ANBONSEMI
INNOVATOR IN SEMICONDUCTOR

AT050SN040MQPG-Q1

N-Channel Enhancement Mode MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	8mΩ@10V	50A
	10mΩ@4.5V	

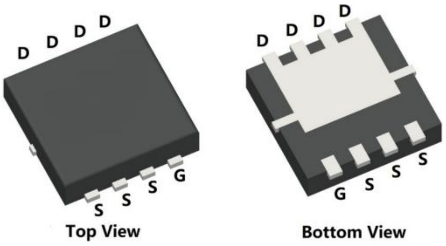
Feature

- Advanced trench technology
- Low on-resistance
- Low gate charge
- High-speed switching
- Green device available
- Suffix “-Q1” for AEC-Q101

Application

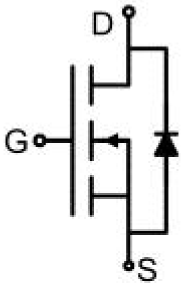
- Power switching application
- PWM application
- DC-DC converter

Package

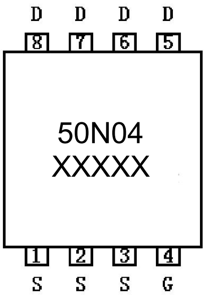


PDFN3*3-8L

Circuit diagram



Marking



Absolute maximum ratings (T_C=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	50	A
Continuous Drain Current (T_C=100℃)	I_D (100 ℃)	32	A
Pulsed Drain Current (t_p=10μs)	I_{DM}	200	A
Single Pulse Avalanche Energy$^{1)}$	E_{AS}	78	mJ
Power Dissipation	P_D	37	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	3.4	℃/W
Operating Junction Temperature	T_J	-55 ~ +150	℃
Storage Temperature	T_{STG}	-55 ~ +150	℃

Electrical characteristics (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	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} =32V, V_{GS} =0V			1	μA
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±20V			±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.2	1.8	2.5	V
Drain-source on-resistance$^{2)}$	$R_{DS(on)}$	V_{GS} =10V, I_D =12A		7	8	mΩ
		V_{GS} =4.5V, I_D =10A		8.5	10	
Dynamic characteristics$^{3)}$						
Input Capacitance	C_{iss}	V_{DS} =15V, V_{GS} =0V, f =1MHz		1729		pF
Output Capacitance	C_{oss}			182		
Reverse Transfer Capacitance	C_{rss}			164		
Total Gate Charge	Q_g	V_{DS} =20V, V_{GS} =4.5V, I_D =20A		19.3		nC
Gate-Source Charge	Q_{gs}			5.5		
Gate-Drain Charge	Q_{gd}			9.3		
Turn-on delay time	$t_{d(on)}$	V_{DS} =30V, V_{GS} =15V, I_D =10A R_G =2Ω		5		nS
Turn-on rise time	t_r			26		
Turn-off delay time	$t_{d(off)}$			39		
Turn-off fall time	t_f			30		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				50	A
Diode Forward voltage$^{2)}$	V_{SD}	V_{GS} =0V, I_S =10A			1.2	V
Reverse Recovery Time	T_{rr}	V_{GS} =0V, I_S =12A di/dt =-100A/μs		35		nS
Reverse Recovery Charge	Q_{rr}			18		nC

Notes:

1) The EAS data shows Max. rating. The test condition is V_{DD} = 25V, V_{GS} = 10V, L = 0.5mH.

2) The data tested by pulsed, pulse width ≤300μs, duty cycle ≤2%.

3) Guaranteed by design, not subject to production.

