

JMTLB138K

Features

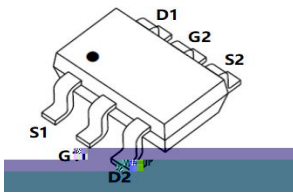
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Halogen-free; RoHS-compliant
- Pb-free plating

Applications

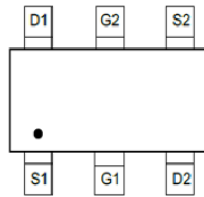
- Load Switch
- PWM Application
- Power Management

Product Summary

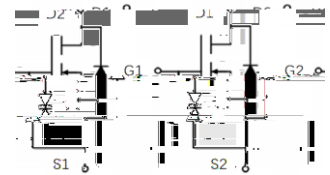
Parameters	Value	Unit
V_{DSS}	60	V
$V_{GS(th_Typ)}$	1.0	V
$I_D(@V_{GS}=10V)$	0.41	A
$R_{DS(ON_Typ)}(@V_{GS}=10V)$	805	m Ω
$R_{DS(ON_Typ)}(@V_{GS}=4.5V)$	871	m Ω



SOT-363-6L Dual top view



Pin Assignment



Schematic Diagram

Ordering Information

Device	Marking	MSL	Form	Package	Reel(pcs)	Per Carton (pcs)
JMTLB138K	B138K	3	Tape&Reel	SOT-363-6L	3000	120000

Absolute Maximum Ratings (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-to-Source Voltage	60	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_A = 25^\circ\text{C}$	A
		$T_A = 100^\circ\text{C}$	
I_{DM}	Pulsed Drain Current ⁽¹⁾	Refer to Fig.4	A
P_D	Power Dissipation	$T_A = 25^\circ\text{C}$	W
		$T_A = 100^\circ\text{C}$	
T_J, T_{STG}	Junction & Storage Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

