Texas Instruments
Military and HiRel Products

Nomenclature and Process Flows

Typical Analog Product

Example: TLE2022AMJGBEP

Prefix—TLE

SNJ	= TI Interface, MIL-PRF-38535 (QML)
SN	= Commercial Processing
TL	= TI Linear Control Circuit
TLC	= TI LinCMOS™
TLE	= TI Excalibur
TLV	= TI Linear Low Voltage
TPIC	= TI Intelligent Power
AD	= Analog Devices™ *
AM	= Advanced Micro Devices™ *
LM	= National Semiconductor™ *
LT	= Linear Technology™ *
OP	= PMI™ *
SE	= Signetics™ *
µA	= Fairchild™ *
THS	= TI High Power
TPS	= TI Power Supply

Unique Device Designator—2022A

A or B in last position = Upgrade

Temperature Range—M

M	= -55°C to 125°C (applicable to all TI prefixes except SNJ)
Q	= -40°C to 125°C
I	= -40°C to 85°C
T	= -40°C to 105°C

Package Type / Pin Count—JG

DA	= Plastic Small Outline Package / 28, 30, 32 or 38
FK	= Ceramic Leadless Chip Carrier / 20 or 28
GA	= Ceramic Pin Grid Array / 84
HFG	= Ceramic Flatpack / 84 or 164
J	= Ceramic DIP / 8, 14, 16, 20 or 28
JG	= Ceramic DIP / 8
U	= Ceramic Flatpack /10
W	= Ceramic Flatpack / 14 or 16
WD	= Ceramic Flatpack / 56
L	= Ceramic Leadless Chip Carrier / 20 or 28
PHP	= Plastic Quad Flatpack PowerPad / 48
PCE	= Plastic Quad Flatpack / 144 or 160
PWP	= Plastic Power TSSOP / 14, 16, 20, 24 or 28
DW	= Plastic Widebody (30 mil) SOIC / 16, 20, 24 or 28
TCP	= Tape Carrier Package / Custom
PFB	= Plastic Quad Flatpack / 48

Process Level—B

Blank	= Standard Suffix, Commercial Processing
B	= MIL-PRF-38535 (QML)

Enhanced Plastic—EP

* = Second Source

TI-Unitrode Power Management Products

Example: UC1825BJ883BEP

Prefix—TLE
UC = Linear Integrated Circuits
UCC = BiCMOS

Part Number—1825
First Digit "1" = Military Temperature Range*
First Digit "2" = Industrial Temperature Range*
First Digit "3" = Commerical Temperature Range*

Optional Grades—B
A or B = Improved Version

Process Level—883B
J, JE = Ceramic DIP (300 mil and 600 mil)
L, L20 = Ceramic Leadless Chip Carrier (CLCC)

Enhanced Plastic—EP

* = Consult individual data sheets for specific temperature ranges on each part.
** = The "883B" designator was retained to be consistant with the original Unitrode naming convention.

Digital Signal Processors (DSPs)

Example: SMJ320C40GBM40EP

Prefix—SMJ

SM	= Commercial Processing
SMJ	= MIL-PRF-38535 (QML Class Q)
SMQ	= MIL-PRF-38535 (QML Class N) (Order by SMD)
SMP	= Production Prototype
SMX	= Military Preproduction
TMS	= Commercial Qualified
TMP	= Commercial Grade
SMV	= MIL-PRF-38535 QML Class V (Order by SMD)

320 DSP Family Designator—320 or 32

320 DSP Product Designator—C40

BC	= CMOS Boot
C	= CMOS
E	= CMOS EPROM
F	= CMOS FLASH
LC	= CMOS 3.3 V
VC	= CMOS 1.5 V / 3.3 V

14	= E14	50	= C50	5409	= VC5409
15	= C15	62	= C62xx	5421	= VC5421
25	= C25	64	= C64xx		
26	= C26	67	= C67xx		
30	= C30	80	= C80		
31	= C31	240	= F240		
32	= C32	2812	= F2812		
33	= VC33	5416	= VC5416		
40	= C40	549	= LC549		

Package Type / Pin Count—GB

JD	= CDIP
FD/FJ	= LCCC
GB/GF	= CPGA
GFA	= CFGP
GLG/GLP	= FC/CSP
HFH/HFG	= CFP
HFP	= CFP
KGD	= KGD
PCM/PQ	= QFP
GNM	= FBGA
GAD	= FCµBGA
GJC	= FC/CSP
GJL	= FC/CSP
GLZ	= FCBGA
GDP	= LQFP
PGE	= Plastic LQFP
GGU	= BGA
GGW	= BGA Microstar
PGF	= LQFP
GHH	= PBGA

