AT023SN060MQTA-Q1

N-Channel Enhancement Mode MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
60V	31mΩ@10V	23A
	50mΩ@4.5V	

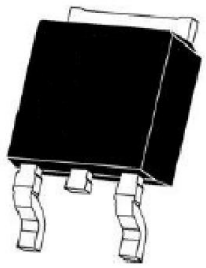
Feature

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

Application

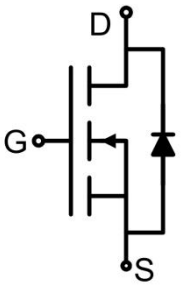
- Power switching application
- Uninterruptible power supply
- DC-DC convertor

Package

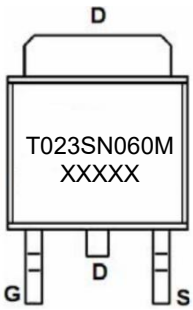


TO-252AB

Circuit diagram



Marking



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AS-1151475	2023/11/21	2026/05/08	B	6

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current[1,3] (V_{GS} =10V, Chip limitation)	I_D	23	A
Continuous Drain Current[1,3] (V_{GS} =10V,T_C =100℃)	I_D(100℃)	16	A
Pulsed Drain Current (t_p ≤10us)	I_{DM}	65	A
Single Pulse Avalanche Energy[2]	E_{AS}	56	mJ
Power Dissipation[1,3]	P_D	41.6	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	3.6	℃/W
Operating Junction Temperature	T_J	-55 ~ +175	℃
Storage Temperature	T_{STG}	-55 ~ +175	℃

Electrical characteristics (T_J=25 °C, 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	60			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =60V, 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	1.5	2	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =20A		24	31	mΩ
		V_{GS} =4.5V, I_D =10A		37	50	
Dynamic characteristics[4]						
Input Capacitance	C_{iss}	V_{DS} =30V, V_{GS} =0V, f =1MHz		920		pF
Output Capacitance	C_{oss}			65		
Reverse Transfer Capacitance	C_{rss}			53		
Total Gate Charge	Q_g	V_{DS} =30V, V_{GS} =10V, I_D =20A		18		nC
Gate-Source Charge	Q_{gs}			2.8		
Gate-Drain Charge	Q_{gd}			2.4		
Turn-on delay time	$t_{d(on)}$	V_{DS} =30V, V_{GS} =10V, I_D =20A R_G =2.7Ω		9.3		nS
Turn-on rise time	t_r			48.5		
Turn-off delay time	$t_{d(off)}$			19.4		
Turn-off fall time	t_f			4.6		
Source-Drain Diode characteristics						
Diode Forward Current	I_S	T_C =25℃			23	A
Diode Forward voltage	V_{SD}	V_{GS} =0V, I_S =20A			1.2	V
Reverse Recovery Time	T_{rr}	V_{GS} =0V, V_R =30V, I_F =20A di/dt =-100A/μs		18.7		nS
Reverse Recovery Charge	Q_{rr}			15.3		nC

Notes:

1) The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.

2) T_J =25℃, V_G =10V, R_G =25Ω, L =0.5mH, I_{AS} =15A.

3) Thermal resistance from junction to soldering point (on the exposed drain pad).

4) Guaranteed by design, not subject to production.