Typical Characteristics

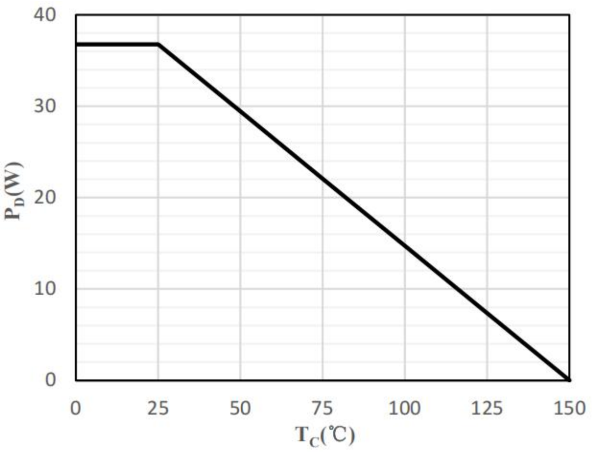


Fig 1 Power Dissipation

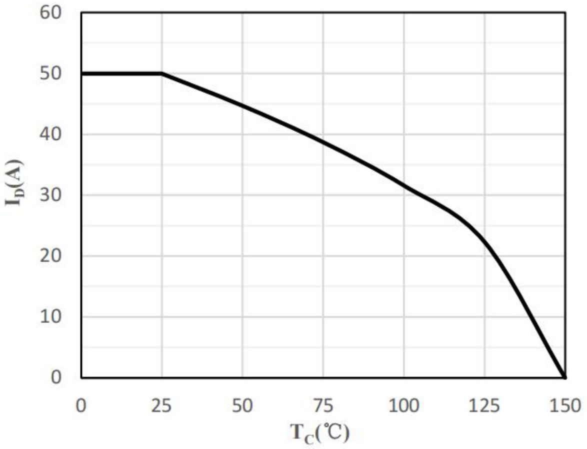


Fig 2 Drain Current

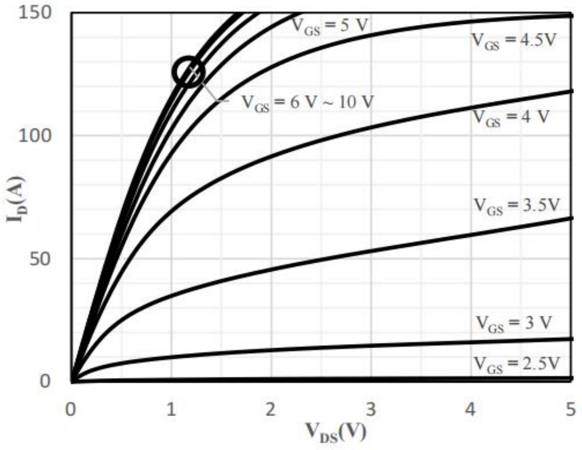


Fig 3 Typical Output Characteristics

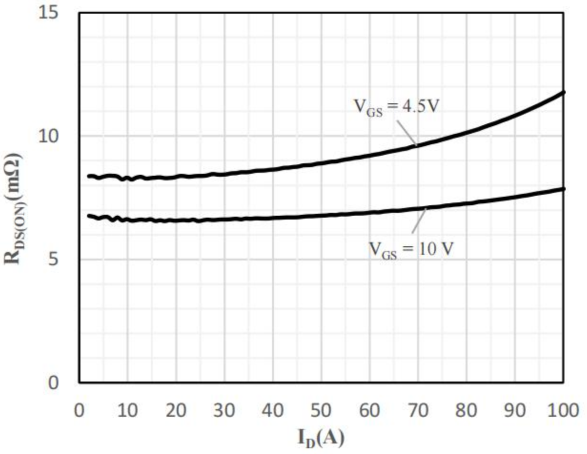


Fig 4 On-Resistance vs. Drain Current

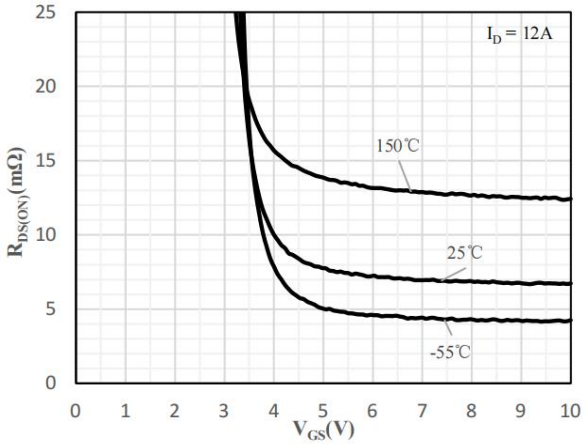


Fig 5 On-Resistance vs. Gate-Source Voltage

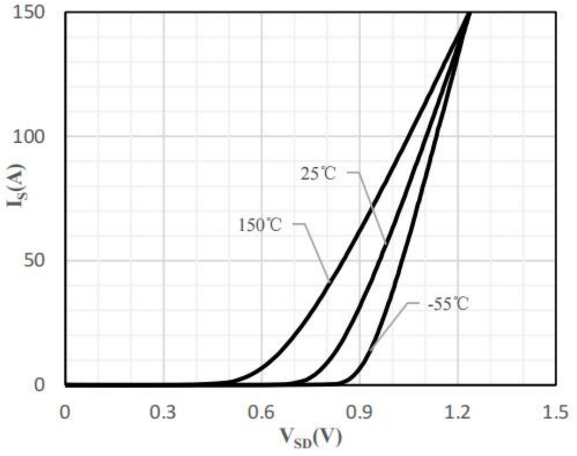


Fig 6 Body-Diode Characteristics

Typical Characteristics

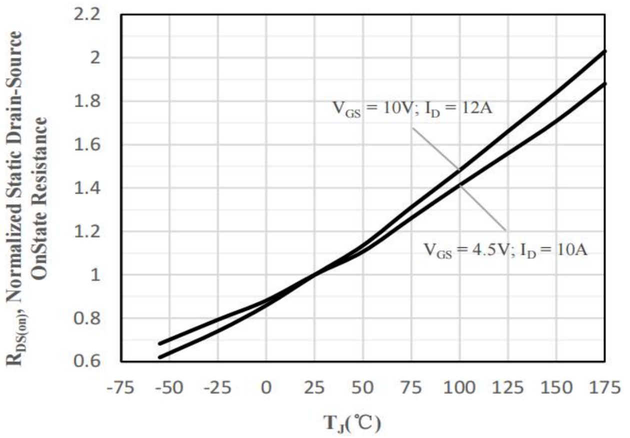


