

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	1.7mΩ@10V	170A

Feature

- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- Excellent package for heat dissipation
- Suffix "-Q1" for AEC-Q101

Application

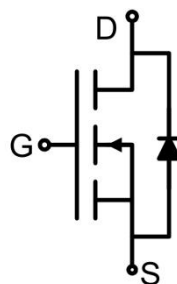
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

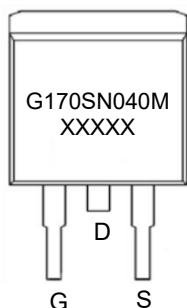


TO-263AB

Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	170	A
Continuous Drain Current ($T_c=100^\circ\text{C}$)	$I_D (100^\circ\text{C})$	120	A
Pulsed Drain Current	I_{DM}	680	A
Power Dissipation	P_D	250	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.6	$^\circ\text{C/W}$
Single pulse avalanche energy ¹⁾	E_{AS}	1200	mJ
Junction Temperature	T_J	175	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +175	$^\circ\text{C}$

Electrical characteristics ($T_c=25^\circ\text{C}$, 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	40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =40V,V _{GS} = 0V			1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} = 0V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	3	4	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =85A		1.4	1.7	mΩ
Dynamic characteristics ⁴⁾						
Input Capacitance	C _{iss}	V _{DS} =20V,V _{GS} =0V,f =1MHz		5670		pF
Output Capacitance	C _{oss}			2550		
Reverse Transfer Capacitance	C _{rss}			110		
Total Gate Charge	Q _g	V _{DS} =20V,V _{GS} =10V,I _D =85A		88.6		nC
Gate-Source Charge	Q _{gs}			28		
Gate-Drain Charge	Q _{gd}			13		
Turn-on delay time	t _{d(on)}	V _{DD} =20V,V _{GS} =10V, I _D =85A,R _G =1.6Ω		13.5		nS
Turn-on rise time	t _r			7.2		
Turn-off delay time	t _{d(off)}			55		
Turn-off fall time	t _f			8.6		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				170	A
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =85A			1.2	V
Reverse Recovery Time	t _{rr}	I _F =I _S , di/dt =100A/μs		33		nS
Reverse Recovery Charge	Q _{rr}	T _J =25℃		119		nC

Notes:

- 1) EAS condition : $T_J=25^\circ\text{C}, V_{DD}=20V, V_G=10V, L=0.5mH, R_g=25\Omega$.
- 2) Guaranteed by design, not subject to production testing.

