

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-40V	5.45mΩ@-10V	-120A
	8.5mΩ@-4.5V	

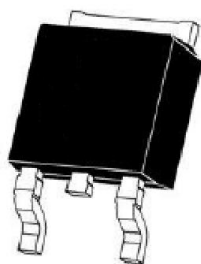
Feature

- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- 175°C operating temperature
- Suffix "-Q1" for AEC-Q101

Application

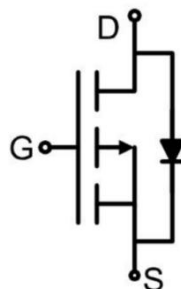
- Ideal for high-frequency switching and synchronous rectification
- DC/DC converter

Package

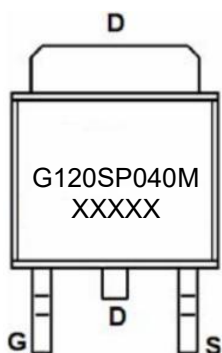


TO-252AB

Circuit diagram



Marking



Absolute maximum ratings (T_c=25°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	-120	A
Continuous Drain Current (T _c =100°C)	I _D (100°C)	-84	A
Pulsed Drain Current	I _{DM}	-480	A
Single Pulse Avalanche Energy ¹⁾	E _{AS}	1155	mJ
Power Dissipation	P _D	220	W
Thermal Resistance Junction to Case	R _{θJC}	0.68	°C/W
Operating Junction Temperature	T _J	-55 ~ +175	°C
Storage Temperature	T _{STG}	-55 ~ +175	°C

Electrical characteristics (T_c=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.6	-2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-20A$		4.55	5.45	m Ω
		$V_{GS}=-4.5V, I_D=-20A$		7	8.5	
Dynamic characteristics ²⁾						
Input Capacitance	C_{iss}	$V_{DS}=-20V, V_{GS}=0V$ $f=1MHz$		6100		pF
Output Capacitance	C_{oss}			1500		
Reverse Transfer Capacitance	C_{rss}			95		
Total Gate Charge	Q_g	$V_{DS}=-20V, V_{GS}=-10V$ $I_D=-20A$		86		nC
Gate-Source Charge	Q_{gs}			17.5		
Gate-Drain Charge	Q_{gd}			10.5		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=-20V, V_{GS}=-10V$ $I_D=-20A, R_G=1.6\Omega$		13		nS
Turn-on rise time	t_r			30		
Turn-off delay time	$t_{d(off)}$			75		
Turn-off fall time	t_f			14		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				-120	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=-20A$			-1.2	V
Reverse Recovery Time	T_{rr}	$I_F=-60A, di/dt=-100A/\mu s$		55		nS
Reverse Recovery Charge	Q_{rr}	$T_J=25^{\circ}C$		75		nC

Notes:

1) EAS condition : T_J = 25°C, V_{DD} = -20V, V_G = -10V, L = 0.5mH, R_G = 25Ω.

2) Guaranteed by design, not subject to production testing.

