

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
20V	8mΩ@4.5V	30A
	9mΩ@2.5V	
	14mΩ@1.8V	

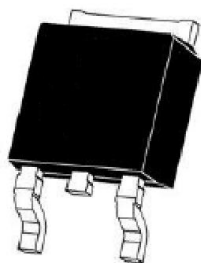
Feature

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

Application

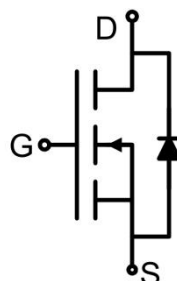
- High current load applications
- Load switch
- Hard switched and high frequency circuits
- Uninterruptible power supply

Package

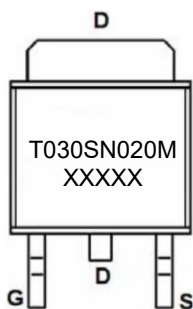


TO-252AB

Circuit diagram



Marking



Absolute maximum ratings ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 10	V
Continuous Drain Current ($T_C=25^{\circ}\text{C}$)	I_D	30	A
Continuous Drain Current ($T_C=100^{\circ}\text{C}$)	$I_{D(100^{\circ}\text{C})}$	19	A
Pulsed Drain Current ¹⁾	I_{DM}	125	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	64	mJ
Power Dissipation ($T_C=25^{\circ}\text{C}$)	P_D	25	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	5	$^{\circ}\text{C}/\text{W}$
Operating Junction Temperature	T_J	$-55 \sim +150$	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$

Electrical characteristics ($T_J=25^{\circ}\text{C}$, 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	20			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =20V, V _{GS} =0V			1	μA
Gate-body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±10V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.45	0.62	1	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =15A		5.6	8	mΩ
		V _{GS} =2.5V, I _D =7A		7.1	9	
		V _{GS} =1.8V, I _D =3A		10	14	
Dynamic characteristics ³⁾						
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, f =1MHz		1650		pF
Output Capacitance	C _{oss}			266		
Reverse Transfer Capacitance	C _{rss}			206		
Total Gate Charge	Q _g	V _{DS} =10V, V _{GS} =10V, I _D =30A		46.8		nC
Gate-Source Charge	Q _{gs}			4.6		
Gate-Drain Charge	Q _{gd}			7.3		
Turn-on delay time	t _{d(on)}	V _{DS} =10V, V _{GS} =10V, I _D =30A R _G =3Ω		13		nS
Turn-on rise time	t _r			110		
Turn-off delay time	t _{d(off)}			40		
Turn-off fall time	t _f			105		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				30	A
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =15A			1.2	V
Reverse Recovery Time	T _{rr}	I _F =30A, di/dt =100A/μs		19.5		nS
Reverse Recovery Charge	Q _{rr}			5.8		nC

Notes:

- 1) Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
- 2) $T_J=25^{\circ}\text{C}$, $V_{DD}=15\text{V}$, $V_G=5\text{V}$, $L=0.5\text{mH}$, $I_{AS}=16\text{A}$.
- 3) Guaranteed by design, not subject to production.

