

**DESCRIPTION**

The AM40P04 is available in TO-252 Package

BVDSS	RDSON	ID
-40V	25mΩ	-40A

APPLICATION

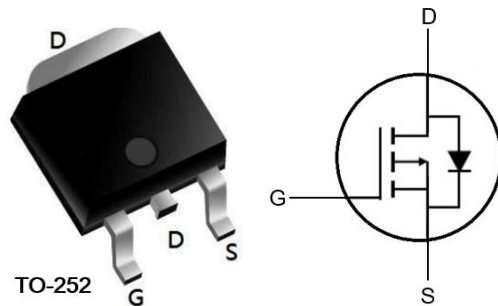
- Load switch
- PWM application

ORDERING INFORMATION

Package Type	Part Number	
TO-252	D	AM40P04DR
SPQ: 2,500pcs/Reel		AM40P04DVR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

FEATURE

- High density cell design for ultralow $R_{DS(ON)}$
- $R_{DS(ON)typ.}=25m\Omega @ V_{GS}=-10V$
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

PIN DESCRIPTION

Pin#	Symbol	Function
1	G	Gate
2	D	Drain
3	S	Source

ABSOLUTE MAXIMUM RATINGS

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-40	A
Pulsed Drain Current	I_{DM}	-60	A
Maximum Power Dissipation	P_D	50	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ\text{C}$
Thermal Characteristic			
Thermal Resistance, Junction-to-Case ⁽¹⁾	$R_{\theta JC}$	3.0	$^\circ\text{C/W}$

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) Surface Mounted on FR4 Board, $t \leq 10$ sec.



ELECTRICAL CHARACTERISTICS

T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = -250μA	-40	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = -24V, V _{GS} = 0V, T _J = 25°C	-	-	-1	μA
Gate-Source Leakage Current	I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics ⁽³⁾						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1.0	-1.5	-2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = -10V, I _D = -15A	-	23	25	mΩ
		V _{GS} = -4.5V, I _D = -10A	-	30	40	
Forward Transconductance	g _{fs}	V _{DS} = -5V, I _D = -15A	-	10	-	S
Dynamic Characteristics ⁽⁴⁾						
Input Capacitance	C _{iss}	V _{DS} = -20V, V _{GS} = 0V, f = 1MHz	-	930	-	pF
Output Capacitance	C _{oss}		-	85	-	
Reverse Transfer Capacitance	C _{rss}		-	35	-	
Switching Characteristics ⁽³⁾						
Total Gate Charge	Q _g	V _{DS} = -20V, V _{GS} = -10V, I _D = -15A	-	25	-	nC
Gate-Source Charge	Q _{gs}		-	3	-	
Gate-Drain Charge	Q _{gd}		-	7	-	
Turn-on Delay Time	t _{d(ON)}	V _{DD} = -20V, V _{GS} = -10A, R _G = 3Ω, R _L = 1Ω	-	8	-	nS
Turn-on Rise Time	t _r		-	4	-	
Turn-Off Delay Time	t _{d(OFF)}		-	32	-	
Turn-Off Fall Time	t _f		-	7	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽²⁾	V _{SD}	V _{GS} = 0V, I _S = -15A	-	-	-1.2	V
Diode Forward Current ⁽¹⁾	I _S		-	-	-15	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = -15A	-	25	-	nS
Reverse Recovery Charge	Q _{rr}	di/dt = -100A/μs ⁽²⁾	-	31	-	nC

(1) Surface Mounted on FR4 Board, t ≤ 10 sec.

