Dual Rail-to-Rail Operational Amplifiers

Features

- **Wide Supply Operation Range +4.5V to +20V**
- **Input Common Voltage Range Beyond the Rails**
- **Rail-to-Rail Output Voltage Swing**
- **High Peak Source Capability 1300mA**
- **High Peak Sink Capability 850mA**
- **Low Input Offset Voltage 3mV (Typical)**
- **Wide -3dB Bandwidth 35MHz**
- **Quiescent Current: 4.5mA**
- **Large DC Voltage Gain 80dB (Typical)**
- **Slew-Rate 50V/μs**
- **Unit-Gain Stable**

Applications

- **Portable Equipment**
- **LCD-TV Equipment**
- **Battery-Powered Equipment**
- **ASIC Input or Output Amplifier**
- **Low Power/Low Voltage Applications**

General Description

The G1583 consists of one independent, high gain, internally frequency compensated operational amplifiers which was designed to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible. The input common mode range of the G1583 can be beyond the rails, and the G1583 is with rail-to-rails output voltage swing. The quiescent current is 4.5mA, typically.

The G1583 also feature fast slewing and settle-times, as well as high output drive capability of source 1300mA /sink 850mA. These features make this amplifier ideal for use as reference buffers for TFT-LCD. Other applications include battery power, portable devices, and anywhere low power consumption is important.

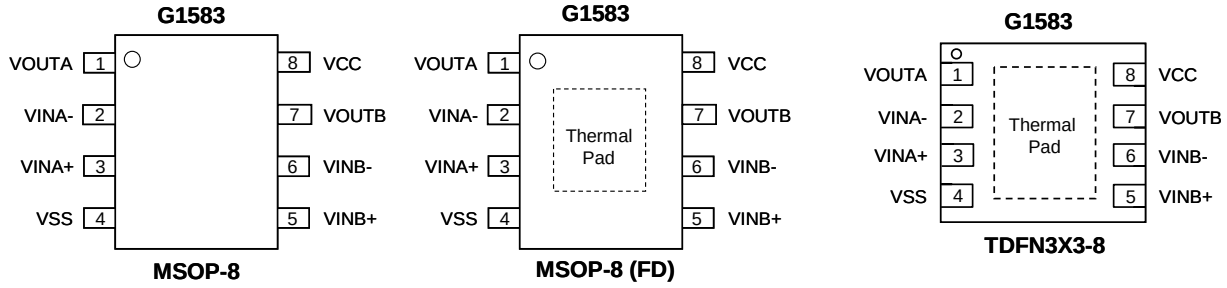
The G1583 is housed in a MSOP-8, MSOP-8 (FD) and TDFN3X3-8 package.

Ordering Information

ORDER NUMBER	MARKING	TEMP. RANGE	PACKAGE (Green)
G1583P81U	1583	-40°C~ +85°C	MSOP-8
G1583F51U	1583	-40°C~ +85°C	MSOP-8 (FD)
G1583RD1U	1583	-40°C~ +85°C	TDFN3X3-8

Note: P8: MSOP-8 F5: MSOP-8 (FD) RD: TDFN3X3-8
1: Bonding Code
U: Tape & Reel
Green : Lead Free / Halogen Free

Pin Configuration



Note: Recommend connecting the Thermal Pad to the Pin#4 VSS for excellent power dissipation.

Absolute Maximum Ratings

Supply Voltage (V_{DD} to GND) 24V
Storage Temperature Range. . . . . -65°C to 150°C
Input Voltage . . . . . .-0.3V to V_{CC} +0.3V
ESD Susceptibility 2000V
Junction Temperature. . . . . 150°C
Thermal Resistance Junction to Ambient, (θ_{JA})
TDFN3X3-8. . . . . .210°C/W(1)
MSOP-8 . . . . . 190°C/W(1)
MSOP-8 (FD) . . . . . 137°C/W(2)
Continuous Power Dissipation (T_A=25°C)*
TDFN3X3-8 . . . . . .0.6W(1)
MSOP-8 . . . . . .0.5W(1)
MSOP-8 (FD) . . . . . .0.9W(2)

(1) : Please refer to Minimum Footprint PCB Layout Section.
(2) : Please refer to 1in^2 of 1oz PCB Layout Section.

