

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
85V	1.2mΩ@10V	400A

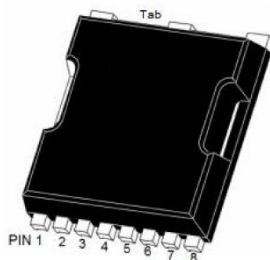
Feature

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

Application

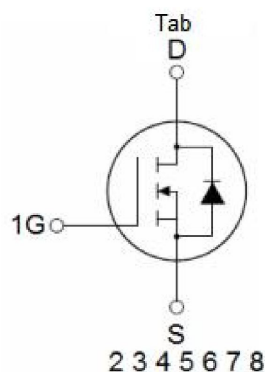
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

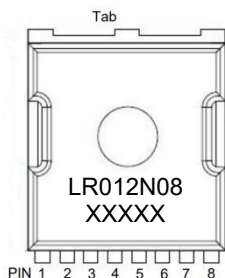


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Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	85	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	400	A
Continuous Drain Current($T_c = 100^\circ\text{C}$)	$I_{D(100^\circ\text{C})}$	300	A
Pulsed Drain Current	I_{DM}	1600	A
Power Dissipation	P_D	500	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.3	$^\circ\text{C/W}$
Single pulse avalanche energy ¹⁾	E_{AS}	3800	mJ
Junction Temperature	T_J	175	$^\circ\text{C}$
Storage Temperature Range	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 =250uA	85			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =85V,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	2.0	3.0	4.0	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		1.0	1.2	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V,I _D =20A		200		S
Dynamic characteristics ²⁾						
Input Capacitance	C _{iss}	V _{DS} =40V,V _{GS} =0V, f =1MHz		19200		pF
Output Capacitance	C _{oss}			2900		
Reverse Transfer Capacitance	C _{rss}			124		
Total Gate Charge	Q _g	V _{DS} =40V,V _{GS} =10V, I _D =20A		284		nC
Gate-Source Charge	Q _{gs}			78		
Gate-Drain Charge	Q _{gd}			64		
Turn-on delay time	t _{d(on)}	V _{DD} =40V,V _{GS} =10V, I _D =20A,R _G =1.6Ω		37		nS
Turn-on rise time	t _r			21		
Turn-off delay time	t _{d(off)}			62		
Turn-off fall time	t _f			20		
Source-Drain Diode characteristics						
Diode Forward voltage	V _{SD}	V _{GS} =0V,I _S =20A			1.2	V
Diode Forward Current	I _S				400	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = 20A		147		nS
Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs		392		nC

Notes:

- 1) EAS condition : $T_J = 25^\circ\text{C}, V_{DD} = 40V, V_G = 10V, L = 0.5mH, R_G = 25\Omega$
- 2) Guaranteed by design, not subject to production