(2) Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

(3) Guaranteed by design, not subject to production



TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Output Characteristics

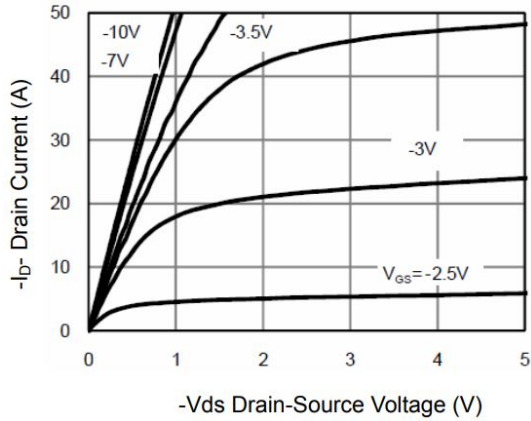


Fig 2. Transfer Characteristics

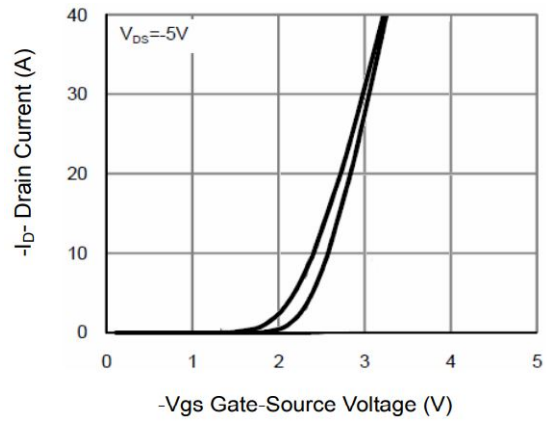


Fig 3. Rdson- Drain Current

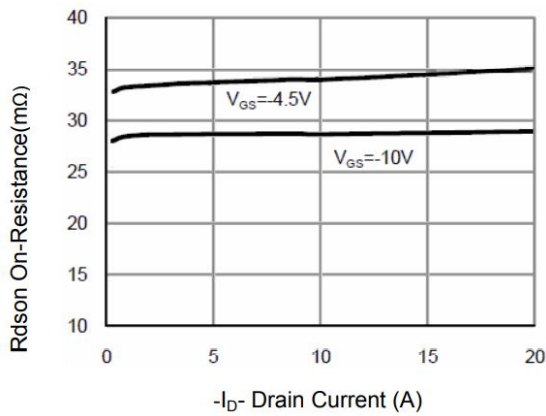


Fig 4. Rdson-Junction Temperature

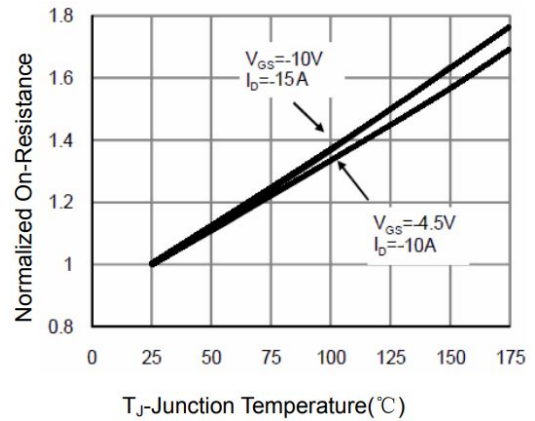


Fig 5. Gate Charge

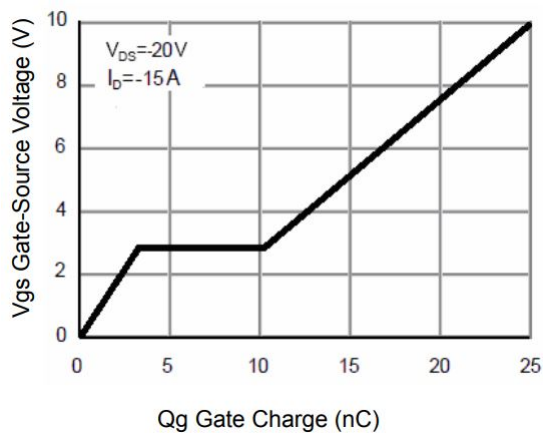


