

Dual Rail-to-Rail Operational Amplifiers

Features

- Wide Supply Operation Range +4.5V to +19.5V
- Input Common Voltage Range Beyond the Rails
- Rail-to-Rail Output Voltage Swing
- High Peak Source Capability 900mA
- High Peak Sink Capability 900mA
- Low Input Offset Voltage 3mV (Typical)
- Wide -3dB Bandwidth 35MHz
- Quiescent Current: 3.0mA
- Large DC Voltage Gain 80dB (Typical)
- Slew-Rate 30V/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 G1583A 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 G1583A can be beyond the rails, and the G1583A is with rail-to-rails output voltage swing. The quiescent current is 3mA, typically.

The G1583A also feature fast slewing and settle-times, as well as high output drive capability of source 900mA /sink 900mA. 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 G1583A is housed in a MSOP-8, MSOP-8 (FD) and TDFN3X3-8 package.

Ordering Information

ORDER NUMBER	MARKING	TEMP. RANGE	PACKAGE (Green)
G1583AP81U	1583A	-40°C~ +85°C	MSOP-8
G1583AF51U	1583A	-40°C~ +85°C	MSOP-8 (FD)
G1583ARD1U	1583A	-40°C~ +85°C	TDFN3X3-8

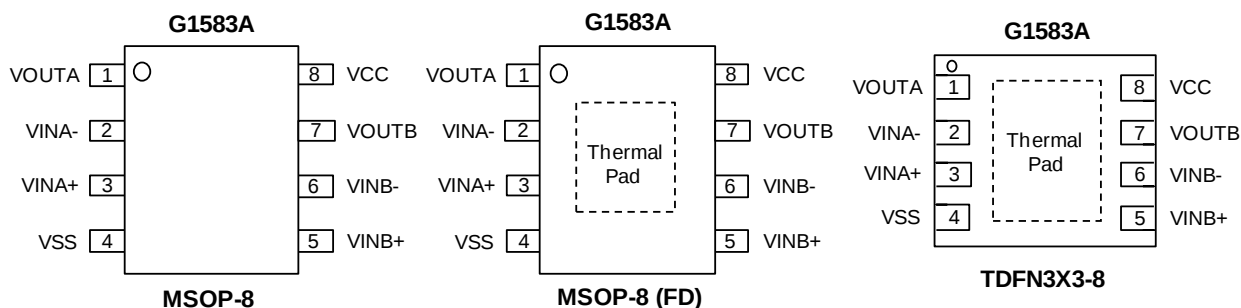
Note: P8: MSOP-8 F5: MSOP-8 (FD) RD: TDFN3X3-8

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)	22V
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 ($T_A=25^\circ\text{C}$)	
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 1in² 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 . . . $4.5V \leq V_{DD} \leq 19.5V$
 Operating Temperature Range -40°C to 85°C

Electrical Characteristics

$V_{CC} = 19V$; $V_{SS} = 0V$; $T_{AMB} = 25^\circ\text{C}$; $C_L = 10pF$, $R_L = 10k\Omega$ 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.

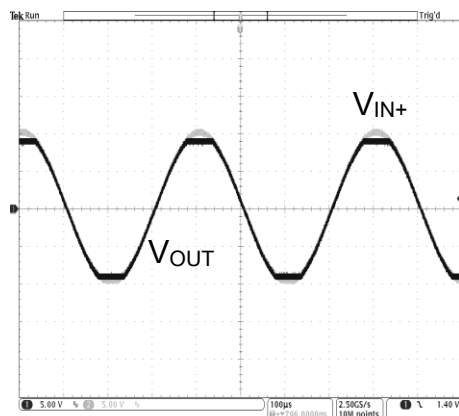
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supplies						
Supply Voltage Range	$V_{CC}-V_{SS}$	Note1	4.5	---	19.5	V
Supply Current	I_{CC1}	$V_O=0V$ no load	2	3	6	mA
DC Characteristics						
Input Offset Voltage	$V_{I(OS)}$		-15	3	+15	mV
Common Mode Voltage	V_{CM}	Inferred from CMRR test	$V_{SS}-0.5$	---	$V_{CC}+0.5$	V
Input Bias Current	I_B	$V_{CM}=0$	---	2	100	nA
Input Impedence			---	1	---	GΩ
Open Loop Gain	A_V	$V_O = 5V$ to 14V	60	80	---	dB
Output Voltage Swing High	V_{OH}	$I_{load}=5mA$	$V_{CC}-0.15$	$V_{CC}-0.03$	---	V
Output Voltage Swing Low	V_{OL}	$I_{load}=-5mA$	---	30	150	mV
Continuous Output Current	I_O		---	±300	---	mA
High Peak Source Current	I_{Source}		---	900	---	mA
High Peak Sink Current	I_{Sink}		---	900	---	mA
Power Supply Rejection Ratio	PSRR	$5V \leq V_{CC} \leq 19V$	60	80	---	dB
Common-Mode Rejection Ratio	CMRR	$V_{SS} \leq V_{CM} \leq V_{CC}$	50	67	---	dB
Slew Rate		2V to +8V 20% to 80%	15	30	---	V/μs
-3dB Bandwidth		$R_L=10k\Omega$, $C_L=10pF$	---	35	---	MHz