Typical Characteristics

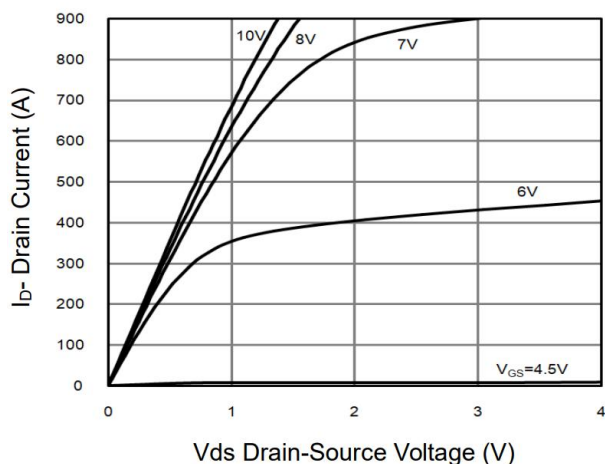


Figure 1 Output Characteristics

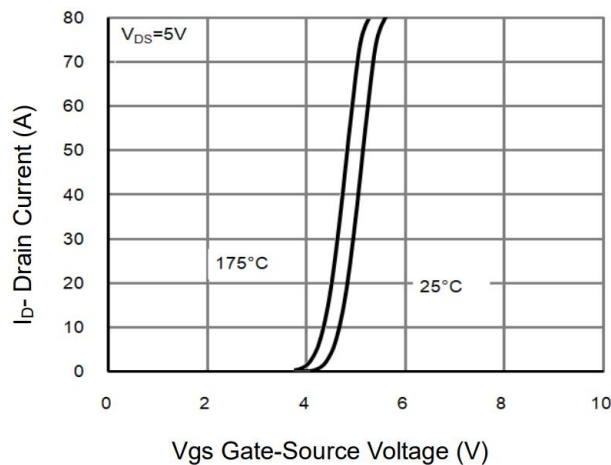


Figure 2 Transfer Characteristics

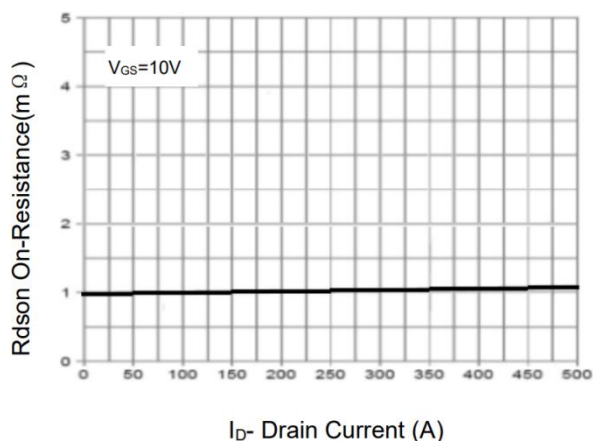


Figure 3 Rdson- Drain Current

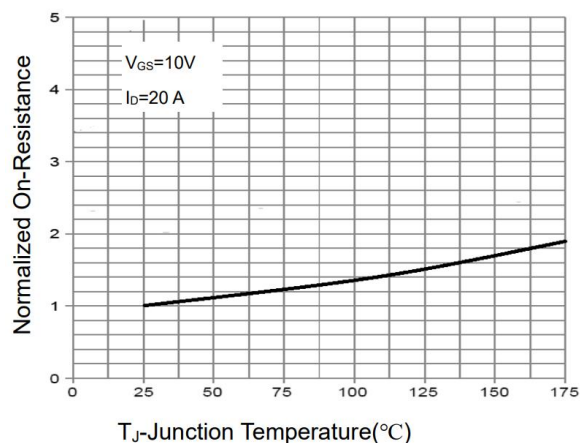


Figure 4 Rdson-Junction Temperature

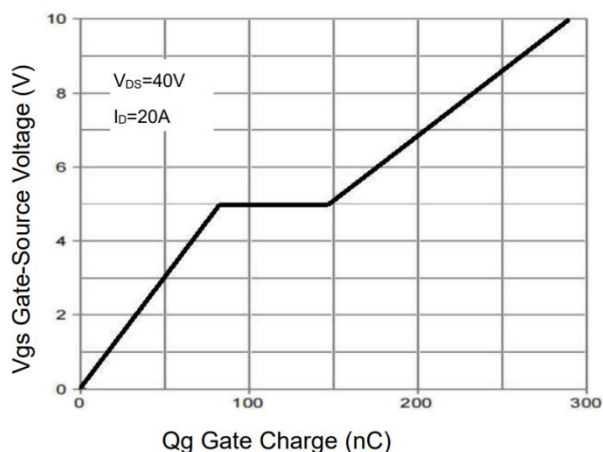