Enhanced Plastic—EP

Speed Designator—GB

12	= 120 MHz
16	= 160 MIPS (VC5416)
20	= 200 MIPS (VC5421)
33	= 33 MHz
40	= 40 MHz
50	= 500 MHz (C64xx)
60	= 60 MHz (600 MHz C6415)
60	= 60 MIPS (C54x)
66	= 66 MHz
10	= 100 MIPs (C54x)
14	= 140 MHz
15	= 150 MHz
16	= 167 MHz
17	= 175 MHz
20	= 200 MHz
120	= 120 MFLOPS (VC33)
150	= 150 MFLOPS (VC33)

Temperature Range—M

M	= -55°C to 125°C
A	= -40°C to 105°C (C6000)
L	= 0°C to 70°C
W	= -55°C to 115°C
S	= Special Per datasheet
Blank	= 25°C

* = Not all speed, package, process, temperature combinations are available.

First-In, First-Out Products (FIFOs)

Example: SN54ABT36148HFPEP

Prefix—SN
SN = Commercial Processing
SNJ = MIL-PRF-38535 (QML) (Class Q)

Military Temperature—54
54 = -55°C to 125°C
74 = 0°C to 70°C

Technology—ABT
ABT = Advanced BiMOS
ACT = Advanced CMOS
LS = Low-Power Schottky
HC = High Speed CMOS (CMOS Input Levels)
HCT = High Speed CMOS (TTL Input Levels)

Circuit Designator—3614
J, JE = Ceramic DIP (300 mil and 600 mil)
L, L20 = Ceramic Leadless Chip Carrier (CLCC)

Package Type—3614
J = CDIP
HFP = CFP
KGD = KGD
PCB/PN = QFP
FK = LCCC
GB = BGA Microstar

Enhanced Plastic—EP

TI Acquired Harris Logic

Example: CD4XXXXXXX

Prefix—CD

Device Function (up to 5 digits)—4XXXX

Supply Voltage—XX

A	= 2 V Max
B	= 18 V Max
UB	= 18 V Max Unbuffered

Package Designation—X

F	= Ceramic Dual In-Line Package (CDIP)
K	= Ceramic Flatpack
D	= Metal Seal CDIP

Process Levels—X

3	= Mil Temp Commercial Processing
3A	= MIL-PRF-38535 (QML)
B	= MIL-M-38510 Electrical (QPL)

Logic

Example: SNJ54ABTH162245WDEP

Prefix—SNJ

SNJ	= MIL-PRF-38535 (QML)
SN	= Commercial Processing
SNV	= MIL-PRF-38535 QML Class V (Order by SMD)

Type—54

Technology—ABT

No designator	= TTL
ALS/AS	= Advanced Low-Power Schottky Advanced Schottky
AHC/AHCT	= Advanced High Speed CMOS
HC/HCT	= High Speed CMOS
BCT	= BiCMOS
AC/ACT	= Advanced CMOS
ABT	= Advanced BiCMOS
LVC	= Low Voltage CMOS
LVTH	= Low Voltage Advanced CMOS w/ Bus Hold
CDC	= Clock Distribution Circuit
CBT	= Crossbar Bus Switch
GTL	= Gunning Transceiver Logic
FCT	= Fast CMOS Technology
F	= FAST

Special Features—H

D	= Level Shifting Diode (CBTD)
H	= Bus Hold (LVTH)

Bus/Scan Options—16

8	= SCOPE/JTAG
16	= Widebus
18	= SCOPE/JTAG Widebus
32	= Widebus+

Options—2

2	= Series-Damping Resistors on Outputs

Device Function—245

Package Type—WD

PZ	= LQFP
PW	= TSSOP
DW	= SOIC
DL	= SSOP
D	= SOIC
DB	= TSSOP
DGG	= TSSOP
DCK	= SOP
GQL	= BGA Microstar Junior
ZQL	= BGA Microstar Junior
J,JT	= CDIP
W/WD	= Ceramic Flatpack
FK	= Leadless Ceramic Chip Carrier
HV, HT, HFP	= Ceramic Quad Flatpack
GB	= Pin Grid Array (PGA)

