AT060SN040MTA-Q1

N-Channel Enhancement Mode MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	7mΩ@10V	60A
	9.5mΩ@4.5V	

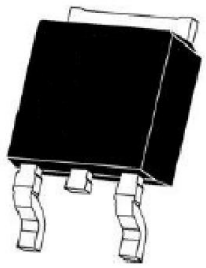
Feature

- Trench Power LV MOSFET technology
- High density cell design for low $R_{DS(ON)}$
- Excellent package for heat dissipation
- Suffix "-Q1" for AEC-Q101

Application

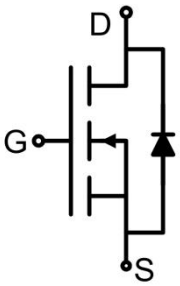
- High current load applications
- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

Package

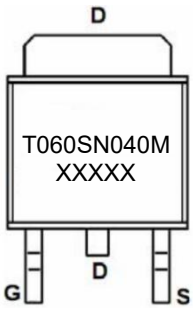


TO-252AB

Circuit diagram



Marking



Absolute maximum ratings (T_A=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 (T_C=25℃)	I_D	60	A
Continuous Drain Current (T_C=100℃)	I_D(100℃)	38	A
Pulsed Drain Current[1)]	I_{DM}	200	A
Single Pulse Avalanche Energy[2)]	E_{AS}	110	mJ
Power Dissipation (T_C=25℃)	P_D	44	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	2.8	℃/W
Operating Junction Temperature	T_J	-55 ~ +150	℃
Storage Temperature	T_{STG}	-55 ~ +150	℃

Electrical characteristics (T_J=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} =40V, 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	1.5	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =20A		5.4	7	mΩ
		V_{GS} =4.5V, I_D =10A		6.8	9.5	
Dynamic characteristics[3)]						
Input Capacitance	C_{iss}	V_{DS} =20V, V_{GS} =0V, f =1MHz		1860		pF
Output Capacitance	C_{oss}			256		
Reverse Transfer Capacitance	C_{rss}			205		
Total Gate Charge	Q_g	V_{DS} =20V, V_{GS} =10V, I_D =20A		46.7		nC
Gate-Source Charge	Q_{gs}			8		
Gate-Drain Charge	Q_{gd}			11.6		
Turn-on delay time	$t_{d(on)}$	V_{DS} =20V, V_{GS} =10V, I_D =2A R_G =3Ω, R_L =1Ω		10		nS
Turn-on rise time	t_r			21		
Turn-off delay time	$t_{d(off)}$			36		
Turn-off fall time	t_f			25		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				60	A
Diode Forward voltage	V_{SD}	V_{GS} =0V, I_S =20A			1.2	V
Reverse Recovery Time	T_{rr}	I_F =20A, di/dt =-100A/μs		15		nS
Reverse Recovery Charge	Q_{rr}			2.3		nC

Notes:

1) Pulse Test: Pulse Width ≤300us, Duty cycle ≤2%.

2) T_J=25℃, V_{DD}=38V, V_G=10V, L =0.5mH, I_{AS}=21A.

3) Guaranteed by design, not subject to production.

