

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	2.5mΩ@10V	130A

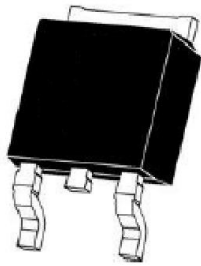
Feature

- Split gate trench MOSFET technology
- High density cell design for low $R_{DS(on)}$
- Excellent package for heat dissipation
- Suffix "-Q1" for AEC-Q101

Application

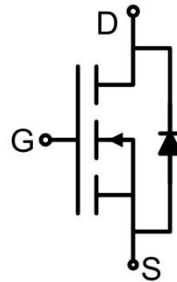
- Power switching application
- Uninterruptible power supply
- DC-DC convertor

Package

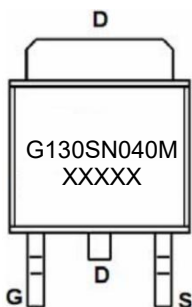


TO-252AB

Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C=25^\circ\text{C}$)	I_D	130	A
Continuous Drain Current ($T_C=100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	92	A
Pulsed Drain Current ¹⁾	I_{DM}	390	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	676	mJ
Power Dissipation ³⁾	P_D	125	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.2	$^\circ\text{C}/\text{W}$
Operating Junction Temperature	T_J	-55 ~ +175	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +175	$^\circ\text{C}$

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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu\text{A}$	40			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 40V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2	3	4	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$		1.9	2.5	m Ω
Dynamic characteristics⁴⁾						
Input Capacitance	C_{iss}	$V_{DS} = 20V, V_{GS} = 0V, f = 1\text{MHz}$		4380		pF
Output Capacitance	C_{oss}			1490		
Reverse Transfer Capacitance	C_{rss}			30		
Total Gate Charge	Q_g	$V_{DS} = 20V, V_{GS} = 10V, I_D = 55A$		56.56		nC
Gate-Source Charge	Q_{gs}			27		
Gate-Drain Charge	Q_{gd}			5.66		
Turn-on delay time	$t_{d(on)}$	$V_{DS} = 20V, V_{GS} = 10V, I_D = 55A$ $R_G = 3\Omega$		21.8		nS
Turn-on rise time	t_r			8.6		
Turn-off delay time	$t_{d(off)}$			43.8		
Turn-off fall time	t_f			51.7		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				130	A
Diode Forward voltage	V_{SD}	$V_{GS} = 0V, I_S = 20A$			1.2	V
Reverse Recovery Time	T_{rr}	$I_F = 55A, di/dt = -100A/\mu\text{s}$		58.2		nS
Reverse Recovery Charge	Q_{rr}			52.58		nC

Notes:

- 1) Repetitive rating; pulse width limited by max. junction temperature.
- 2) $T_J=25^\circ\text{C}$, $V_G=10V$, $R_G=25\Omega$, $L=2\text{mH}$, $I_{AS}=26A$.
- 3) P_a is based on max. junction temperature, using junction-case thermal resistance.
- 4) Guaranteed by design, not subject to production.