Enhanced Plastic—EP

Programmable Logic

Example: TIBPAL16L8-10MJB

Prefix—TIB
TIB = IMPACT™

Product Family Designator—PAL

Number of Array Inputs—16

Output Configuration Designator—L
L = Active Low
R = Registered
V = Variable (programmable)

Number of Outputs in Designated Configuration—8

Performance Designator—-10
-7 = 7 ns propagation delay
-10 = 10 ns propagation delay
-12 = 12 ns propagation delay
-15 = 15 ns propagation delay
-20 = 20 ns propagation delay
-25 = 25 ns propagation delay
-30 = 30 ns propagation delay
A = Standard power
A-2 = Half power

Temperature Range—M
M = -55°C to 125°C
C = 0°C to 70°C

Package Type—J
J,JT = Ceramic Dual In-Line Package (CDIP)
FK = Leadless Ceramic Chip Carrier (LCCC)
W = Ceramic Flatpack

Processing—B
Blank = Commercial processing
B = MIL-PRF-38535 (QML) (Class Q)

DSCC Standard Microcircuit Drawing (SMD)

Example: 5962-85155 or 8200501MFA*

Drawing Number—5962-85155 or 82005

Device—01

Device Structure—M

M = Vendor self-certifiation to the requirements for MIL-STD-883 compliant
Q = Certification and qualification to the MIL-PRF-38535 (Class Q)
V = Certification and qualification to the MIL-PRF-38535 (Class V)

Package—F

A = 14-pin Flatpack (1/4" x 1/4")	I = 10-pin Flatpack	S = 20-pin Flatpack
B = 14-pin Flatpack (3/16" x 1/4")	J = 24-pin DIP	V = 18-pin DIP
C = 14-pin DIP	K = 24-pin Flatpack	W = 22-pin DIP
D = 14-pin Flatpack	L = 24-pin DIP (300 mil)	2 = 20-pad LCC
E = 16-pin DIP	M = 12-pin Can	3 = 28-pad LCC
F = 16-pin Flatpack	P = 8-pin DIP	X = Other packages
G = 8-pin Can	Q = 40-pin DIP	Y = Other packages
H = 10-pin Flatpack	R = 20-pin DIP	

Lead Finish—A*

A* = Solder Dip
C = Gold Plate
D = Paladium

DSCC JAN Slash Sheet

Example: JM38510/00104BCA*

Process Level—JM38510/

Device/Slash Sheet—00104

Device Class—B

Package Type—C

A = 14-pin Flatpack (1/4" x 1/4")	I = 10-pin Flatpack	S = 20-pin Flatpack
B = 14-pin Flatpack (3/16" x 1/4")	J = 24-pin DIP	V = 18-pin DIP
C = 14-pin DIP	K = 24-pin Flatpack	W = 22-pin DIP
D = 14-pin Flatpack	L = 24-pin DIP (300 mil)	2 = 20-pad LCC
E = 16-pin DIP	M = 12-pin Can	3 = 28-pad LCC
F = 16-pin Flatpack	P = 8-pin DIP	X = Other packages
G = 8-pin Can	Q = 40-pin DIP	Y = Other packages
H = 10-pin Flatpack	R = 20-pin DIP	

* Solder dip lead finish normally supplied by TI. Lead finish options must be specified by ordering the DSCC SMD number.

Lead Finish—A*

A* = Solder Dip
C = Gold Plate
D = Paladium

Process Flows

Things to Consider

Several process flows are available for TI Military Products. The flows are typical and may vary depending on changes to applicable military standards, such as MIL-PRF-38535.

QML products, processed to MIL-PRF-38535 level Q, are offered in three different types:

JM38510
Processed under MIL-PRF-38535 and electrically tested to the JAN slash sheet

DSCC/SMD
Processed under MIL-PRF-38535 and electrically tested to the DSCC standard microcircuit drawing.
— SMQ - Processed under MIL-PRF - 38535 Class N (Order by SMD)
— SMV - Processed under MIL-PRF - 38535 Class V (Order by SMD)

SNJ/SMJ
Processed under MIL-PRF-38535 (Class Q) and electrically tested to the TI data sheet. All QML products are symbolized with the Q quality designator on the top side.

Enhanced Plastic
Testing and screening of EP products is performed in accordance with the TI data sheet for that device. Configuration control is performed by Texas Instruments. TI processes EP products per "best commercial practices" to the TI internal baseline flow. Processing and screening is documented in the TI Quality System Manual and is in compliance with ISO9001.