Thermal Resistance Junction to Case, (θ_{JC})
TDFN3X3-8 . . . . . .30°C/W
MSOP-8 . . . . . 55°C/W
MSOP-8 (FD) . . . . . 40°C/W
Reflow Temperature (soldering, 10sec) . . . . . 260°C

Operation Conditions

Operating Supply Voltage Range . .4.5V ≤ V_{DD} ≤ 19.5V
Operating Temperature Range . . . . . -40°C to 85°C

Electrical Characteristics

V_{CC} = 19V; V_{SS} = 0V; T_{AMB} = 25°C; C_L=10pF, R_L=10kΩ 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.

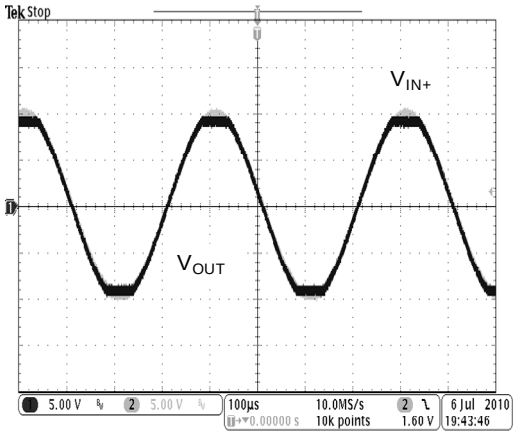
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supplies						
Supply Voltage Range	V_{CC}-V_{SS}	Note1	4.5	---	19.5	V
Supply Current	I_{CC1}	V_O=0V no load	2.5	4.5	7	mA
DC Characteristics						
Input Offset Voltage	$V_{I(OS)}$		-12	3	+12	mV
Common Mode Voltage	V_{CM}	Inferred from CMRR test	V_{SS}-0.5	---	V_{CC}+0.5	V
Input Bias Current	I_B	V_{CM}=0	---	2	100	nA
Input Impendence			---	1	---	GΩ
Open Loop Gain	A_V	V_O= 5V to 14V	60	80	---	dB
Output Voltage Swing High	V_{OH}	Iload=5mA	V_{CC}-0.065	V_{CC}-0.03	---	V
Output Voltage Swing Low	V_{OL}	Iload=-5mA	---	30	65	mV
Continuous Output Current	I_O		---	±400	---	mA
High Peak Source Current	I_{Source}		---	1300	---	mA
High Peak Sink Current	I_{Sink}		---	850	---	mA
Power Supply Rejection Ratio	PSRR	5V≦V_{CC}≦19V	60	80	---	dB
Common-Mode Rejection Ratio	CMRR	V_{SS}≦V_{CM}≦V_{CC}	50	67	---	dB
Slew Rate		2V to +8V 20% to 80%	30	50	---	V/μS
-3dB Bandwidth		RL=10kΩ, C_L=10pF	---	35	---	MHz

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

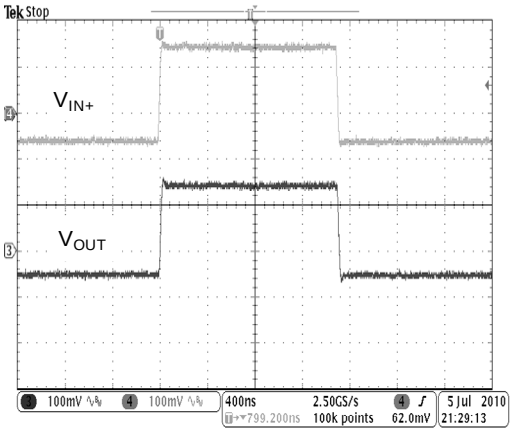
Typical Performance Characteristics

V_{CC}=19V, V_{SS}=0V, C_L=10pF, R_L=10kΩ, unless otherwise noted.