Typical Characteristics

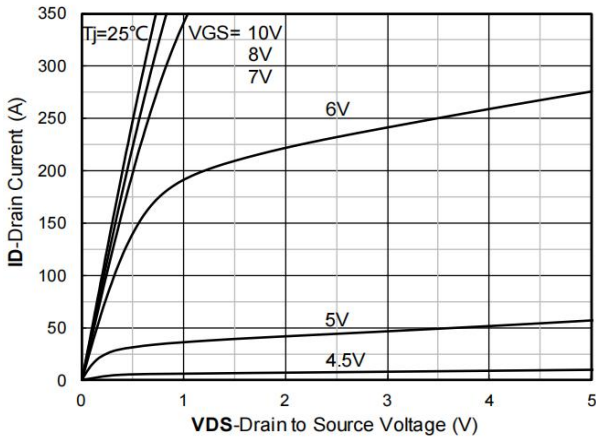


Figure1. Output Characteristics

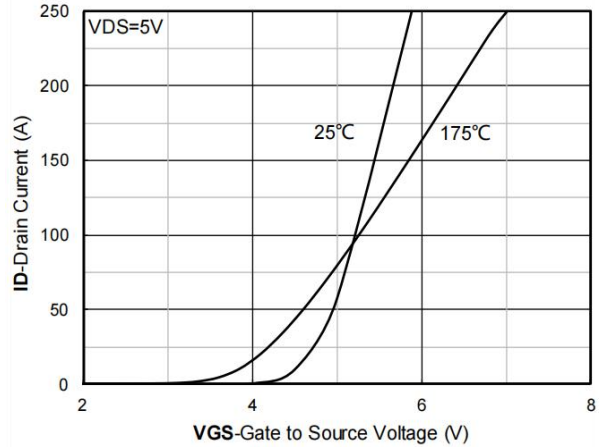


Figure2. Transfer Characteristics

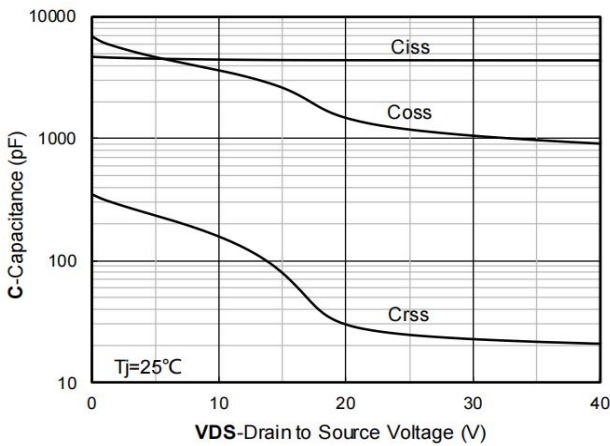


Figure3. Capacitance Characteristics

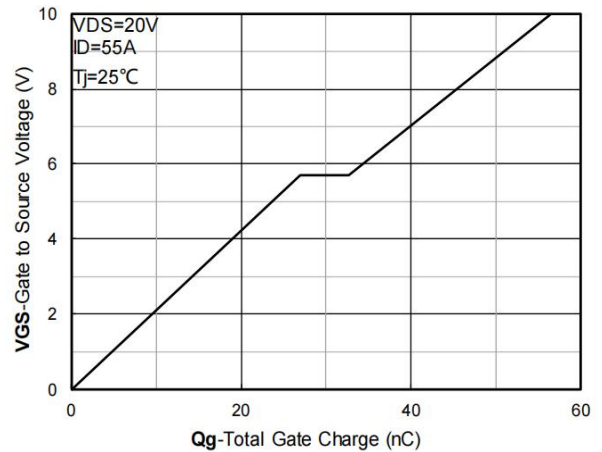


Figure4. Gate Charge