Typical Characteristics

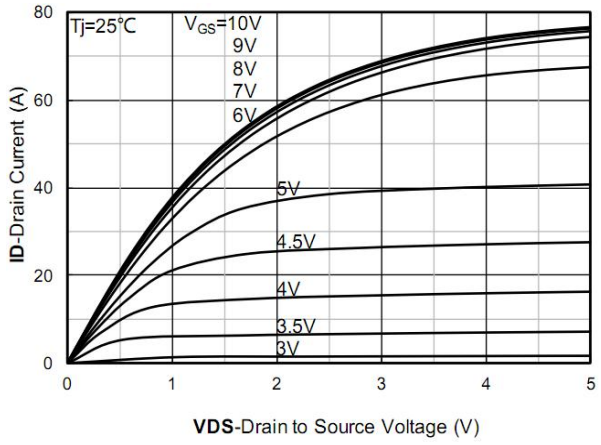


Figure 1. Output Characteristics; typical values

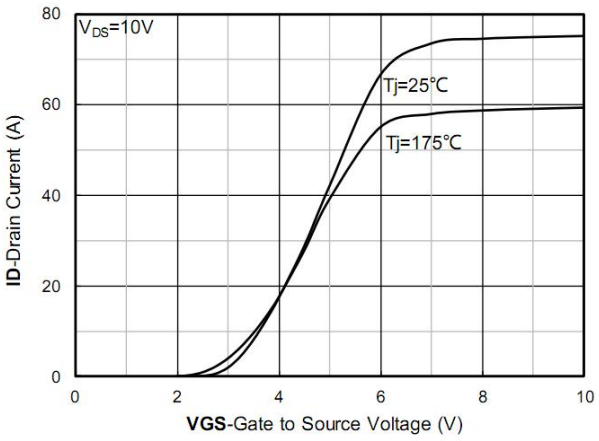


Figure 2. Transfer Characteristics; typical values

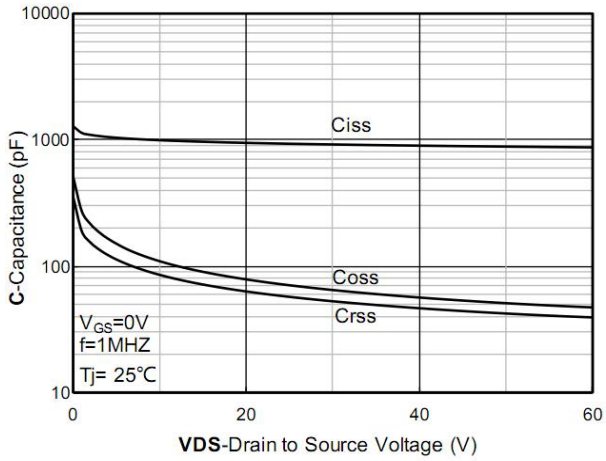


Figure 3. Capacitance Characteristics; typical values

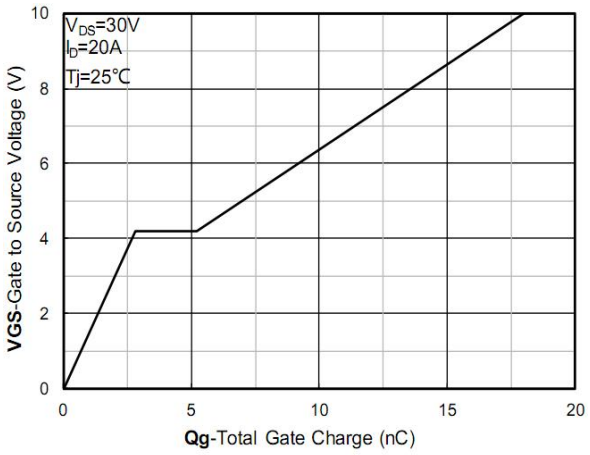


Figure 4. Gate Charge; typical values

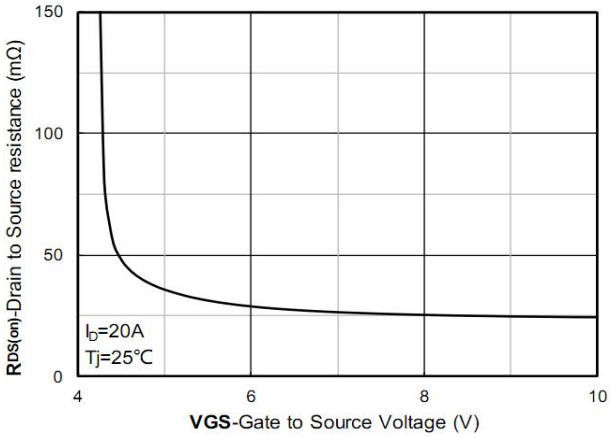


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

