

Dual Rail-to-Rail Operational Amplifiers

Features

- Wide Supply Operation Range +4.5V to +20V
- Beyond the Rails Input Capability
- Rail-to-Rail Output Swing
- Low Supply Current, 3mA / Per Amplifier (Typical)
- Low Input Offset Voltage 2mV (Typical)
- Internal Frequency Compensated for Unit Gain Stable
- Wide Bandwidth (unit gain) 30MHz
- High Slew Rate = 150V/ μ s
- Large DC Voltage Gain 80dB (Typical)
- ± 180 mA Output Short Current
- Embedded Over-Temperature Protection
- Short-Circuit Current Limit Protection
- MSOP-8, TSSOP-8, SOP-8 (FD) and MSOP-8 (FD) Package Available

Applications

- Portable Equipment
- TFT Vcom/Gamma buffers
- Battery-Powered Equipment
- ASIC Input or Output Amplifier
- Low Power/Low Voltage Applications

General Description

The G1563 is the dual rail-to-rail input/output operation amplifiers with the low power, high voltage swing. Operating on supplies ranging from 4.5V to 20V, while current consuming only 3mA / per amplifier, the G1563 is with high unit-gain bandwidth of 30MHz. The G1563 also provides common mode input ability beyond the supply rails, as well as rail-to-rail output capability. This enables this amplifier to offer maximum dynamic range at any supply voltage.

The G1563 also features fast slewing and settling times, as well as a high output drive capability of 65mA (sink and source). These features make these amplifiers ideal for high speed filtering and signal conditioning application. Other applications include battery power, TFT Vcom /Gamma buffers, portable devices, and anywhere low power consumption is important.

There are over temperature and short-circuit current limit protection embedded to avoid the unexpected damages. The G1563 is available in MSOP-8, TSSOP-8, SOP-8 (FD) and MSOP-8 (FD) package.

Ordering Information

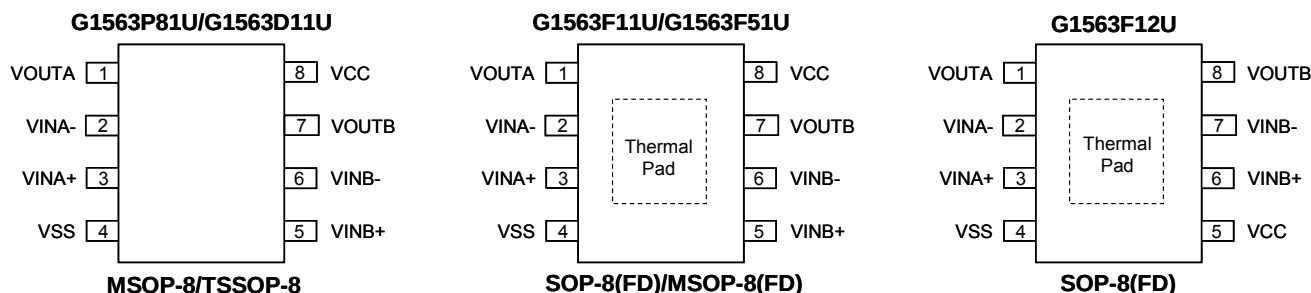
ORDER NUMBER	MARKING	TEMP. RANGE	PACKAGE (Green)
G1563P81U	G1563	-40°C~ +85°C	MSOP-8
G1563D11U	G1563	-40°C~ +85°C	TSSOP-8
G1563F11U	G1563A	-40°C~ +85°C	SOP-8 (FD)
G1563F12U	G1563	-40°C~ +85°C	SOP-8 (FD)
G1563F51U	G1563	-40°C~ +85°C	MSOP-8 (FD)

Note: P8: MSOP-8 D1: TSSOP-8 F1: SOP-8 (FD) F5: MSOP-8 (FD)

1 & 2: Bonding Code

U: Tape & Reel

Pin Configuration



Note: Recommend connecting the Thermal Pad to the VSS for excellent power dissipation.