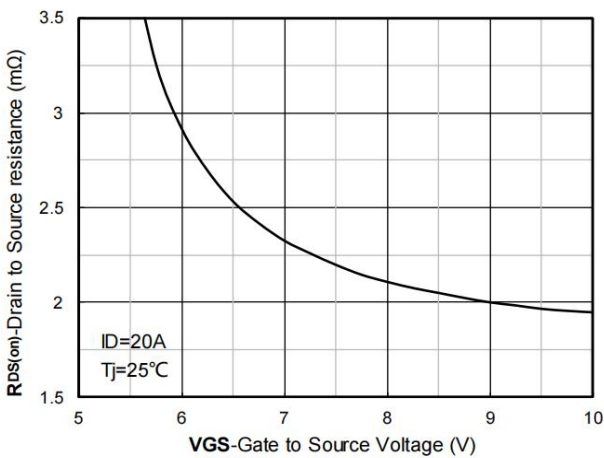


Figure5. On-Resistance vs Gate to Source Voltage

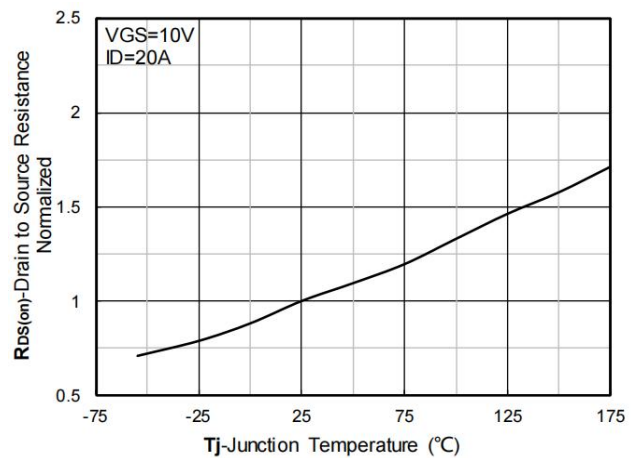


Figure6. Normalized On-Resistance

Typical Characteristics

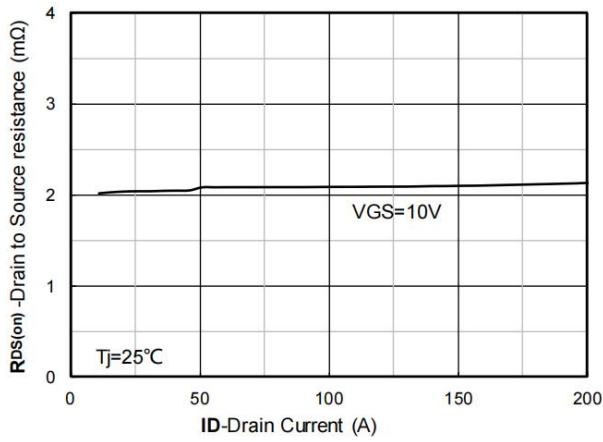


Figure7. $R_{DS(on)}$ VS Drain Current

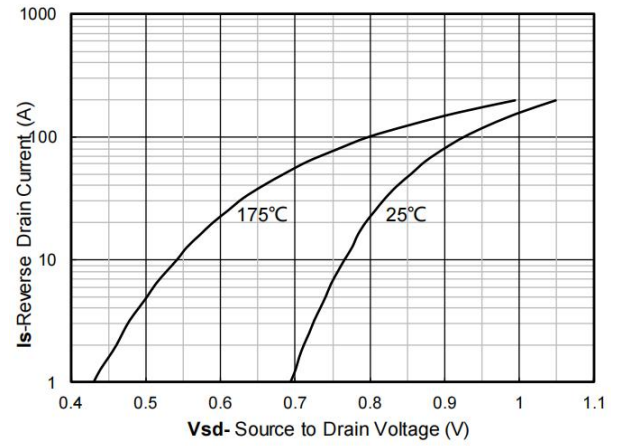