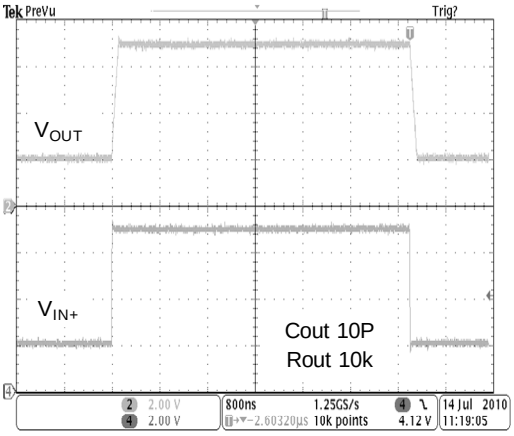
Input Beyond the Rail



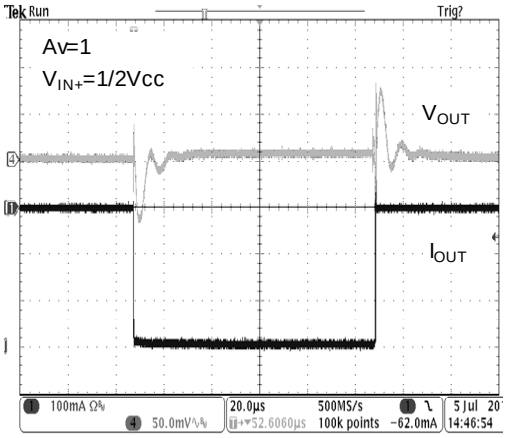
Small Signal Transient Response



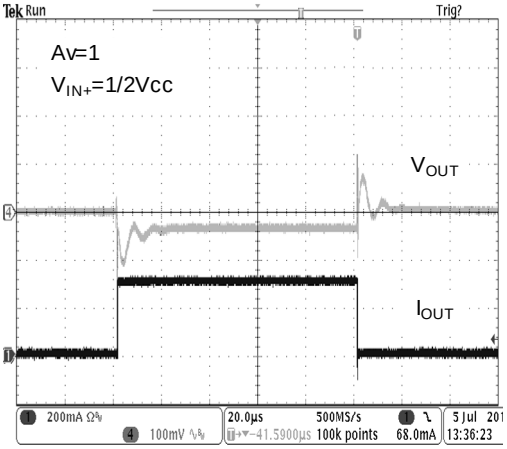
Large Signal Transient Response



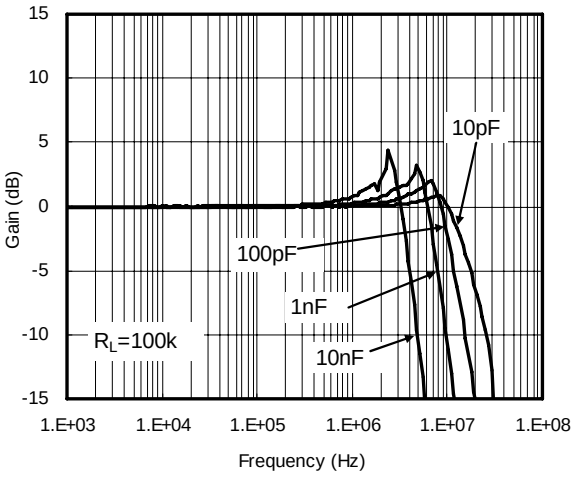
Load Transient Response (sink current)



Load Transient Response (source current)

