

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: 2.2mA
- 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 G1582 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 G1582 can be beyond the rails, and the G1582 is with rail-to-rails output voltage swing. The quiescent current is 2.2mA, typically.

The G1582 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 G1582 is housed in a SOT-23-5, TDFN3X3-8 & MSOP-8 (FD) package.

Ordering Information

ORDER NUMBER	MARKING	TEMP. RANGE	PACKAGE (Green)
G1582T11U	1582x	-40°C to 85°C	SOT-23-5
G1582RD1U	1582	-40°C to 85°C	TDFN3X3-8
G1582F51U	G1582	-40°C to 85°C	MSOP-8 (FD)

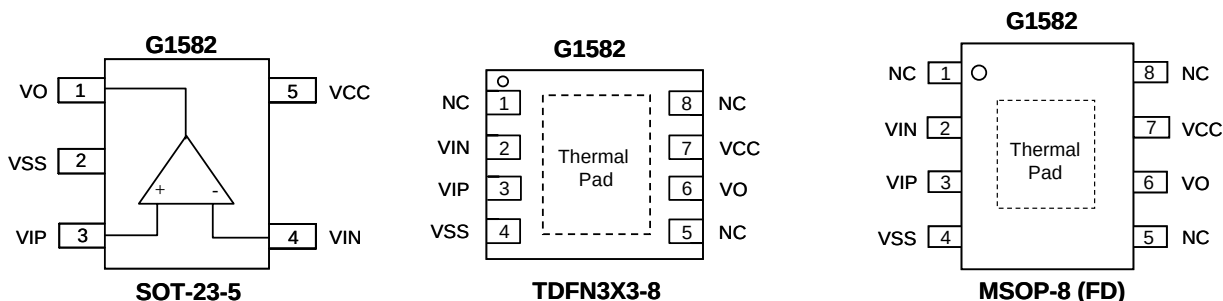
Note: T1: SOT-23-5 RD: TDFN3X3-8 F5: MSOP-8 (FD)

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 130°C
 Thermal Resistance Junction to Ambient, (θ_{JA})*
 SOT-23-5 TBD
 TDFN3X3-8 98°C/W
 MSOP-8 (FD) 120°C/W
 Continuous Power Dissipation ($T_A=25^\circ\text{C}$)*
 SOT-23-5 TBD
 TDFN3X3-8 1.3W

MSOP-8 (FD) 0.9W
 Thermal Resistance Junction to Case, (θ_{JC})
 SOT-23-5 TBD
 TDFN3X3-8 30°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

* Please refer to 1in² of 1oz PCB Layout Section.

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	1.2	2.2	3.5	mA
DC Characteristics						
Input Offset Voltage	$V_{I(OS)}$		-14	3	+14	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}	$I_{load}=5mA$	$V_{CC}-0.1$	$V_{CC}-0.03$	---	V
Output Voltage Swing Low	V_{OL}	$I_{load}=-5mA$	---	30	100	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	$5V \leq V_{CC} \leq 19V$	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%	30	50	---	V/μS
-3dB Bandwidth		$R_L=10k\Omega$ $C_L=10pF$	---	35	---	MHz

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

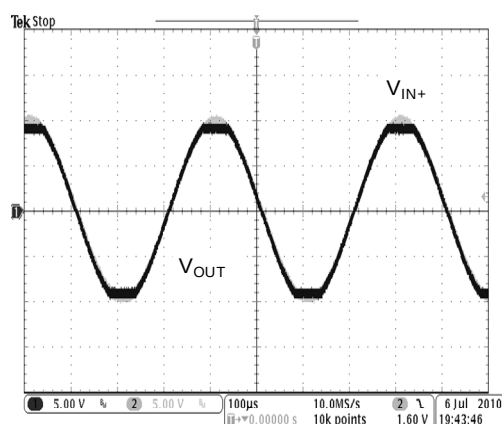
Pin Description

PIN		NAME	I/O	FUNCTION
SOT-23-5	TDFN3X3-8, SOP-8 (FD)			
1	6	VO	O	Output of amplifier.
2	4	VSS	I	Negative supply voltage terminal or ground connection.
3	3	VIP	I	Positive input of amplifier.
4	2	VIN	I	Negative input of amplifier.
5	7	VCC	I	Positive supply voltage terminal.
---	1, 5, 8	NC		No connection.

