

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	0.65mΩ@10V	320A
	1.9mΩ@6V	

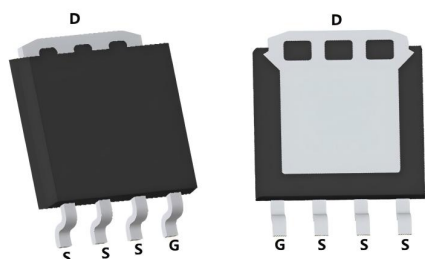
Feature

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

Application

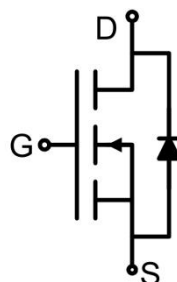
- Power switching application
- Uninterruptible power supply
- DC-DC convertor
- 12V Automotive systems

Package

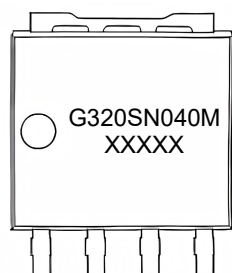


LFPAK56

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 ^{1,3)} (V _{GS} =10V)	I _D	320	A
Continuous Drain Current ^{1,3)} (V _{GS} =10V, T _C =100°C)	I _D (100°C)	226	A
Pulsed Drain Current (t _p ≤ 10μs)	I _{DM}	1280	A
Single Pulse Avalanche Energy ²⁾	E _{AS}	436.8	mJ
Power Dissipation ^{1,3)}	P _D	230	W
Thermal Resistance Junction to Case	R _{θJC}	0.65	°C/W
Operating Junction Temperature	T _J	-55 ~ +175	°C
Storage Temperature Range	T _{STG}	-55 ~ +175	°C

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	40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =32V, 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	2.2	2.9	3.7	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =75A		0.48	0.65	mΩ
		V _{GS} =6V, I _D =20A		1.3	1.9	
Dynamic characteristics ⁴⁾						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f =1MHz		6485		pF
Output Capacitance	C _{oss}			3365		
Reverse Transfer Capacitance	C _{rss}			129		
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =10V, I _D =75A		80		nC
Gate-Source Charge	Q _{gs}			27.6		
Gate-Drain Charge	Q _{gd}			18.6		
Turn-on delay time	t _{d(on)}	V _{DS} =20V, V _{GS} =10V I _D =160A, R _G =3Ω		17.5		nS
Turn-on rise time	t _r			32		
Turn-off delay time	t _{d(off)}			55		
Turn-off fall time	t _f			54		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				320	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 =20V, I _F =40A		83		nS
Reverse Recovery Charge	Q _{rr}	di/dt =100A/μs		125		nC

Notes:

- 1) The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular.
- 2) V_G =10V, R_G =25Ω, L =0.5mH, I_{AS} =41.8A, T_J =25°C.
- 3) Thermal resistance from junction to soldering point (on the exposed drain pad).
- 4) Guaranteed by design, not subject to production.