Typical Characteristics

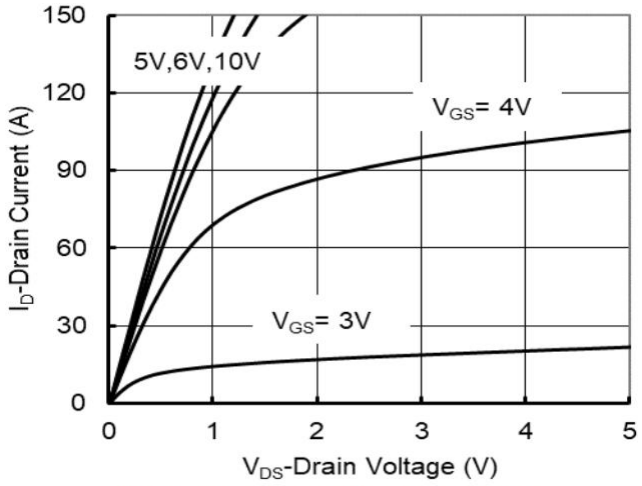


Figure 1. Output Characteristics

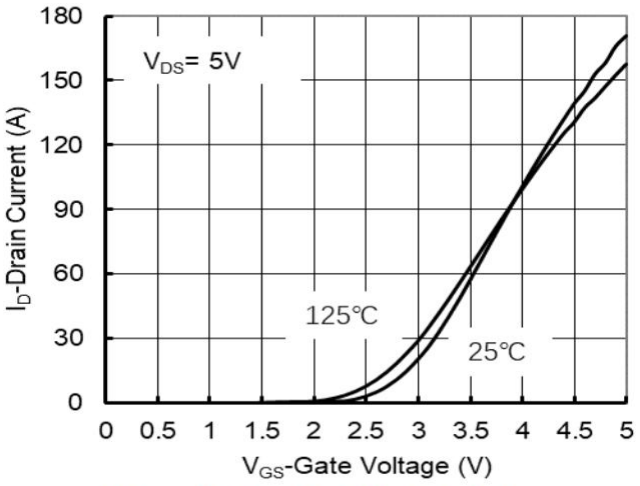


Figure 2. Transfer Characteristics

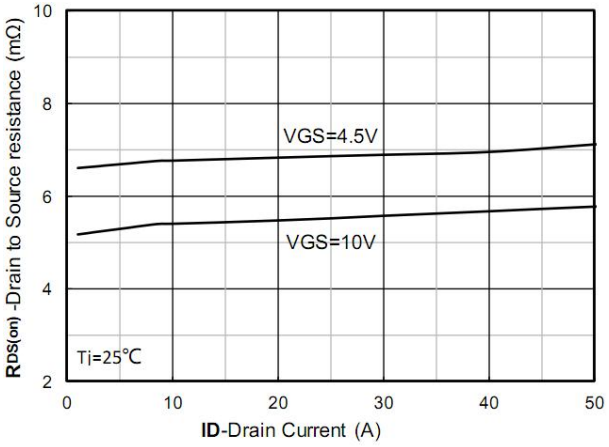


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

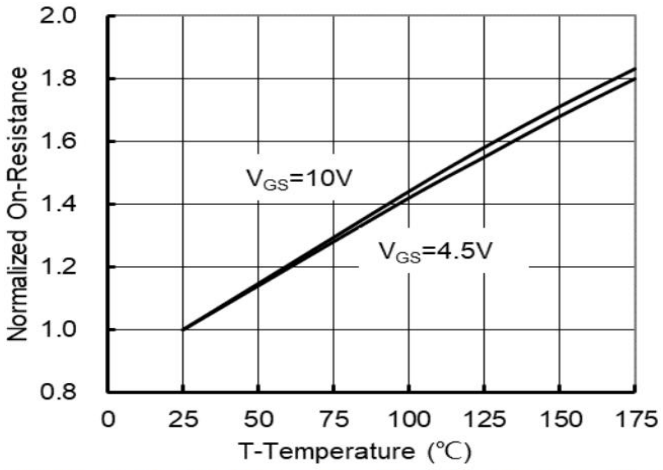


Figure 4. On-Resistance vs. Junction Temperature

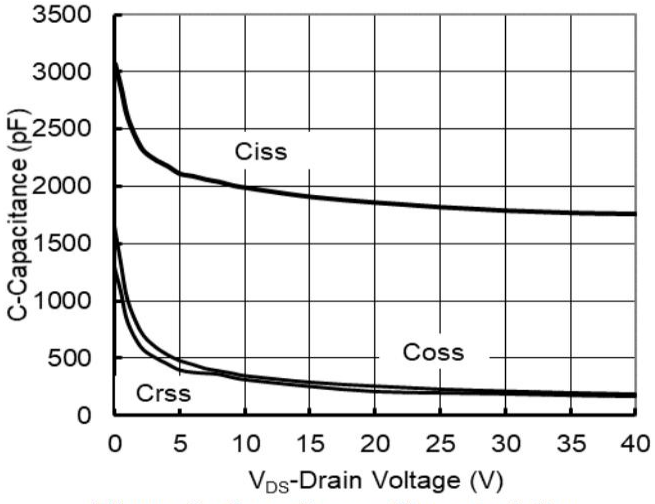


Figure 5. Capacitance Characteristics