Typical Characteristics

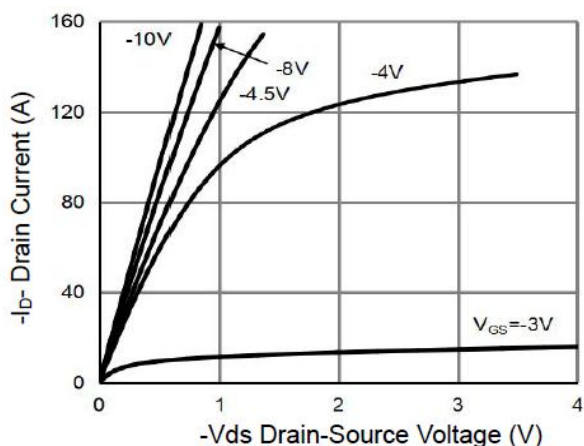


Figure 1 Output Characteristics

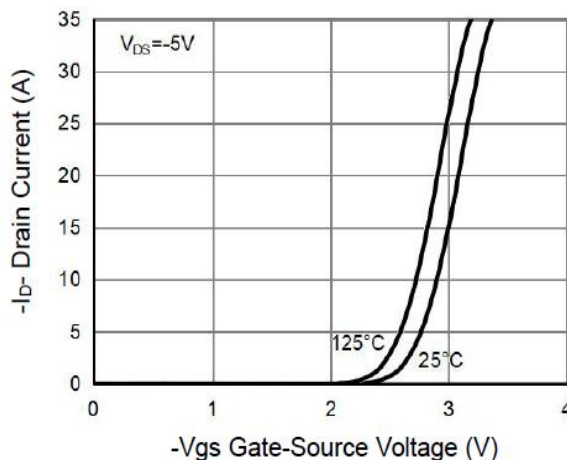


Figure 2 Transfer Characteristics

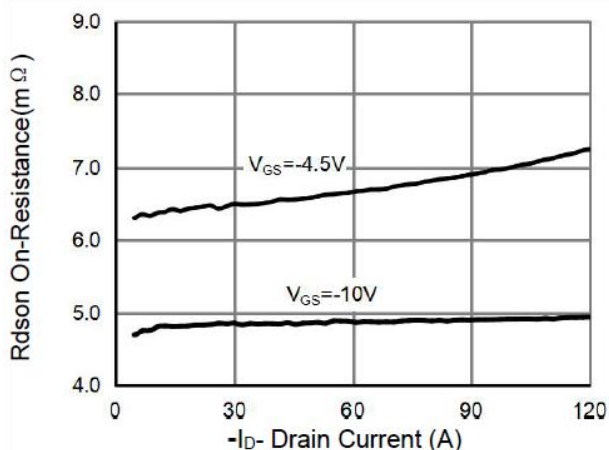


Figure 3 Rdson- Drain Current

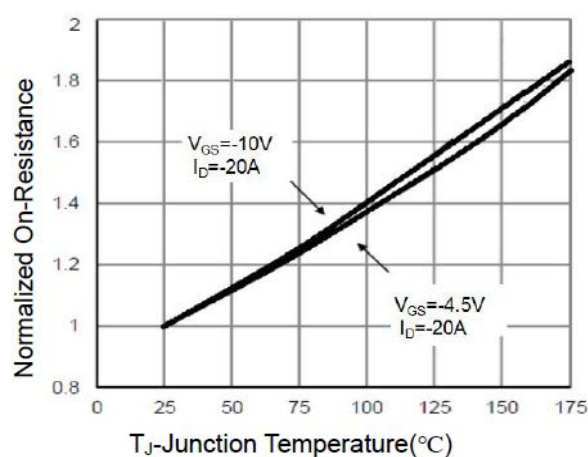


Figure 4 Rdson-Junction Temperature

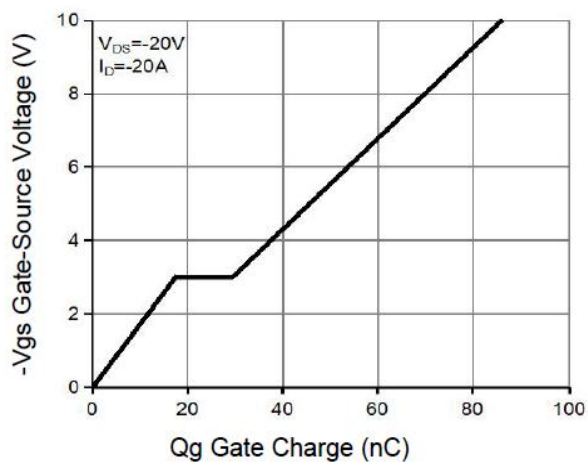