Typical Characteristics

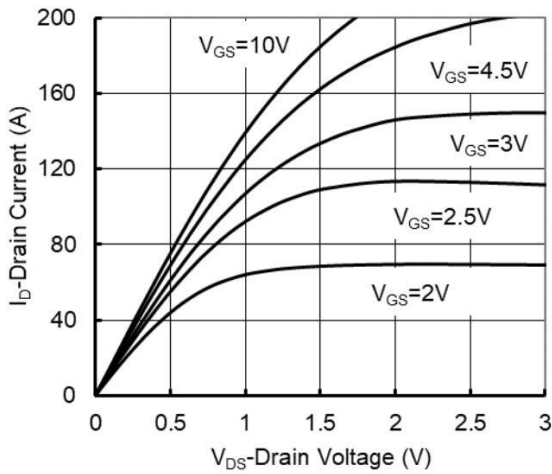


Figure1. Output Characteristics

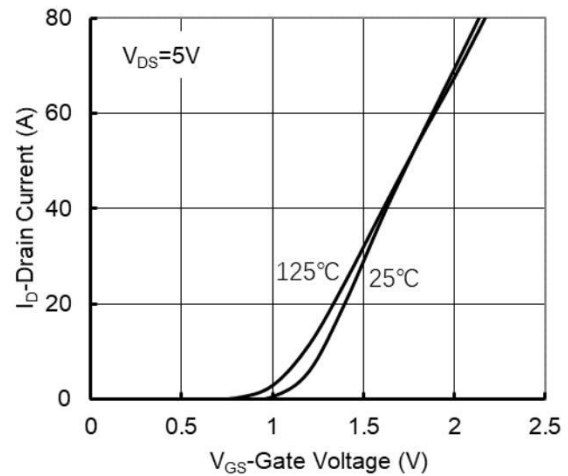


Figure2. Transfer Characteristics

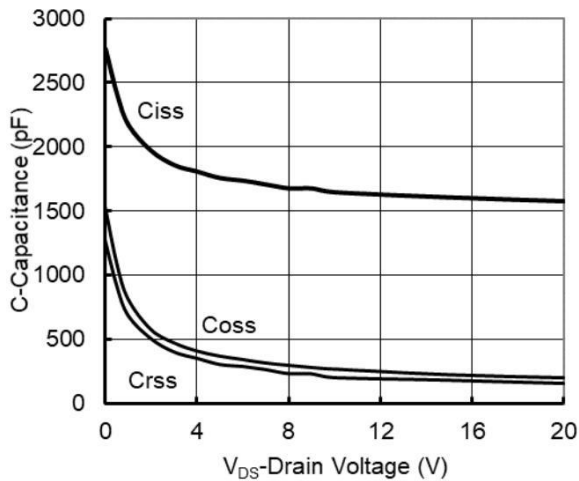


Figure3. Capacitance Characteristics

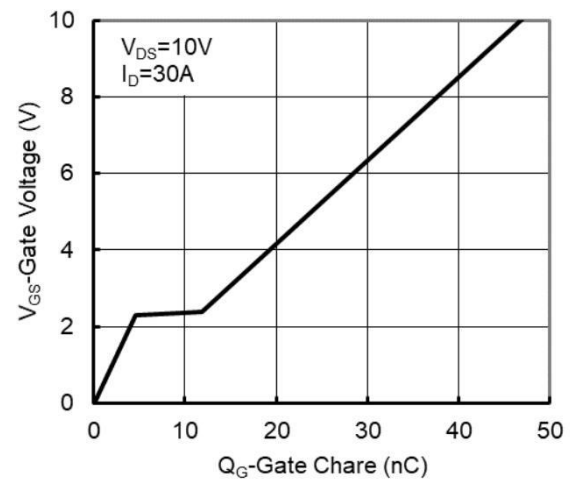


Figure4. Gate Charge

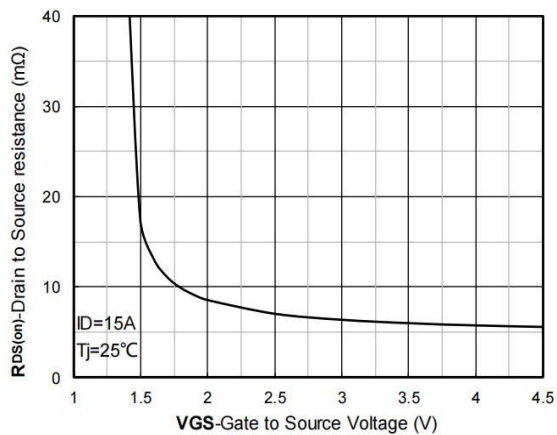


Figure5. On-Resistance vs. Gate to Source Voltage

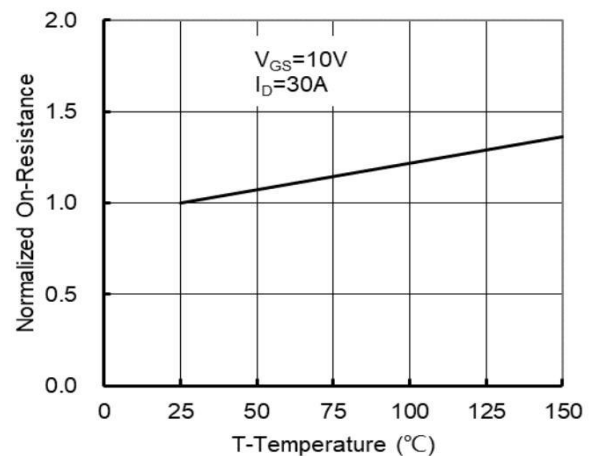