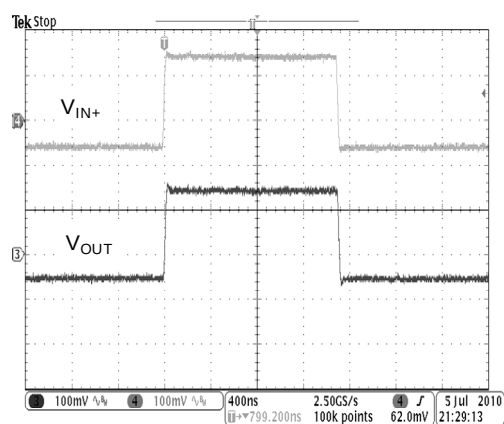
Typical Performance Characteristics

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

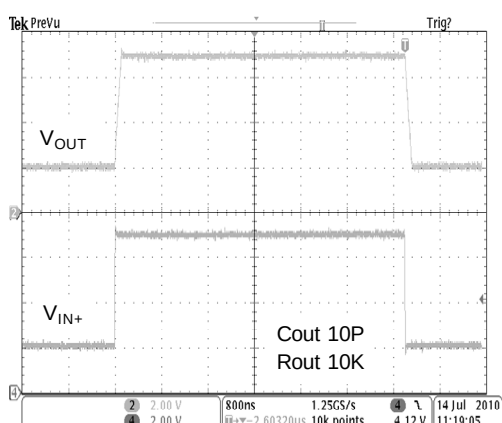
Input Beyond the Rail



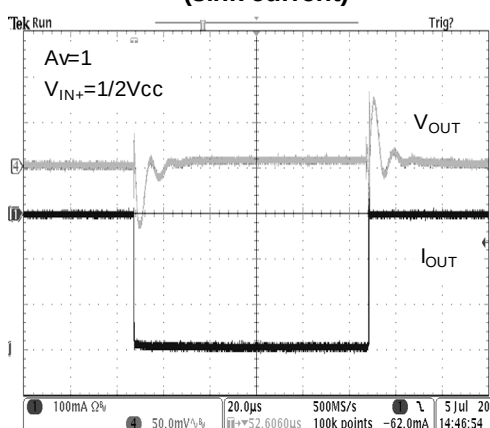
Small Signal Transient Response



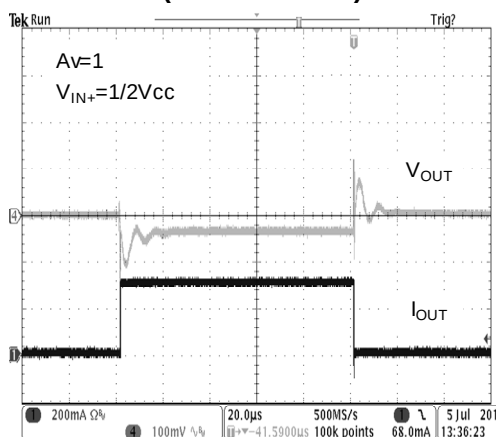
Large Signal Transient Response



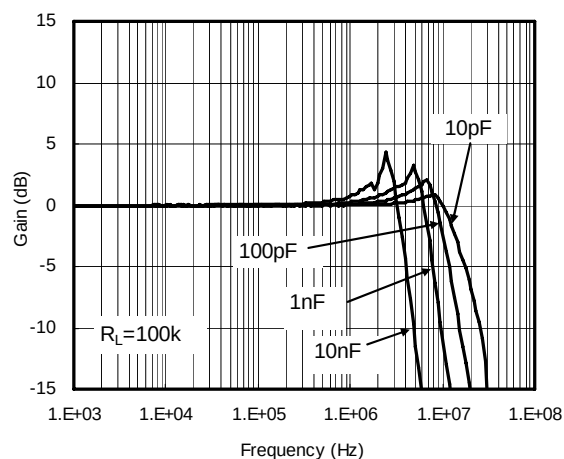
Load Transient Response (sink current)



Load Transient Response (source current)