Absolute Maximum Ratings

Supply Voltage (V_{CC} to V_{SS})	+24V
Input Voltage	$V_{SS}-0.3V$ to $V_{CC}+0.3V$
Storage Temperature Range	-65°C to 150°C
Junction Temperature	150°C
Reflow Temperature (soldering, 10sec)	260°C
Thermal Resistance Junction to Ambient, (θ_{JA})	
MSOP-8	192°C/W ⁽¹⁾
TSSOP-8	210°C/W ⁽¹⁾
SOP-8(FD)	108°C/W ⁽²⁾
MSOP-8(FD)	132°C/W ⁽²⁾
Continuous Power Dissipation ($T_A=25^\circ\text{C}$)	
MSOP-8	0.65W ⁽¹⁾

TSSOP-8	0.6W ⁽¹⁾
SOP-8(FD)	1.2W ⁽²⁾
MSOP-8(FD)	0.9W ⁽²⁾
Thermal Resistance Junction to Case, (θ_{JC})	
MSOP-8	55°C/W
SOP-8(FD)	12°C/W
MSOP-8(FD)	40°C/W

Recommend Operating Range

Operating Supply Voltage Range	6.5V ≤ V_{DD} ≤ 19.5V
Operating Temperature Range	-40°C to 85°C
ESD Susceptibility	2000V

⁽¹⁾: Please refer to Minimum Footprint PCB Layout Section.

⁽²⁾: Please refer to 1in² of 1oz PCB Layout Section.

Electrical Characteristics

$V_{CC} = 10V$; $V_{SS} = 0V$; $T_{AMB} = 25^\circ\text{C}$; $R_L = 1k\Omega$ to $V_{CC}/2$.

The device is not guaranteed to function outside its operating conditions. Parameters with MIN and/or MAX limits are 100% tested at +25°C, unless otherwise specified.

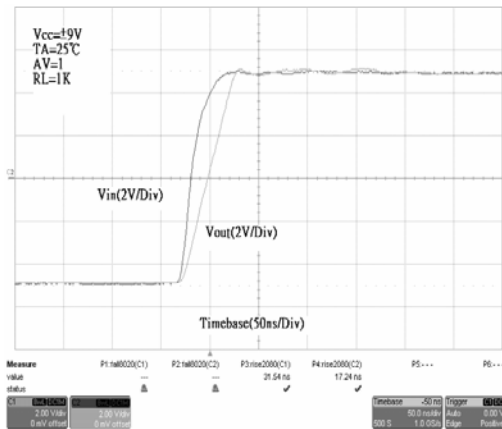
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supplies						
Supply Voltage Range	V_{CC}	Note1	4.5	---	20	V
Supply Current	I_{CC}	$V_O=5V$ no load / per amplifier	---	3	5	mA
DC Characteristics						
Input Offset Voltage	$V_{I(OS)}$		---	2	12	mV
Common Mode Voltage	V_{CM}	Inferred from CMRR test	-0.5	---	$V_{CC}+0.5$	V
Input Bias Current	I_B	$V_O=5V$	---	20	100	nA
Input Bias Current Offset	I_{OS}	$V_O=5V$	---	2	50	nA
Open Loop Gain	A_V	$0.5V \leq V_{OUT} \leq 9.5V$ (no load)	70	80	---	dB
Output Voltage Swing High	V_{OH}	$I_L=5mA$	9.86	9.92	---	V
Output Voltage Swing Low	V_{OL}	$I_L=-5mA$	---	0.08	0.14	V
Power Supply Rejection Ratio	PSRR	$7V \leq V_{CC} \leq 18V$	65	80	---	dB
Common-Mode Rejection Ratio	CMRR	$V_{SS} \leq V_{CM} \leq V_{CC}$	50	65	---	dB
Channel Separation	α	$f=1kHz$	---	90	---	dB
Output Current	$I_{O(SOURCE)}$		---	65	---	mA
	$I_{O(SINK)}$		---	65	---	mA
Short Circuit Current	I_{SC}		---	±180	---	mA
Slew-Rate	SR	$1V \leq V_{CC} \leq 9V$; 20% to 80%	---	150	---	V/μS
Unit-Gain Bandwidth	BW	No load	---	30	---	MHz
Phase Margin	PH	No load	---	50	---	degree
Settling Time	t_s	$AV=+1$, $V_O=2V$ step (Settling to 0.1%)	---	130	---	nS