Process Flows

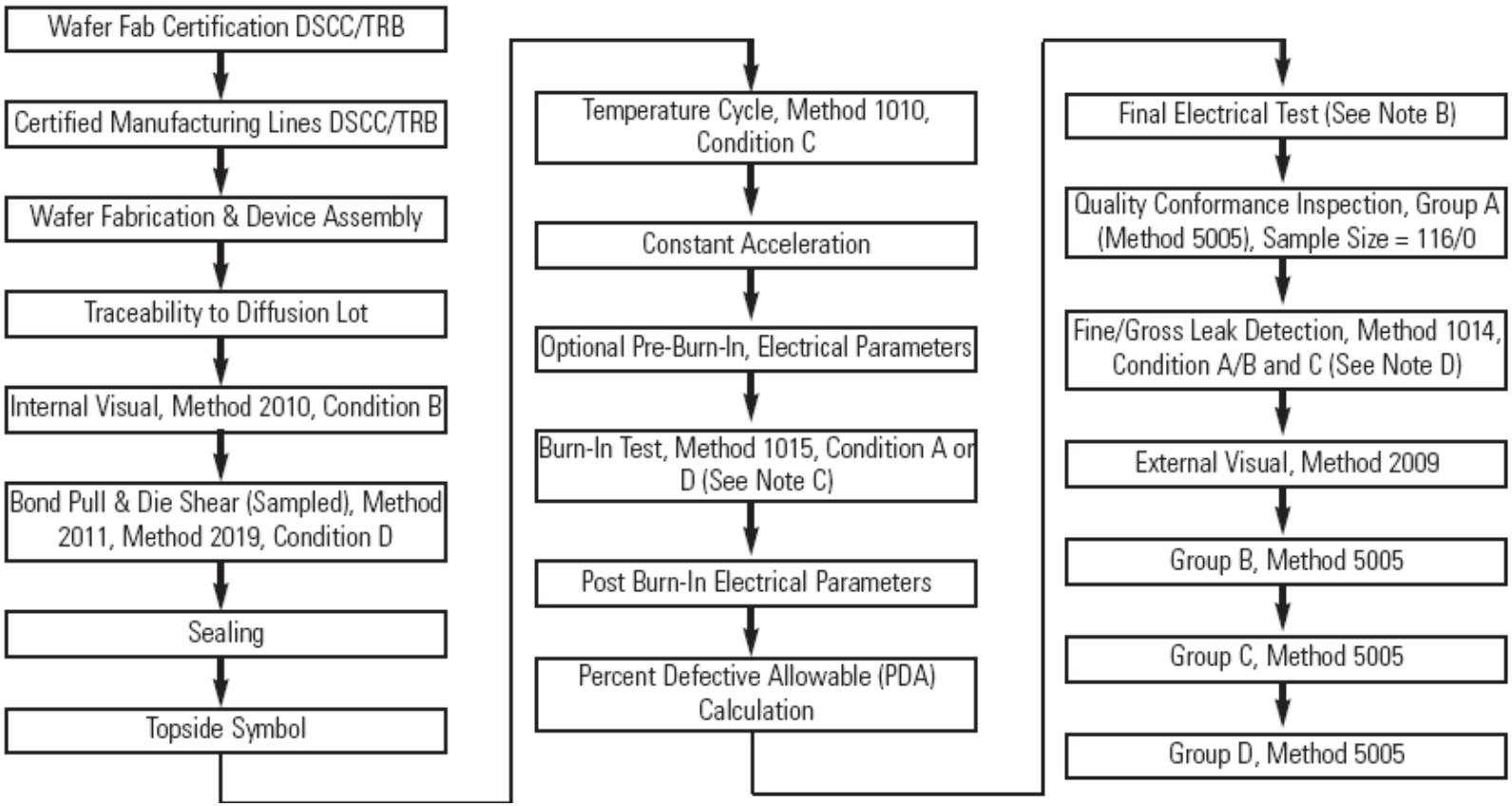
Process Flows (See Note A)	Description
DSCC/SMD	Standard Microcircuit Drawing products processed to a MIL-PRF-38535 flow. Electricals controlled by SMD/DSCC.
SNJ/SMJ	Products processed to MIL-PRF-38535 Level B for military applications. Electricals controlled by current TI data sheet.
SN/SM	Commercial level ceramic processing. Test flow defined in this section. Electricals defined by current TI data sheet but may not be production tested.
SMX*/SNX*	Experimental products assembled and tested by Military Products prior to qualification. No minimum screening or testing required. Electricals controlled by current TI data sheet.
SMP*/SNP*	Prototype devices representative of production material with military temperature range testing. Shipped prior to completion of qualification testing. Electricals controlled by current TI data sheet.
JAN	Processed per QML MIL-PRF-38535 flow. Electricals controlled by JAN slash sheet.
EP	Processed in compliance with ISO9001. Testing and screening performed in accordance with TI data sheet.