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

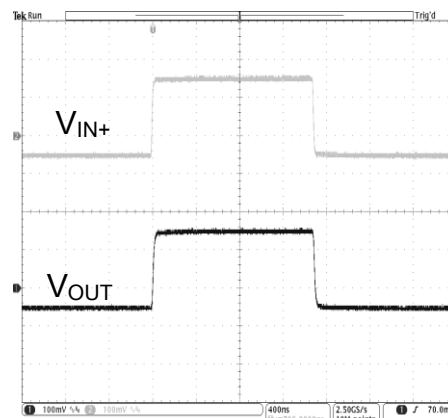
Typical Performance Characteristics

$V_{CC}=19V$, $V_{SS}=0V$, $C_L=10pF$, $R_L=10k\Omega$, unless otherwise noted.

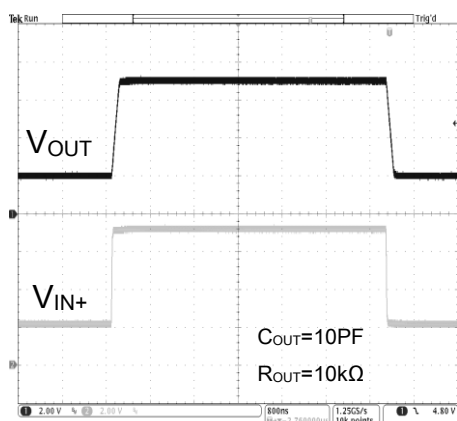
Input Beyond the Rail



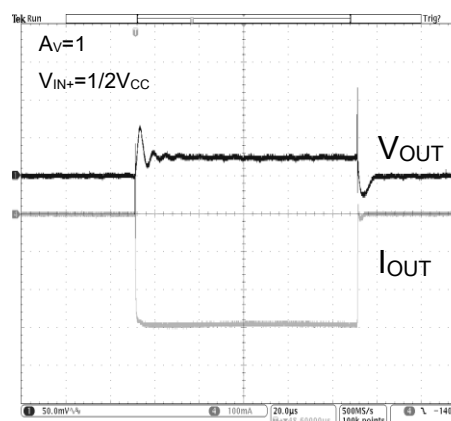
Small Signal Transient Response



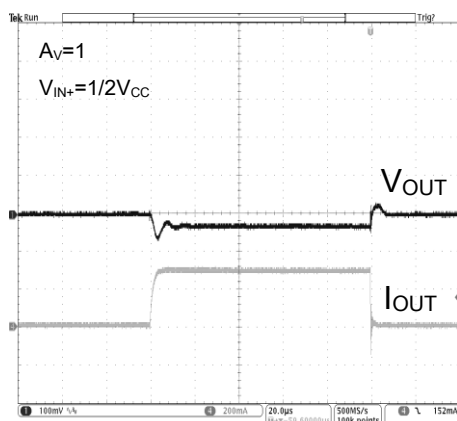
Large Signal Transient Response



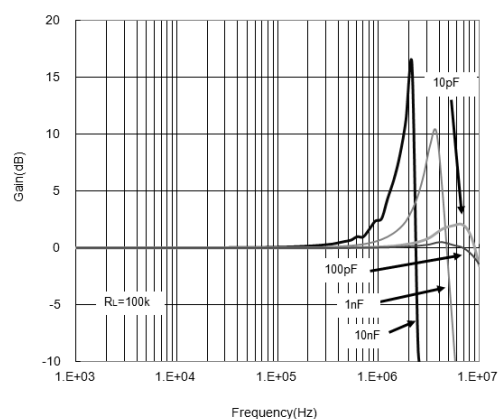
Load Transient Response (Sink current)



