

GENERAL DESCRIPTION

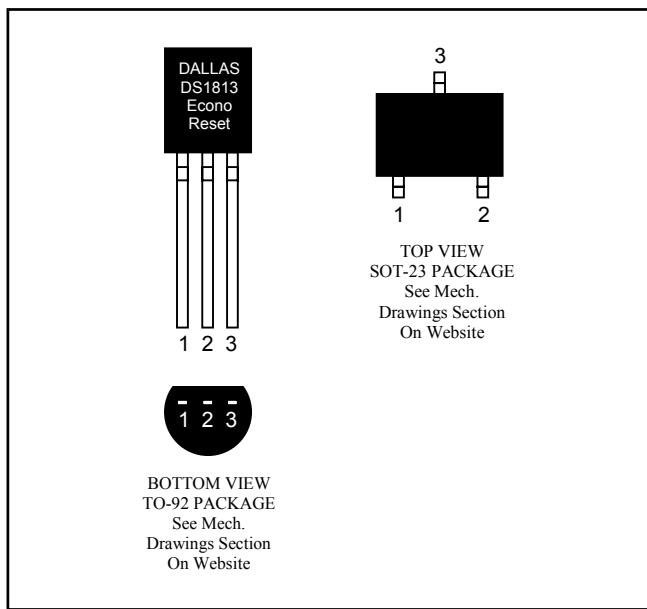
The DS1813 EconoReset uses a precision temperature reference and comparator circuit to monitor the status of the power supply (V_{CC}). When an out-of-tolerance condition is detected, an internal power-fail signal is generated which forces reset to the active state. When V_{CC} returns to an in-tolerance condition, the reset signal is kept in the active state for approximately 150ms to allow the power supply and processor to stabilize.

The DS1813 also monitors a pushbutton on the reset output. If the reset line is pulled low, a reset is generated upon release and will be held in reset output low for typically 150ms.

FEATURES

- Automatically Restarts a Microprocessor After Power Failure
- Monitors Pushbutton for External Override
- Maintains Reset for Typically 150ms After V_{CC} Returns to an In-Tolerance Condition
- Reduces Need for Discrete Components
- Precision Temperature-Compensated Voltage Reference and Voltage Sensor
- Low-Cost TO-92 or Space-Saving Surface-Mount SOT-23 Packages Available
- Efficient Open-Drain Output with Internal 5.5k Ω Pullup Resistor
- -40°C to +85°C Operating Temperature

PIN CONFIGURATIONS



PIN DESCRIPTION

PIN		NAME	FUNCTION
TO-92	SOT-23		
1	1	$\overline{RST}$	Active-Low Reset Output
2	2	V_{CC}	Power Supply
3	3	GND	Ground

OPERATION—POWER MONITOR

The DS1813 provides the functions of detecting out-of-tolerance power-supply conditions and warning a processor-based system of impending power failure. When V_{CC} is detected as out-of-tolerance, the $\overline{RST}$ signal is asserted. On power-up, $\overline{RST}$ is kept active for approximately 150ms after the power supply has reached the selected tolerance. This allows the power supply and microprocessor to stabilize before $\overline{RST}$ is released.

OPERATION—PUSHBUTTON RESET

The DS1813 provides for a pushbutton switch for manual reset control. When the DS1813 is not in a reset cycle, a pushbutton reset can be generated by pulling the $\overline{RST}$ pin low for at least $1\mu s$. When the pushbutton is held low, the $\overline{RST}$ is forced active low and will remain active low for about 150ms after the pushbutton is released. See Figure 2 for an application example and Figure 3 for the timing diagram.

Figure 1. Block Diagram (Open-Drain Output)

