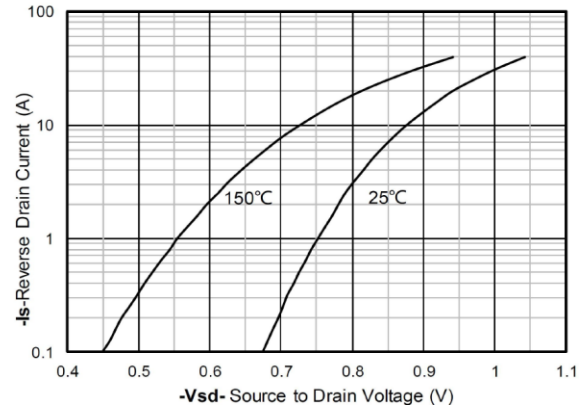


Fig 10 Normalized Threshold Voltage

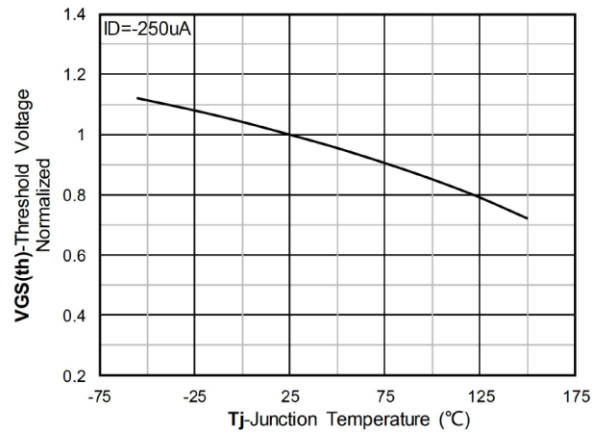
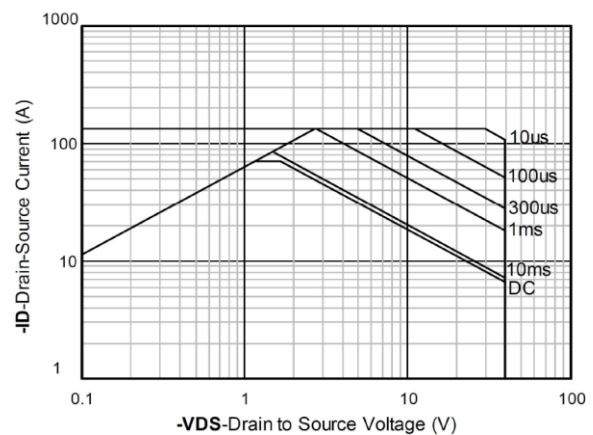