Figure 5 Gate Charge

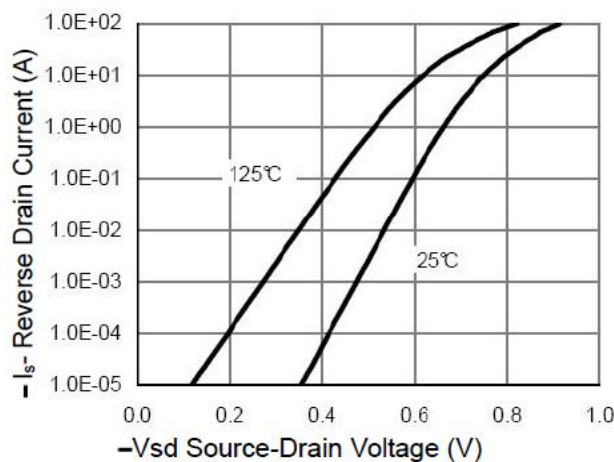


Figure 6 Source- Drain Diode Forward

Typical Characteristics

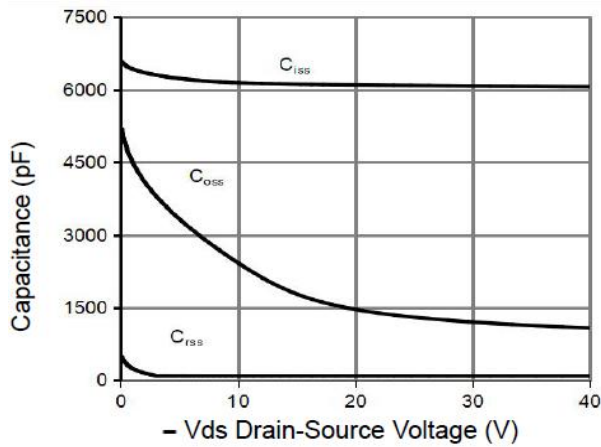


Figure 7 Capacitance vs Vds

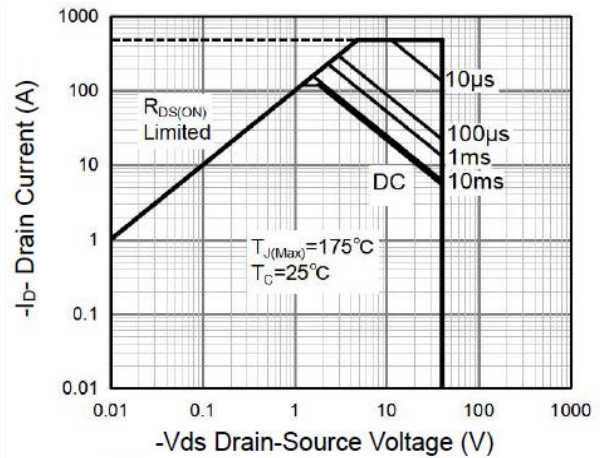


Figure 8 Safe Operation Area

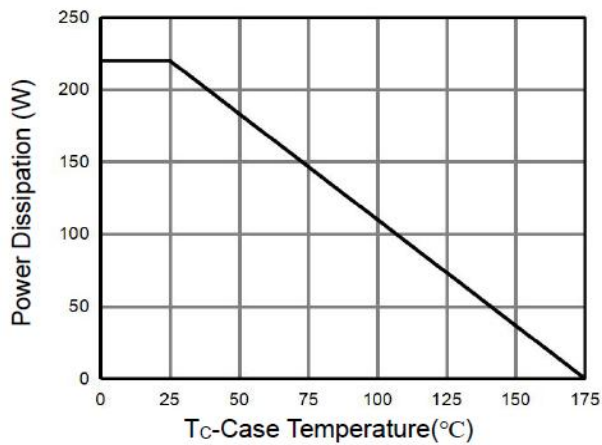


Figure 9 Power De-rating

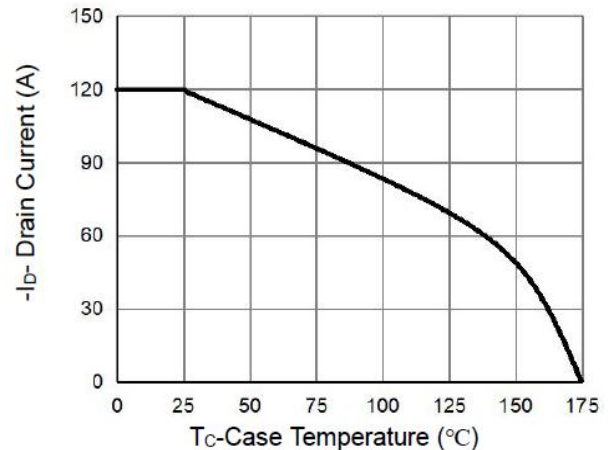


