

Description

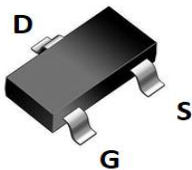
N-channel Enhancement Mode Power MOSFET

Features

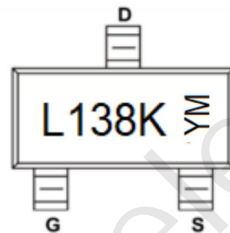
- 60V, 0.2A
 $R_{DS(ON)} < 2.2\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 3\Omega @ V_{GS} = 4.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free
- ESD Protected: 2KV

Applications

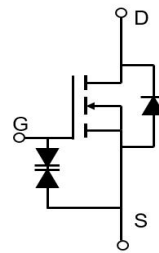
- Battery Operated System
- Direct logic-level Interface:
TTL/CMOS
- Solid-State Relays



SOT-323-3L



Marking and Pin Assignment



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Outline	Package	Reel Size	Reel(pcs)	Per Carton (pcs)
L138K	CRMLATL138K	TAPING	SOT-323-3L	7"	3000	120000

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

Symbol	Parameter	Value	Units
V_{DS}	Drain-to-Source Voltage	60	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
I_{DM}	Pulsed Drain Current ⁽¹⁾	0.8	A
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ⁽²⁾	415	$^\circ\text{C/W}$
T_J, T_{STG}	Junction & Storage Temperature Range	-55 to 150	$^\circ\text{C}$



Electrical Characteristics (T_J = 25°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	0.7	1.1	1.5	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽³⁾	V _{GS} = 10V, I _D = 0.3A	-	1.8	2.2	Ω
		V _{GS} = 4.5V, I _D = 0.2A	-	2.0	3.0	Ω
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 25V, f = 1MHz	-	22	-	pF
C _{oss}	Output Capacitance		-	3.4	-	pF
C _{rss}	Reverse Transfer Capacitance		-	2.3	-	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 4.5V V _{DS} = 10V, I _D = 0.3A	-	1.6	-	nC
Q _{gs}	Gate Source Charge		-	0.2	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	0.5	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 10V, V _{DD} = 10V I _D = 0.2A, R _{GEN} = 10Ω	-	2	-	ns
t _r	Turn-On Rise Time		-	14	-	ns
t _{d(off)}	Turn-Off DelayTime		-	6	-	ns
t _f	Turn-Off Fall Time		-	19	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	0.3	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	1.2	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S = 0.3A	-	-	1.2	V

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. R_{θJA} is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
 3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%.