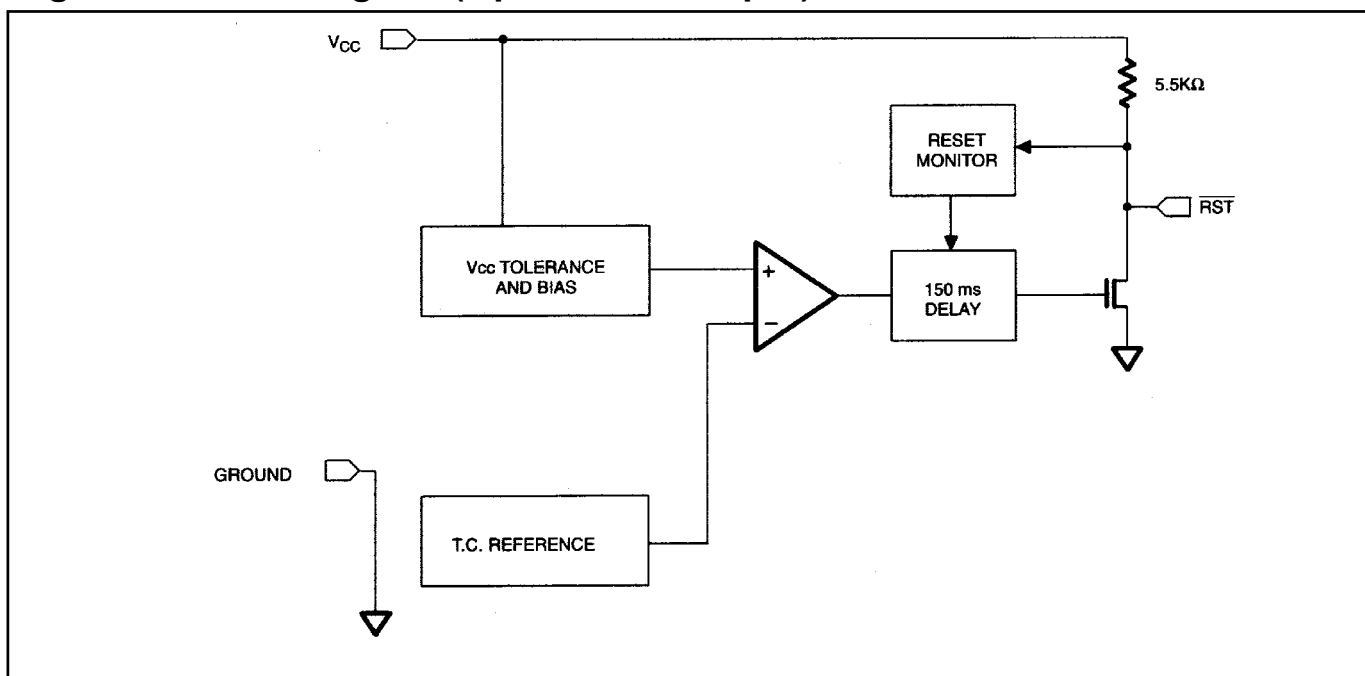


Figure 2. Application Example

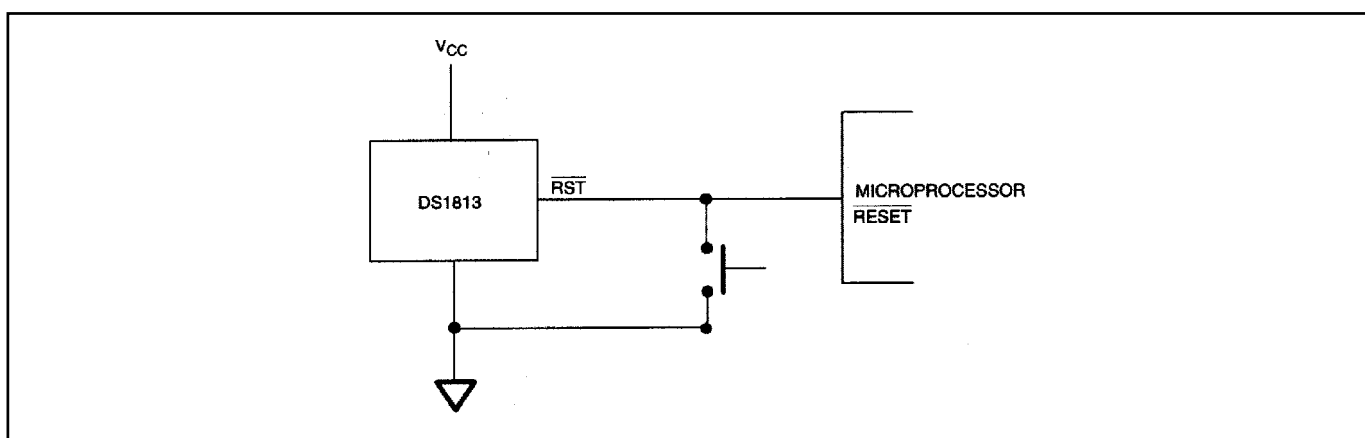