Fig 12. Safe Operation Area





TYPICAL PERFORMANCE CHARACTERISTICS

Fig 13. Gate Charge Test Circuit & Waveform

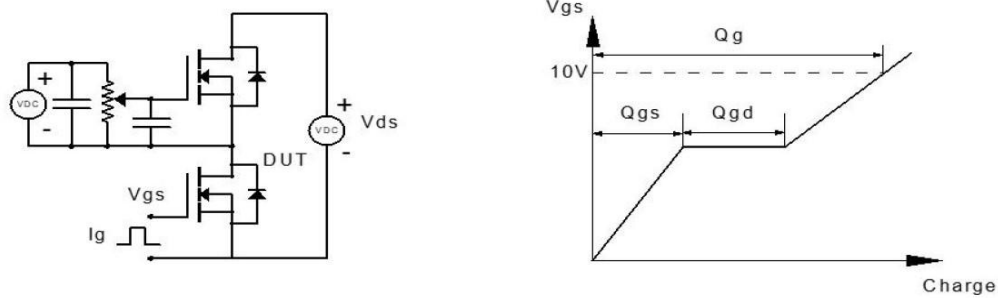


Fig 14. Resistive Switching Test Circuit & Waveform

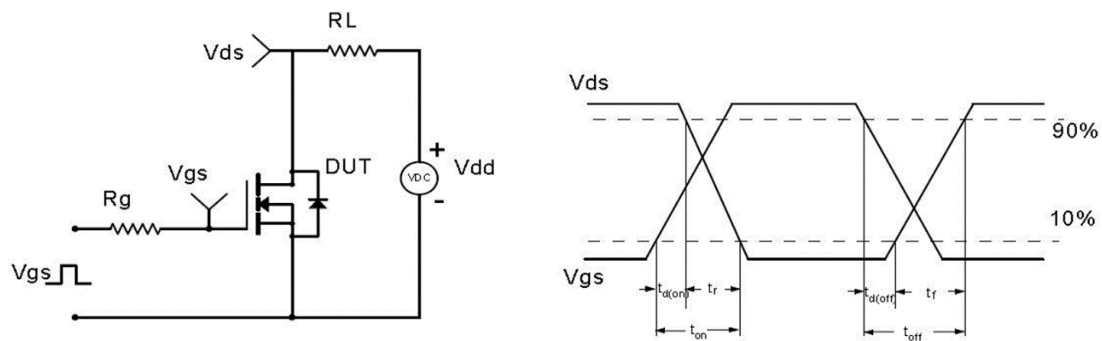


Fig 15. Unclamped Inductive Switching Test Circuit & Waveform

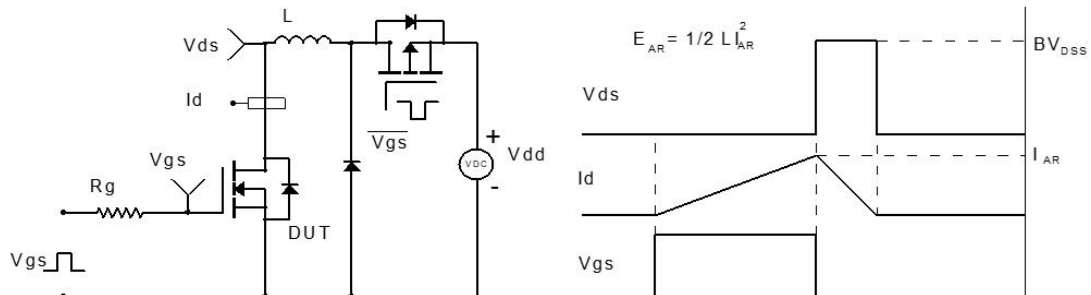
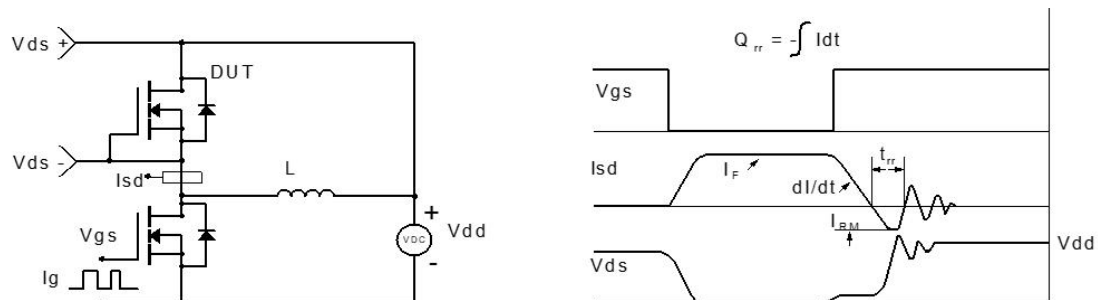
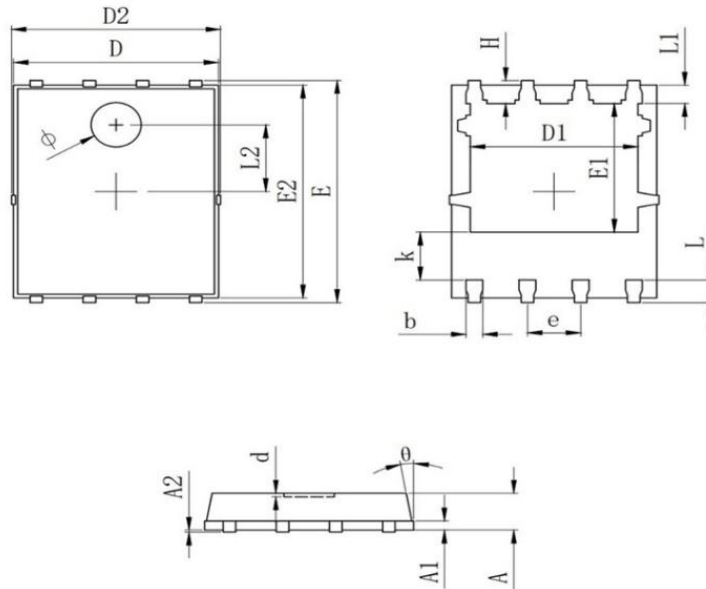


Fig 16. Diode Recovery Test Circuit & Waveform



**PACKAGE INFORMATION**

Dimension in PDFN8(5x6) (Unit: mm)



Symbol	Millimeters	
	Min.	Max.
A	0.900	1.100
A1	0.254 REF.	
A2	0	0.050
b	0.350	0.450
D	4.824	4.976
D1	3.910	4.110
D2	4.924	5.076
d	-	0.100
E	5.924	6.076
E1	3.375	3.575
E2	5.674	5.826
e	1.270 TYP.	
L	0.534	0.686
L1	0.424	0.576
L2	1.800 REF.	
k	1.190	1.390
H	0.549	0.701
θ	8°	12°
Φ	1.100	1.300

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