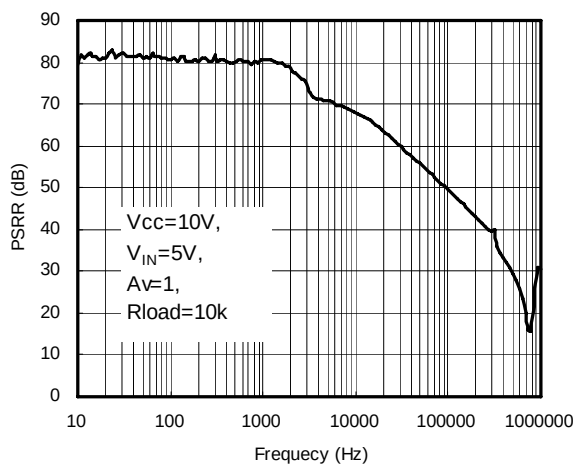


Frequency Response vs. Various C_L

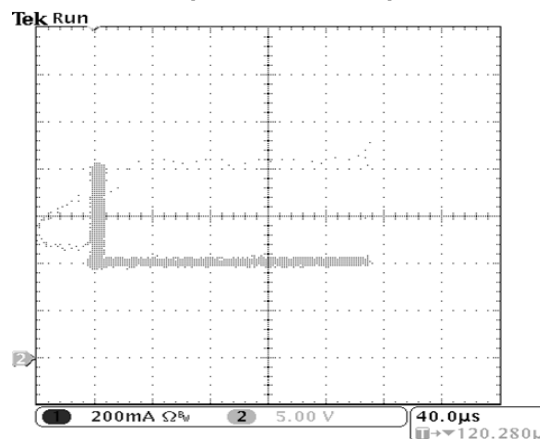


Typical Performance Characteristics (continued)

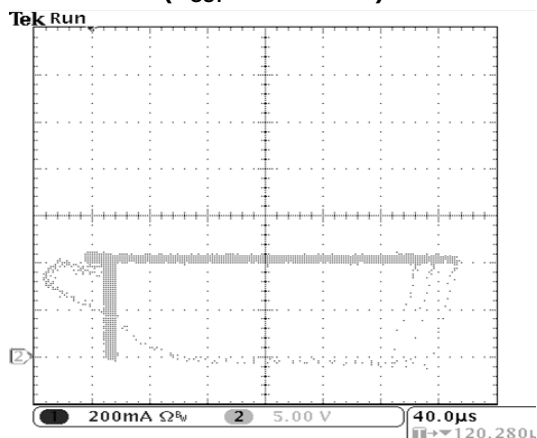
PSRR vs. Frequency



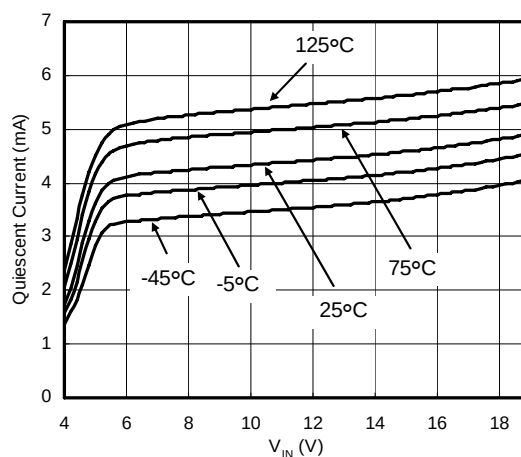
OC (V_{OUT} 10V to 20V)



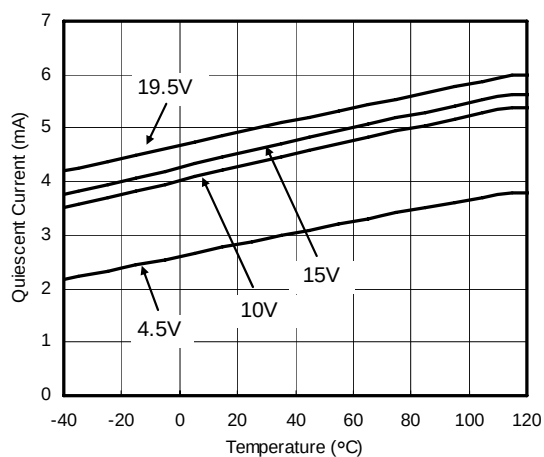
OC (V_{OUT} 10V to GND)