Load Transient Response (Source current)

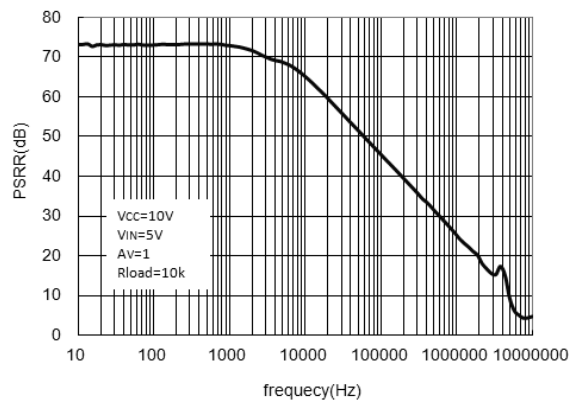


Frequency Response vs. Various C_L

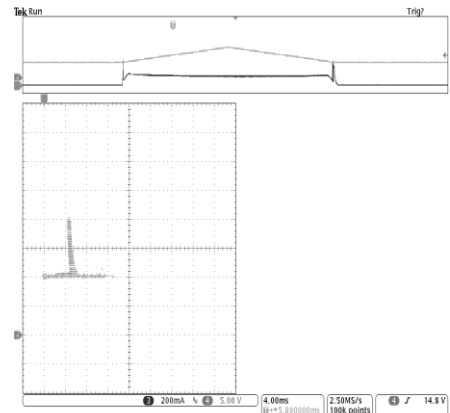


Typical Performance Characteristics (continued)

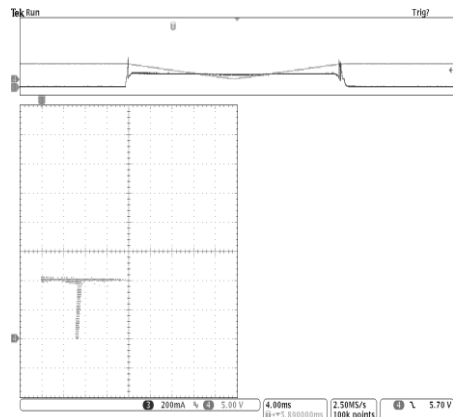
PSRR vs. Frequency



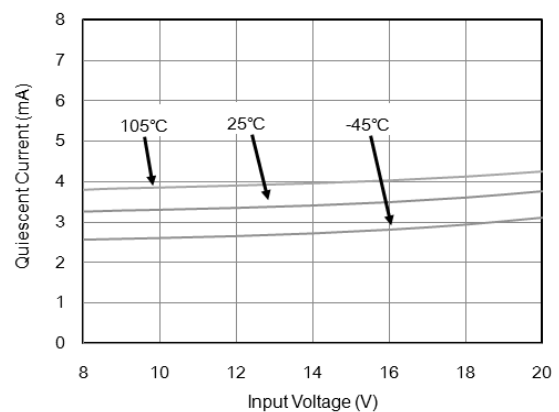
OC (V_{OUT} 10V to 20V)



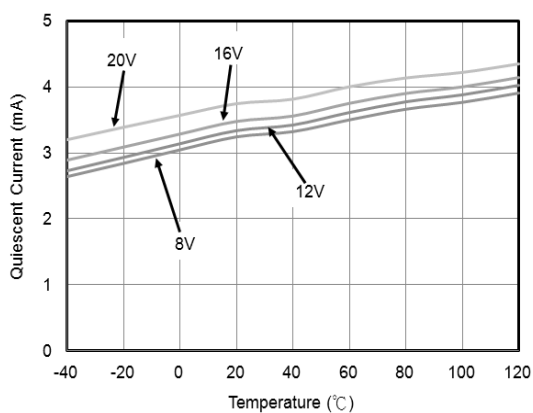
OC (V_{OUT} 10V to GND)