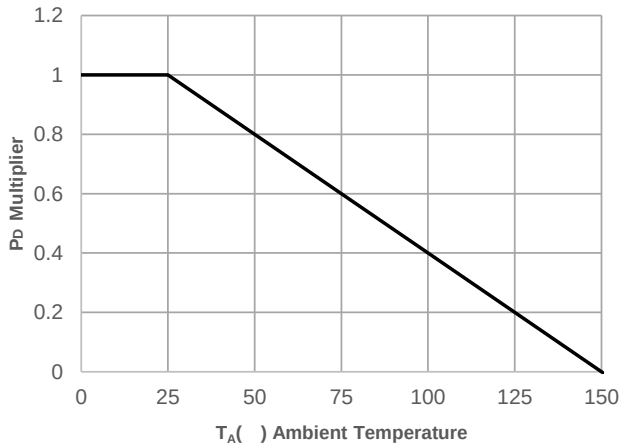
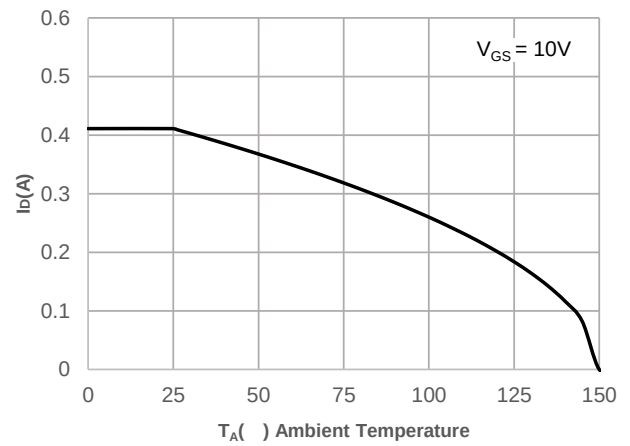
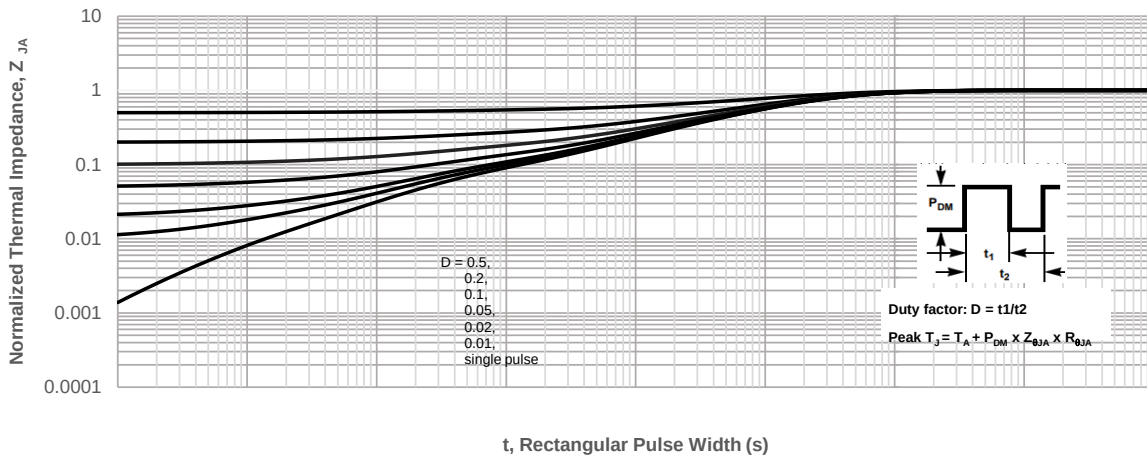
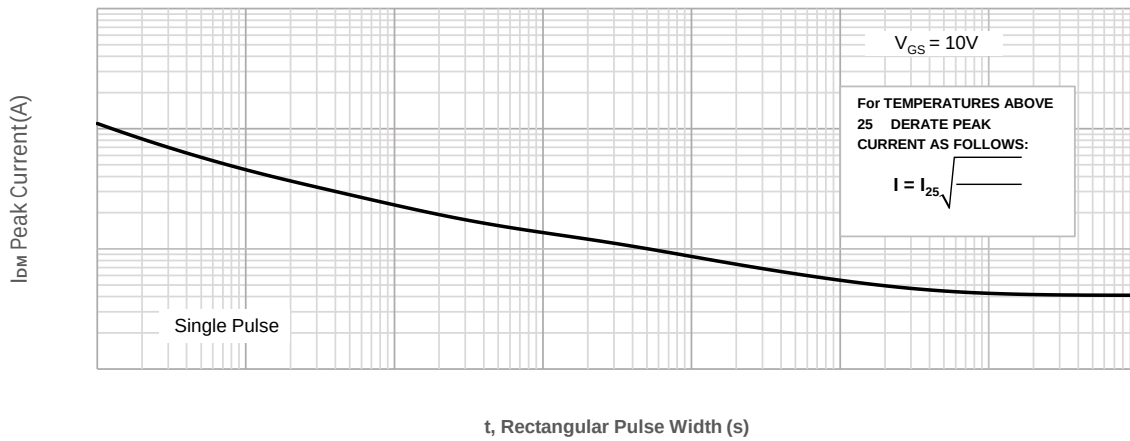
Symbol	Parameter	Max	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ⁽²⁾	231	$^\circ\text{C/W}$

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 60V, V _{GS} = 0V	-	-	1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±10	μA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	0.6	1.0	1.6	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽³⁾	V _{GS} = 10, I _D = 0.3A	-	805	1600	mΩ
		V _{GS} = 4.5V, I _D = 0.2A	-	871	1700	mΩ
Dynamic Characteristics						
R _g	Gate Resistance	f = 1MHz	-	6.8	-	Ω
C _{iSS}	Input Capacitance	V _{GS} = 0V, V _{DS} = 30V, f = 1MHz	-	38	56	pF
C _{oss}	Output Capacitance		-	5.8	-	pF
C _{rSS}	Reverse Transfer Capacitance		-	2.1	-	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 30V, I _D = 1A	-	1.7	-	nC
Q _{gs}	Gate Source Charge		-	0.3	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	0.2	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 10V, V _{DD} = 30V I _D = 0.3A, R _{GEN} = 3Ω	-	0.6	-	ns
t _r	Turn-On Rise Time		-	2.4	-	ns
t _{d(off)}	Turn-Off DelayTime		-	6.3	-	ns
t _f	Turn-Off Fall Time		-	9.2	-	ns
Body Diode Characteristics						
I _S	Maximum Continuous Body Diode Forward Current		-	-	0.41	A
I _{SM}	Maximum Pulsed Body Diode Forward Current		-	-	1.6	A
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _S = 0.3A	-		1.2	V
trr	Body Diode Reverse Recovery Time	I _F = 1A, di/dt = 100A/us	-	15	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	6.1	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB.
 3. Pulse Test: Pulse Width 300 μs , Duty Cycle 0.5%.

