

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

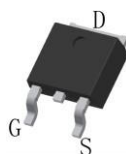
- Valves control
- Solenoids control
- Lighting

KEY CHARACTERISTICS

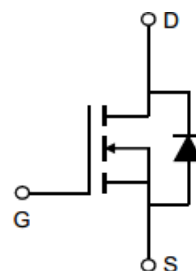
- $V_{DS} = 60V, I_D = 50A$
- $R_{DS(ON)} < 15m\Omega @ V_{GS}=10V$
- $R_{DS(ON)} < 18m\Omega @ V_{GS}=4.5V$
- Special process technology for high ESD capability
- High density cell design for lower $R_{DS(on)}$
- 175°C operating temperature
- Good stability and uniformity with high EAS
- MSL1 up to 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 ($T_A=25^\circ\text{C}$ 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($T_c=25^\circ\text{C}$)	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	$^\circ\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.1	$^\circ\text{C/W}$
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Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.8	2.4	V
Drain-Source On-State Resistance ^(Note 3)	$R_{DS(on)}$	$V_{GS}=10V, I_D=25A$	-	12	15	m Ω
		$V_{GS}=4.5V, I_D=25A$	-	14	18	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$	-	1170	-	pF
Output Capacitance	C_{oss}		-	94	-	pF
Reverse Transfer Capacitance	C_{rss}		-	101	-	pF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=20A,$ $V_{GS}=10V, R_{GEN}=5\Omega$	-	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. EAS condition : $T_j=25^\circ C, V_{DD}=30V, V_{GS}=10V, L=0.5mH, R_g=25\Omega$
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production.