Note1: Guaranteed by the Power-Supply Rejection Ratio (PSRR) test

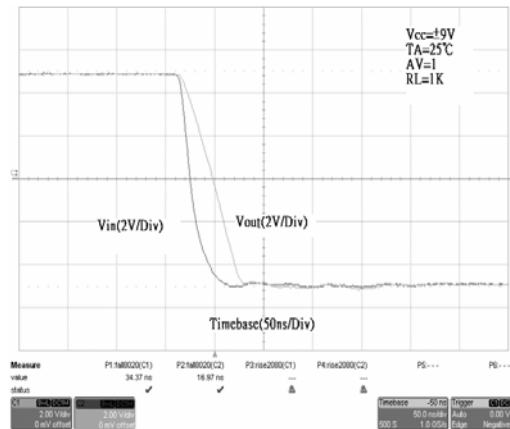
Typical Performance Characteristics

($V_{IN} = \pm 9V$, $V_{OUT} = 0V$, $T_A = 25^\circ C$)

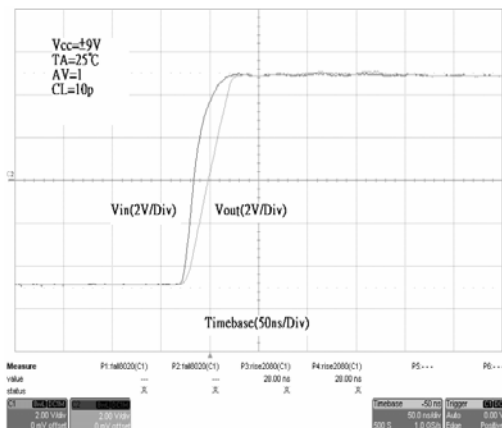
Large Signal Transient Response



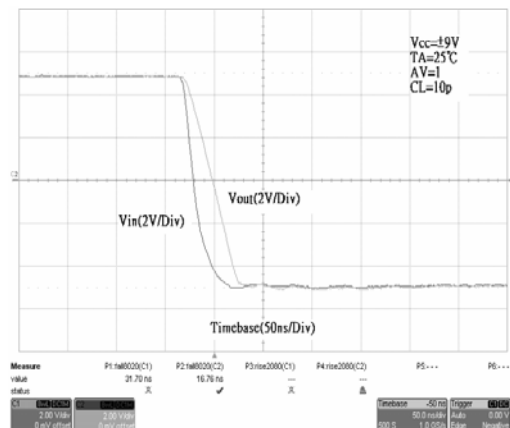
Large Signal Transient Response



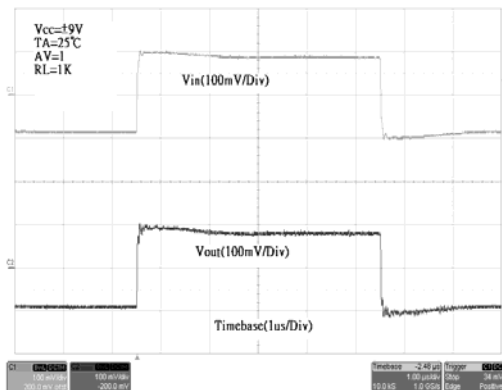
Large Signal Transient Response