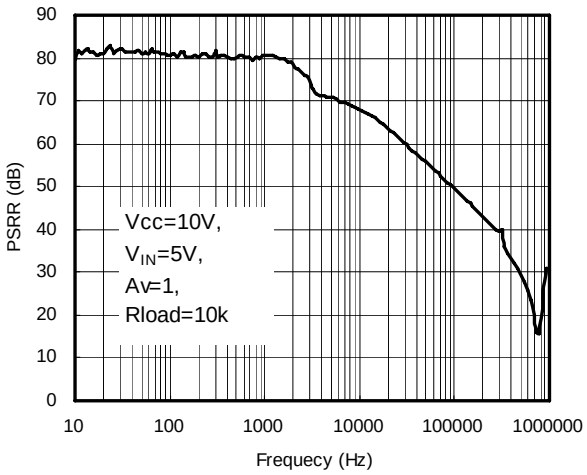


Frequency Response vs. Various C_L

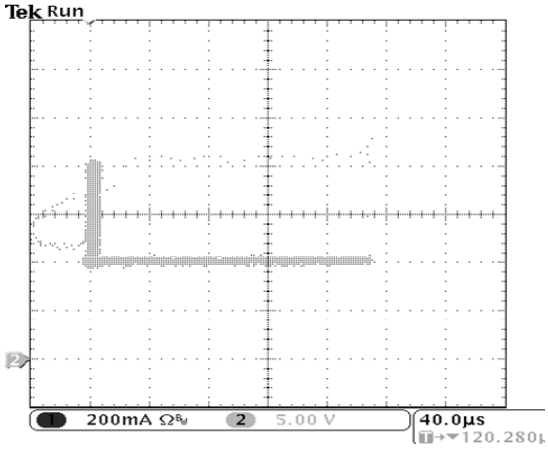


Typical Performance Characteristics (continued)

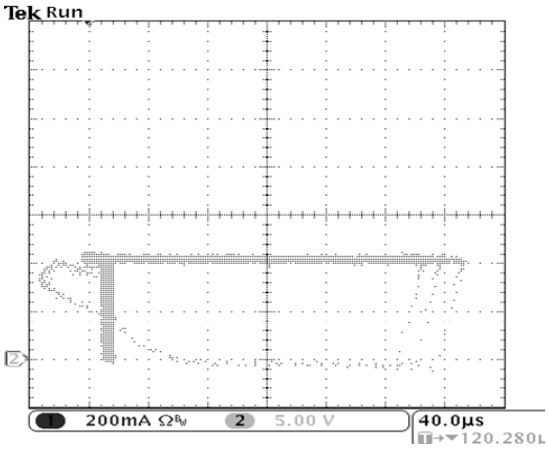
PSRR vs. Frequency



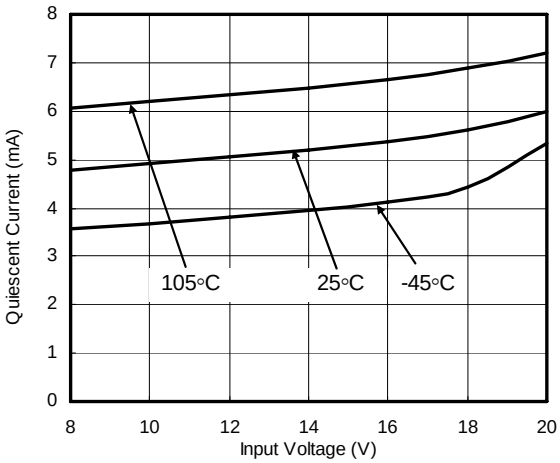
OC (V_{OUT} 10V to 20V)



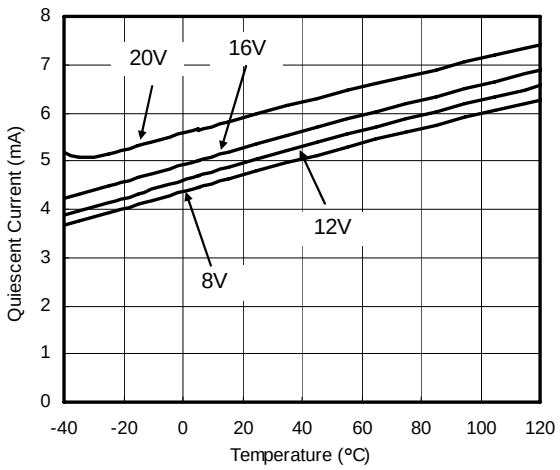
OC (V_{OUT} 10V to GND)