Typical Characteristics

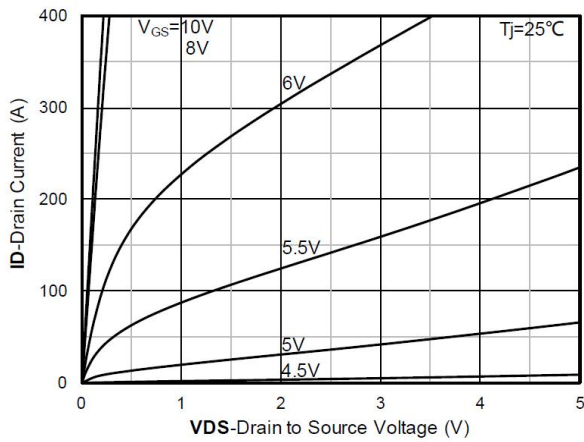


Figure 1. Output Characteristics; typical values

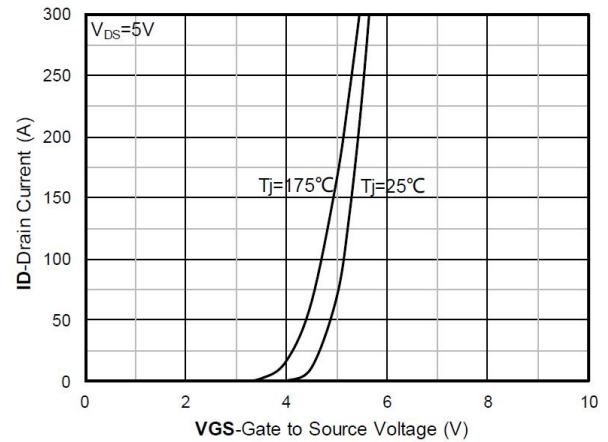


Figure 2. Transfer Characteristics; typical values

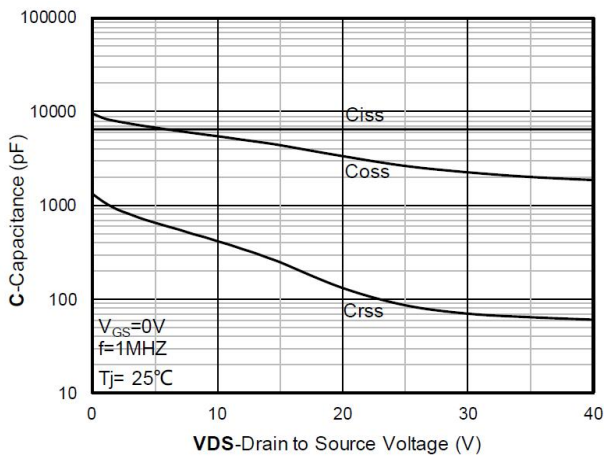


Figure 3. Capacitance Characteristics; typical values

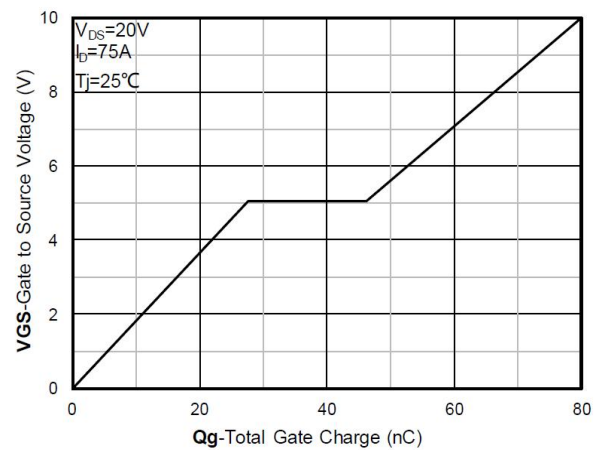


Figure 4. Gate Charge; typical values

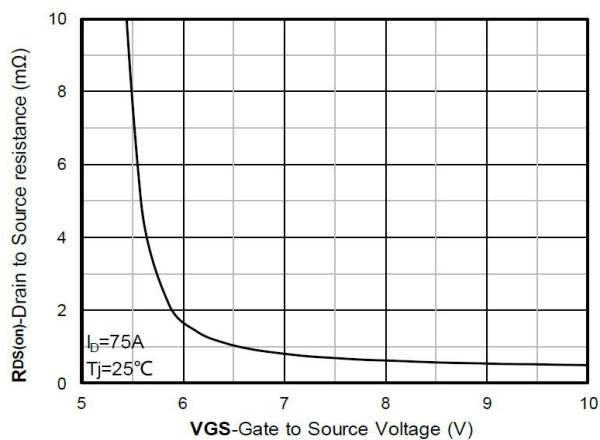


