60V N-Channel Power MOSFET

DESCRIPTION

The BLQM15N06L uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

Application

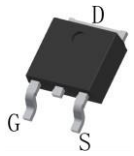
- Valves control
- Solenoids control
- Lighting

KEY CHARACTERISTICS

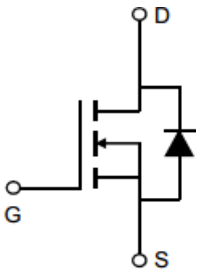
- V_{DS} = 60V,I_D = 50A
  $R_{DS(ON)}$ < 15mΩ @ V_{GS}=10V
  $R_{DS(ON)}$ < 18mΩ @ V_{GS}=4.5V
- Special process technology for high ESD capability
- High density cell design for lower Rdson
- 175°C operating temperature
- Good stability and uniformity with high EAS
- MSL1 up to 260°C peak reflow
- AEC-Q101 Qualified

100% UIS TESTED!

100% DVDS TESTED!



TO-252-2L Top View



Schematic diagram

Package Marking And Ordering Information

Device Marking	Ordering Codes	Package	Product Code	Packing
QM15N06L	BLQM15N06L-D	TO-252	BLQM15N06L	Reel

Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	50	A
Drain Current-Pulsed (Note 1)	I_{DM}	200	A
Maximum Power Dissipation(Tc=25℃)	P_D	71	W
Single pulse avalanche energy(Note 2)	E_{AS}	81	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	2.1	℃/W

Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1	1.8	2.4	V
Drain-Source On-State Resistance(Note 3)	$R_{DS(ON)}$	V_{GS}=10V, I_D=25A	-	12	15	mΩ
		V_{GS}=4.5V, I_D=25A	-	14	18	
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V, f=1.0MHz	-	1170	-	pF
Output Capacitance	C_{oss}		-	94	-	pF
Reverse Transfer Capacitance	C_{rss}		-	101	-	pF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V, I_D =20A, V_{GS}=10V,R_{GEN}=5Ω	-	26	-	ns
Turn-on Rise Time	t_r		-	6	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	52	-	ns
Turn-Off Fall Time	t_f			7	-	ns
Total Gate Charge	Q_g	V_{DS}=30V,I_D=50A V_{GS}=10V	-	31	-	nC
Gate-Source Charge	Q_{gs}		-	9	-	nC
Gate-Drain Charge	Q_{gd}		-	5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=50A	-	-	1.2	V

Notes:
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. E_{AS} condition :T_j=25℃,V_{DD}=30V,V_{GS}=10V,L=0.5mH,Rg=25Ω
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production.