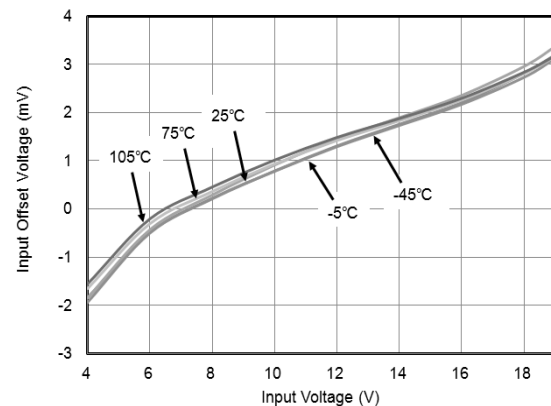
Quiescent Current vs. Input Voltage



Quiescent Current vs. Temperature

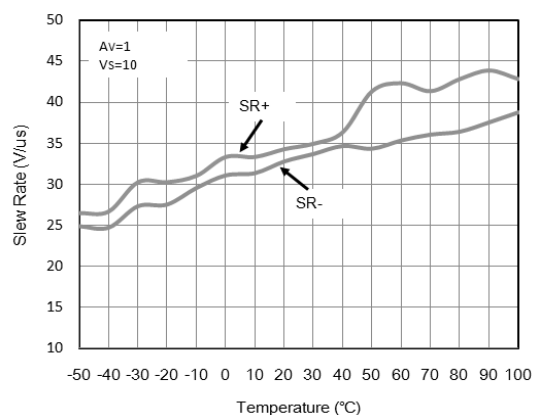


VIN vs. Input Offset Voltage

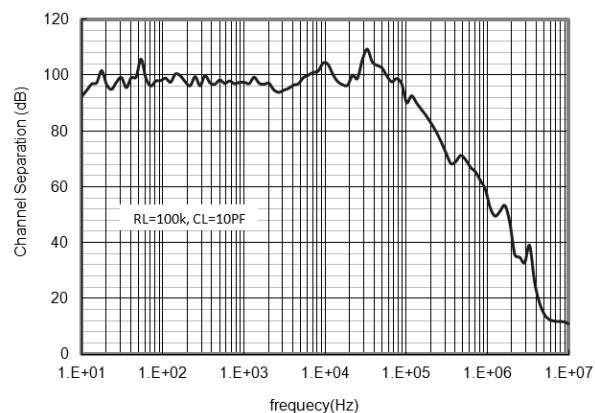


Typical Performance Characteristics (continued)