* These devices have not met or completed TI Military Semiconductors internal qualification requirements. These devices are for prototyping purposes only and standard TI warranties do not apply. Supply of these devices does not constitute a commitment by TI to release them to production.

NOTE A: While TI offers SCDs, it is not the standard or preferred method of procurement.

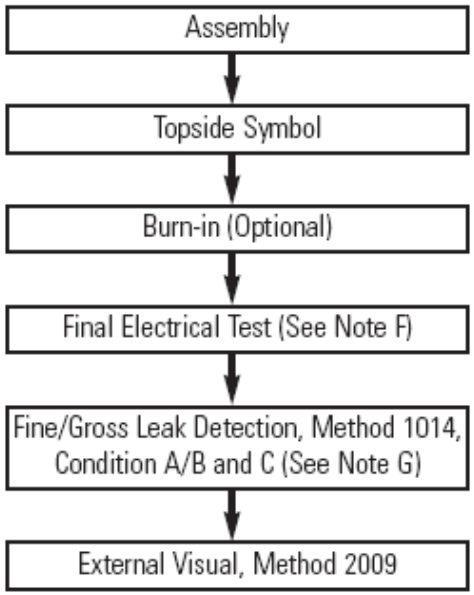
Process Flows

QML Processing Flow Covering DSCC, SMD, SNJ, SMJ and JAN (See Note A)



Process Flows

SN/SM Processing Flow



NOTE A: Per MIL-PRF-38535, if sufficient quality and reliability data is available, the manufacturer, through the QML program and the Technical Review Board may modify, substitute or delete tests.

NOTE B: According to device type, electrical parameters are defined by the slash sheet, DSCC/SMD, or TI data sheet and Method 5004.

NOTE C: Condition A or D at manufacturer's option

NOTE D: Ceramic packages only

NOTE E: Lead finish options must be specified by ordering the DSCC SMD number

NOTE F: Contact the Product Information Center (PIC) for detailed test information.

NOTE G: Ceramic packages only.

NOTE H: Lead finish may vary. For example, ceramic PGA and ceramic QFP packages may be gold finish. Contact the PIC for detailed information.