Characteristics Curves

Figure 1 Output Characteristics

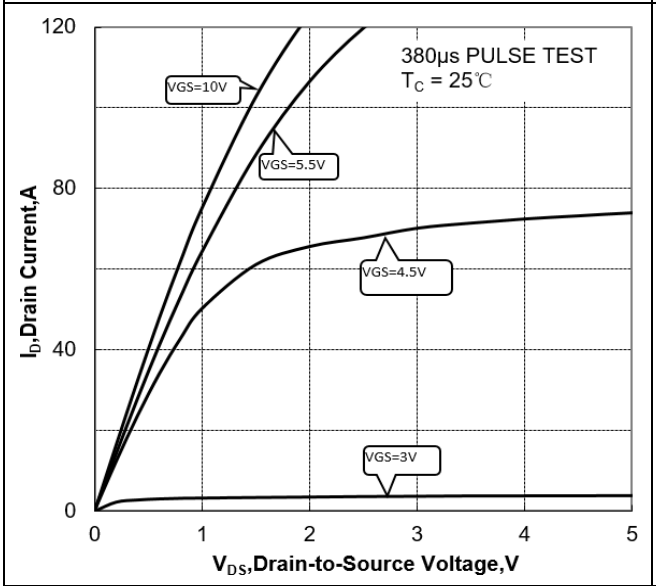


Figure 2 Transfer Characteristics

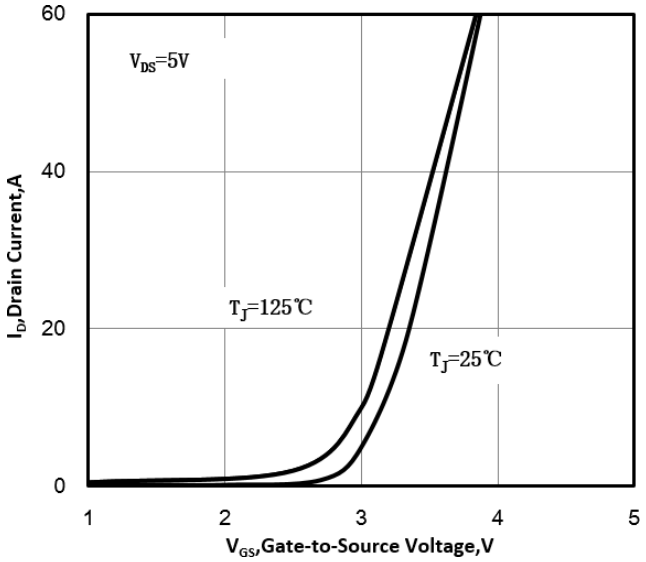


Figure 3 On-Resistance vs. I_D and V_{GS}

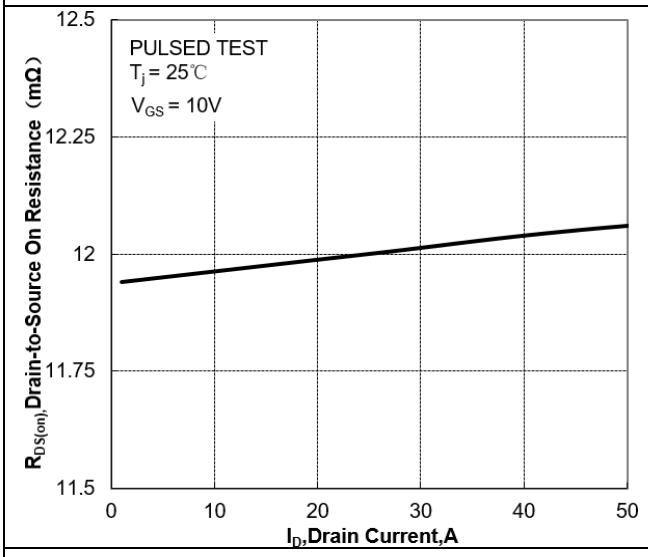


Figure 4 On-Resistance vs. Junction Temperature