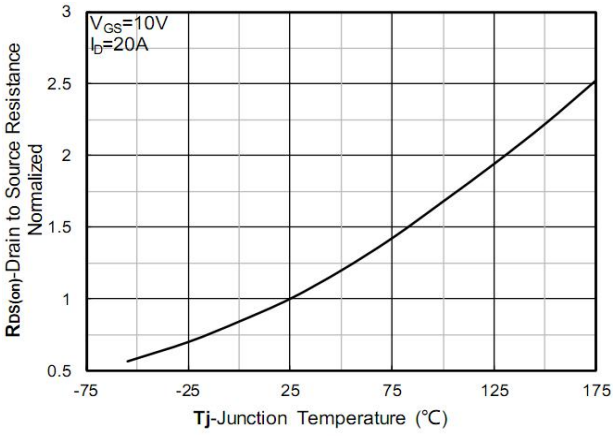


Figure 6. Normalized On-Resistance

Typical Characteristics

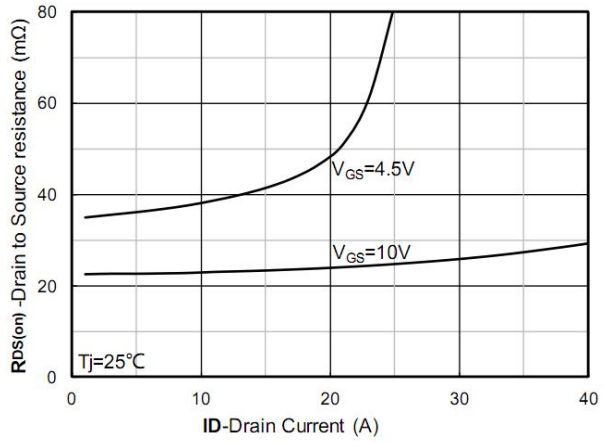


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

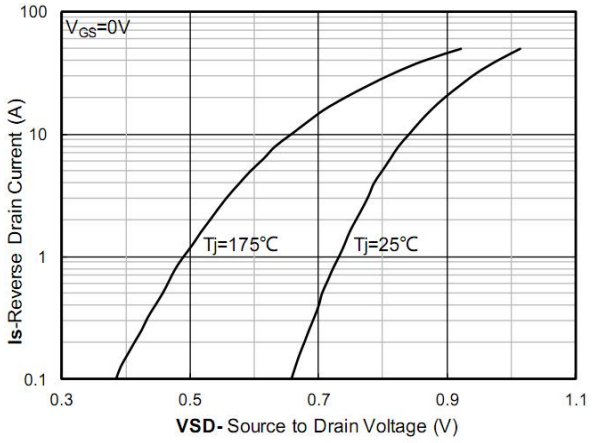


Figure 8. Forward characteristics of reverse diode; typical values

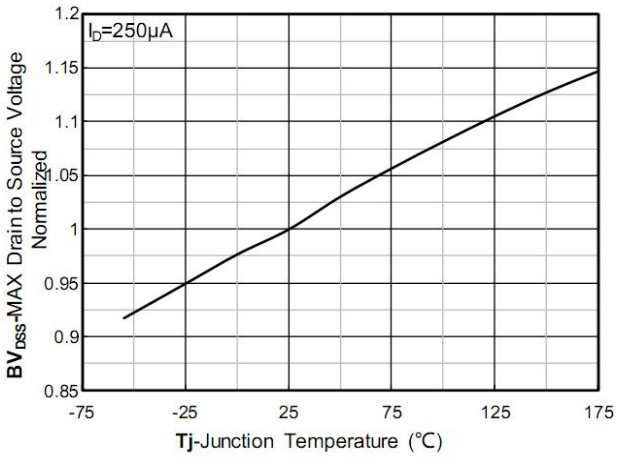


Figure 9. Normalized breakdown voltage

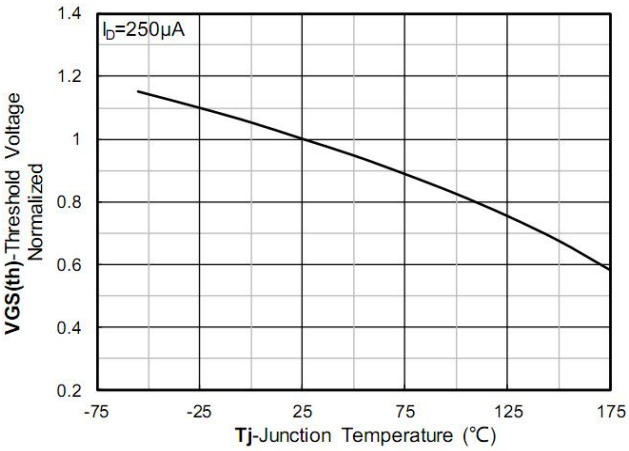