Figure8. Forward characteristics of reverse diode

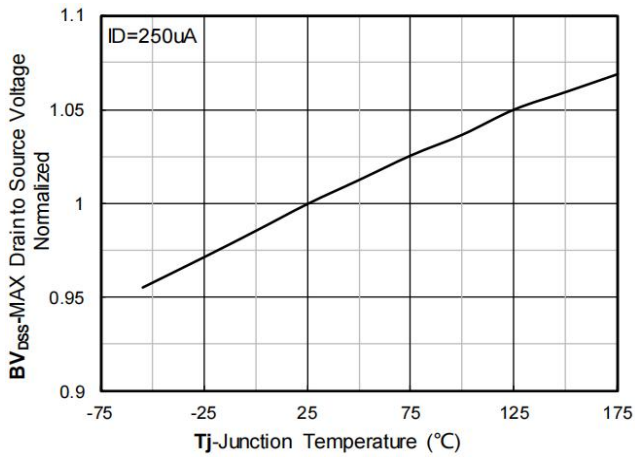


Figure9. Normalized breakdown voltage

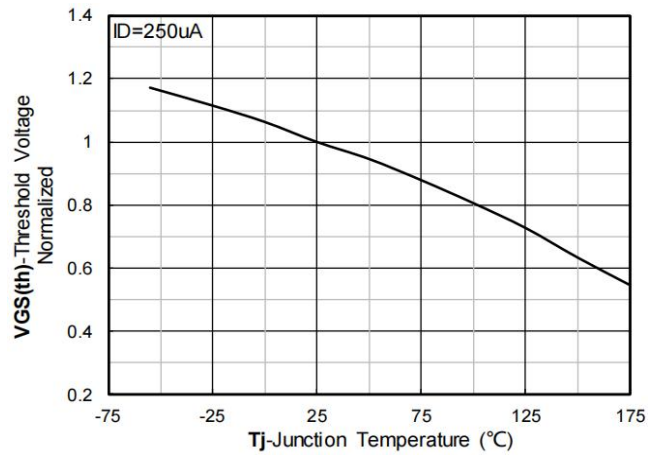


Figure10. Normalized Threshold voltage

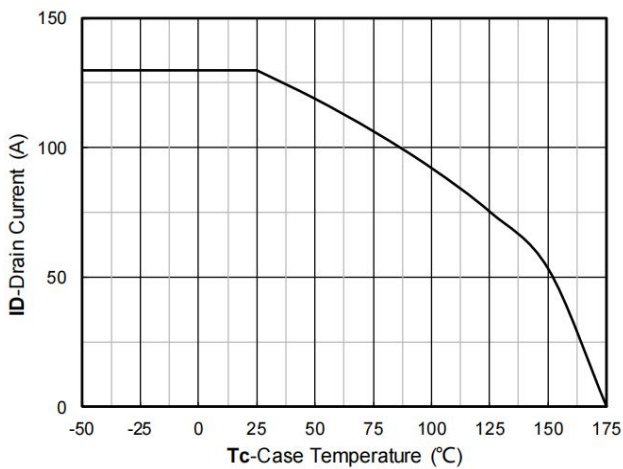


Figure11. Current dissipation

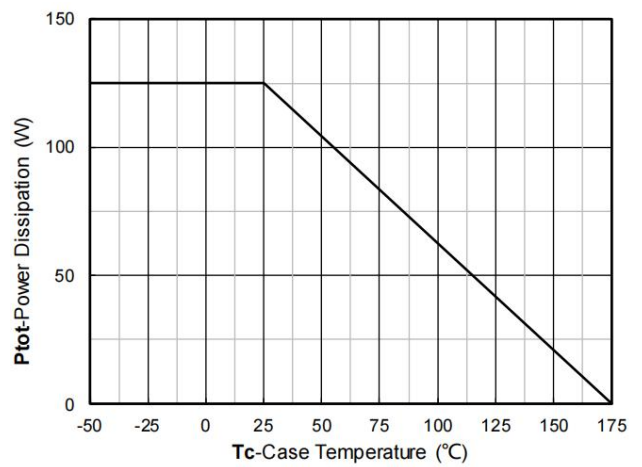