Fig 6. Source- Drain Diode Forward

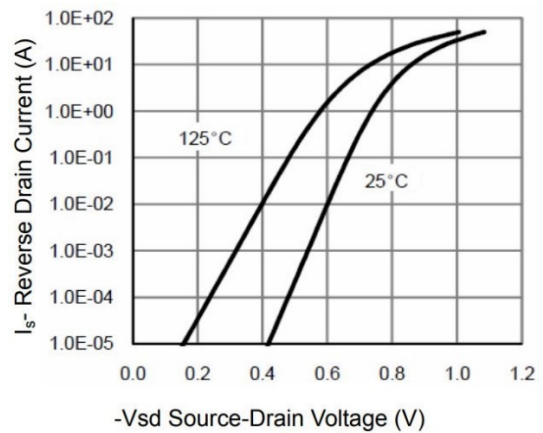




Fig 7. Capacitance vs Vds

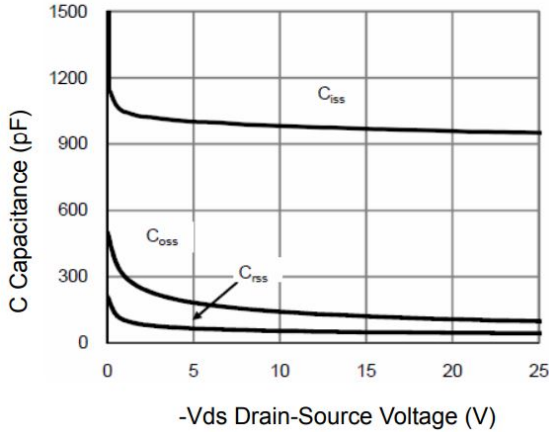


Fig 8. Safe Operation Area

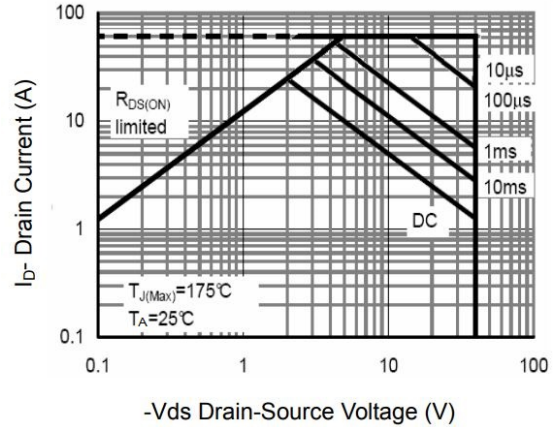


Fig 9. Power Dissipation

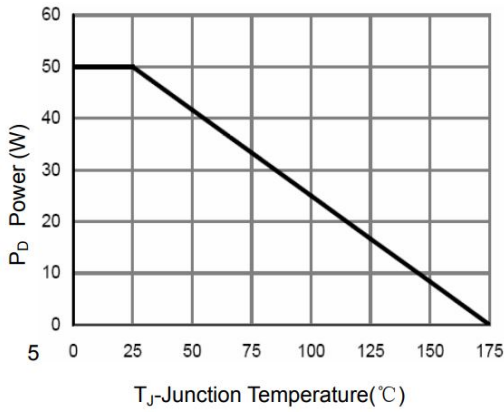


Fig 10. Safe Operating Area

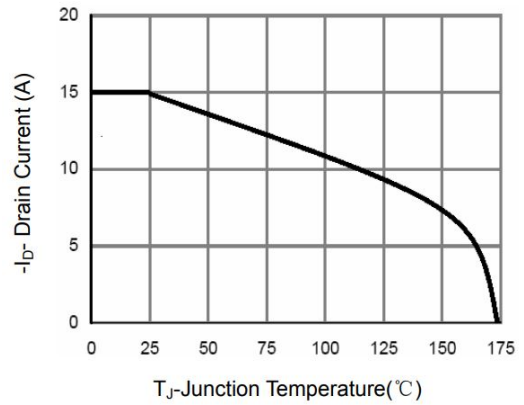


Fig 11. Normalized Maximum Transient Thermal Impedance

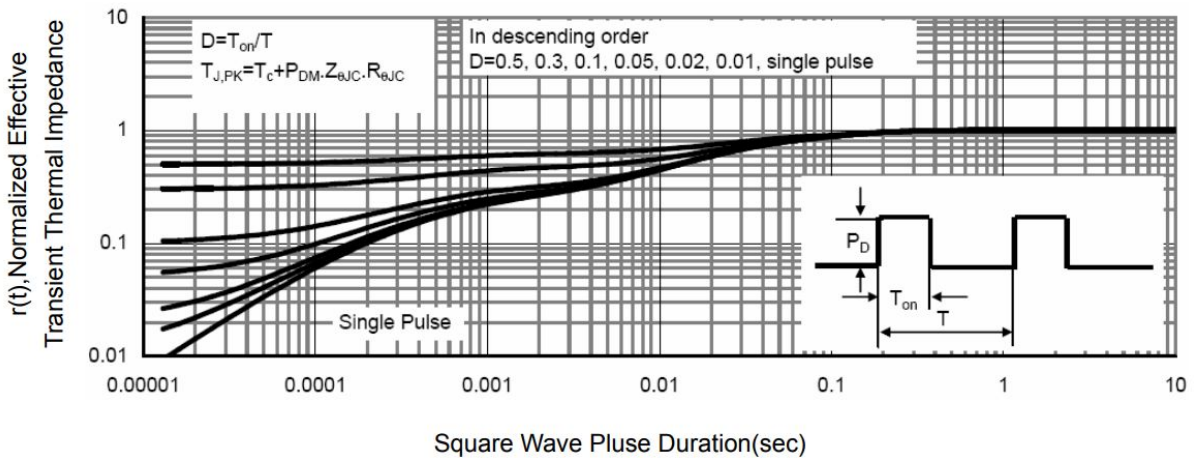




Fig12. EAs test Circuit

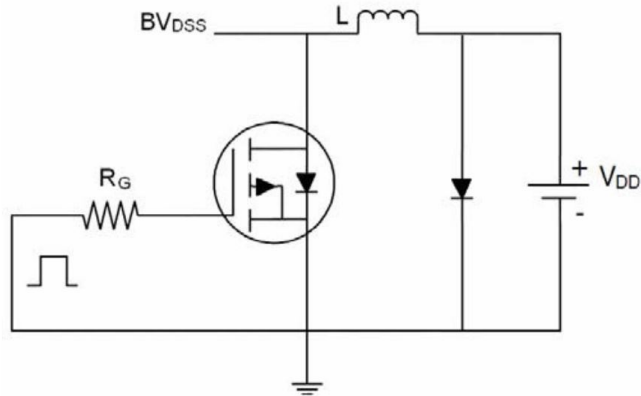