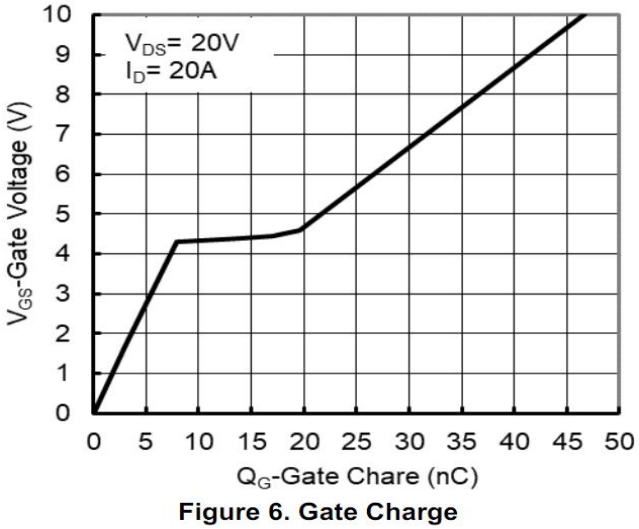


Figure 6. Gate Charge

Typical Characteristics

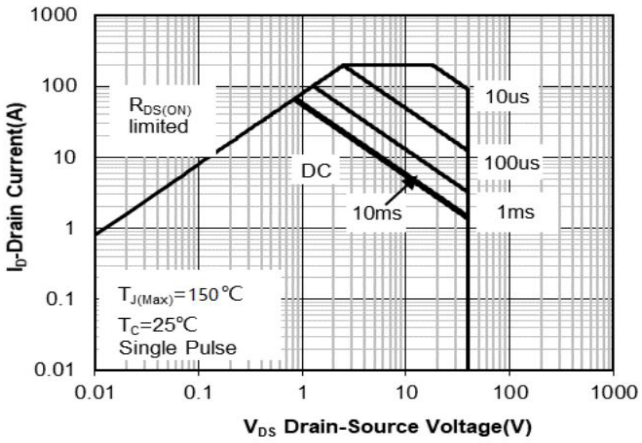


Figure 7. Safe Operation Area

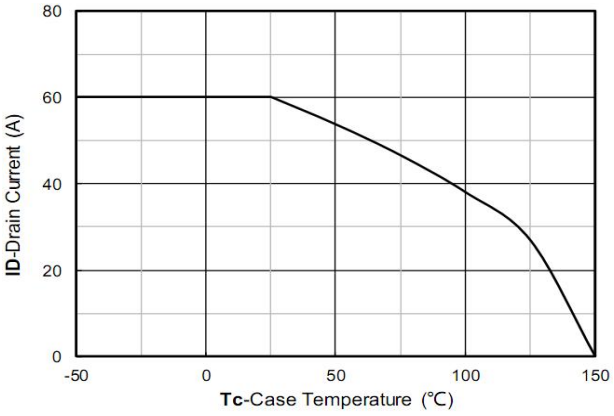


Figure 8. Maximum Continuous Drain Current vs Case Temperature

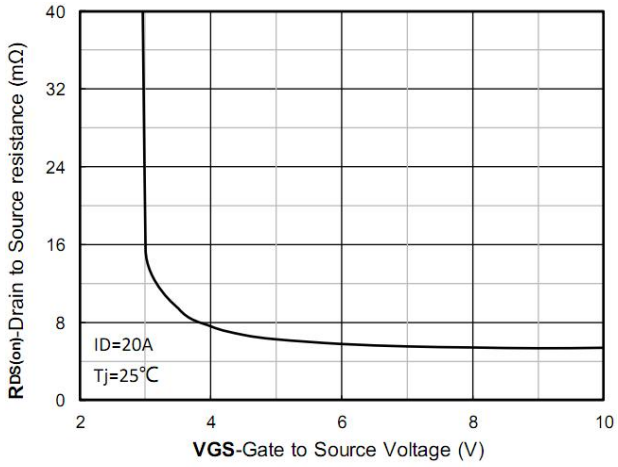


Figure 9. On-Resistance vs Gate to Source Voltage

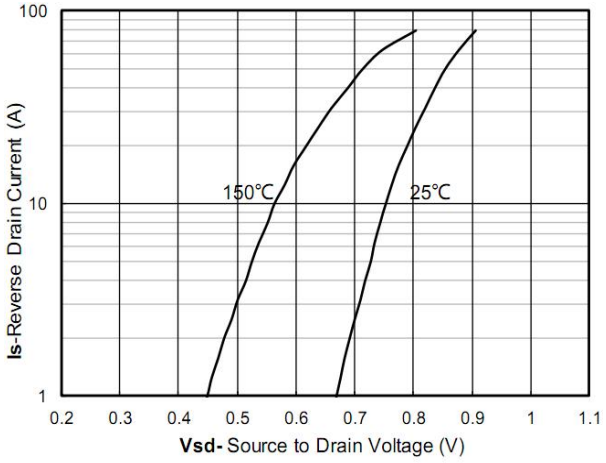


