

# Dual Integrated Circuit

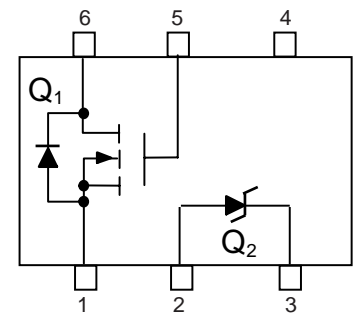
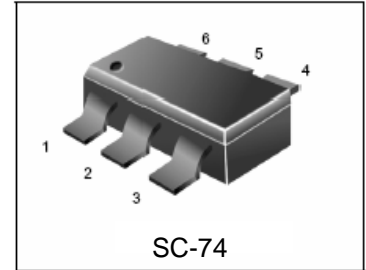
## N-Channel/PN Duals

- We declare that the material of product compliance with RoHS requirements.
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

### MAXIMUM RATING

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	$V_{DSS}$	50	Vdc
Gate-to-Source Voltage – Continuous	$V_{GS}$	$\pm 20$	Vdc
Drain Current			mA
– Continuous @ $T_A = 25^\circ\text{C}$	$I_D$	200	
– Pulsed Drain Current ( $t_p \leq 10 \mu\text{s}$ )	$I_{DM}$	800	
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	$P_D$	225	mW
Operating and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 150	$^\circ\text{C}$
Thermal Resistance – Junction-to-Ambient	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purposes, for 10 seconds	$T_L$	260	$^\circ\text{C}$

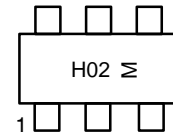
LBSS138V3.3T1G  
S-LBSS138V3.3T1G



### ORDERING INFORMATION

Device	Marking	Shipping
LBSS138V3.3T1G S-LBSS138V3.3T1G	H02	3000/Tape&Reel
LBSS138V3.3T3G S-LBSS138V3.3T3G	H02	10000/Tape&Reel

### MARKING DIAGRAM

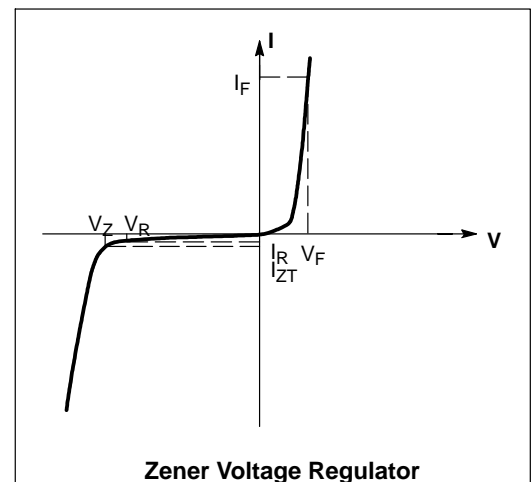


H02 = Device Code  
M = Month Code

### ELECTRICAL CHARACTERISTICS (Q2)

( $T_A = 25^\circ\text{C}$  unless otherwise noted,  
 $V_F = 0.9 \text{ V Max. @ } I_F = 10 \text{ mA}$  for all types)

Symbol	Parameter
$V_Z$	Reverse Zener Voltage @ $I_{ZT}$
$I_{ZT}$	Reverse Current
$Z_{ZT}$	Maximum Zener Impedance @ $I_{ZT}$
$I_{ZK}$	Reverse Current
$Z_{ZK}$	Maximum Zener Impedance @ $I_{ZK}$
$I_R$	Reverse Leakage Current @ $V_R$
$V_R$	Reverse Voltage
$I_F$	Forward Current
$V_F$	Forward Voltage @ $I_F$
$\Theta V_Z$	Maximum Temperature Coefficient of $V_Z$
C	Max. Capacitance @ $V_R = 0$ and $f = 1 \text{ MHz}$



# LBSS138V3.3T1G , S-LBSS138V3.3T1G

## ELECTRICAL CHARACTERISTICS(Q1) $(T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Drain-to-Source Breakdown Voltage ( $V_{GS} = 0\text{ Vdc}$ , $I_D = 250\ \mu\text{Adc}$ )	$V_{(BR)DSS}$	50	–	–	Vdc
Zero Gate Voltage Drain Current ( $V_{DS} = 25\text{ Vdc}$ , $V_{GS} = 0\text{ Vdc}$ ) ( $V_{DS} = 50\text{ Vdc}$ , $V_{GS} = 0\text{ Vdc}$ )	$I_{DSS}$	–	–	0.1 0.5	$\mu\text{Adc}$
Gate-Source Leakage Current ( $V_{GS} = \pm 20\text{ Vdc}$ , $V_{DS} = 0\text{ Vdc}$ )	$I_{GSS}$	–	–	$\pm 0.1$	$\mu\text{Adc}$