Typical Characteristics

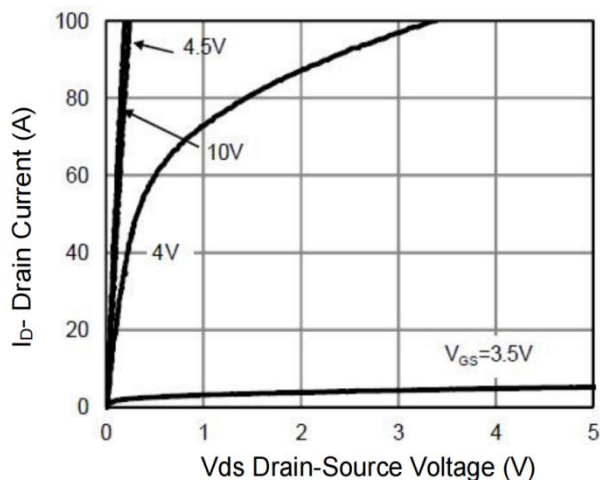


Figure 1 Output Characteristics

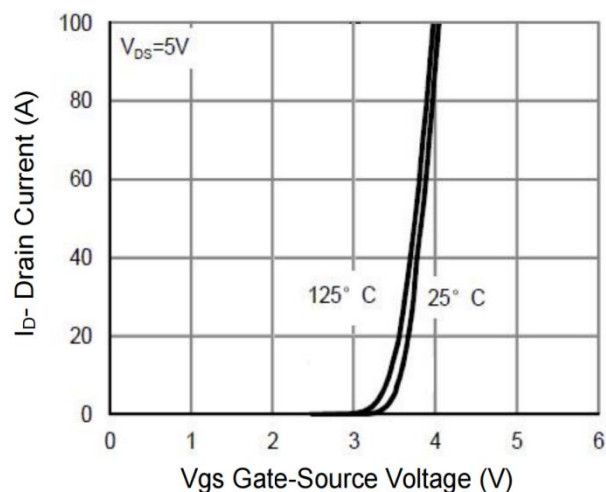


Figure 2 Transfer Characteristics

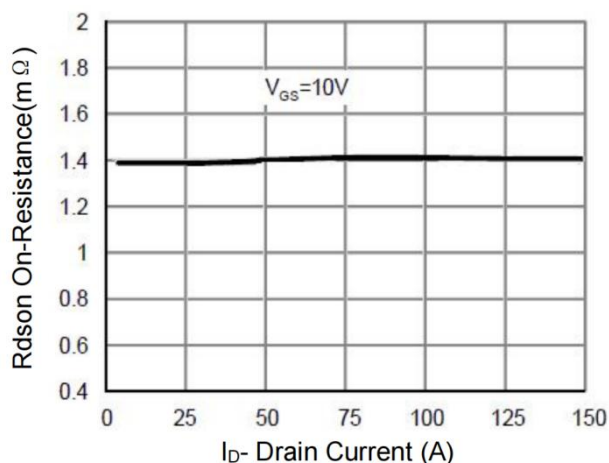


Figure 3 Rdson- Drain Current

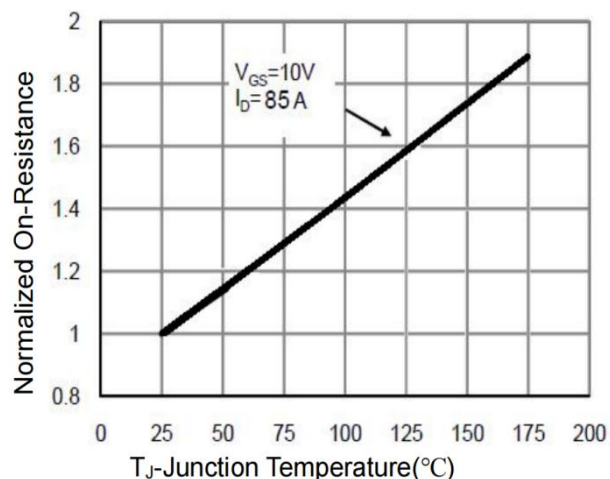


Figure 4 Rdson-Junction Temperature