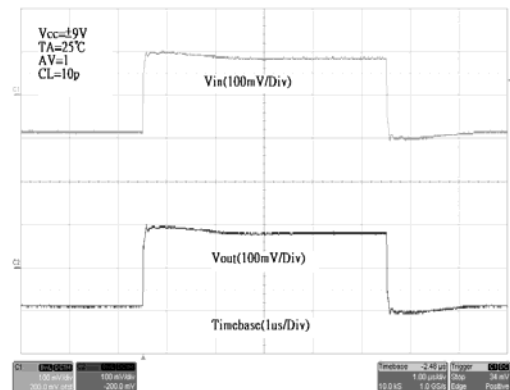
Large Signal Transient Response



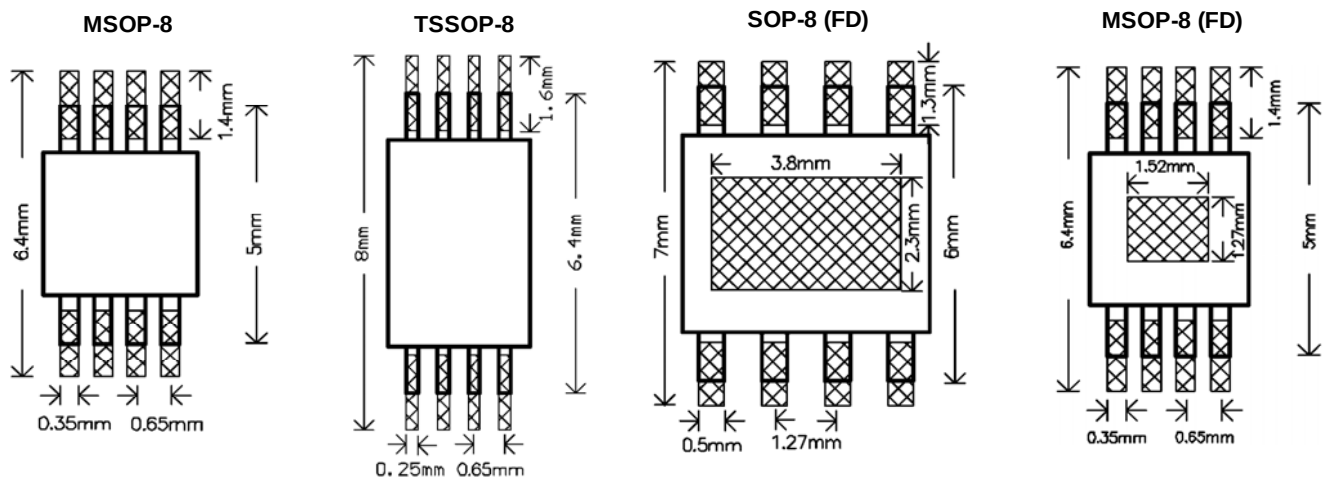
Small Signal Transient Response



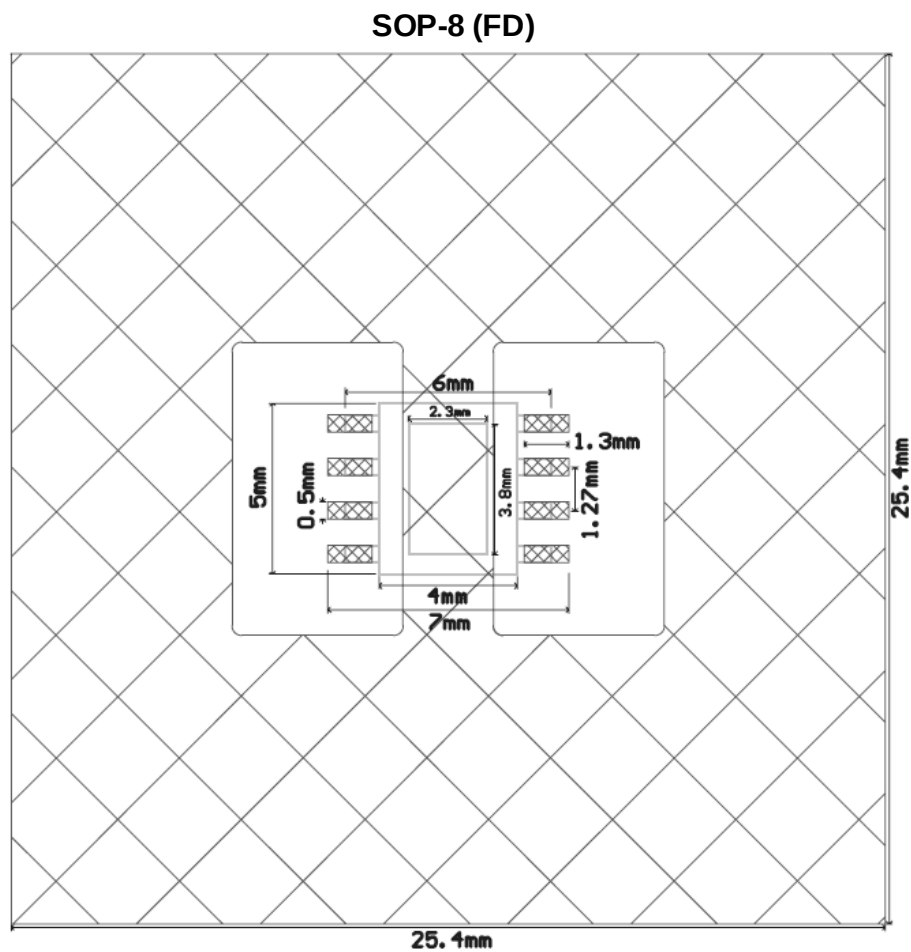