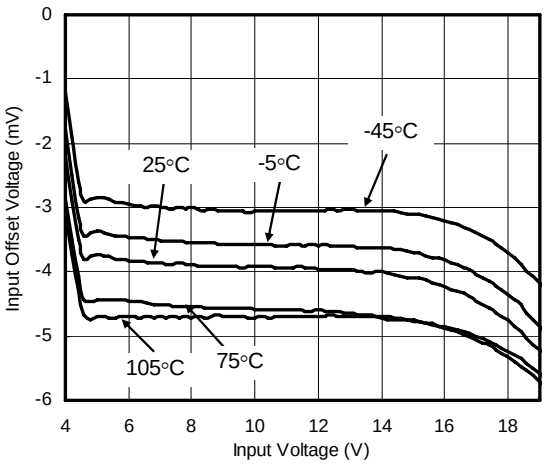
Quiescent Current vs. Input Voltage



Quiescent Current vs. Temperature

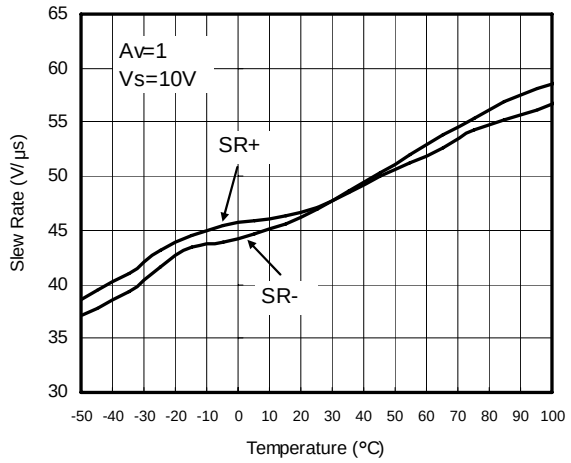


V_{IN} vs. Input offset Voltage

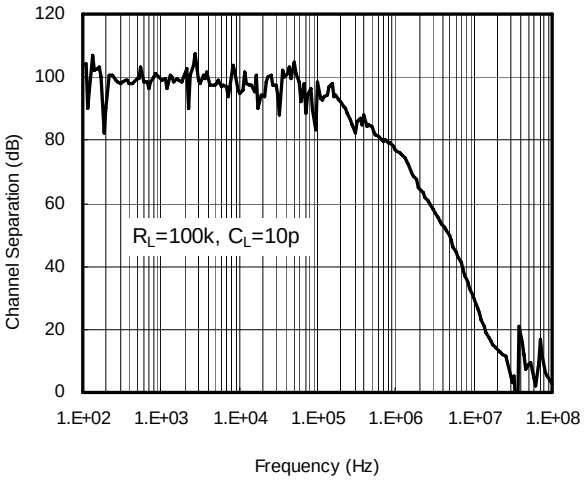


Typical Performance Characteristics (continued)

Slew Rate vs Temperature

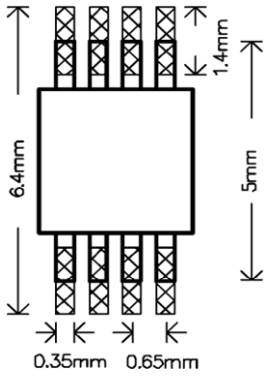


Channel Separation

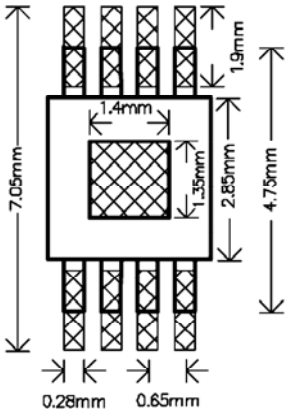


Minimum Footprint PCB Layout Section

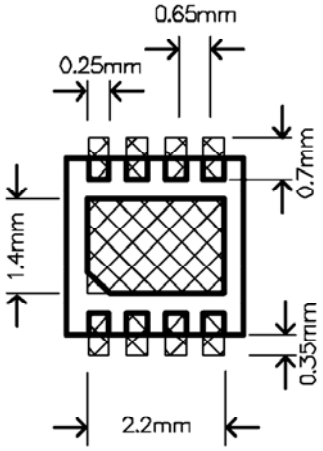
MSOP-8



MSOP-8 (FD)