Figure 5. On-Resistance vs Gate to Source Voltage; typical values

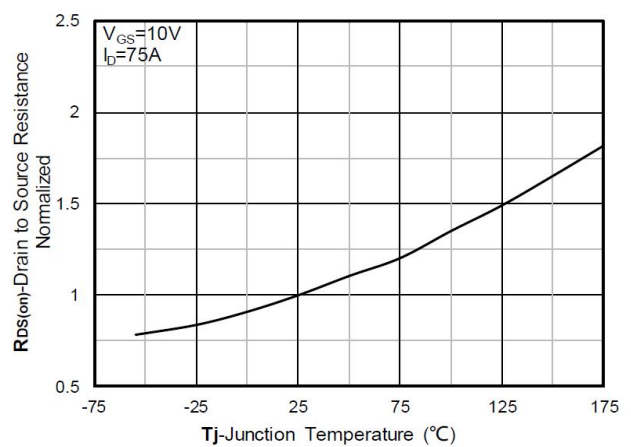


Figure 6. Normalized On-Resistance

Typical Characteristics

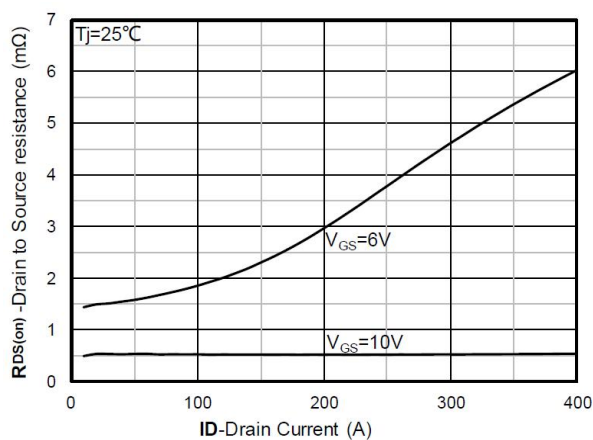


Figure 7. $R_{DS(on)}$ VS Drain Current; typical values

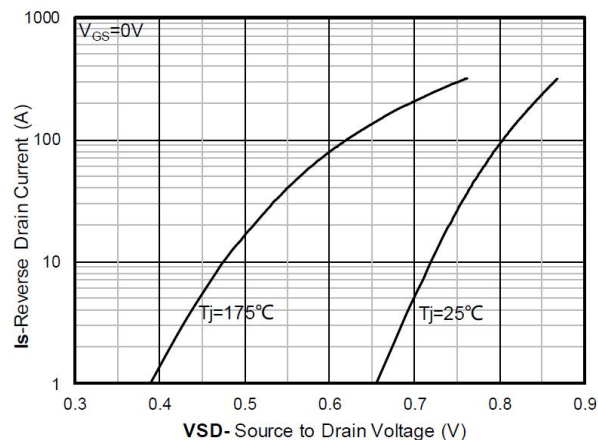


Figure 8. Forward characteristics of reverse diode; typical values

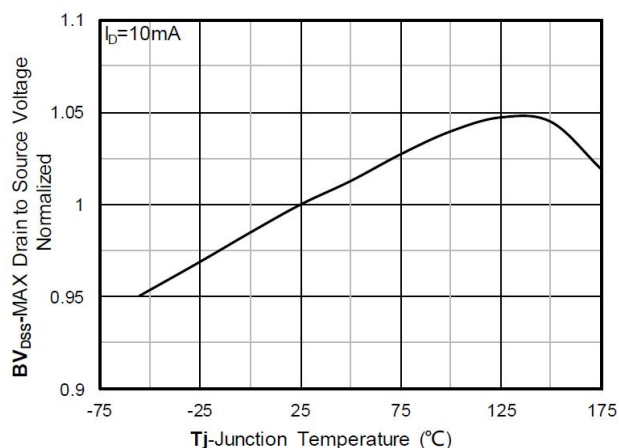


Figure 9. Normalized breakdown voltage

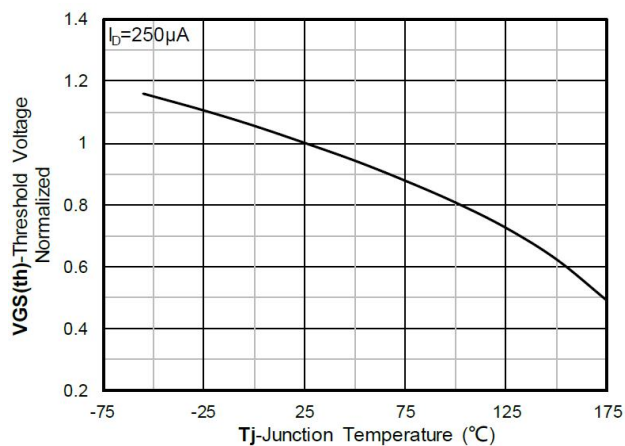