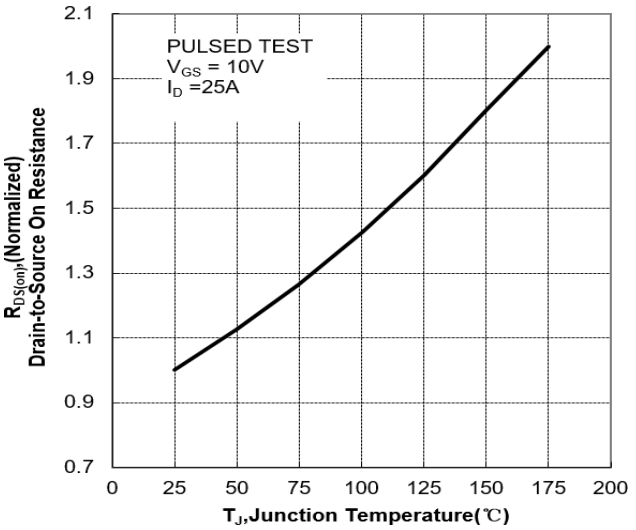


Figure 5 On-Resistance vs. V_{GS}

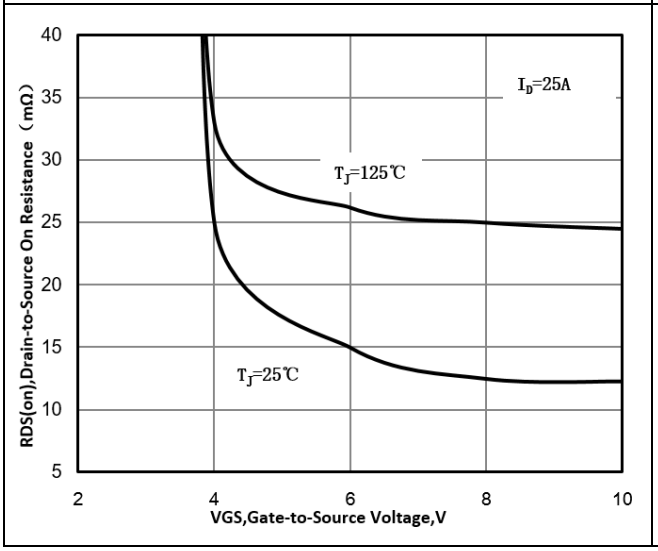


Figure 6 Body Diode Forward Voltage

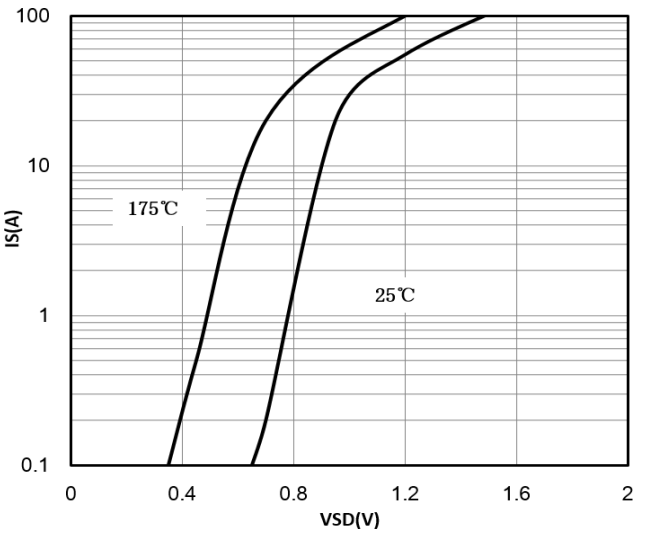


Figure 7 Gate-Charge Characteristics

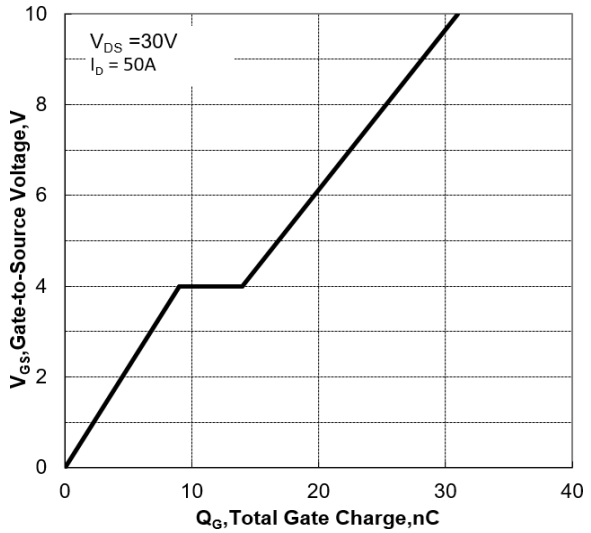


Figure 8 Capacitance Characteristics