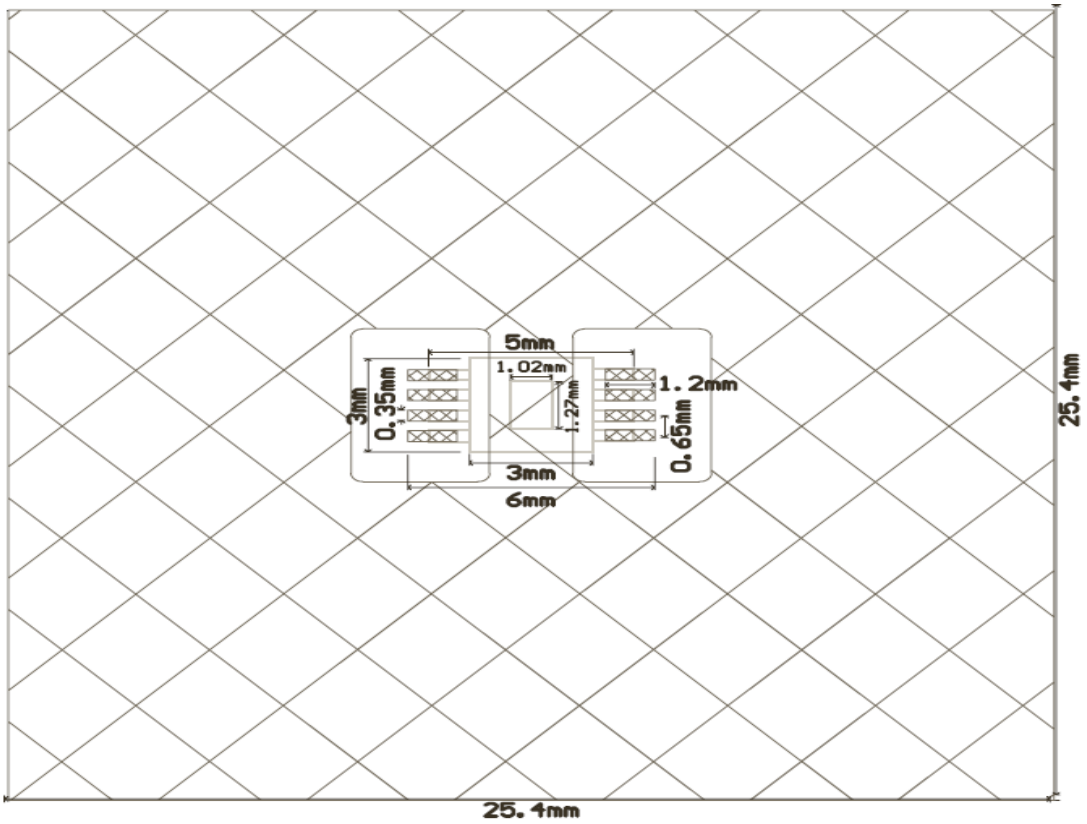


TDFN3X3-8

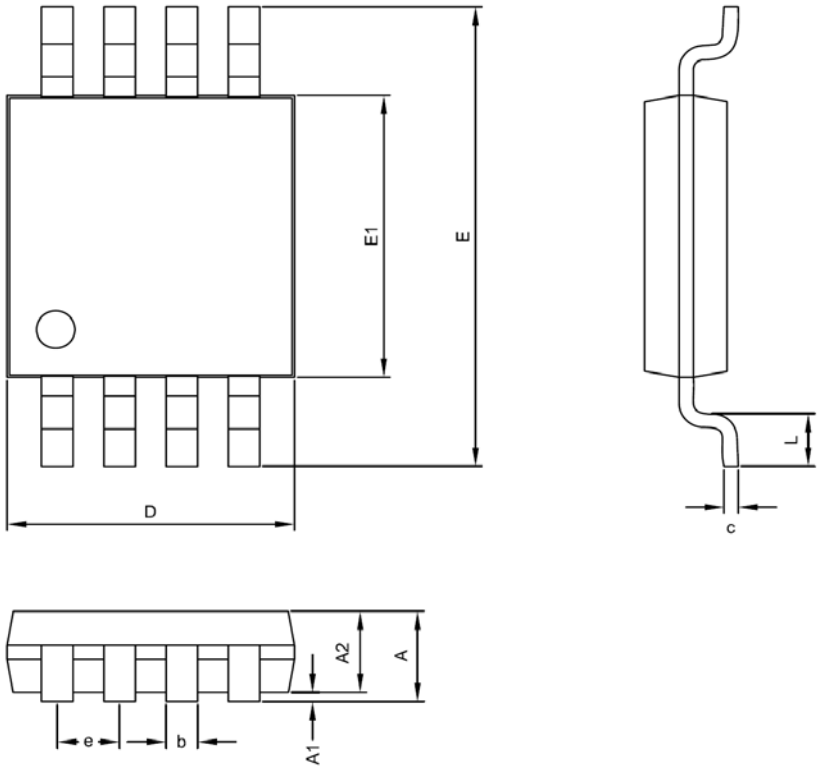


1in^2 of 1oz PCB Layout Section

MSOP-8 (FD)