Figure6. On-Resistance vs. Junction Temperature

Typical Characteristics

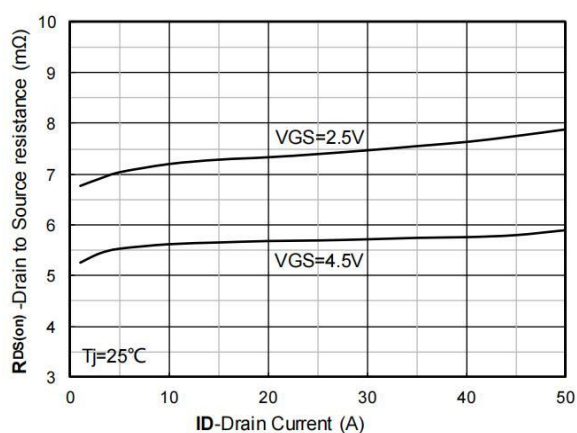


Figure 7. $R_{DS(on)}$ VS Drain Current

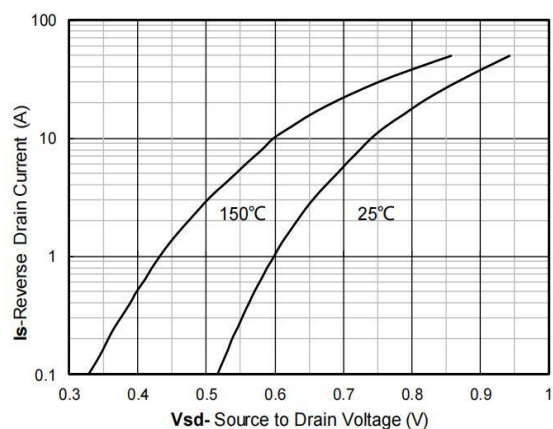


Figure 8. Forward characteristics of reverse diode

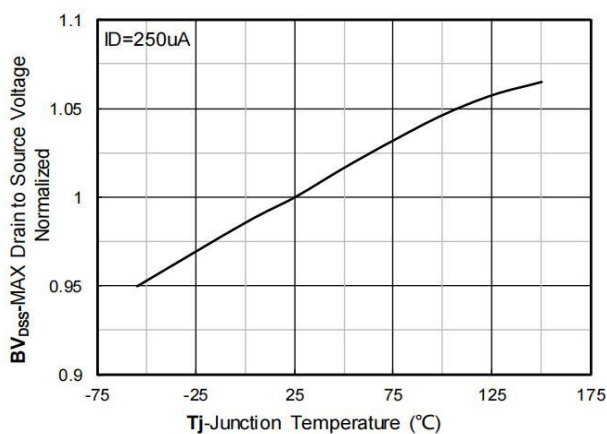


Figure 9. Normalized breakdown voltage

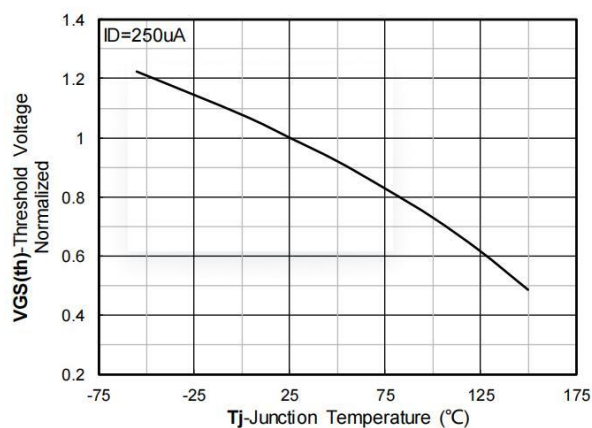


Figure 10. Normalized Threshold voltage