Small Signal Transient Response



Minimum Footprint PCB Layout Section

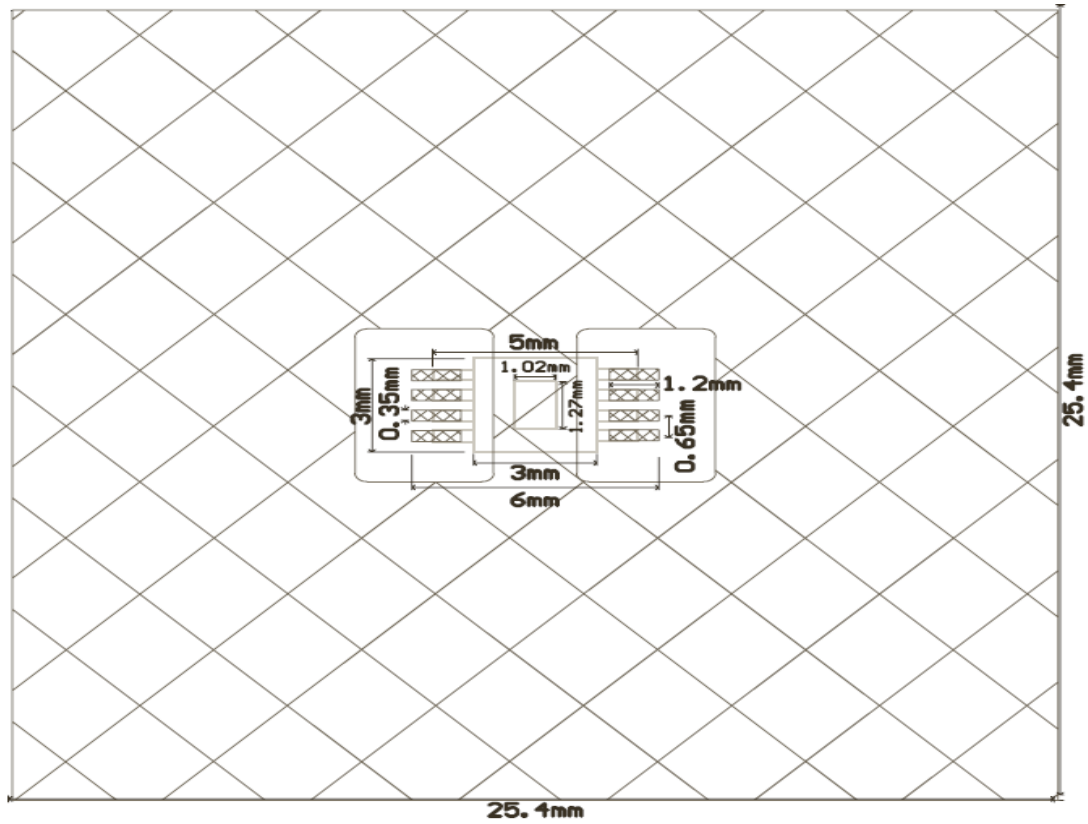


1in² of 1oz PCB Layout Section

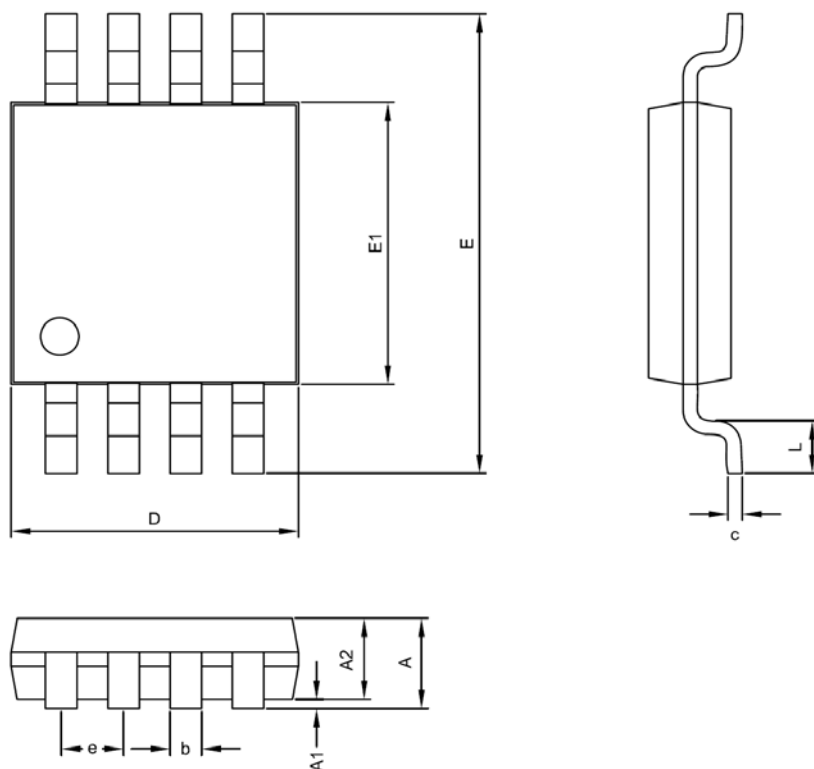




MSOP-8 (FD)