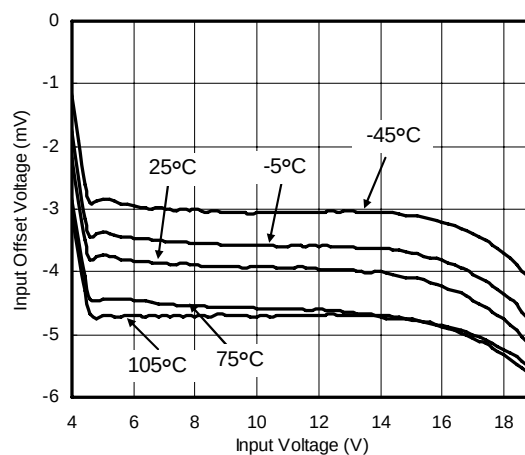
Quiescent Current vs. Input Voltage



Quiescent Current vs. Temperature

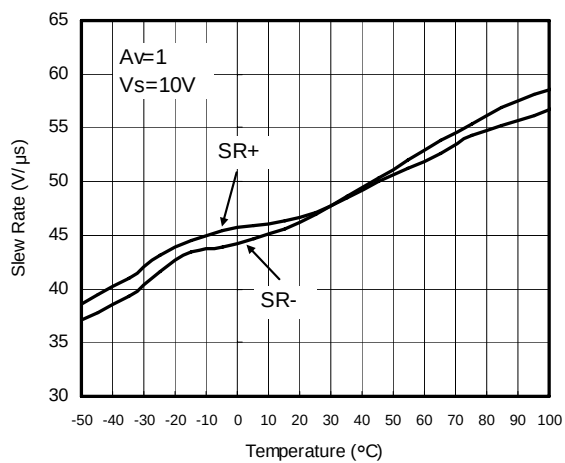


V_{IN} vs. Input offset Voltage



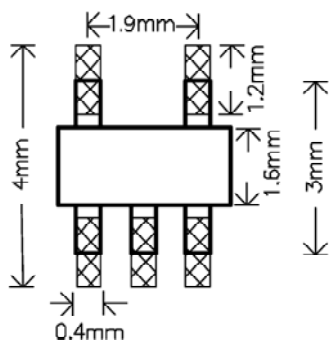
Typical Performance Characteristics (continued)