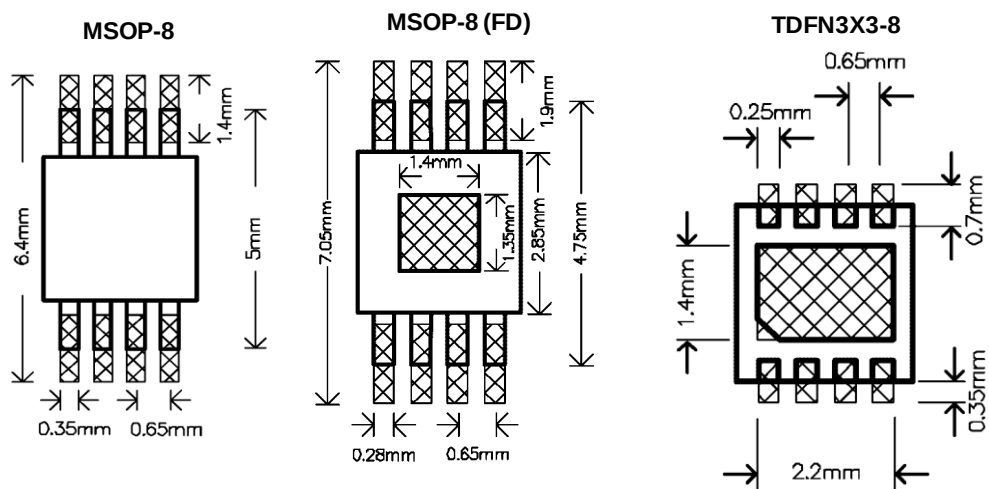
Slew Rate vs. Temperature



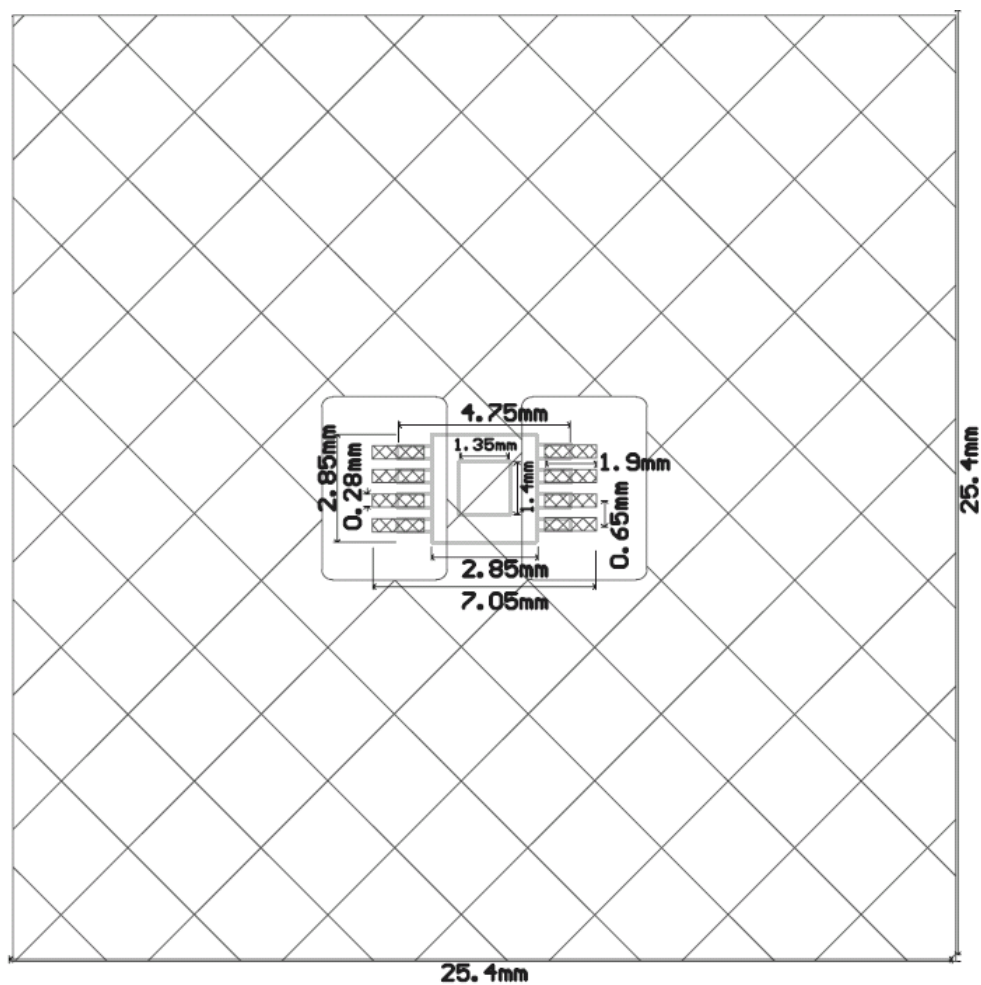
Channel Separation



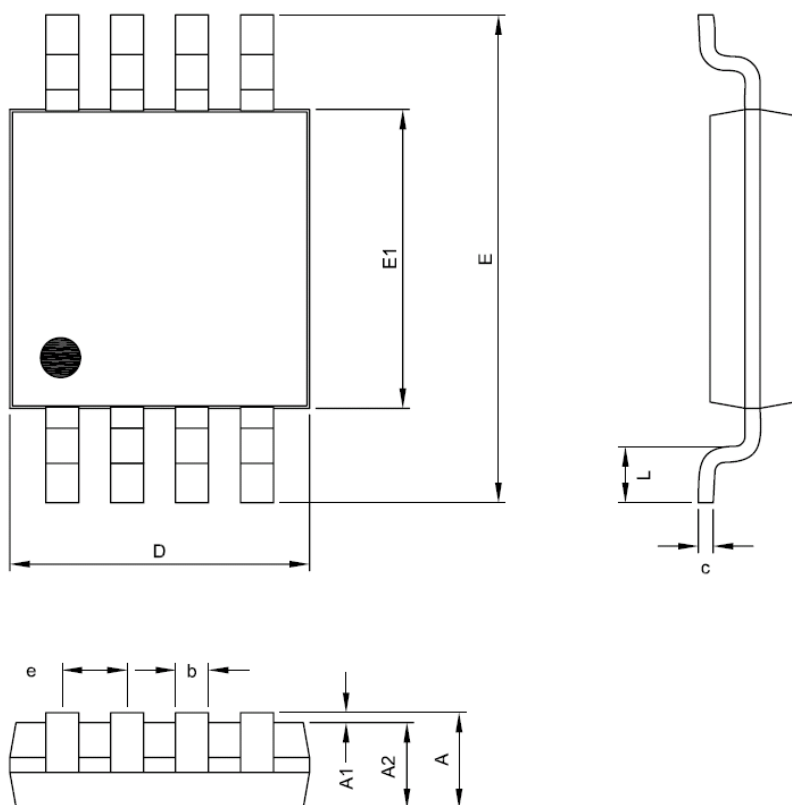
Minimum Footprint PCB Layout Section



MSOP-8 (FD)



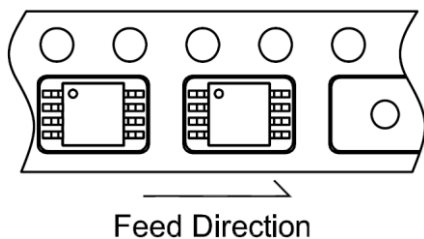
Package Information