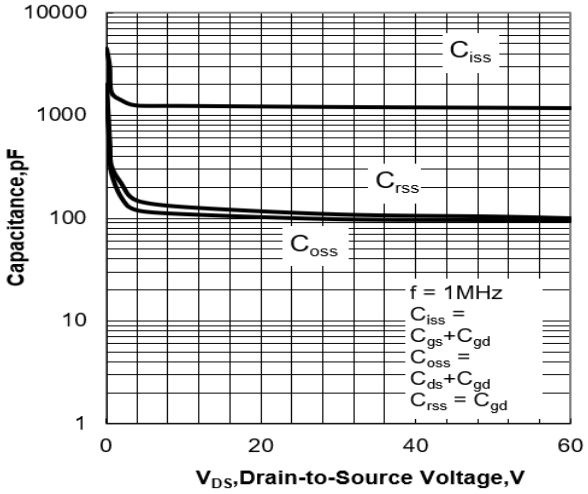


Figure 9 Maximum Forward Biased Safe Operation Area

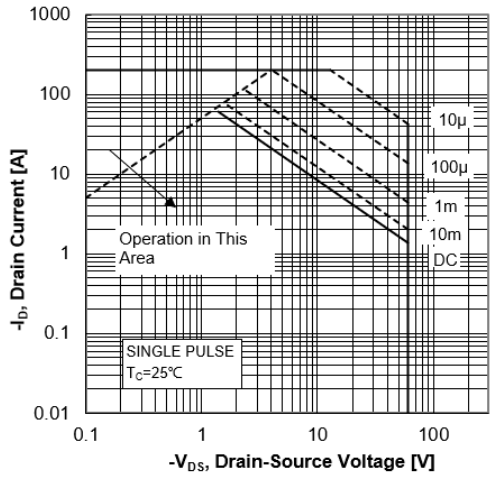


Figure 10 Single Pulse Power Rating Junction-to-Ambient

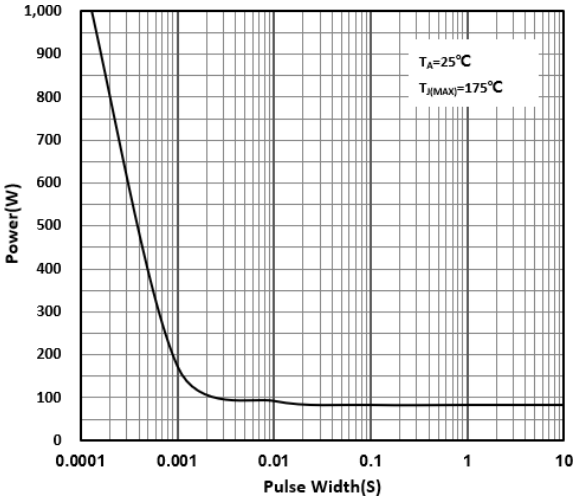
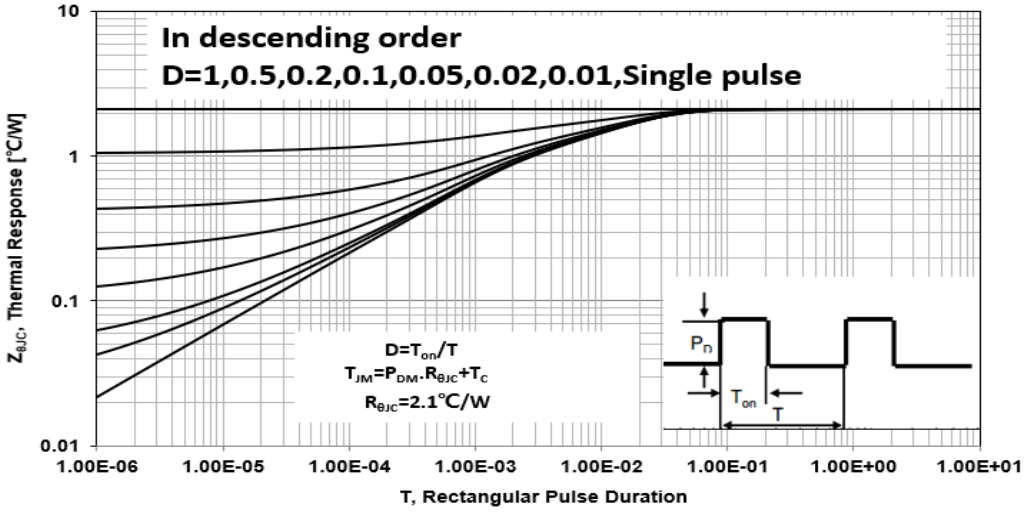