Figure 10 Current De-rating

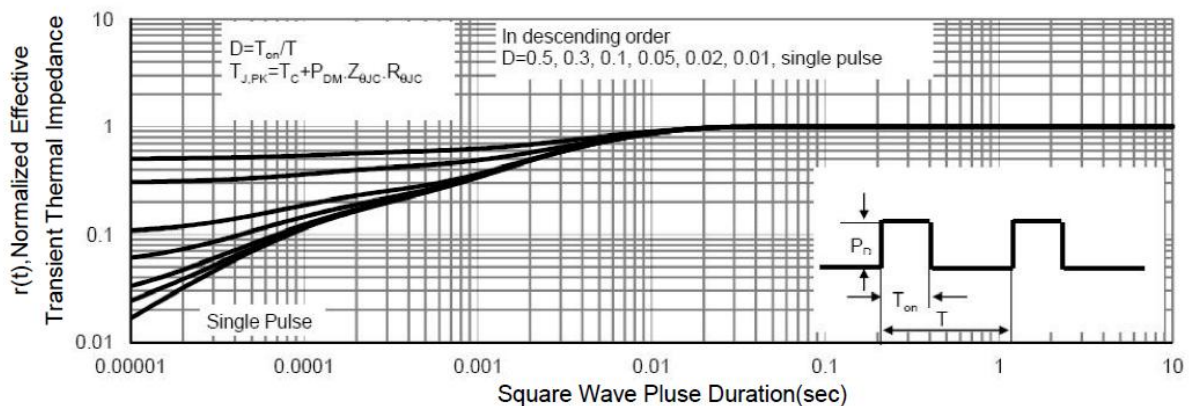
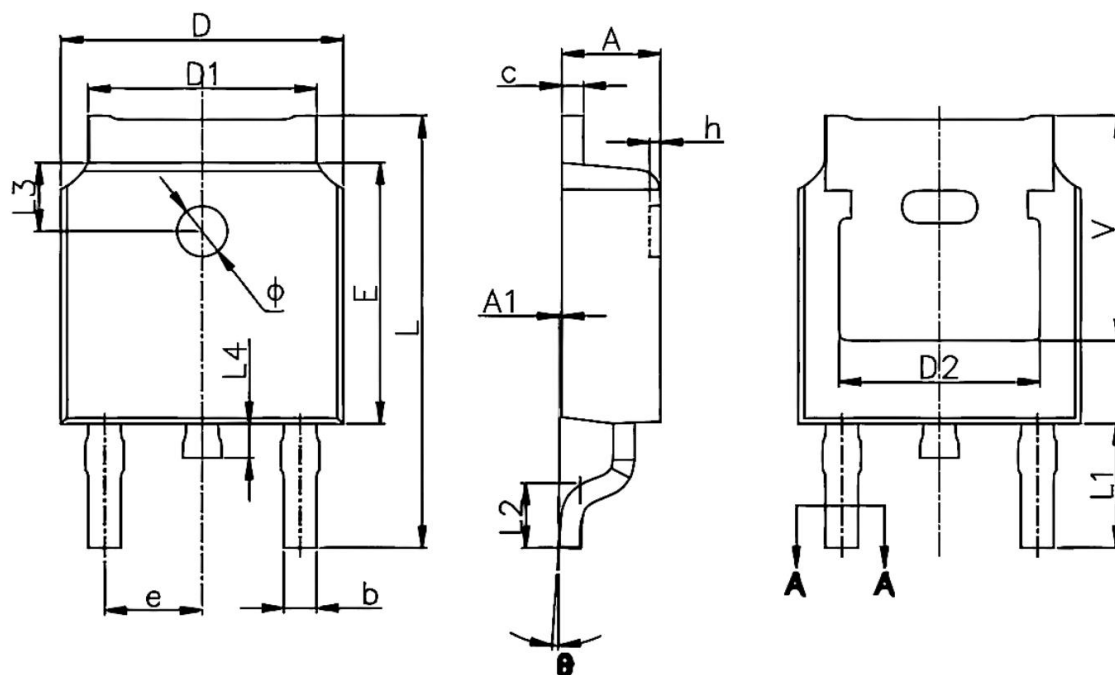


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-252AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 BSC.		0.063 BSC.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
h	0.000	0.300	0.000	0.012
θ	0°	8°	0°	8°
V	5.250 REF.		0.207 REF.	