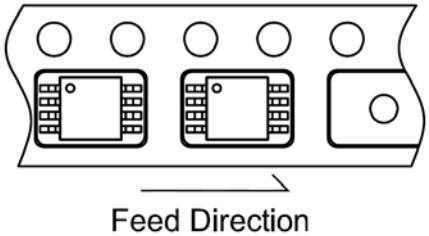
Package Information



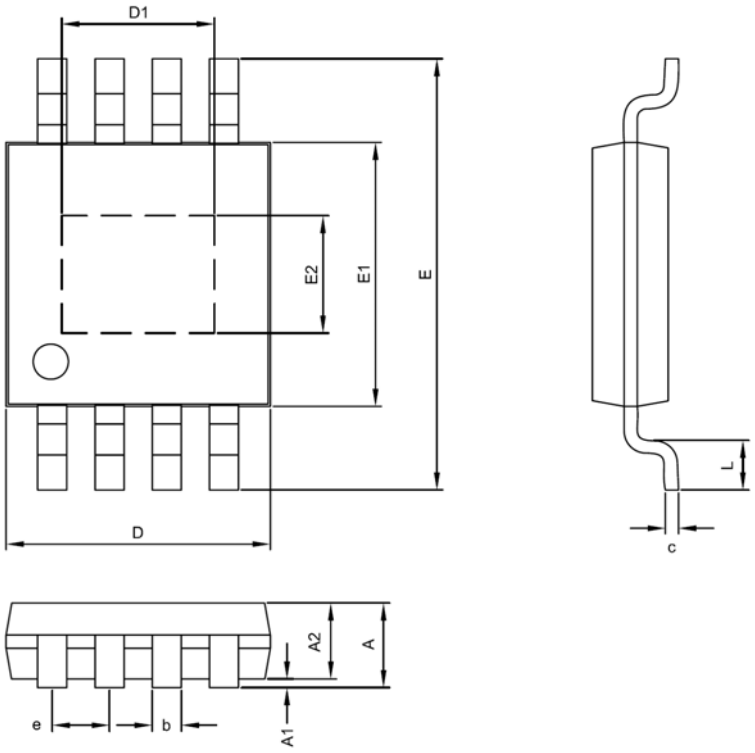
MSOP-8 Package

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	2.85	3.00	3.15	0.112	0.118	0.124
E	4.75	4.90	5.05	0.187	0.193	0.199
E1	2.85	3.00	3.15	0.112	0.118	0.124
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	0.031