Fig 7 **Normalized On-Resistance vs. Junction Temperature**

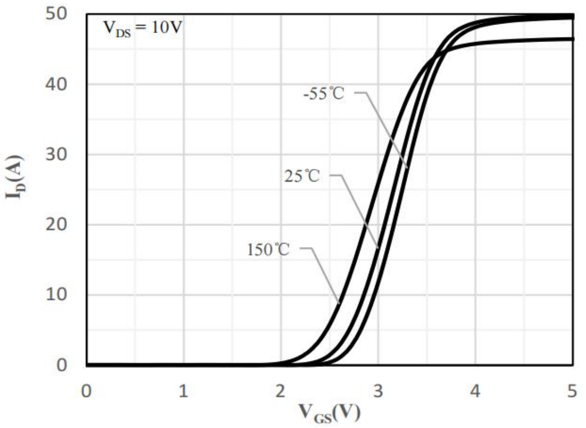


Fig 8 **Transfer Characteristics**

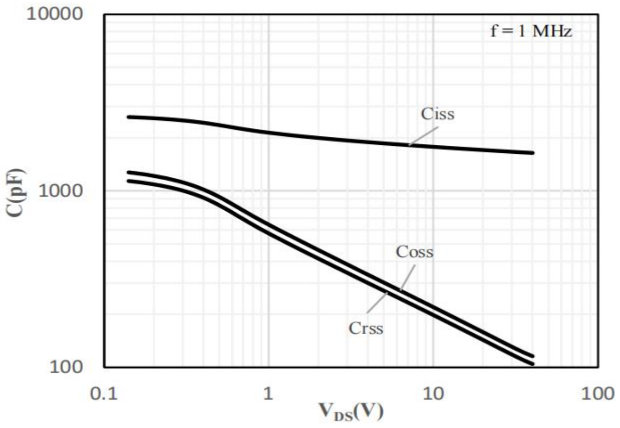


Fig 9 **Capacitance Characteristics**

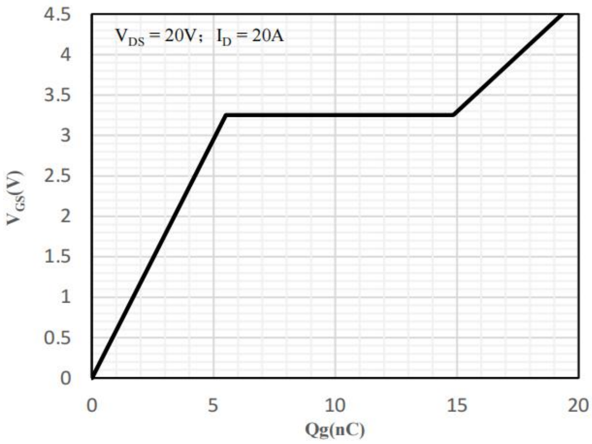


Fig 10 **Gate-Charge Characteristics**

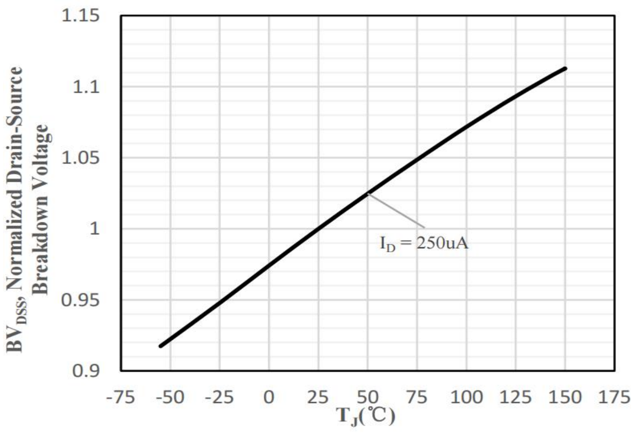


Fig 11 **Normalized Breakdown Voltage vs. Junction Temperature**

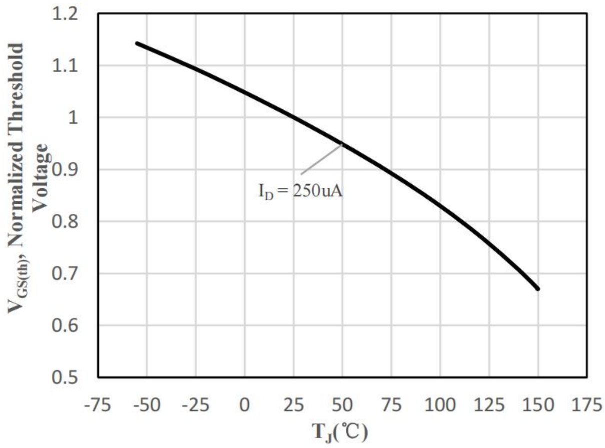


Fig 12 **Normalized $V_{GS(th)}$ vs. Junction Temperature**

Typical Characteristics

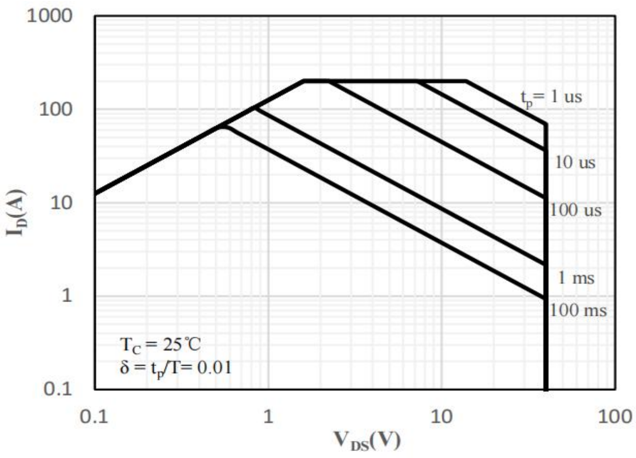