Slew Rate vs Temperature

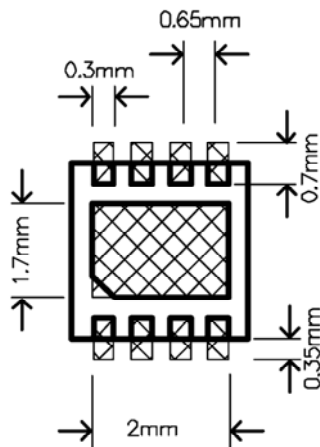


Minimum Footprint PCB Layout Section

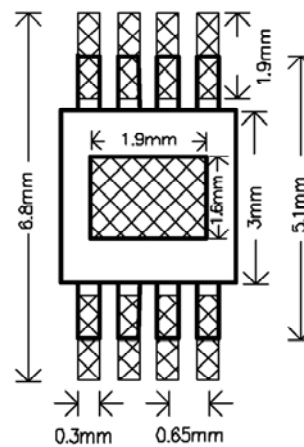
SOT-23-5



TDFN3X3-8

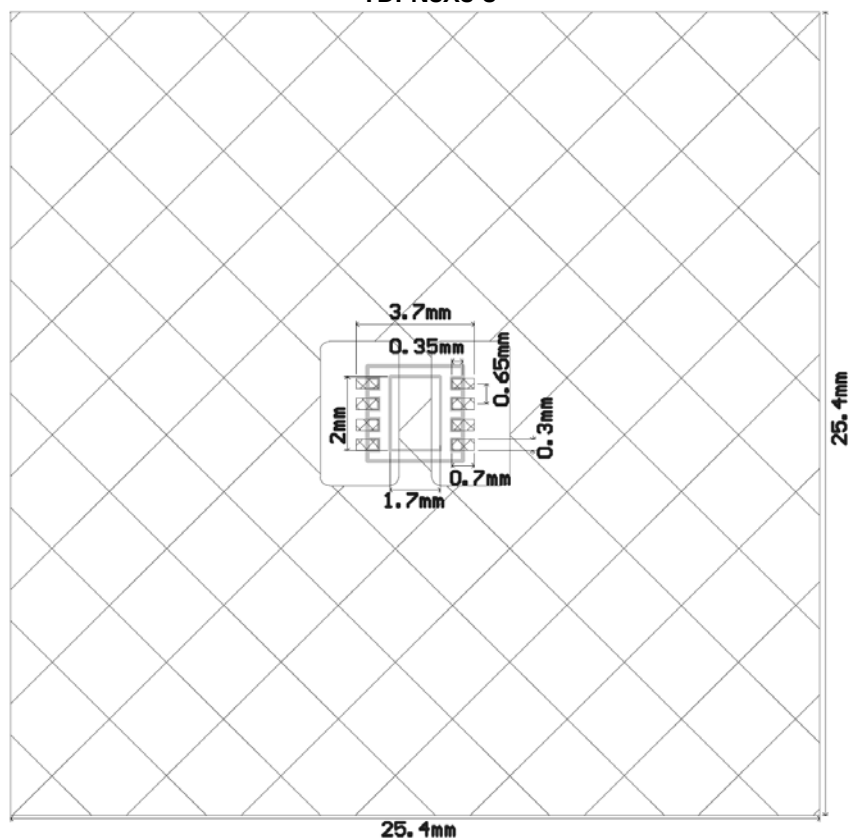


MSOP-8 (FD)