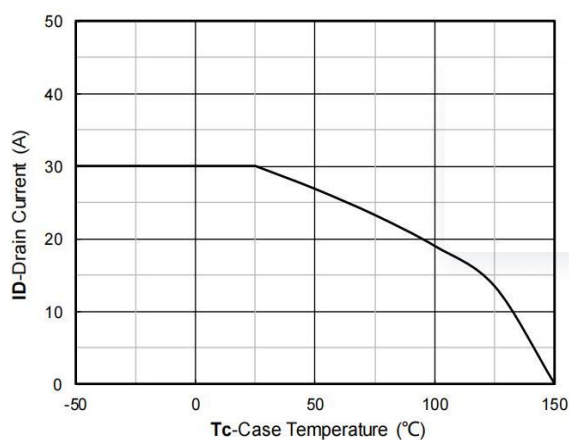


Figure 11. Current dissipation

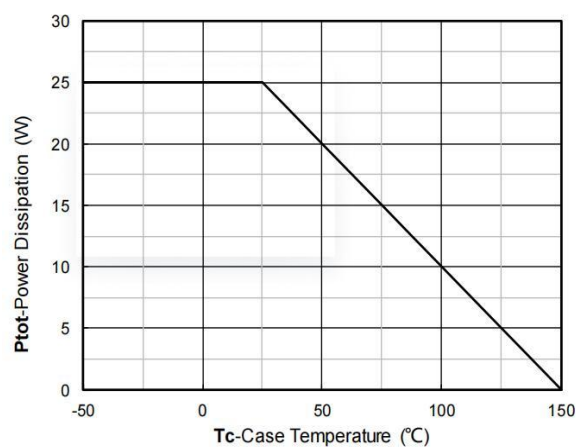


Figure 12. Power dissipation

Typical Characteristics

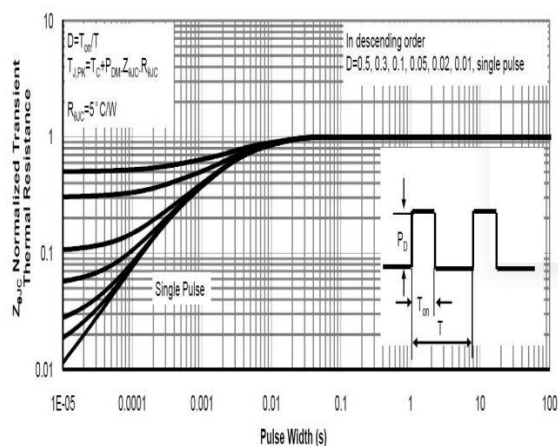


Figure 13. Normalized Maximum Transient Thermal Impedance

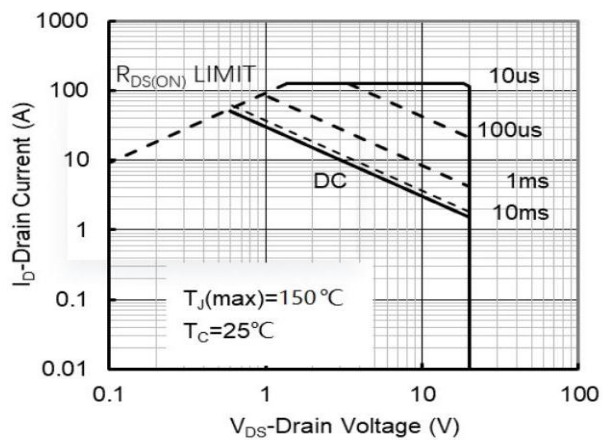
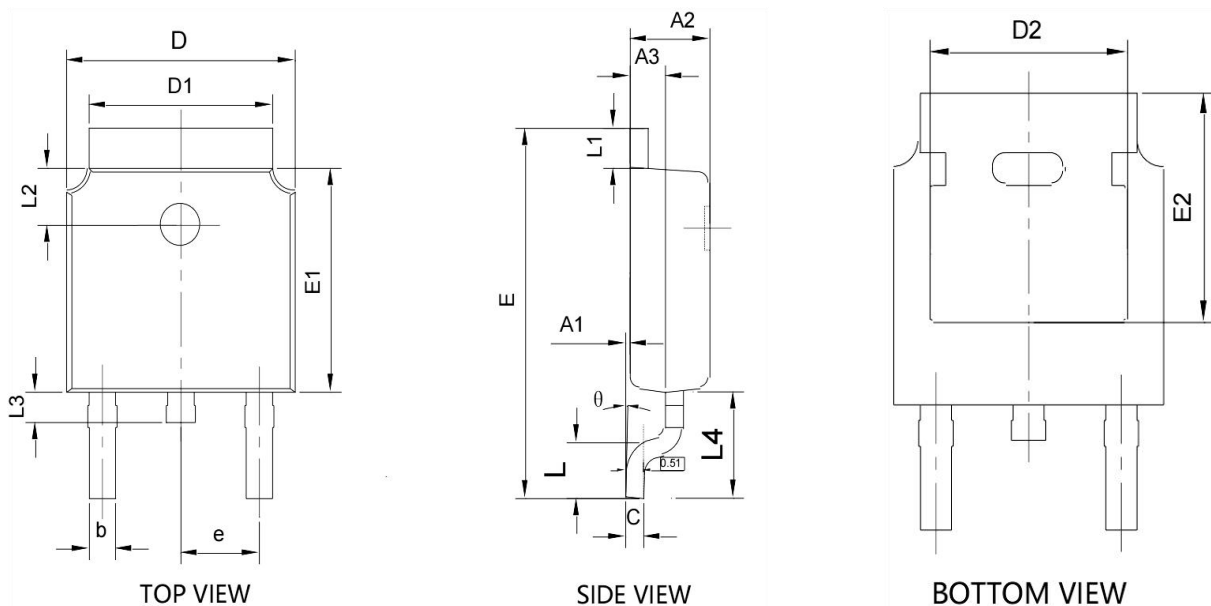


Figure 14. Safe Operation Area

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°