Fig 13 **Safe Operating Area**

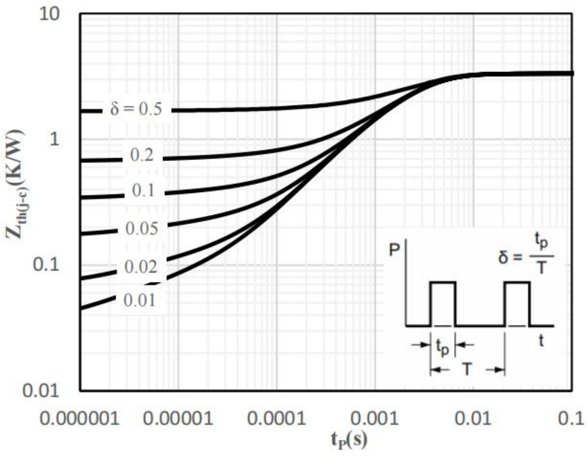
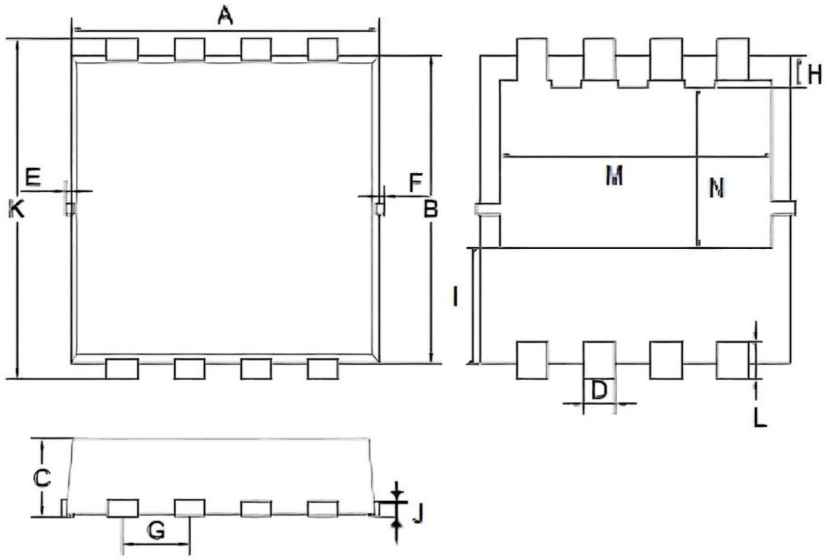


Fig 14 **Maximum transient thermal impedance**

PDFN3*3-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.900	3.100	0.114	0.122
B	2.900	3.100	0.114	0.122
C	0.650	0.850	0.026	0.033
D	0.200	0.400	0.008	0.016
E	0.000	0.100	0.000	0.004
F	0.000	0.100	0.000	0.004
G	0.550	0.750	0.022	0.030
H	0.200	0.400	0.008	0.016
I	0.700	1.100	0.028	0.043
J	0.100	0.200	0.004	0.008
K	3.150	3.450	0.124	0.136
L	0.200	0.400	0.008	0.016
M	2.350	2.550	0.093	0.100
N	1.500	1.900	0.059	0.075