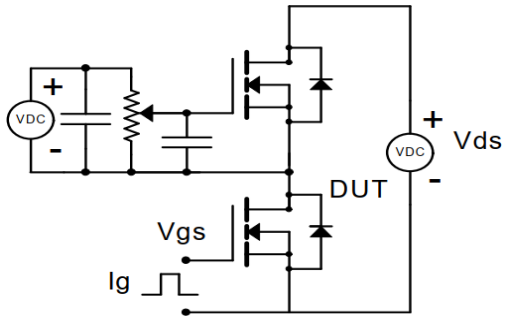
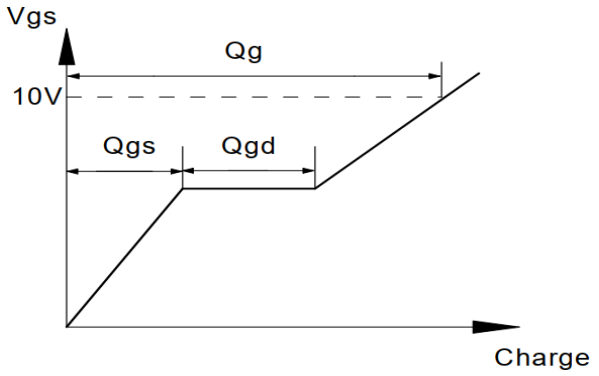
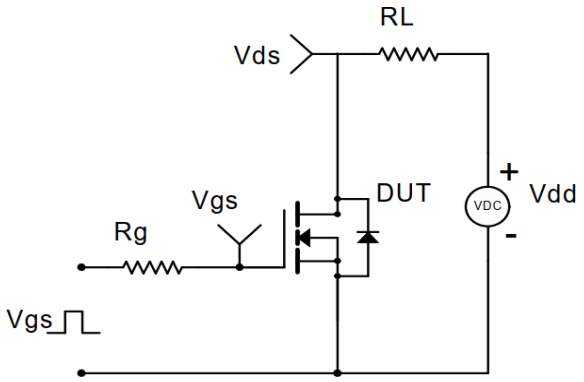
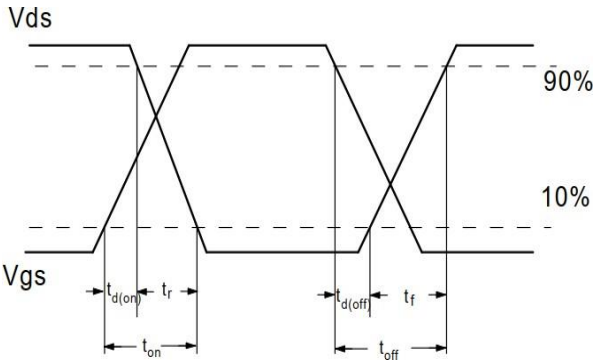
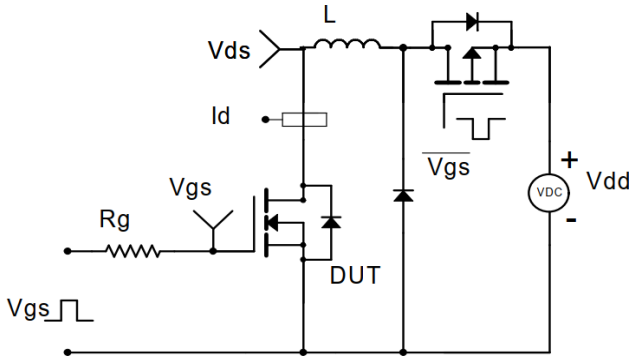
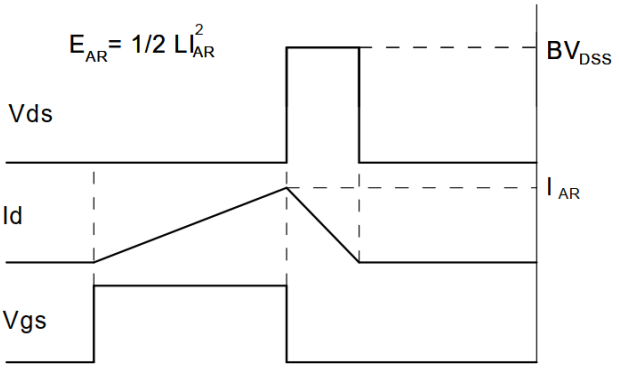
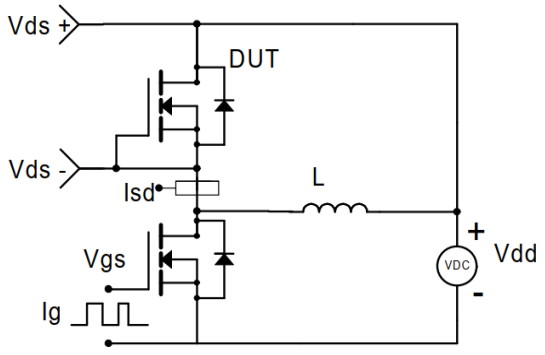
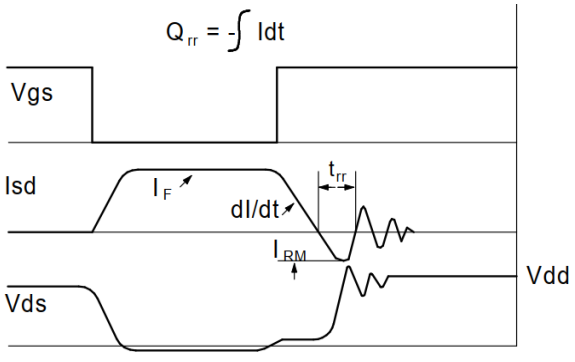