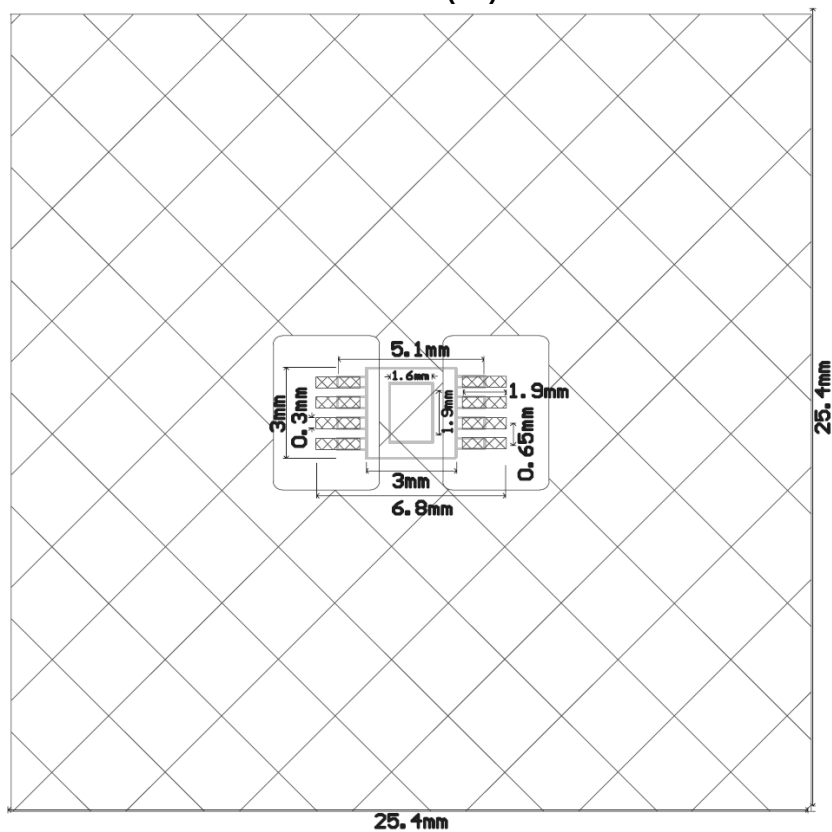


1in² of 1oz PCB Layout Section

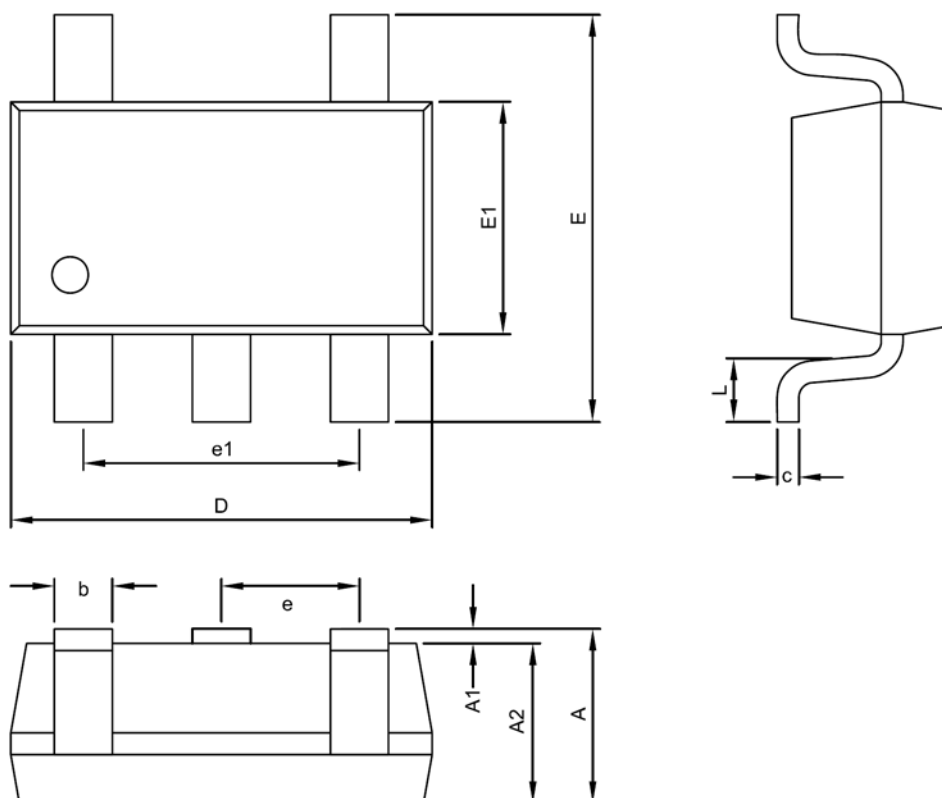
TDFN3X3-8



MSOP-8 (FD)