Figure12. Power dissipation

Typical Characteristics

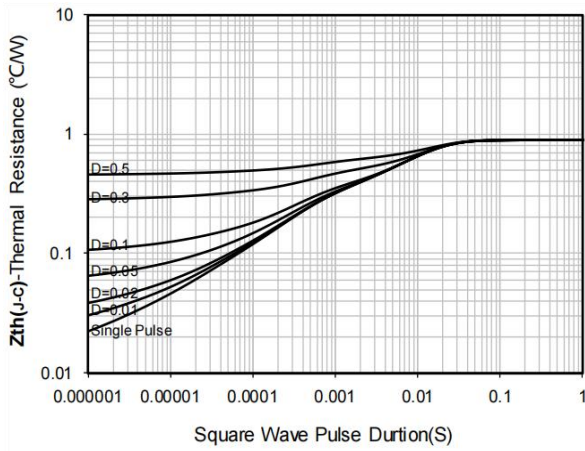


Figure13. Maximum Transient Thermal Impedance

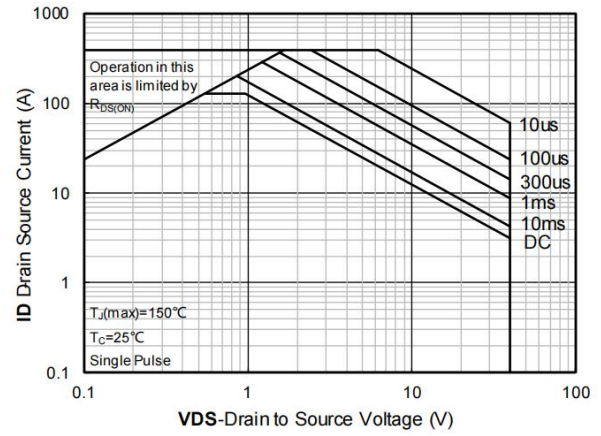
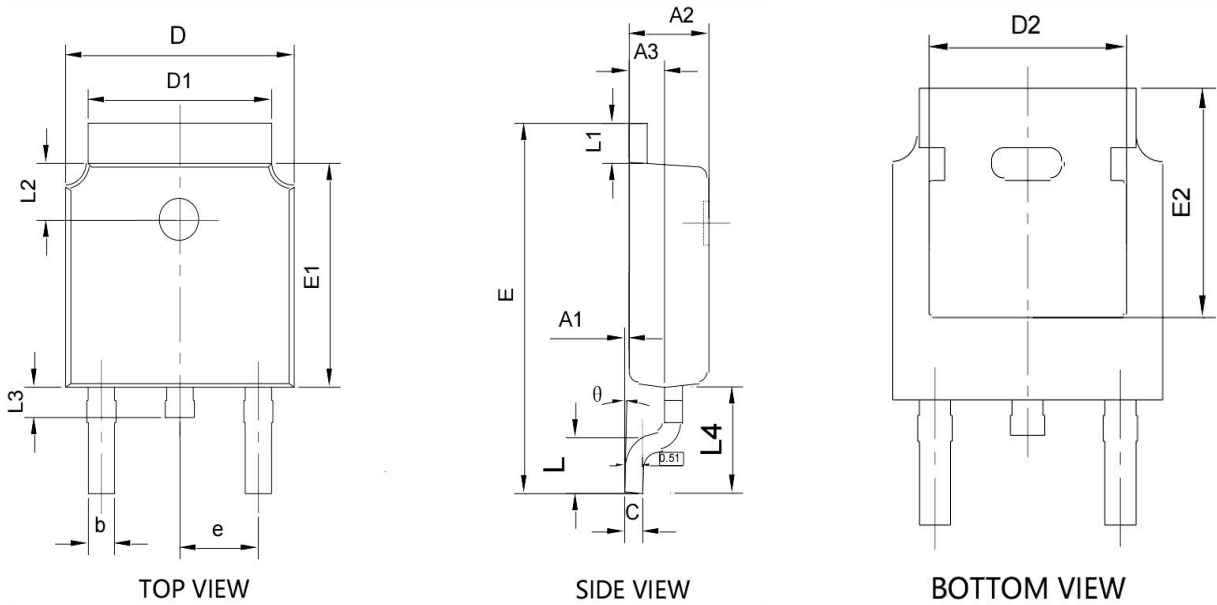


Figure14. Safe Operation Area

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°