Figure 5 Gate Charge

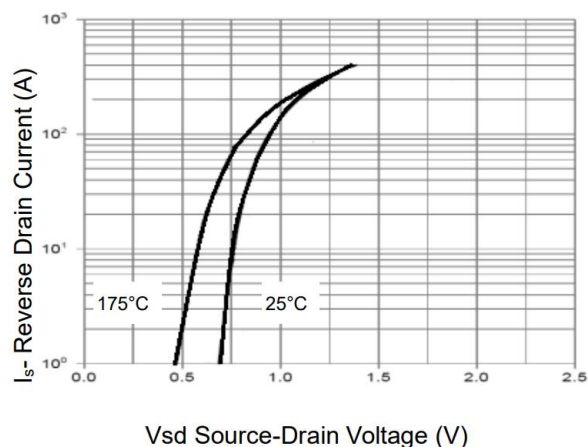
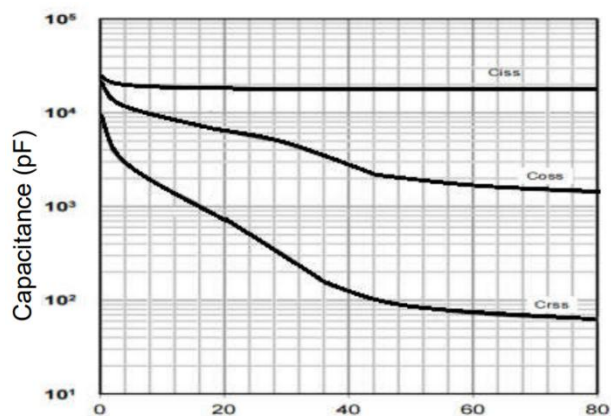
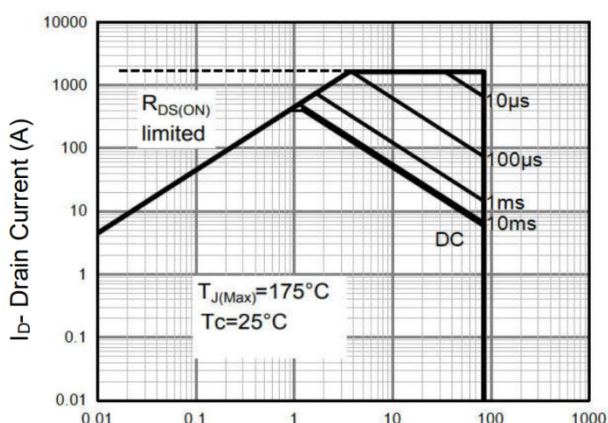


Figure 6 Source- Drain Diode Forward

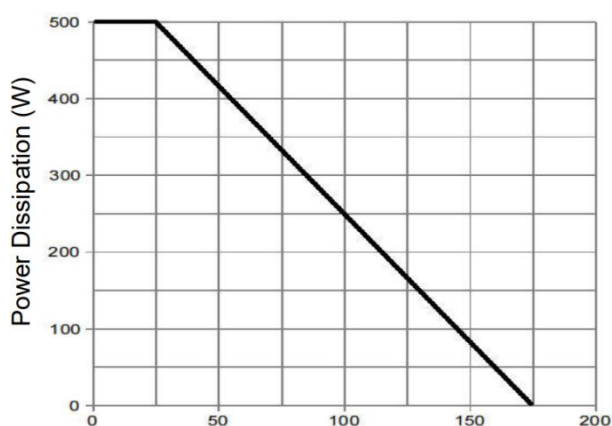
Typical Characteristics



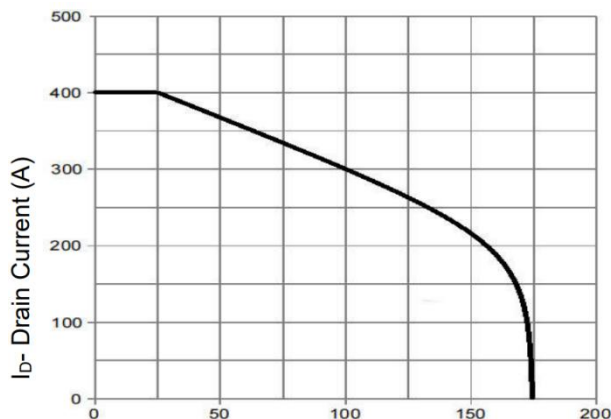
Vds Drain-Source Voltage (V)
Figure 7 Capacitance vs Vds