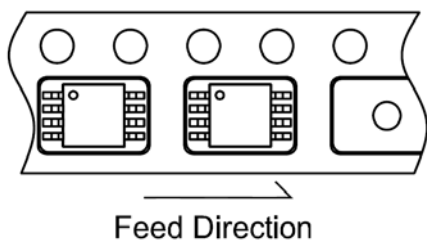
Package Information



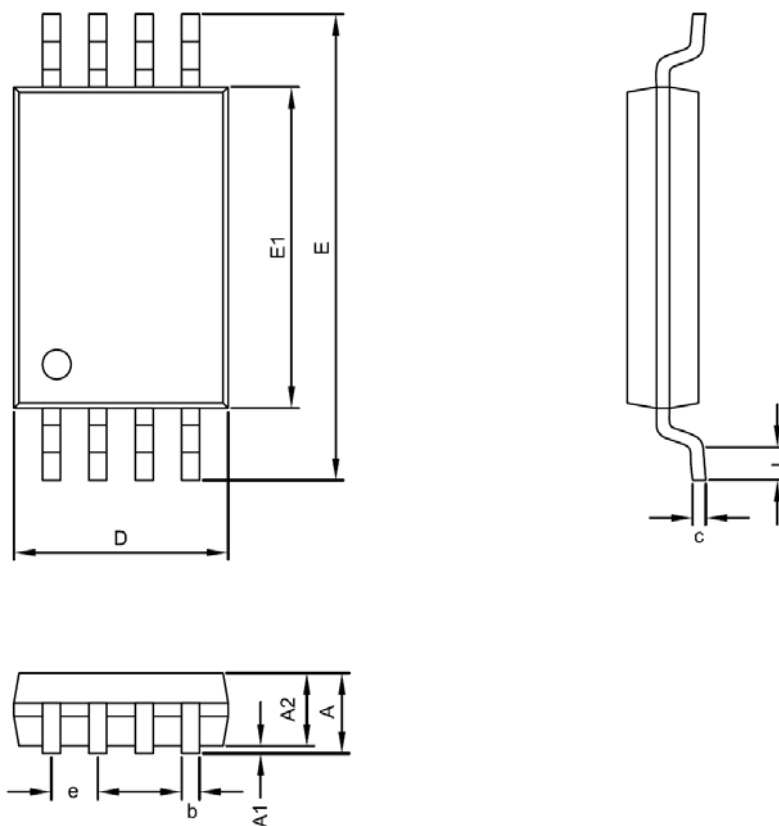
MSOP-8 Package

Symble	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.81	0.95	1.10	0.032	0.037	0.043
A1	0.00	---	0.15	0.000	---	0.006
A2	0.76	0.86	0.96	0.030	0.034	0.038
D	2.90	3.00	3.10	0.114	0.118	0.122
E	4.80	4.90	5.00	0.189	0.193	0.197
E1	2.90	3.00	3.10	0.114	0.118	0.122
c	0.13	0.15	0.23	0.005	0.006	0.009
b	0.28	0.30	0.38	0.011	0.012	0.015
e	0.65 BSC			0.026 BSC		
L	0.4	0.53	0.8	0.016	0.021	0.026

Taping Specification



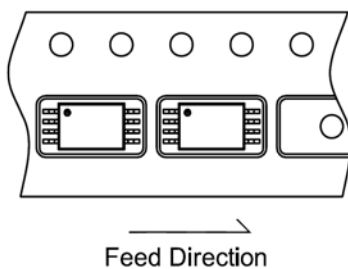
PACKAGE	Q'TY/REEL
MSOP-8	3,000 ea



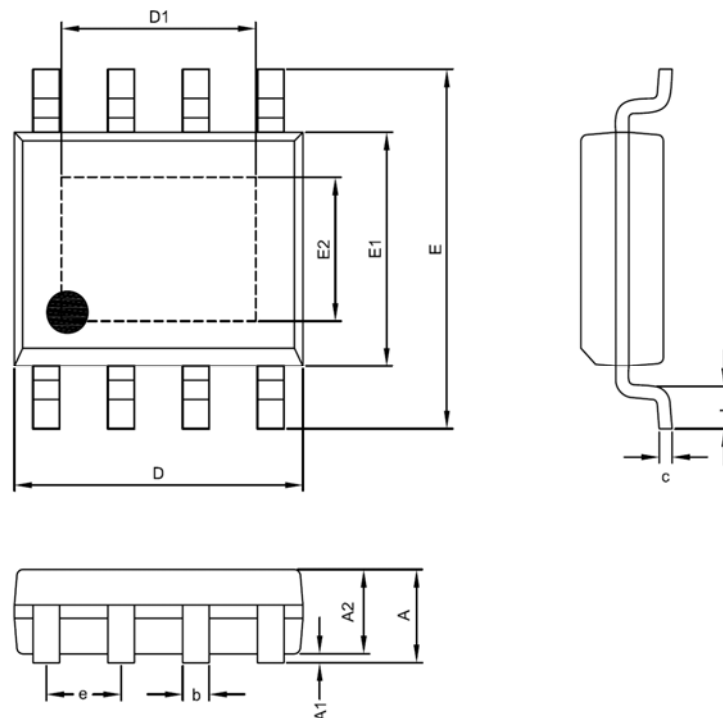
TSSOP-8 Package

Symble	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	---	---	1.20	---	---	0.048
A1	0.00	---	0.15	0.000	---	0.006
A2	0.85	1.00	1.05	0.033	0.039	0.041
D	2.90	3.00	3.10	0.114	0.118	0.122
E	6.20	6.40	6.60	0.244	0.252	0.260
E1	4.30	4.40	4.50	0.169	0.173	0.177
c	0.09	---	0.20	0.004	---	0.008
b	0.19	0.22	0.30	0.008	0.009	0.012
e	0.65 BSC			0.026 BSC		
L	0.45	0.60	0.75	0.018	0.024	0.030