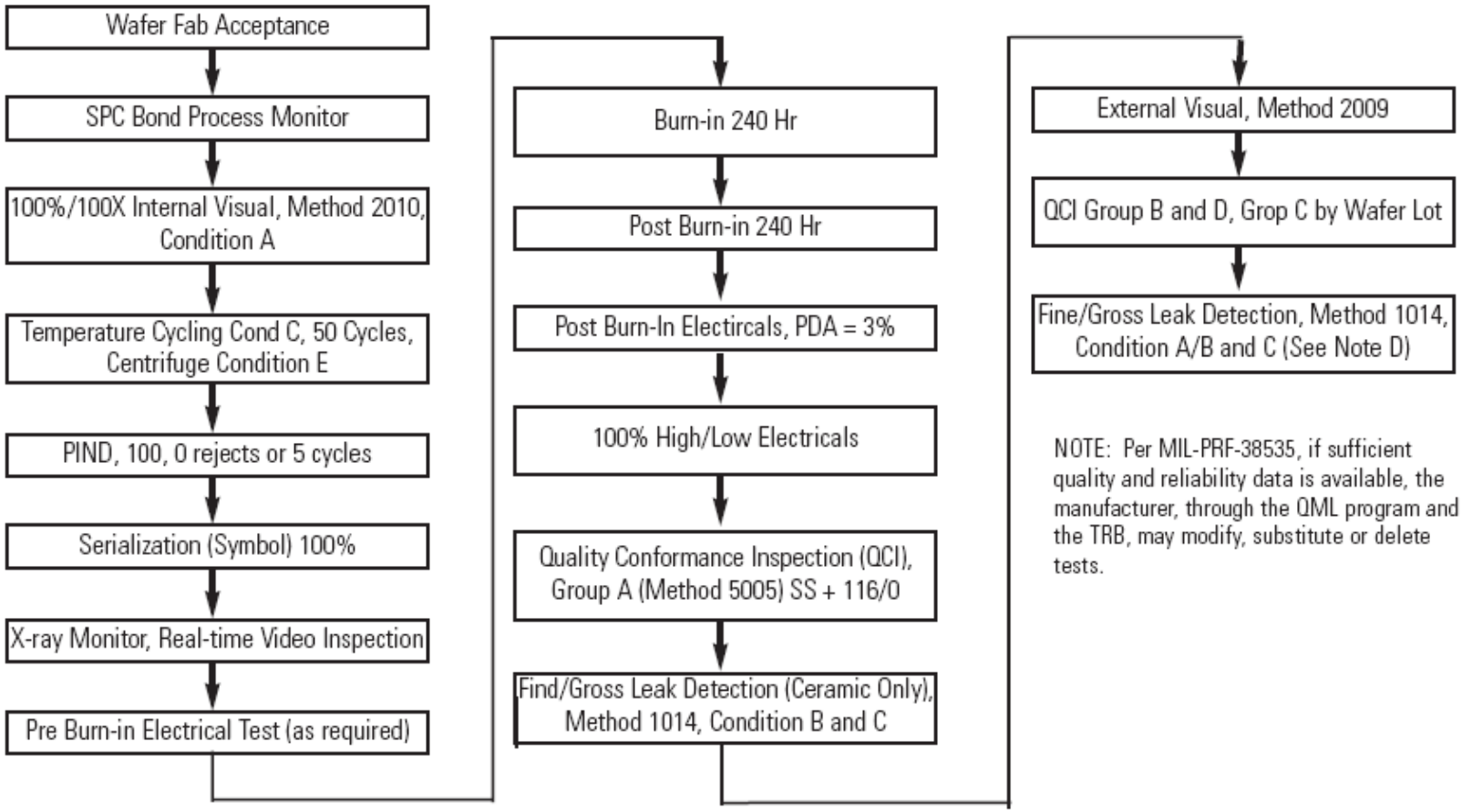
ESD Markings (Optional)

MIL-PRF-38535 ESD Class Designation	Marking	ESD Voltage Range
1	1 Triangle	0 - 1999 V
2	2 Triangles	2000 - 3999 V
3	No Triangles	4000 V

¥ As referred to above, ESD marking is optional.

Process Flows

Offshore Class V Process Flow (Texas Instruments/Unitrode)

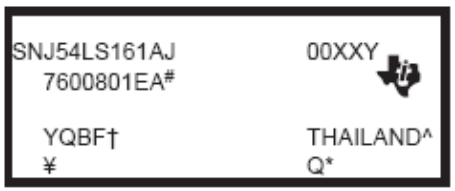


NOTE: Per MIL-PRF-38535, if sufficient quality and reliability data is available, the manufacturer, through the QML program and the TRB, may modify, substitute or delete tests.

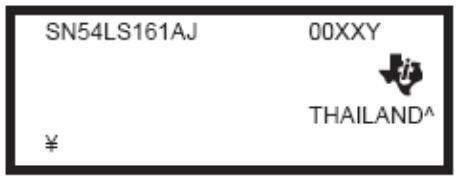
Process Flows

Symbolization ¤

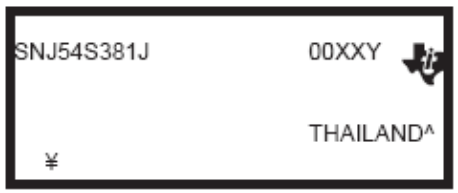
Example: JANB 54LS161A
Order As: JM38510/3003BCA



Example: SNJ 54LS161A
Order As: SNJ54LS161AJ or 7600801EA



Example: SN 54LS161A
Order As: SN54LS161AJ



Example: SNJ With No SMD
Order As: SNJ54S381J

Example: SMJ 320C30GBM40
Order As: SMJ320C30GBM40
or 5962-9052604MXA

Example: UCC 1806JQMLV
Order As: 5962-9457501VEA

¤ TI bug is optional

¥ = ESD marking is optional

† YQ = diffusion date,
B = die revision
F = wafer fab code (optional)

§ YYWW = seal date
LL = lot window
Z = B/I split lot

* Q marking denotes QML-compliant product

Where TI is an approved source

^ Country of origin may be located on package underside.

For more information

www.ti.com/hirel