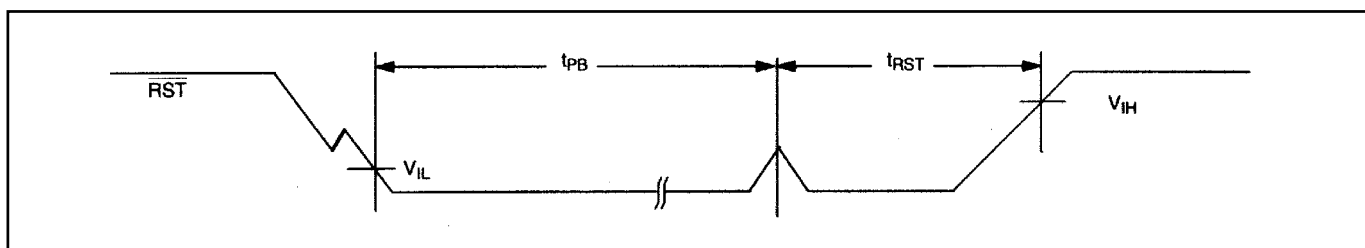
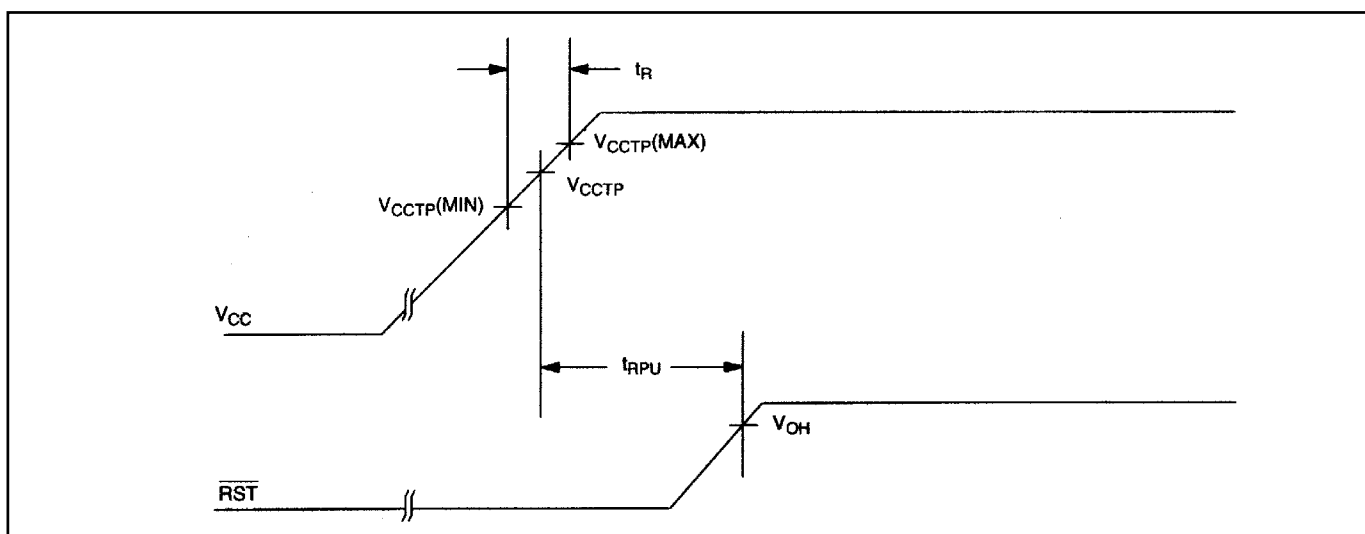
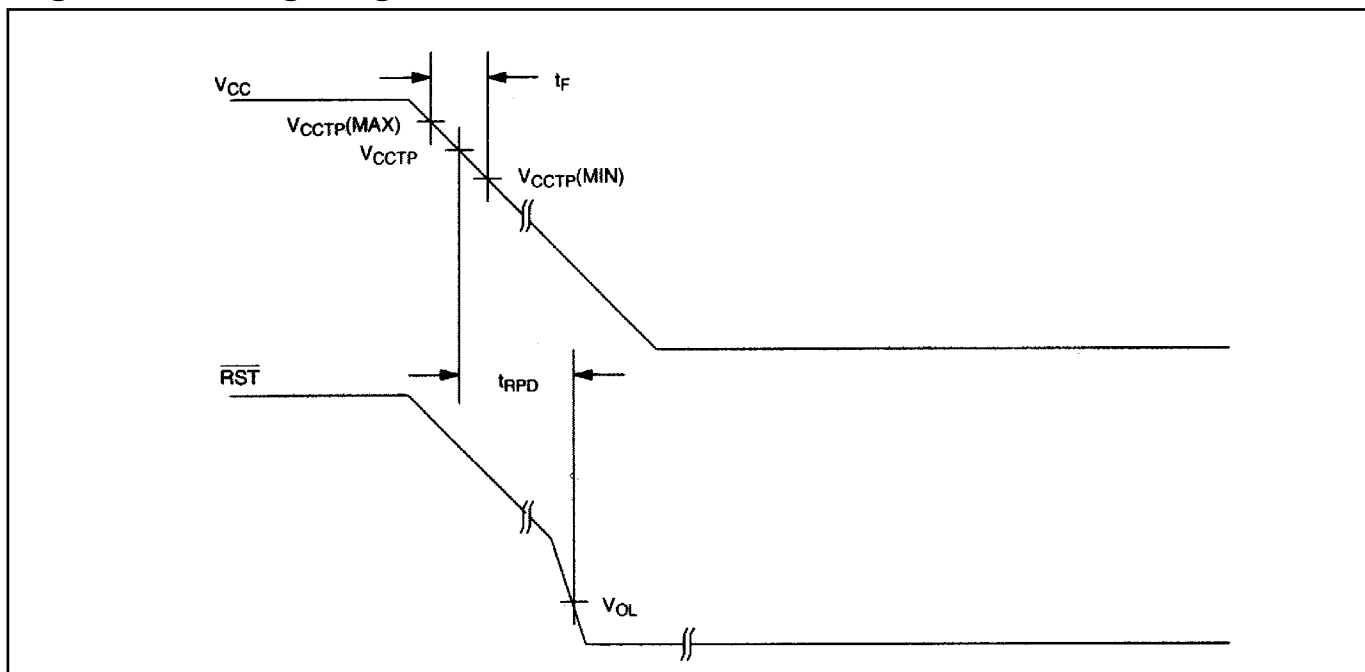