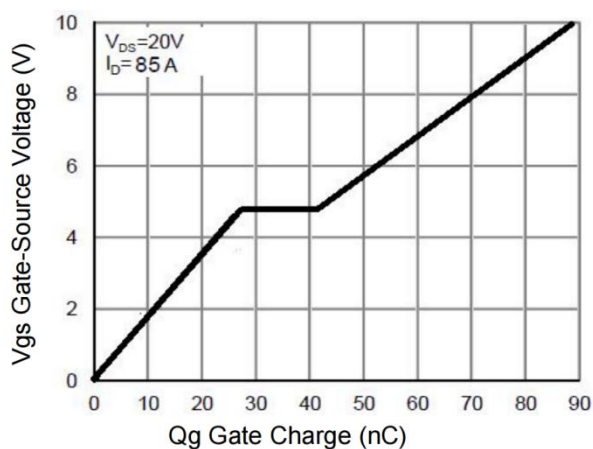


Figure 5 Gate Charge

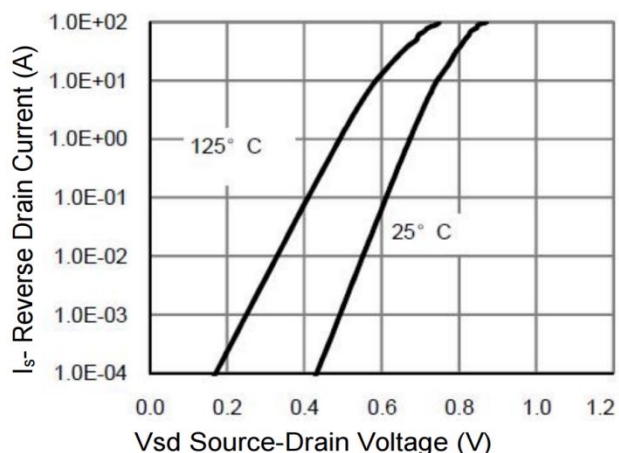


Figure 6 Source- Drain Diode Forward

Typical Characteristics

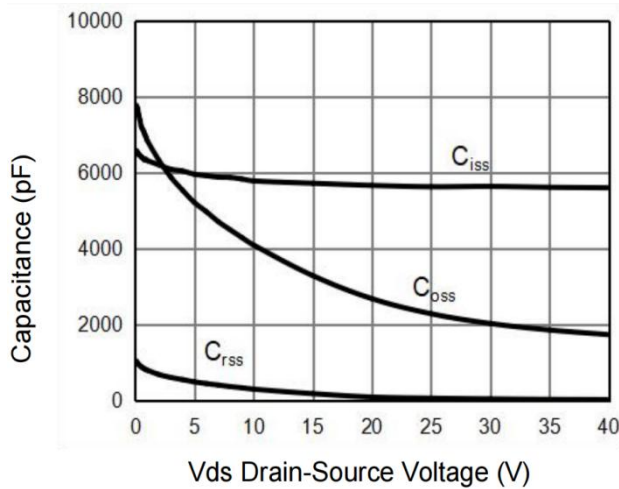


Figure 7 Capacitance vs Vds

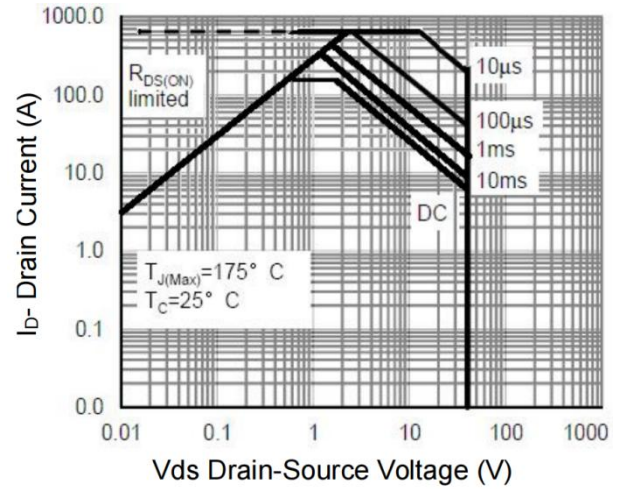


Figure 8 Safe Operation Area (Note 3)