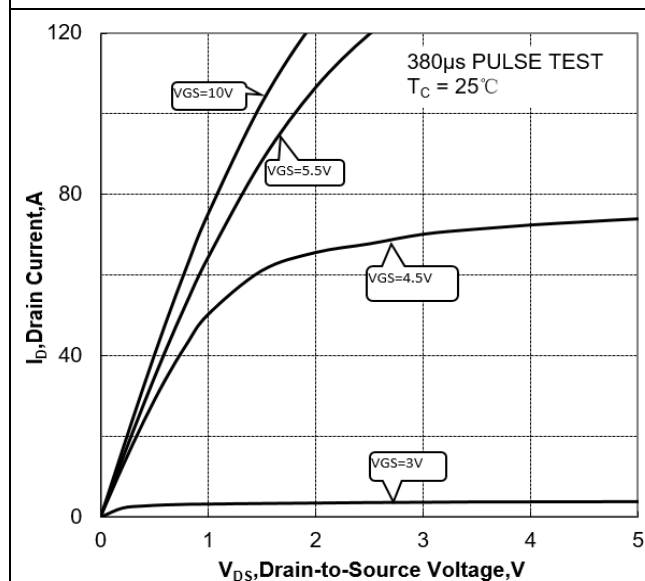
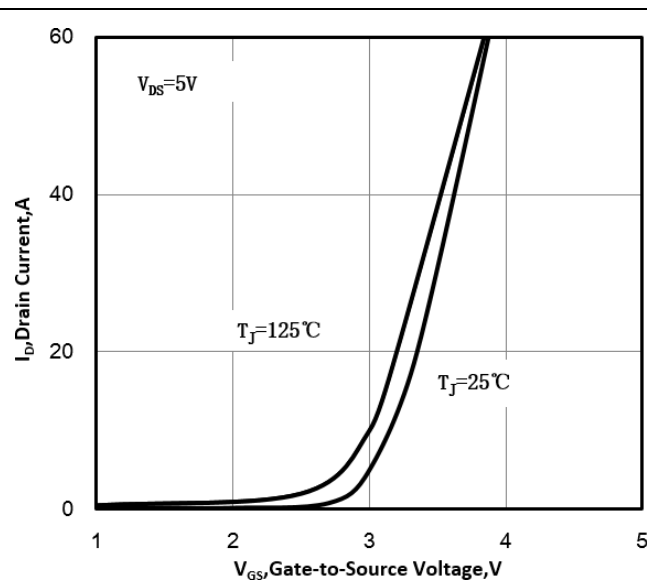
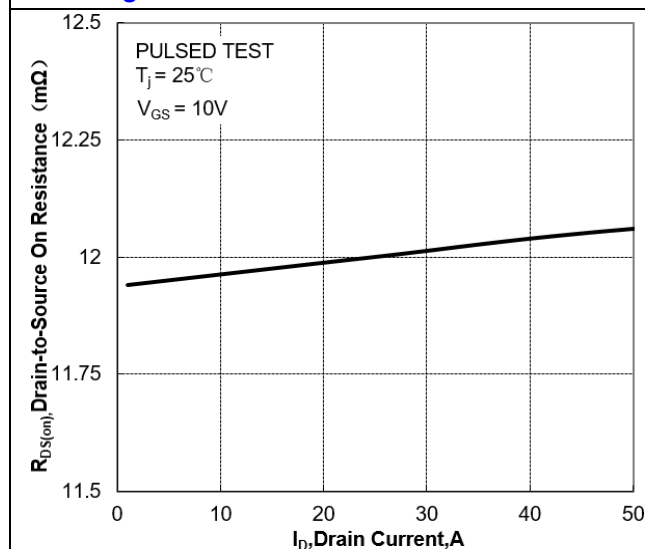
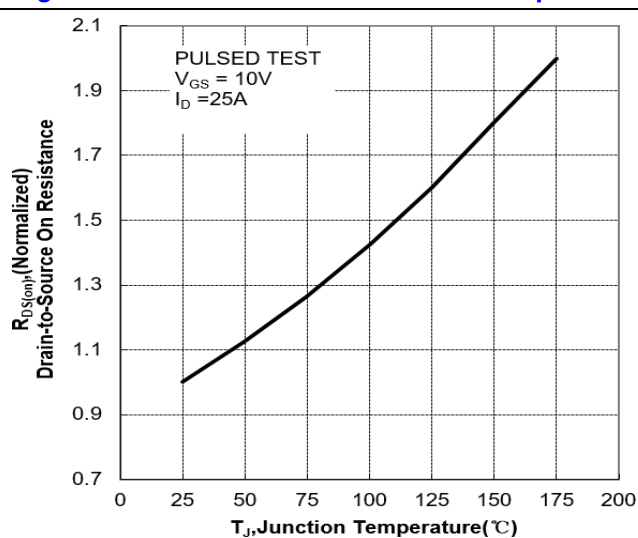
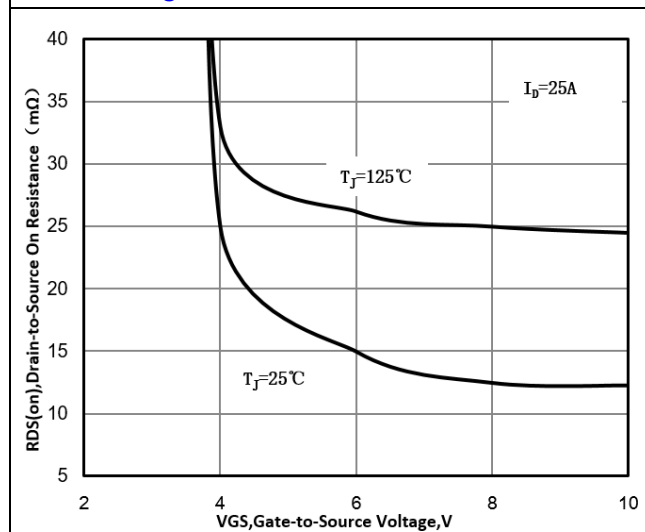
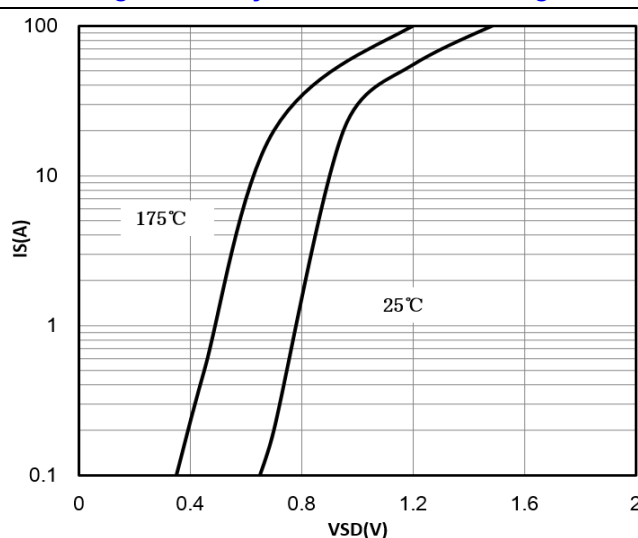
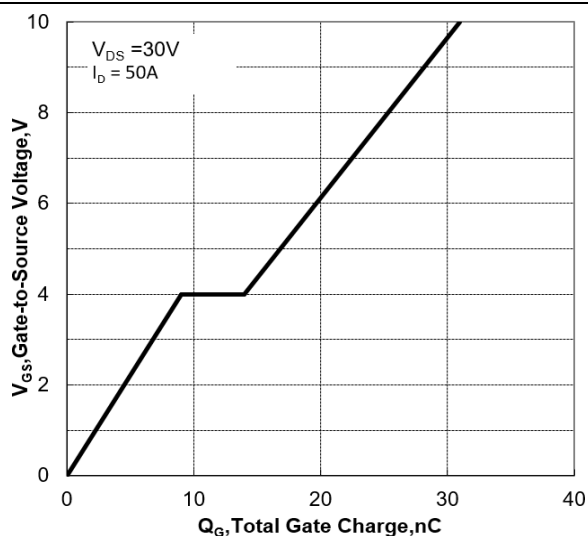
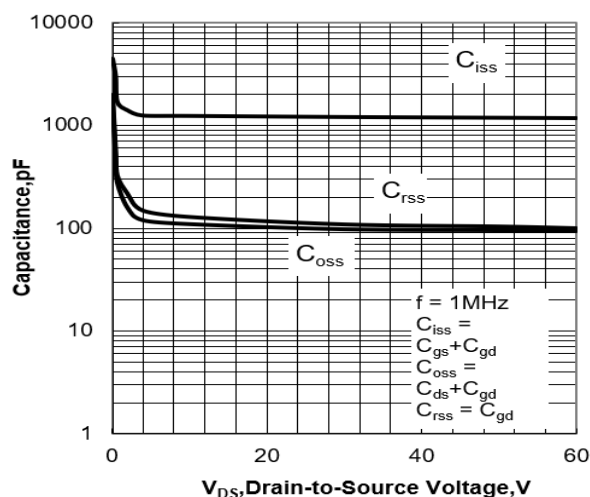