Figure 10. Normalized Threshold voltage

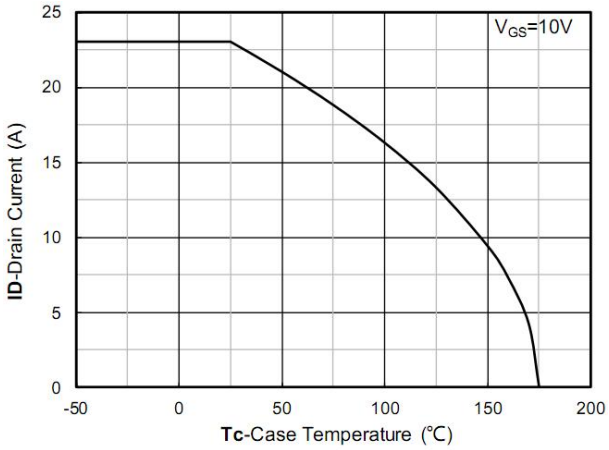


Figure 11. Current dissipation

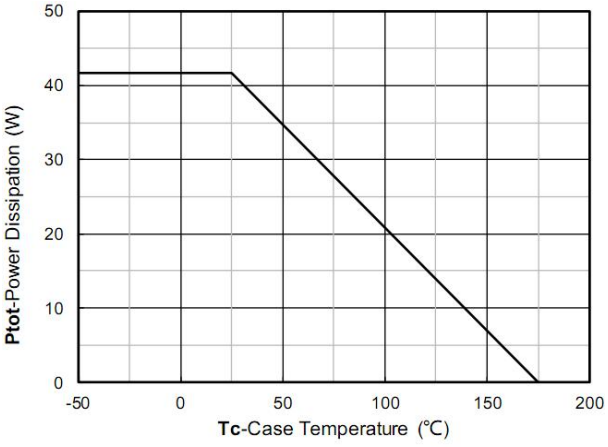


Figure 12. Power dissipation

Typical Characteristics

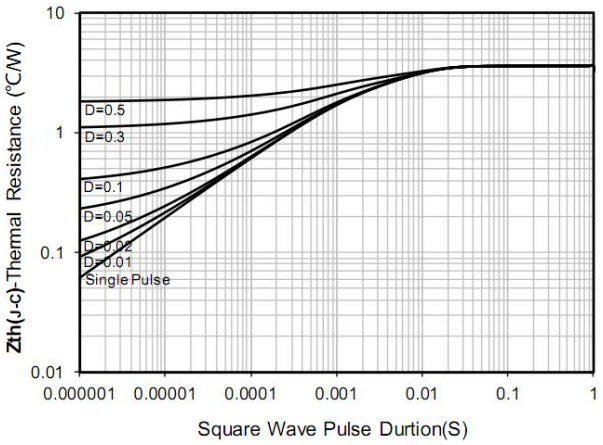


Figure 13. Maximum Transient Thermal Impedance

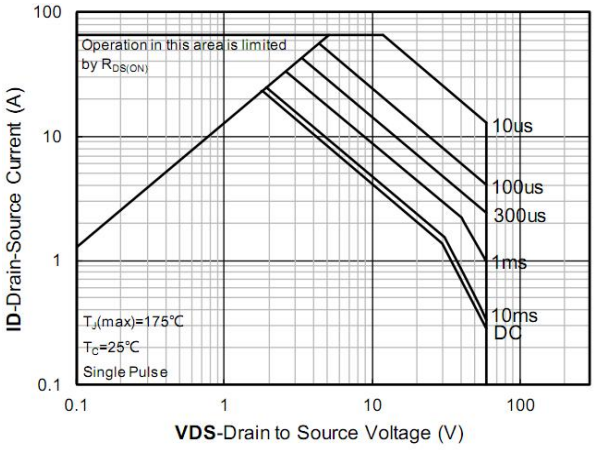
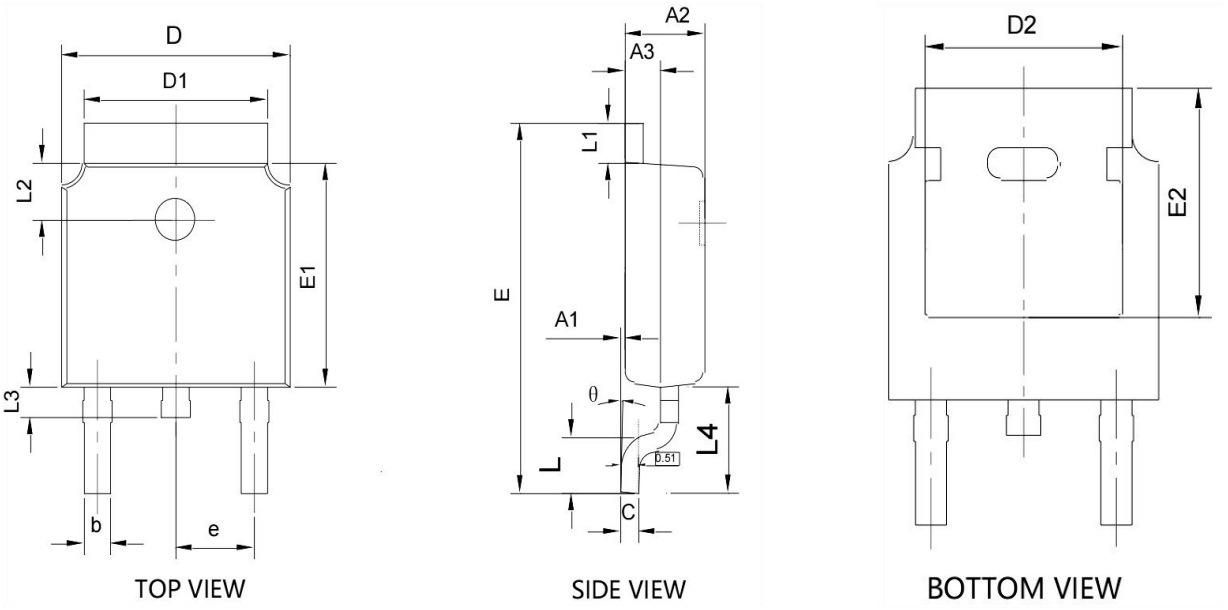


Figure 14. Safe Operation Area

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°