Figure 10. Normalized Threshold voltage

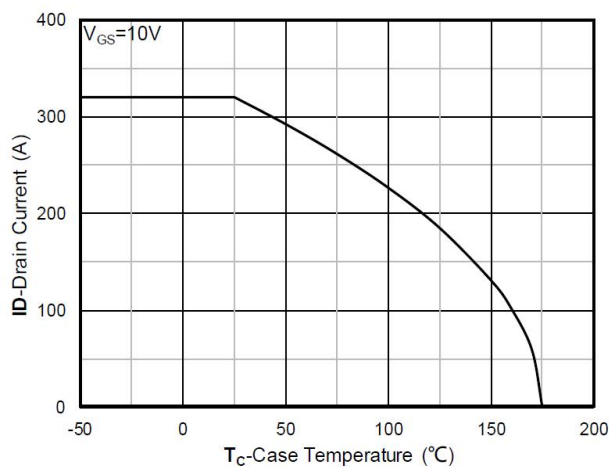


Figure 11. Current dissipation

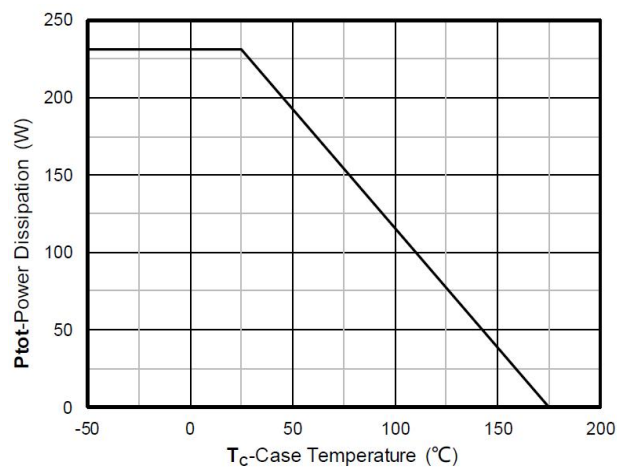


Figure 12. Power dissipation

Typical Characteristics

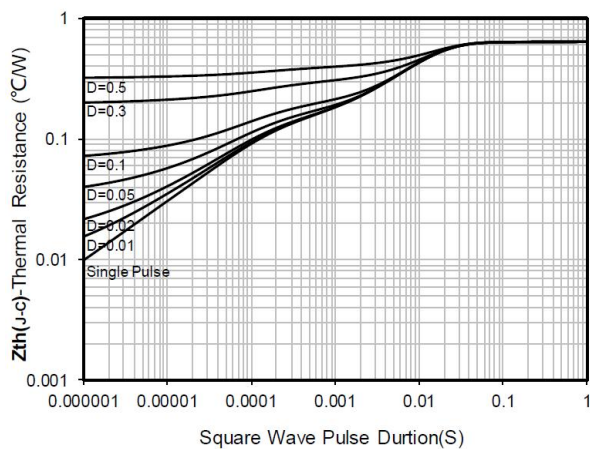


Figure 13. Maximum Transient Thermal Impedance

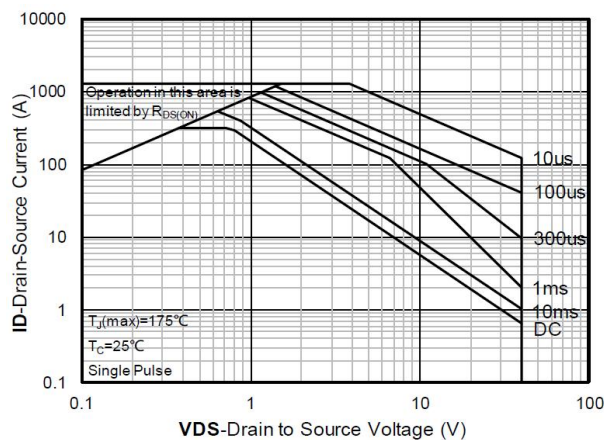
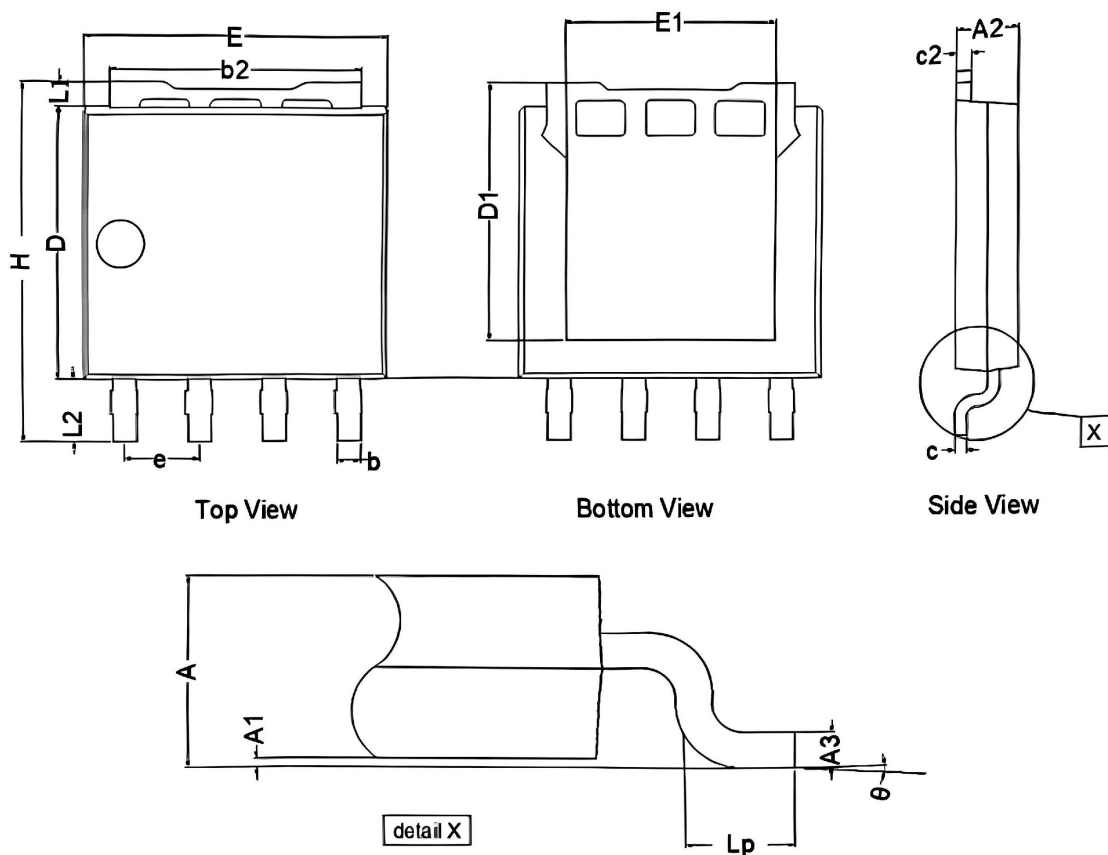


Figure 14. Safe Operation Area

LFPAK56 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.000	1.300	0.039	0.051
A1	0.000	0.150	0.000	0.006
A2	0.950	1.120	0.037	0.044
b	0.350	0.500	0.014	0.020
b2	4.020	4.410	0.158	0.174
c	0.190	0.250	0.007	0.010
c2	0.240	0.300	0.009	0.012
D	4.450	4.700	0.175	0.185
D1	4.250	4.450	0.167	0.175
E	4.950	5.300	0.195	0.209
E1	3.500	3.700	0.138	0.146
e	1.270 BSC.		0.050 BSC.	
H	5.900	6.250	0.232	0.246
Lp	0.400	0.850	0.016	0.033
L1	0.270	0.570	0.011	0.022
L2	0.800	1.300	0.031	0.051
θ	0°	8°	0.039	0.051