Typical Performance Characteristics

Figure 1: Power De-rating

Figure 2: Current De-rating

Figure 3: Normalized Maximum Transient Thermal Impedance

Figure 4: Peak Current Capacity


Typical Performance Characteristics

Figure 5: Output Characteristics

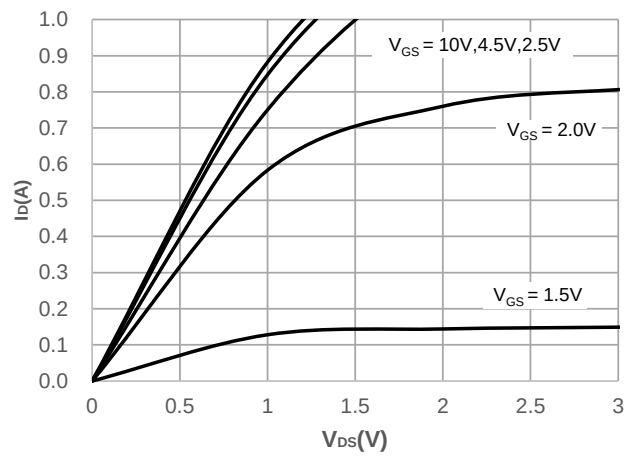


Figure 6: Typical Transfer Characteristics

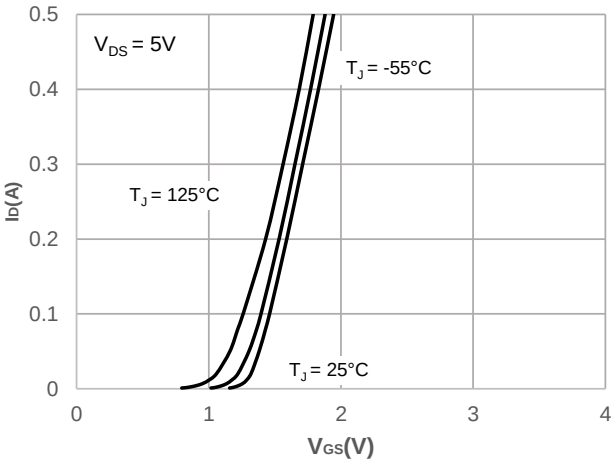
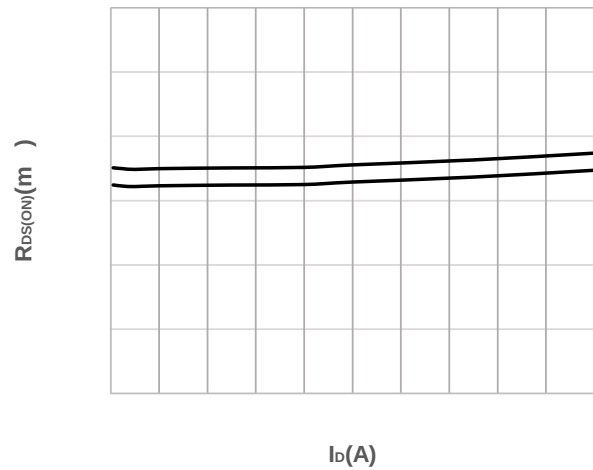