Fig13. Gate charge test Circuit

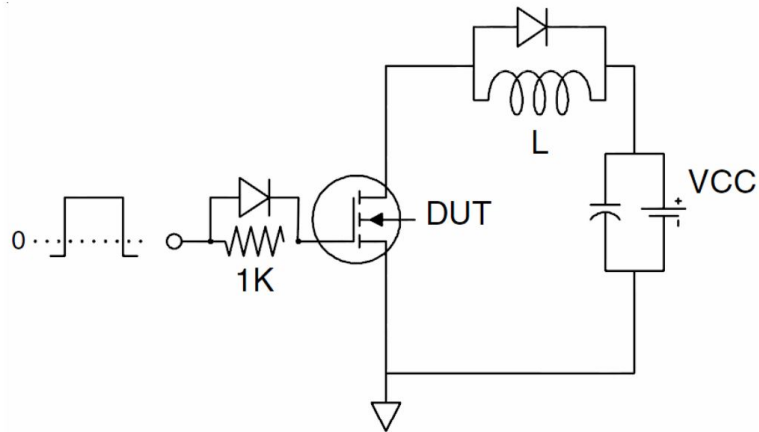
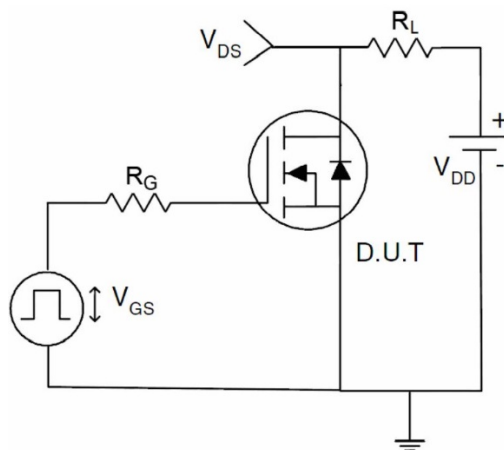


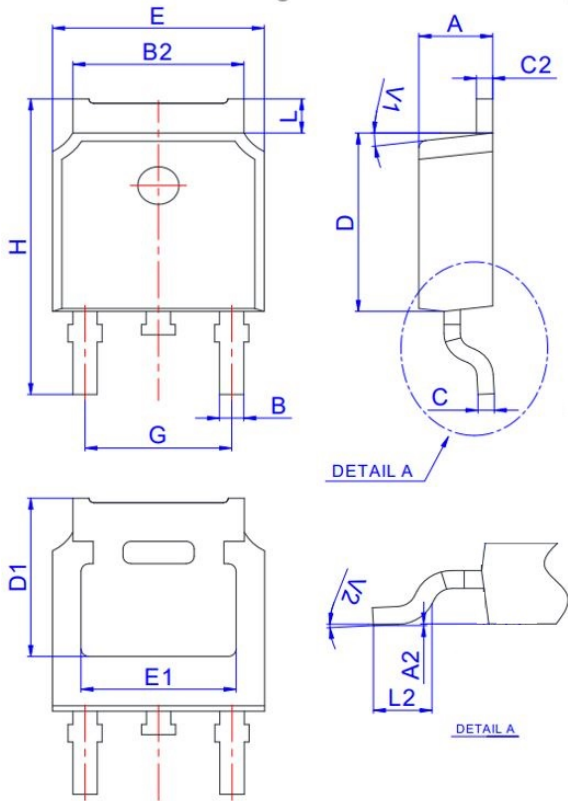
Fig14. Switch Time Test Circuit





PACKAGE INFORMATION

Dimension in TO-252 (Unit: mm)



Symbol	Min.	Max.
A	2.200	2.380
A2	0.000	0.100
B	0.720	0.850
B2	5.130	5.460
C	0.508BSC	
C2	0.470	0.600
D	6.000	6.200
D1	5.250	
E	6.500	6.700
E1	4.700	
G	4.380	4.780
H	9.800	10.40
L	0.900	1.250
L2	1.400	1.700
V2	0°	8°



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