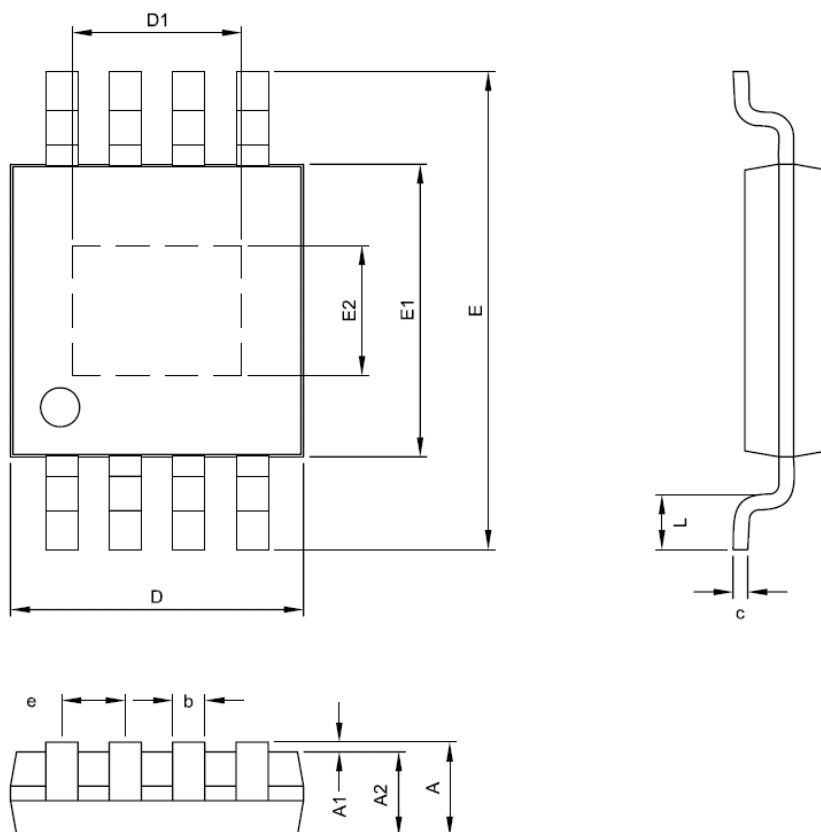
MSOP-8 Package

Symbol	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	0.75	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
b	0.22	0.30	0.38	0.009	0.012	0.015
c	0.15 REF			0.006 REF		
e	0.65 BSC			0.026 BSC		
L	0.4	0.53	0.8	0.016	0.021	0.031