Taping Specification



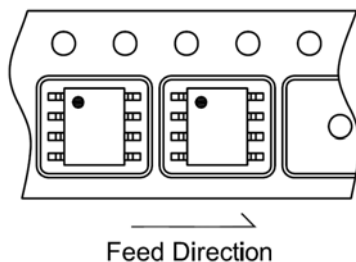
PACKAGE	Q'TY/REEL
TSSOP-8	3,000 ea



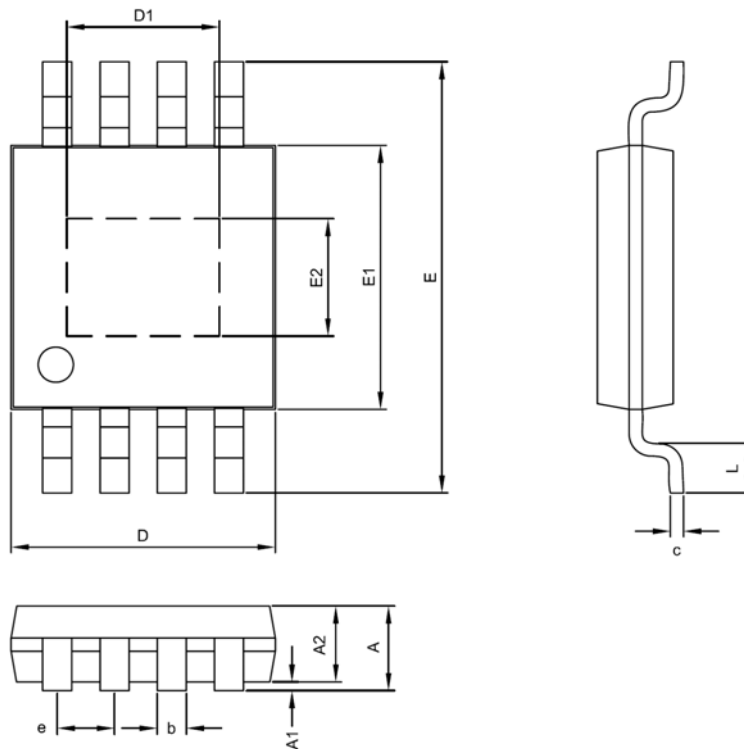
SOP- 8 (FD) Package

Symble	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.35	1.55	1.65	0.053	0.061	0.065
A1	0.00	---	0.15	0.000	---	0.006
A2	1.15	1.35	1.50	0.045	0.053	0.059
D	4.80	4.90	5.00	0.189	0.192	0.197
D1	2.29	---	3.71	0.090	---	0.146
E	5.80	6.00	6.20	0.228	0.236	0.244
E1	3.80	3.90	4.00	0.150	0.153	0.157
E2	2.29	---	2.64	0.090	---	0.104
c	0.19	0.23	0.27	0.007	0.009	0.011
b	0.33	0.43	0.53	0.013	0.017	0.021
e	1.27 BSC			0.050 BSC		
L	0.40	0.70	1.00	0.016	0.028	0.039

Taping Specification



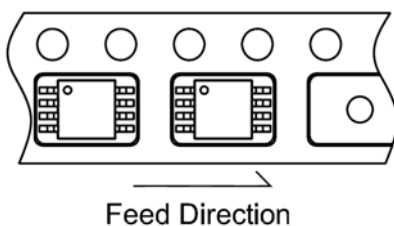
PACKAGE	Q'TY/REEL
SOP-8 (FD)	2,500 ea



MSOP-8 (FD) Package

Symble	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.81	0.95	1.10	0.032	0.037	0.043
A1	0.00	---	0.15	0.000	---	0.006
A2	0.76	0.86	0.96	0.030	0.034	0.038
D	2.90	3.00	3.10	0.114	0.118	0.122
D1	1.40	1.90	2.10	0.055	0.074	0.083
E	4.80	4.90	5.00	0.189	0.193	0.197
E1	2.90	3.00	3.10	0.114	0.118	0.122
E2	1.35	1.60	1.75	0.055	0.075	0.083
c	0.13	0.15	0.23	0.005	0.006	0.009
b	0.28	0.30	0.38	0.011	0.012	0.015
e	0.65 BSC			0.026 BSC		
L	0.4	0.53	0.8	0.016	0.021	0.026

Taping Specification



PACKAGE	Q'TY/REEL
MSOP-8 (FD)	3,000 ea

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