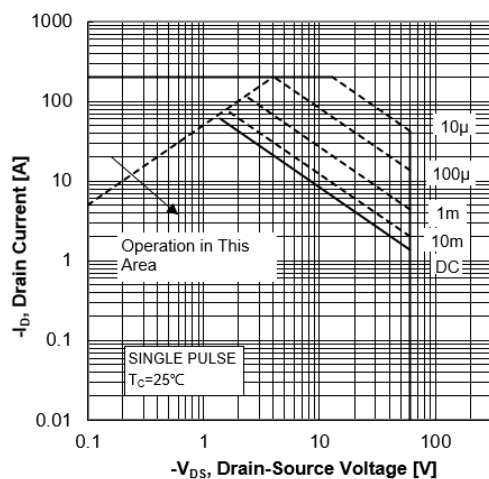
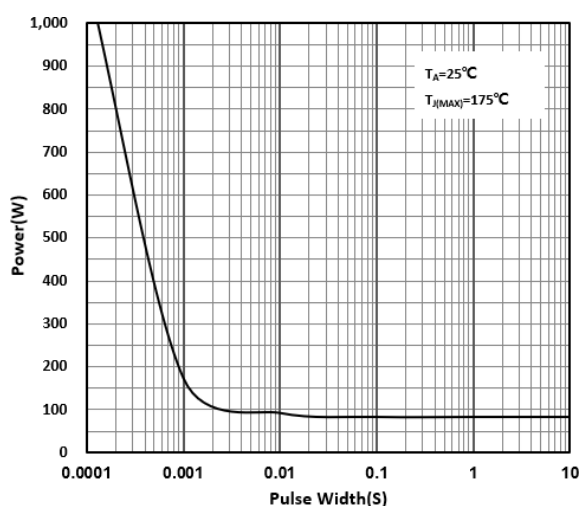
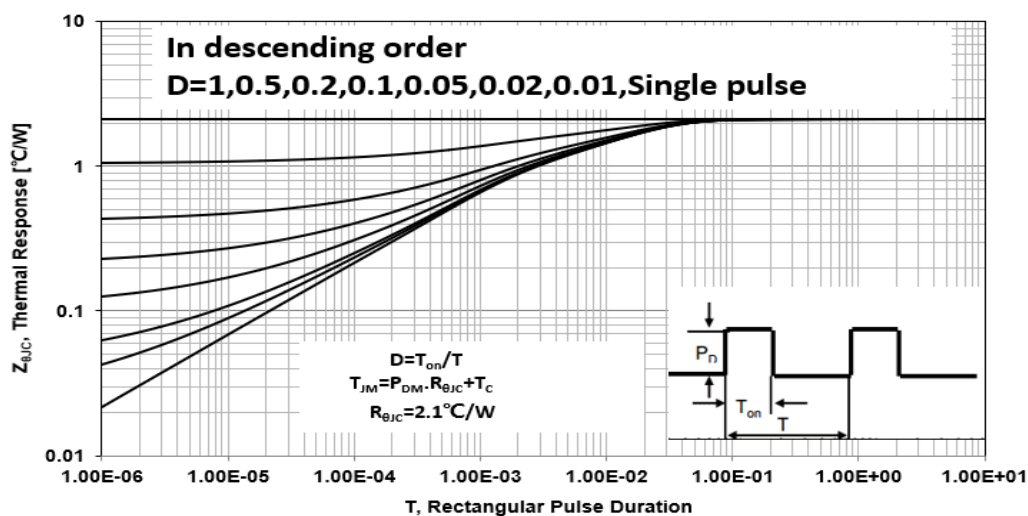
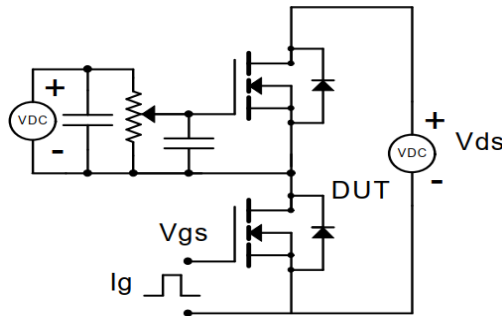
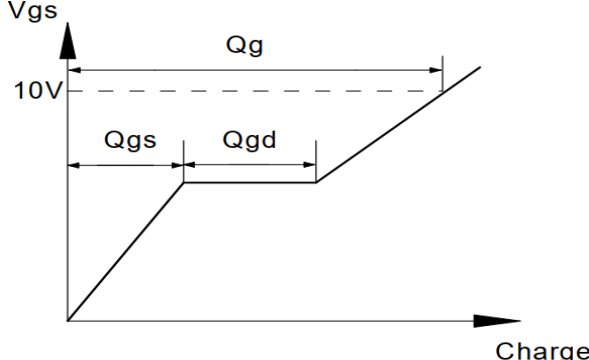
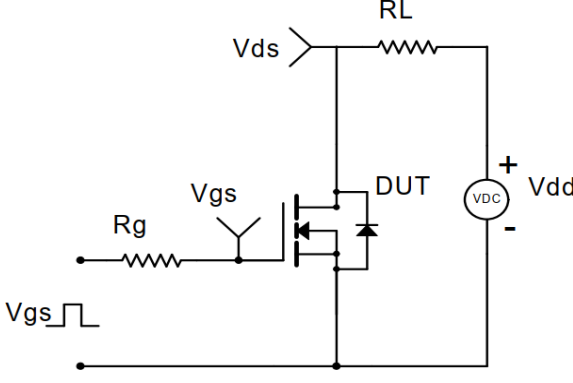
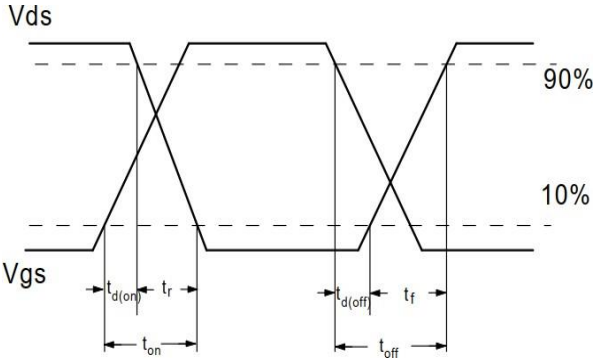
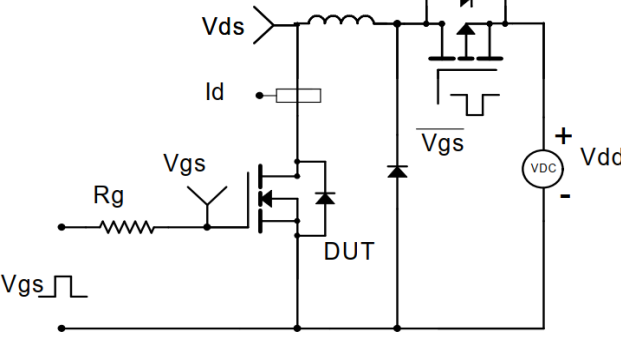
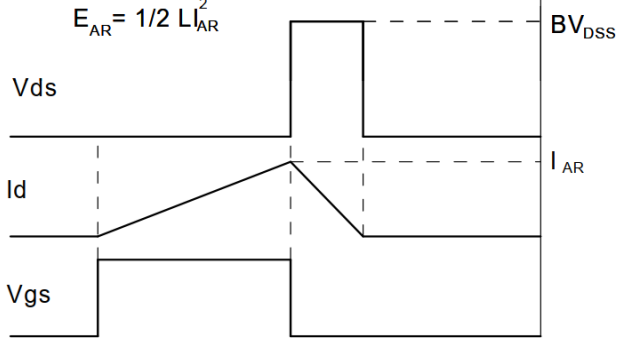