## ON CHARACTERISTICS (Note 1.)

Gate-Source Threshold Voltage ( $V_{DS} = V_{GS}$ , $I_D = 1.0\text{ mAdc}$ )	$V_{GS(th)}$	0.5	–	1.5	Vdc
Static Drain-to-Source On-Resistance ( $V_{GS} = 2.75\text{ Vdc}$ , $I_D < 200\text{ mAdc}$ , $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$ ) ( $V_{GS} = 5.0\text{ Vdc}$ , $I_D = 200\text{ mAdc}$ )	$r_{DS(on)}$	–	5.6	10 3.5	Ohms
Forward Transconductance ( $V_{DS} = 25\text{ Vdc}$ , $I_D = 200\text{ mAdc}$ , $f = 1.0\text{ kHz}$ )	$g_{fs}$	100	–	–	mmhos

## DYNAMIC CHARACTERISTICS

Input Capacitance	( $V_{DS} = 25\text{ Vdc}$ , $V_{GS} = 0$ , $f = 1\text{ MHz}$ )	$C_{iss}$	–	40	50	pF
Output Capacitance	( $V_{DS} = 25\text{ Vdc}$ , $V_{GS} = 0$ , $f = 1\text{ MHz}$ )	$C_{oss}$	–	12	25	
Transfer Capacitance	( $V_{DG} = 25\text{ Vdc}$ , $V_{GS} = 0$ , $f = 1\text{ MHz}$ )	$C_{rss}$	–	3.5	5.0	

## SWITCHING CHARACTERISTICS (Note 2.)

Turn-On Delay Time	( $V_{DD} = 30\text{ Vdc}$ , $I_D = 0.2\text{ Adc}$ ,)	$t_{d(on)}$	–	–	20	ns
Turn-Off Delay Time		$t_{d(off)}$	–	–	20	

1. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
2. Switching characteristics are independent of operating junction temperature.

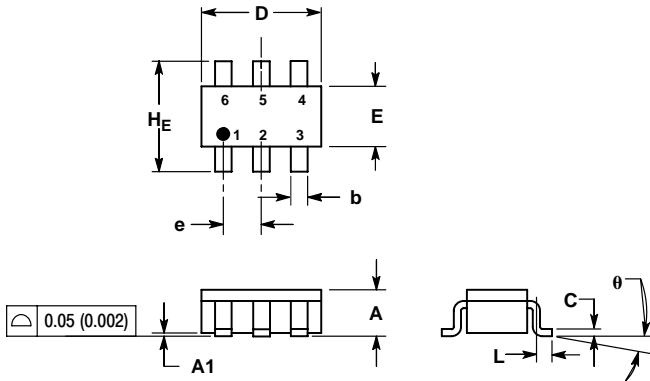
## ELECTRICAL CHARACTERISTICS(Q2) $(T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Zener Voltage @ $I_{ZT} = 5\text{mA}$	$V_Z$ (Volts)	3.1	3.3	3.5	V
Maximum Zener Impedance @ $I_{ZT} = 5\text{mA}$	$Z_{ZT}$			95	$\Omega$
Maximum Zener Impedance @ $I_{ZK} = 0.5\text{mA}$	$Z_{ZK}$			1000	$\Omega$
Reverse Leakage Current @ $V_R = 1.0\text{V}$	$I_R$			5	$\mu\text{A}$
Forward Voltage @ $I_F = 10\text{mA}$	$V_F$			0.9	V
Maximum Temperature Coefficient of $V_Z$ $I_{ZT} = 5\text{mA}$	$\theta V_Z$	–3.5		0	mV/k
Max. Capacitance @ $V_R = 0, f = 1\text{ MHz}$	$C$		450		pF

2. Zener voltage is measured with a pulse test current  $I_Z$  at an ambient temperature of  $25^\circ\text{C}$ .

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## SC-74



DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.37	0.50	0.010	0.015	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.034	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
HE	2.50	2.75	3.00	0.099	0.108	0.118
theta	0°	-	10°	0°	-	10°