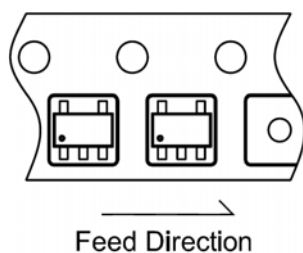
Package Information



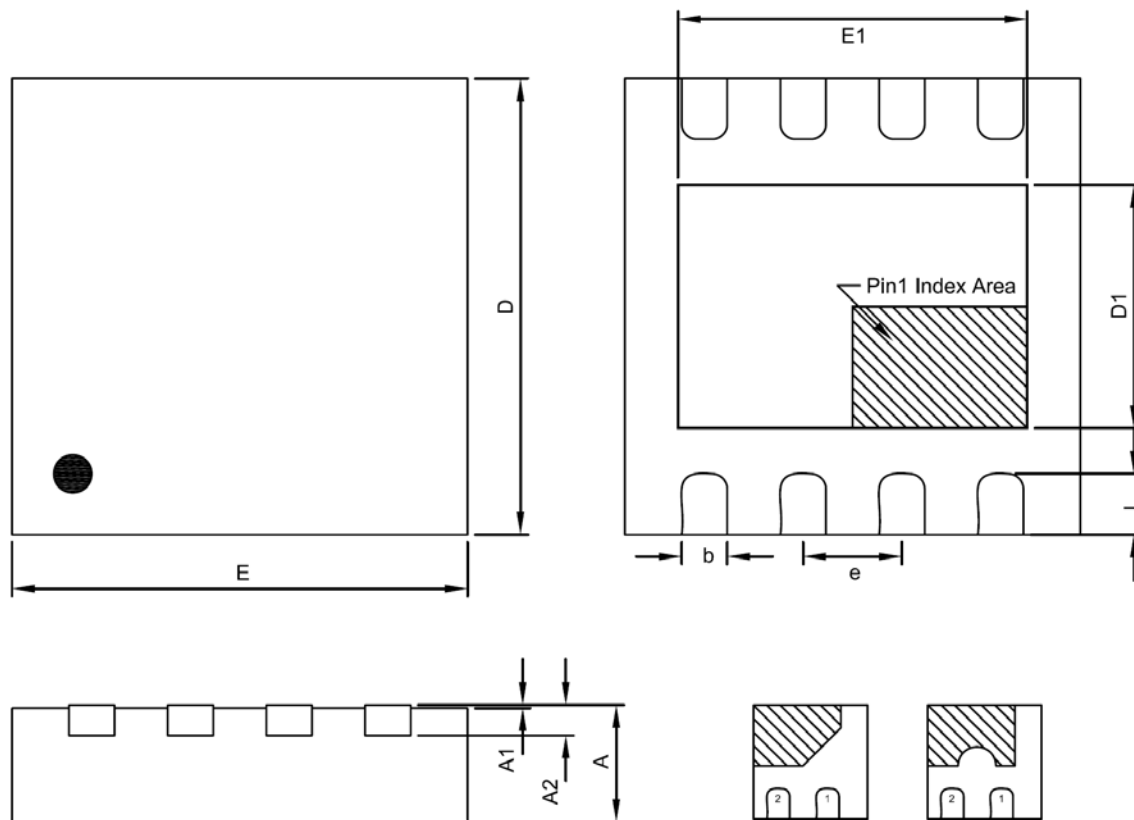
SOT-23-5 Package

Symbol	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.95	1.10	1.45	0.037	0.043	0.057
A1	0.00	---	0.15	0.000	---	0.006
A2	0.90	1.10	1.30	0.035	0.043	0.051
D	2.70	2.90	3.10	0.106	0.114	0.122
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
c	0.08	0.15	0.25	0.003	0.006	0.010
b	0.30	0.40	0.50	0.012	0.016	0.020
e	0.95 BSC			0.037 BSC		
e1	1.90 BSC			0.075 BSC		
L	0.30	0.45	0.60	0.012	0.018	0.024

Taping Specification



PACKAGE	Q'TY/REEL
SOT-23-5	3,000 ea

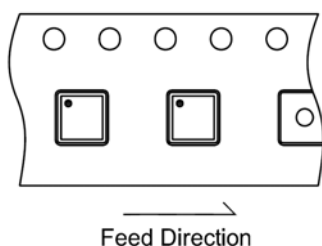


Pin1 Index

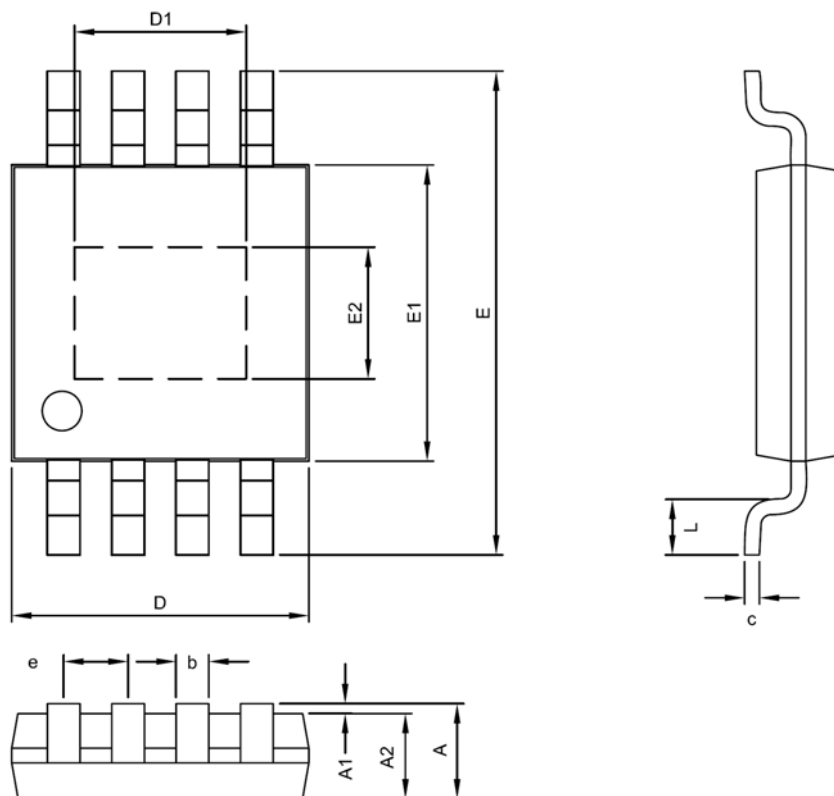
TDFN3X3-8 Package

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	1.60	1.70	1.80	0.0630	0.0669	0.0709
E1	1.90	2.00	2.10	0.0748	0.0787	0.0827
b	0.20	0.30	0.35	0.0079	0.0118	0.0138
e	0.65 BSC			0.0256 BSC		
L	0.30	0.35	0.40	0.0118	0.0138	0.0157

Taping Specification

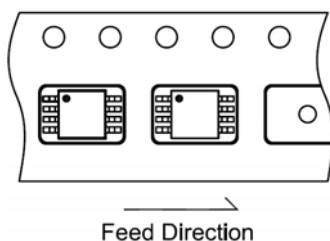


PACKAGE	Q'TY/REEL
TDFN3X3-8	3,000 ea


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	2.10	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
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

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