Taping Specification



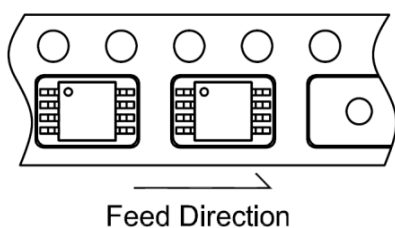
PACKAGE	Q'TY/REEL
MSOP-8	3,000 ea



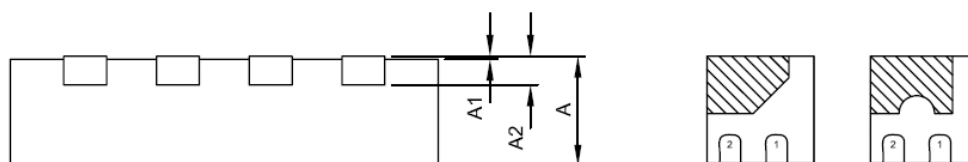
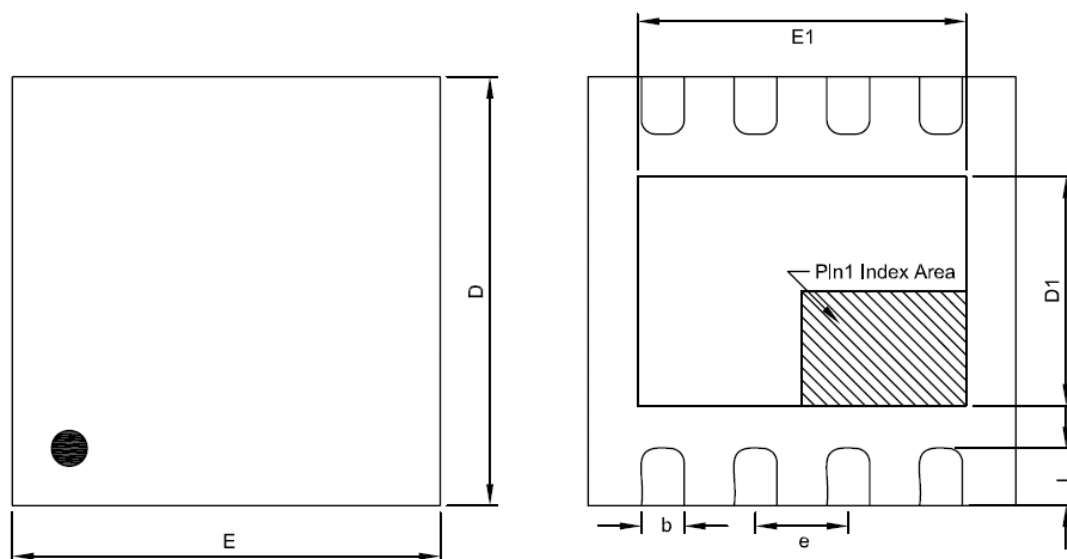
MSOP-8 (FD) Package

Symbol	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	0.75	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	2.15	0.055	0.074	0.085
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	1.85	0.053	0.063	0.073
b	0.22	0.30	0.38	0.009	0.012	0.015
c	0.15 REF			0.006 REF		
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 (FD)	3,000 ea

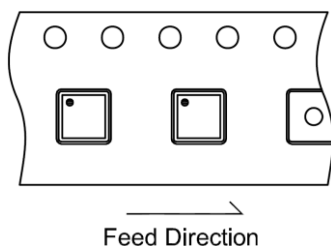


Pin1 Index

TDFN3X3-8 Package

Symbol	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	0.20 REF			0.0079 REF		
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	1.40	1.50	1.60	0.0551	0.0591	0.0630
E1	2.20	2.30	2.40	0.0866	0.0906	0.0945
b	0.20	0.30	0.35	0.0079	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

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