

# Dual Integrated Circuit

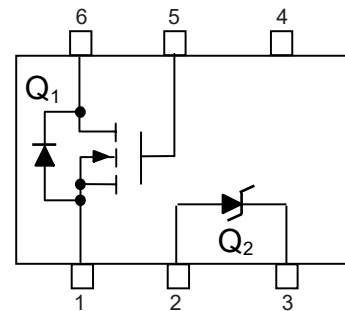
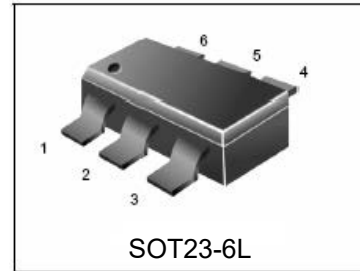
## N-Channel/PN Duals

- 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	$^\circ\text{C}$

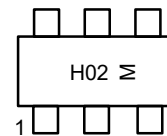
**BSS138V3.3**  
**S-BSS138V3.3**



### ORDERING INFORMATION

Device	Marking	Shipping
BSS138V3.3 S-BSS138V3.3	H02	3000/Tape&Reel

### MARKING DIAGRAM

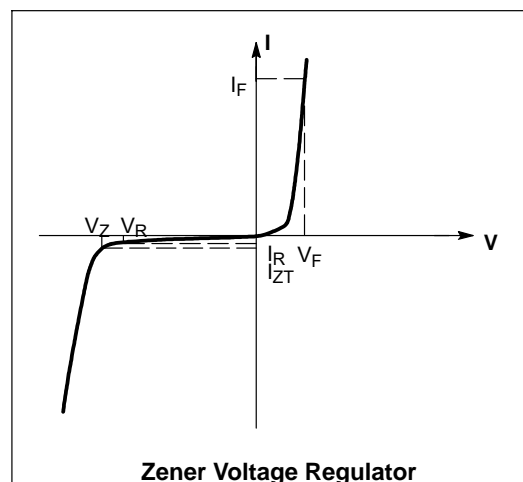


H02 = Device Code  
M = Month Code

### 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 @ $I_F$
$\Theta_{VZ}$	Maximum Temperature Coefficient of $V_Z$
C	Max. Capacitance @ $V_R = 0$ and $f = 1 \text{ MHz}$



# BSS138V3.3, S-BSS138V3.3

## ELECTRICAL CHARACTERISTICS(Q1) (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Drain-to-Source Breakdown Voltage (V <sub>GS</sub> = 0 Vdc, I <sub>D</sub> = 250 μAdc)	V <sub>(BR)DSS</sub>	50	–	–	Vdc
Zero Gate Voltage Drain Current (V <sub>DS</sub> = 25 Vdc, V <sub>GS</sub> = 0 Vdc) (V <sub>DS</sub> = 50 Vdc, V <sub>GS</sub> = 0 Vdc)	I <sub>DSS</sub>	–	–	0.1 0.5	μAdc
Gate-Source Leakage Current (V <sub>GS</sub> = ± 20 Vdc, V <sub>DS</sub> = 0 Vdc)	I <sub>GSS</sub>	–	–	±0.1	μAdc

## ON CHARACTERISTICS (Note 1.)

Gate-Source Threshold Voltage (V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1.0 mAdc)	V <sub>GS(th)</sub>	0.5	–	1.5	Vdc
Static Drain-to-Source On-Resistance (V <sub>GS</sub> = 2.75 Vdc, I <sub>D</sub> < 200 mAdc, T <sub>A</sub> = –40°C to +85°C) (V <sub>GS</sub> = 5.0 Vdc, I <sub>D</sub> = 200 mAdc)	r <sub>DS(on)</sub>	–	5.6	10 3.5	Ohms
Forward Transconductance (V <sub>DS</sub> = 25 Vdc, I <sub>D</sub> = 200 mAdc, f = 1.0 kHz)	g <sub>fs</sub>	100	–	–	mmhos

## DYNAMIC CHARACTERISTICS

Input Capacitance	(V <sub>DS</sub> = 25 Vdc, V <sub>GS</sub> = 0, f = 1 MHz)	C <sub>iss</sub>	–	40	50	pF
Output Capacitance	(V <sub>DS</sub> = 25 Vdc, V <sub>GS</sub> = 0, f = 1 MHz)	C <sub>oss</sub>	–	12	25	
Transfer Capacitance	(V <sub>DG</sub> = 25 Vdc, V <sub>GS</sub> = 0, f = 1 MHz)	C <sub>rss</sub>	–	3.5	5.0	

## SWITCHING CHARACTERISTICS (Note 2.)

Turn-On Delay Time	(V <sub>DD</sub> = 30 Vdc, I <sub>D</sub> = 0.2 Adc,)	t <sub>d(on)</sub>	–	–	20	ns
Turn-Off Delay Time		t <sub>d(off)</sub>	–	–	20	

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
2. Switching characteristics are independent of operating junction temperature.

## ELECTRICAL CHARACTERISTICS(Q2) (T<sub>A</sub> = 25°C unless otherwise noted)

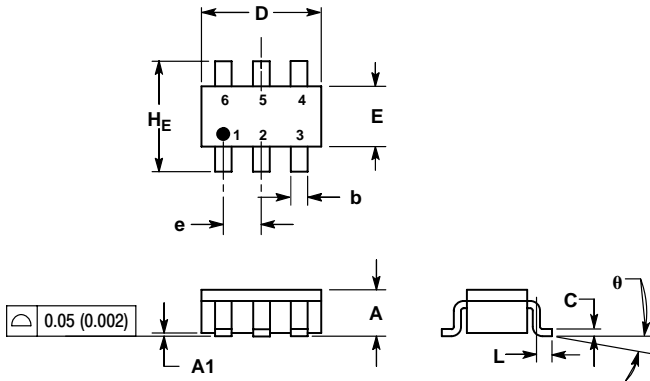
Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Zener Voltage @ I <sub>ZT</sub> = 5mA	V <sub>Z</sub> (Volts)	3.1	3.3	3.5	V
Maximum Zener Impedance @ I <sub>ZT</sub> = 5mA	Z <sub>ZT</sub>			95	Ω
Maximum Zener Impedance @ I <sub>ZK</sub> = 0.5mA	Z <sub>ZK</sub>			1000	Ω
Reverse Leakage Current @ V <sub>R</sub> = 1.0V	I <sub>R</sub>			5	μA
Forward Voltage @ I <sub>F</sub> = 10mA	V <sub>F</sub>			0.9	V
Maximum Temperature Coefficient of V <sub>Z</sub> I <sub>ZT</sub> = 5mA	θV <sub>Z</sub>	–3.5		0	mV/k
Max. Capacitance @ V <sub>R</sub> = 0, f = 1 MHz	C		450		pF

2. Zener voltage is measured with a pulse test current I<sub>Z</sub> at an ambient temperature of 25°C.



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## SOT23-6L



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°