Figure 7: On-resistance vs. Drain Current



Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

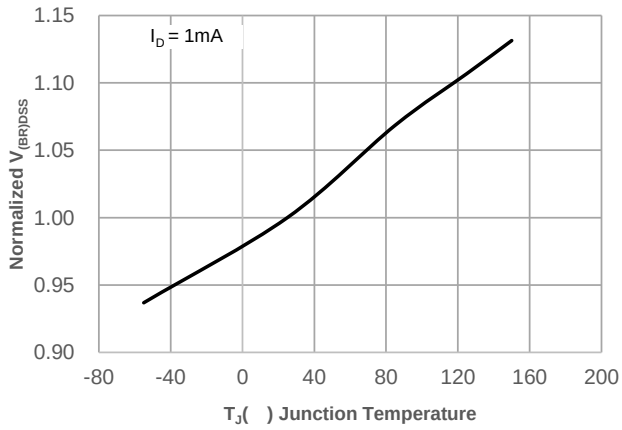


Figure 12: Normalized on Resistance vs. Junction Temperature

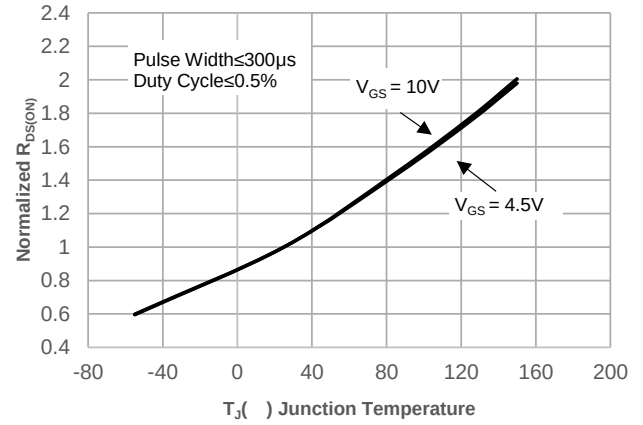


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

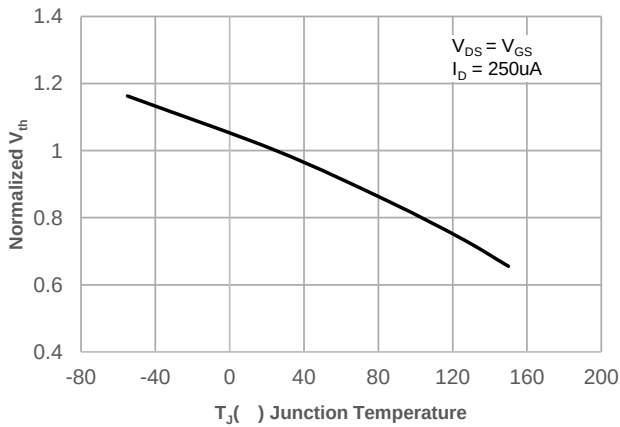


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

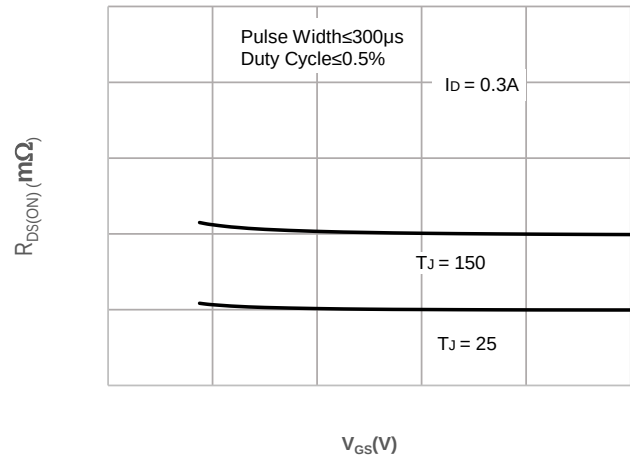
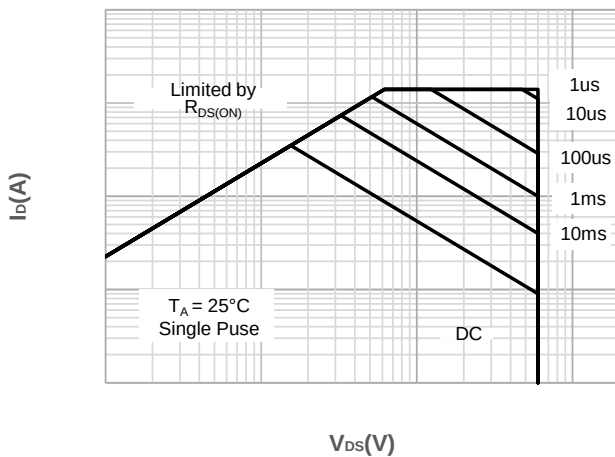