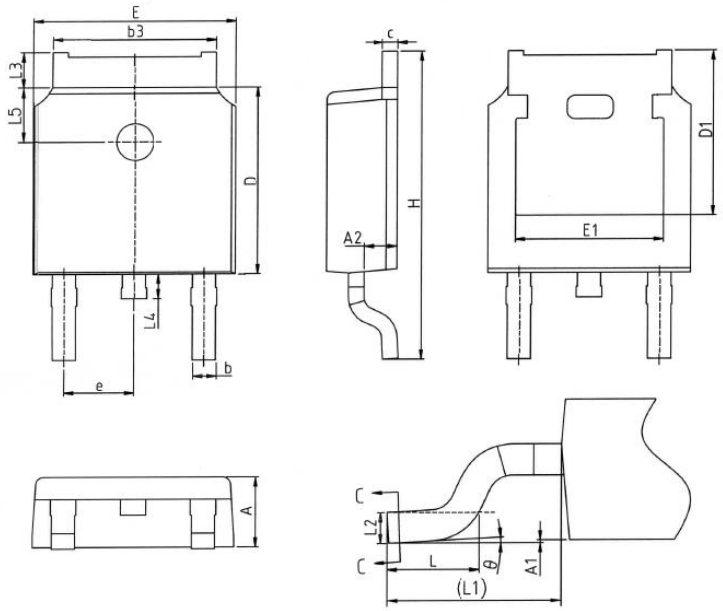
Figure 11 Normalized Maximum Transient Thermal Impedance



Test Circuit and Waveform

Gate Charge Test Circuit	Gate Charge Test Waveform
	
Resistive Switching Test Circuit	**Resistive Switching Test Waveforms**
	
Unclamped Inductive Switching (UIS) Test Circuit	**Unclamped Inductive Switching (UIS) Test Waveforms**
	
Diode Recovery Test Circuit	**Diode Recovery Test Waveforms**
	

Package Description



SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	-	0.12
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.73
E1	4.63	-	-
e	2.286BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88	-	1.28
L4	0.50	-	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°

TO-252 Package

Revision History:

BLQM15N06L Revision: 2023-02-16, Rev. 1.0

BLQM15N06L Revision: 2023-05-08, Rev. 1.1

Previous Revision

Revision	Date	Revision Date Subjects (major changes since last revision)
1.0	2023-2-16	-
1.1	2023-5-08	Dynamic characteristics have been updated

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NOTE:

1. Any use beyond the maximum ratings of the device in performance may cause damage to the device or even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when designing circuit.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. Semiconductor device is sensitive to the ESD, it is necessary to protect the device from being damaged by the ESD when using it.
4. Shanghai Belling reserves the right to make changes in this specification sheet and is subject to change without prior notice.

CONTACT:

上海贝岭股份有限公司（总部）

地址：上海市宜山路 810 号

邮编：200233

电话：021-24261000

产品业务咨询及技术支持

电话：021-24261326

传真 2：021-64852222

邮箱 2：marketing@belling.com.cn

上海贝岭深圳分公司（华南区）

地址：深圳市福田中心区民田路新华保险大厦 1510 室

邮编：518031

电话：0755-33336776 0755-33336770

传真：0755-33336788

上海贝岭北京办事处（华北区）

地址：北京市西城区新华里 16 号院锦官苑小区 10 号楼 1 单元 1505 室

邮编：100044

电话：010-64179374

传真：010-8835 9236