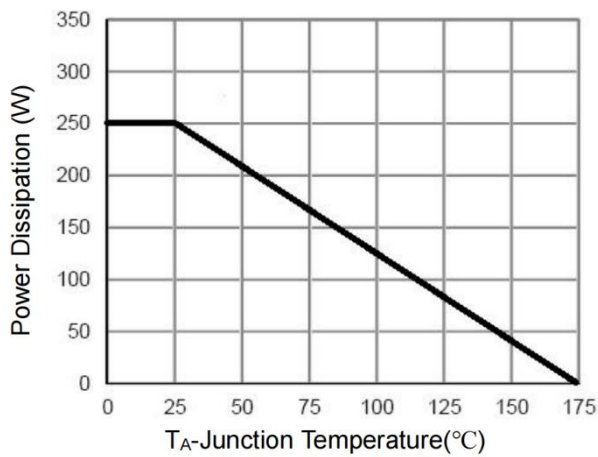


Figure 9 Power De-rating

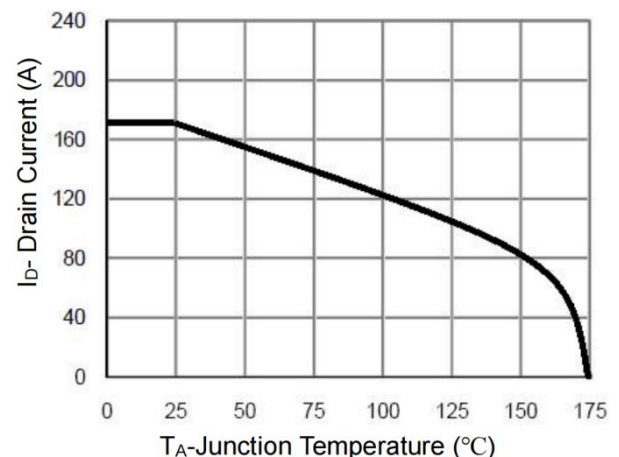


Figure 10 Current De-rating

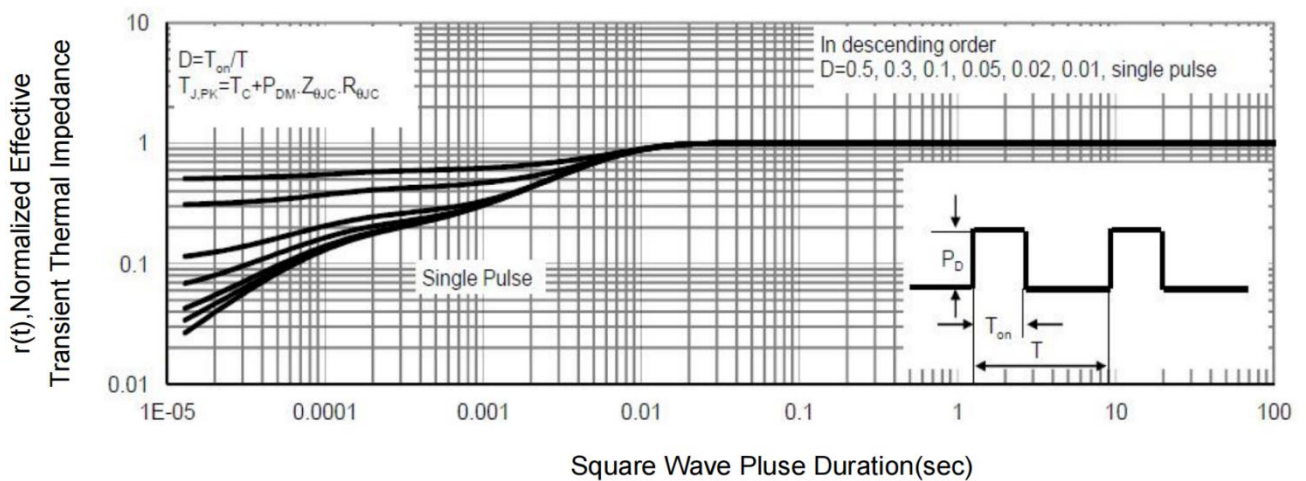
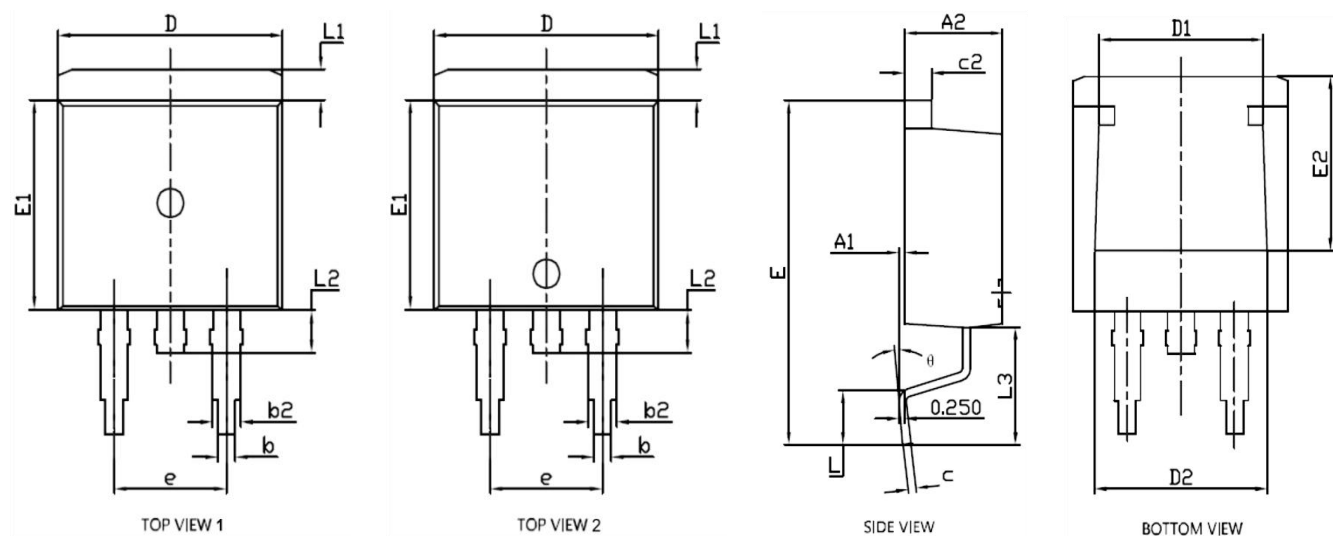


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-263AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A1	0.000	0.250	0.000	0.010
A2	4.240	4.640	0.167	0.183
b	0.700	0.900	0.028	0.035
b2	1.200	1.700	0.047	0.067
c	0.400	0.600	0.016	0.024
c2	1.150	1.400	0.045	0.055
D	9.800	10.360	0.386	0.408
D1	6.890	-	0.271	-
D2	7.700	-	0.303	-
E	14.610	15.880	0.575	0.625
E1	8.820	9.300	0.347	0.366
E2	6.86	-	0.270	-
e	5.080 BSC.		0.200 BSC.	
L	1.780	2.790	0.070	0.110
L1	1.120	1.420	0.044	0.056
L2	1.500 REF.		0.059 REF.	
L3	5.000 REF.		0.197 REF.	
θ	0°	8°	0°	8°