Figure 10. Forward characteristics of reverse diode

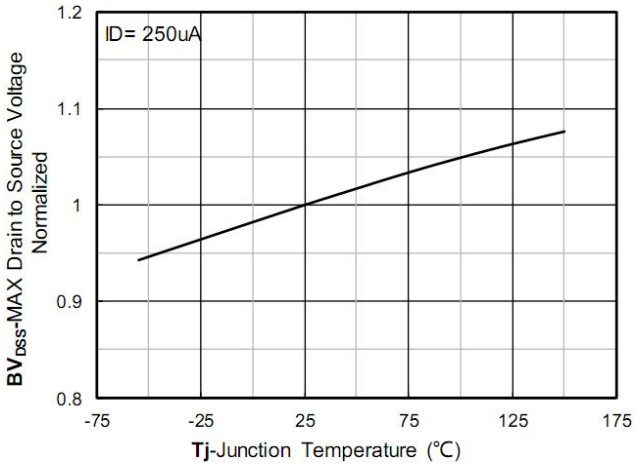


Figure 11. Normalized breakdown voltage

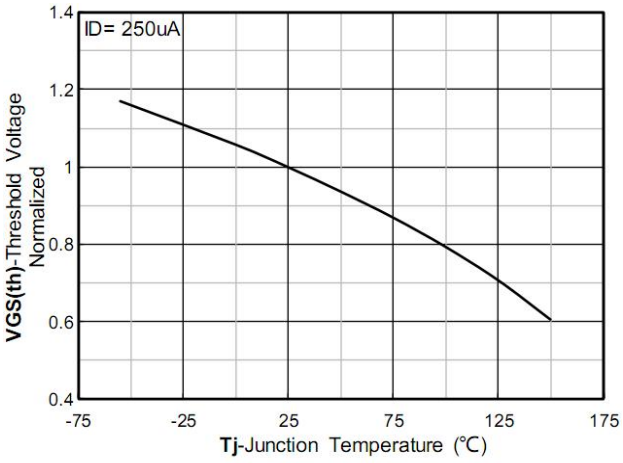


Figure 12. Normalized Threshold voltage

Typical Characteristics

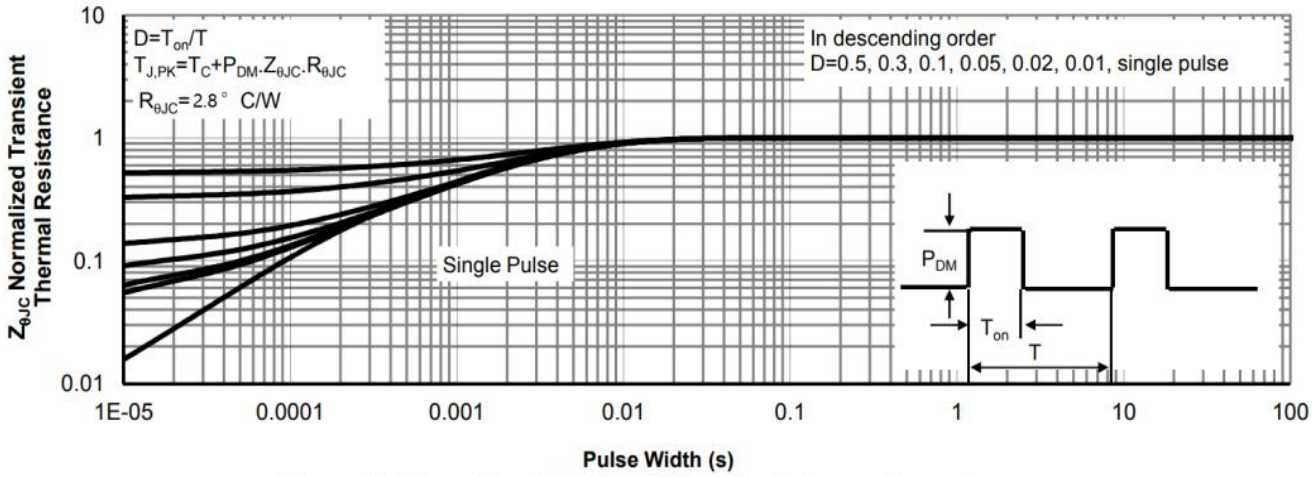
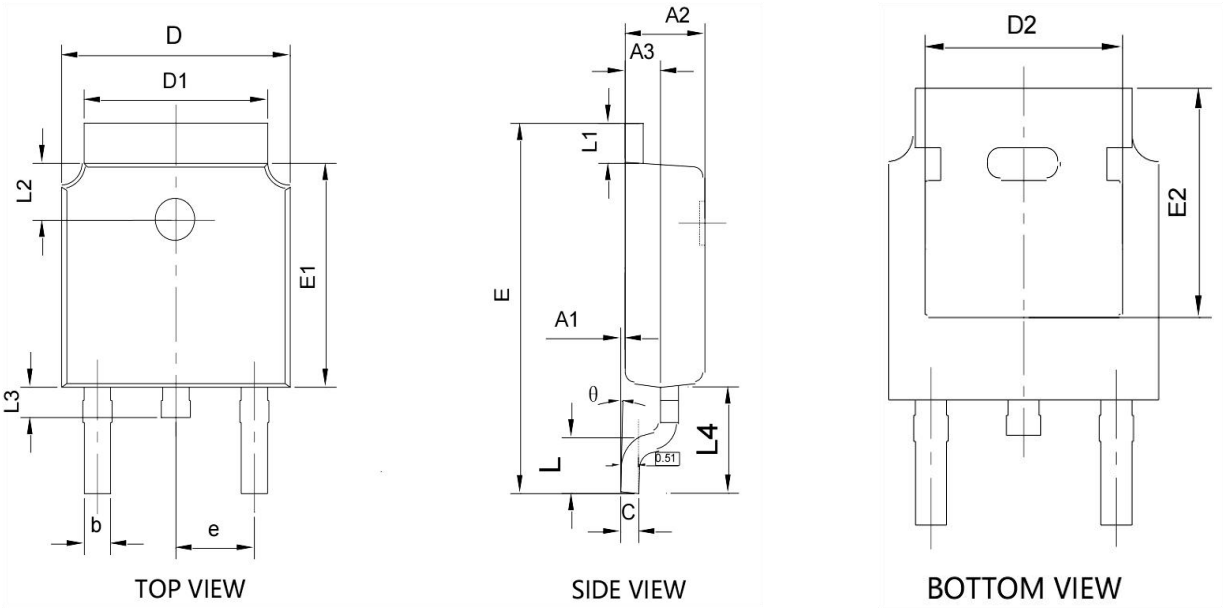


Figure 13. Normalized Maximum Transient Thermal Impedance

TO-252AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A1	0.000	0.200	0.000	0.008
A2	2.200	2.400	0.087	0.094
A3	0.900	1.100	0.035	0.043
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.150	5.450	0.203	0.215
D2	4.600	4.950	0.181	0.195
E	9.900	10.300	0.390	0.406
E1	6.000	6.200	0.236	0.244
E2	5.150	5.450	0.203	0.215
e	2.286 BSC.		0.090 BSC.	
L	1.250	1.750	0.049	0.069
L1	0.900	1.270	0.035	0.050
L2	1.400	1.900	0.055	0.075
L3	0.600	1.000	0.024	0.039
L4	2.900 REF.		0.114 REF.	
θ	0°	10°	0°	10°