Test Circuit

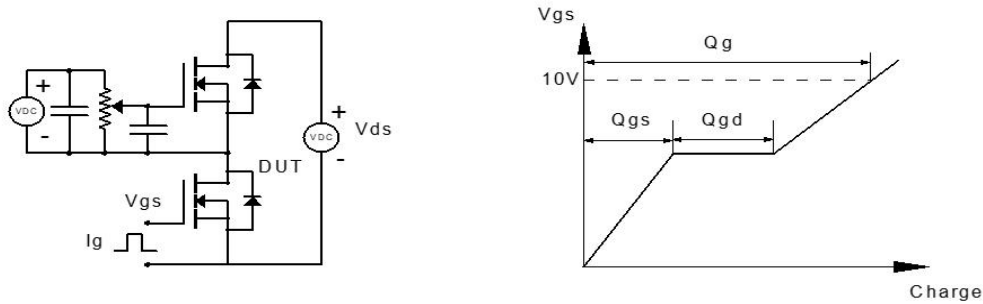


Figure 1: Gate Charge Test Circuit & Waveform

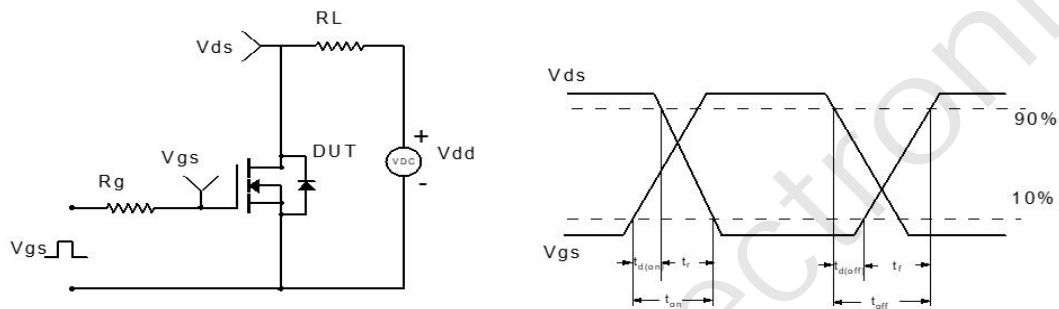


Figure 2: Resistive Switching Test Circuit & Waveform

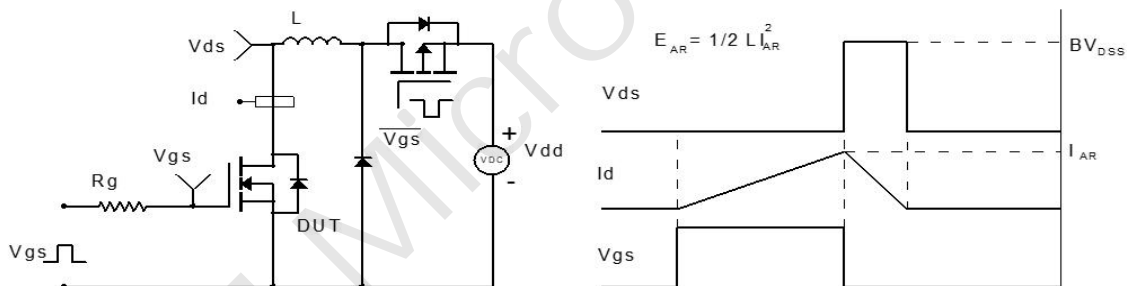


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

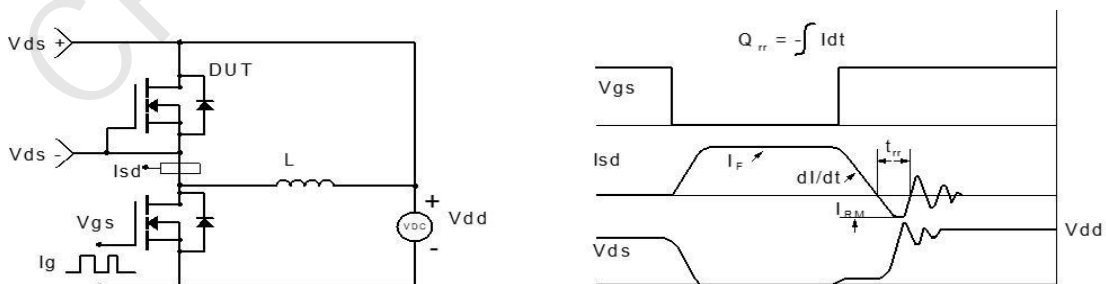
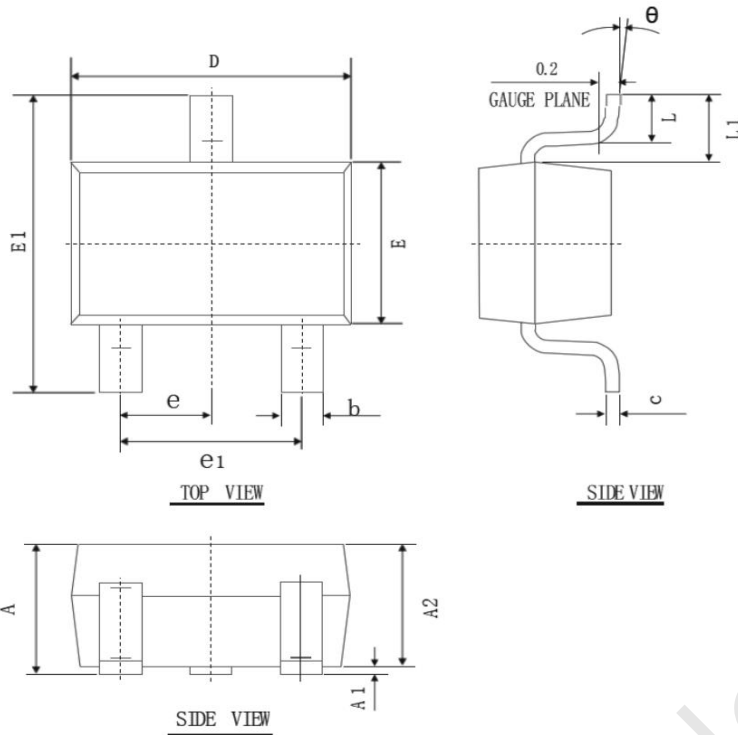


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(SOT-323-3L)



COMMON DIMENSIONS (UNITS OF MEASURE=mm)			
SYMBOL	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	0.05	0.10
A2	0.90	0.95	1.00
b	0.20	0.25	0.30
c	0.08	0.10	0.15
e1	1.20	1.30	1.40
D	2.00	2.10	2.20
E	1.15	1.25	1.35
E1	2.15	2.30	2.45
L	0.26	0.36	0.46
θ	0°	4°	8°
L1		0.525 REF	
e		0.65 TYP	

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