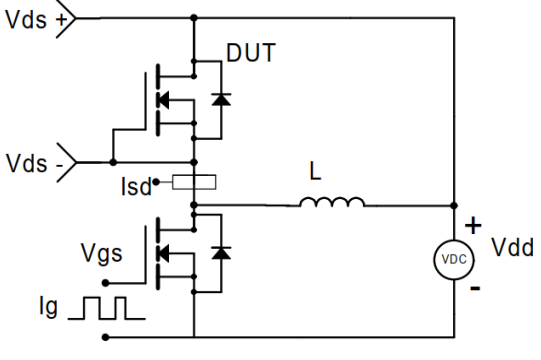
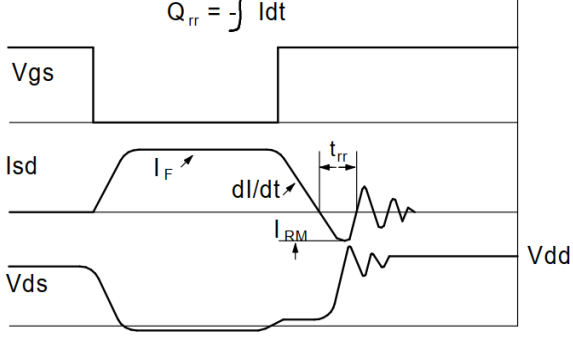
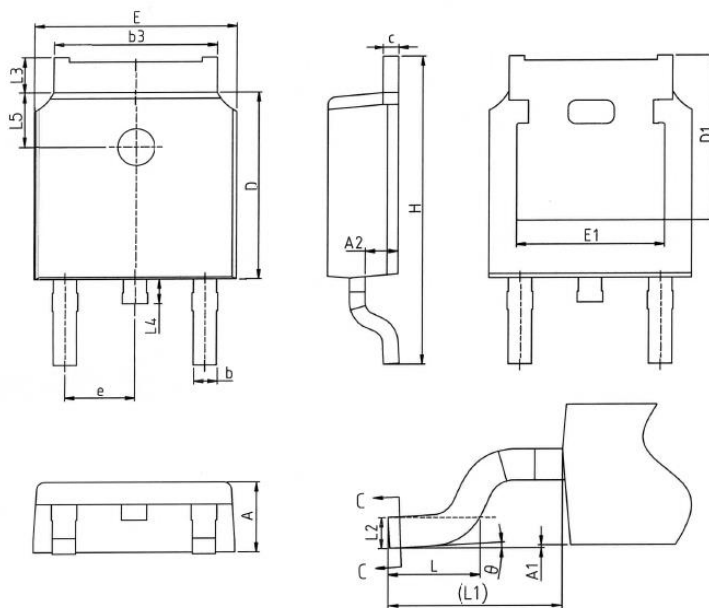
Characteristics Curves
Figure 1 Output Characteristics

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

We Listen to Your Comments

If there is any information within this document that you feel is wrong, unclear, or missing at all, please contact us.

Your feedback will help us to continuously improve the quality of this document.

Published by
Shanghai Belling Co., Ltd.
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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.

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