Figure 15: Maximum Safe Operating Area



Test Circuit



Figure 1: Gate Charge Test Circuit & Waveform

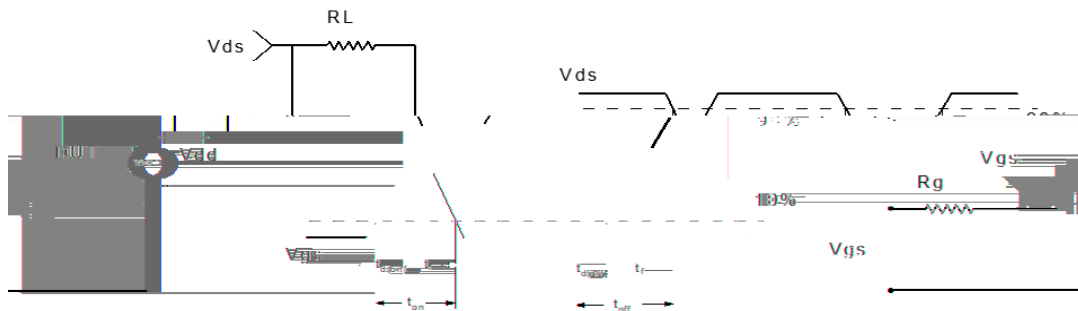


Figure 2: Resistive Switching Test Circuit & Waveform

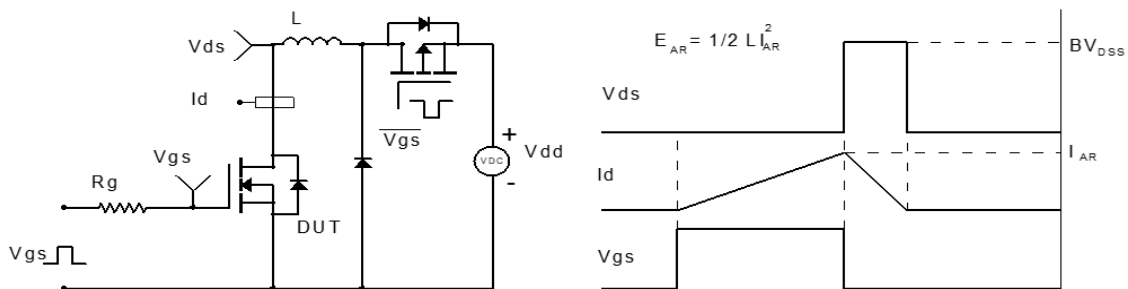


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

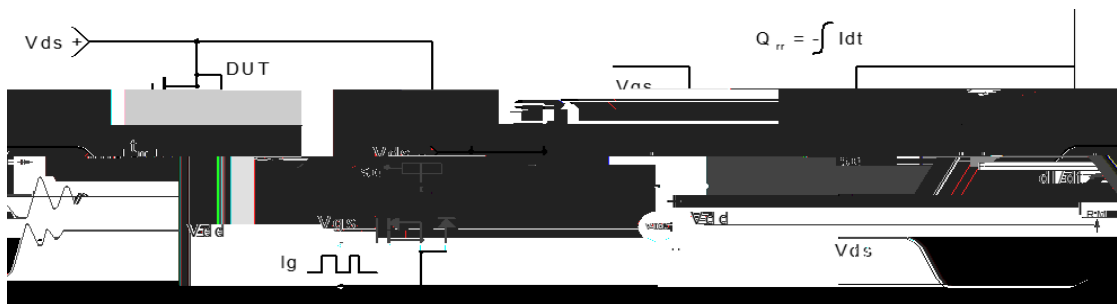
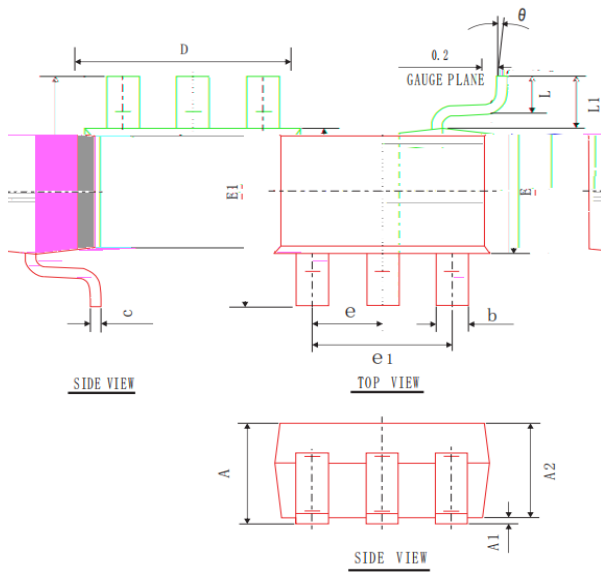


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(SOT-363-6L)

Package Outline



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
L	0.40	0.40	0.40
$L1$	0.70	0.70	0.70
D	0.95	0.95	0.95
$e1$	0.25	0.30	0.30
b	0.10	0.15	0.15
A	1.30	1.40	1.40
$A1$	2.10	2.20	2.20
$A2$	1.25	1.35	1.35
$E1$	2.30	2.45	2.45
L	0.36	0.46	0.46
θ	4°	8°	8°
$L1$	0.525-REF		
e	0.65-TYP		

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