Taping Specification



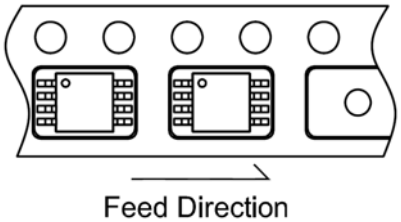
PACKAGE	Q'TY/REEL
MSOP-8	3,000 ea



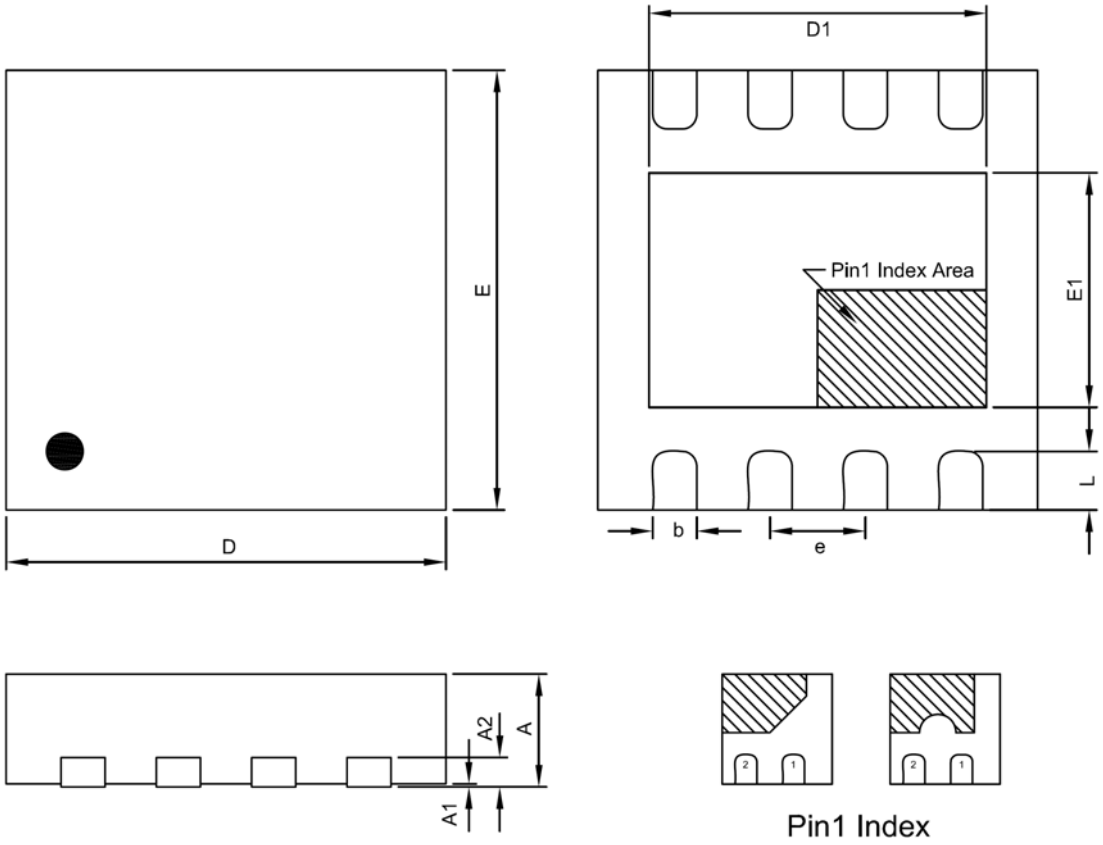
MSOP-8 (FD) Package

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	2.85	3.00	3.15	0.112	0.118	0.124
D1	1.40	1.90	2.10	0.055	0.074	0.083
E	4.75	4.90	5.05	0.187	0.193	0.199
E1	2.85	3.00	3.15	0.112	0.118	0.124
E2	1.35	1.60	1.75	0.053	0.063	0.069
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 TYP.			0.026 TYP.		
L	0.4	0.53	0.8	0.016	0.021	0.031

Taping Specification



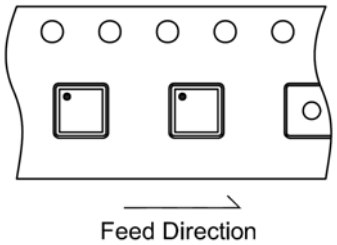
PACKAGE	Q'TY/REEL
MSOP-8 (FD)	3,000 ea



TDFN3X3-8 Package

Symble	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	0.0276	0.0295	0.0315
A1	0.00	- - -	0.05	0.0000	- - -	0.0020
A2	0.19	0.20	0.21	0.0075	0.0079	0.0083
D	2.95	3.00	3.05	0.1161	0.1181	0.1201
E	2.95	3.00	3.05	0.1161	0.1181	0.1201
D1	2.20	2.30	2.40	0.0866	0.0906	0.0945
E1	1.40	1.50	1.60	0.0551	0.0591	0.0630
b	0.25	0.30	0.35	0.0098	0.0118	0.0138
e	0.65 BSC			0.0256 BSC		
L	0.35	0.45	0.525	0.0138	0.0177	0.0207

Taping Specification



PACKAGE	Q'TY/REEL
TDFN3X3-8	3,000 ea