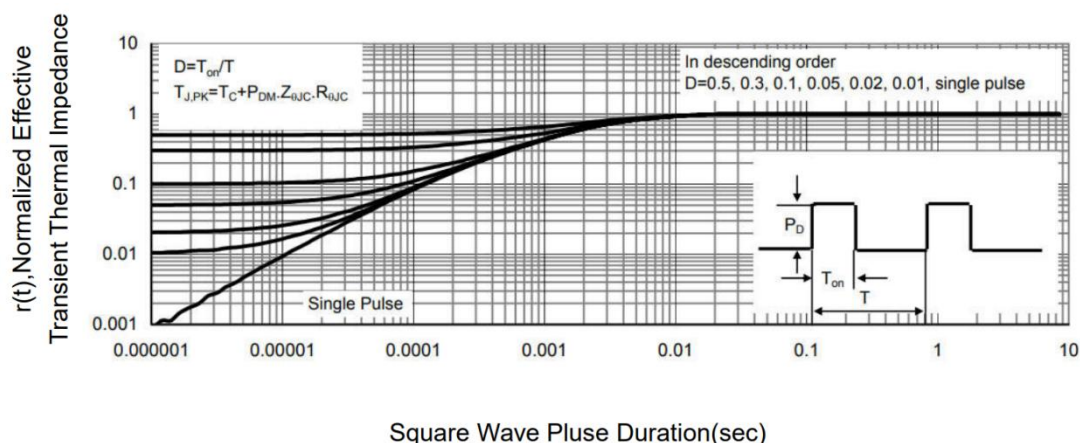
Vds Drain-Source Voltage (V)
Figure 8 Safe Operation Area



Tj-Junction Temperature(°C)
Figure 9 Power De-rating

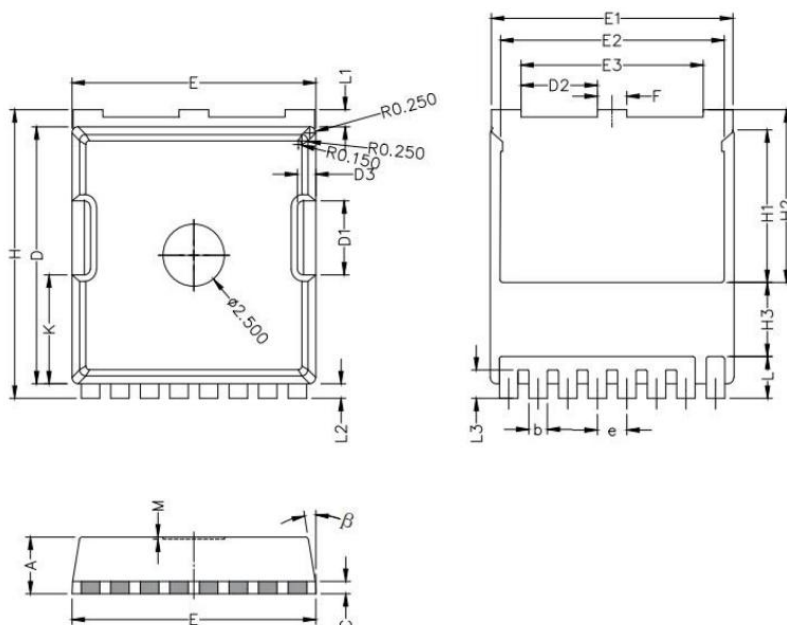


Tj-Junction Temperature (°C)
Figure 10 Current De-rating



Square Wave Pluse Duration(sec)
Figure 11 Normalized Maximum Transient Thermal Impedance

TOLL Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
b	0.650	0.850	0.026	0.033
C	0.500	0.700	0.200	0.028
D	10.250	10.550	0.404	0.415
D1	2.850	3.450	0.112	0.136
E	9.700	10.100	0.382	0.398
E1	9.650	9.950	0.380	0.392
E2	8.000	8.200	0.315	0.322
E3	7.250	7.550	0.285	0.297
e	1.200 BSC.		0.047 BSC.	
F	1.050	1.350	0.041	0.053
H	11.550	11.850	0.455	0.467
H1	6.030	6.330	0.237	0.249
H2	6.850	7.150	0.270	0.281
H3	3.000 BSC.		0.118 BSC.	
L	1.550	2.100	0.061	0.083
L1	0.550	0.850	0.022	0.033
L2	0.450	0.750	0.018	0.030
L3	1.050	1.300	0.041	0.051
M	0.080 REF.		0.003 REF.	
β	8°	12°	8°	12°
K	4.080	4.550	0.161	0.179