Figure 3. Timing Diagram: Pushbutton Reset**Figure 4. Timing Diagram: Power-Up****Figure 5. Timing Diagram: Power-Down**

ABSOLUTE MAXIMUM RATINGS

Voltage Range on V_{CC} Pin Relative to Ground.....	-0.5V to +7.0V
Voltage Range on $\overline{RST}$ Relative to Ground.....	-0.5V to ($V_{CC} + 0.5V$)
Operating Temperature Range.....	-40°C to +85°C
Storage Temperature Range.....	-55°C to +125°C
Soldering Temperature.....	See IPC/JEDEC J-STD-020 Specification

This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

RECOMMENDED DC OPERATING CONDITIONS

($T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Supply Voltage	V_{CC}	0		5.5	V	1

DC ELECTRICAL CHARACTERISTICS

($V_{CC} = 1.2V$ to $5.5V$, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$.)

PARAMETER		SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Output Current at 0.4V		I _{OL}	10			mA	2, 3
Voltage Input Low		V _{IL}			0.4	V	1
Voltage Input High		V _{IH}	0.7 x V _{CC}			V	1
Operating Current V _{CC} < 5.5		I _{CC}		30	40	μA	4
V _{CC} Trip Point	DS1813-5	V _{CCTP}	4.50	4.62	4.75	V	1
	DS1813-10		4.25	4.35	4.49		
	DS1813-15		4.00	4.13	4.24		
Internal Pullup Resistor		R _P	3.50	5.5	7.5	kΩ	6
Output Capacitance		C _{OUT}			10	pF	

AC ELECTRICAL CHARACTERISTICS

($V_{CC} = 1.2V$ to $5.5V$, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$.)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Reset Active Time	t_{RST}	100	150	300	ms	
V_{CC} Detect to $\overline{RST}$	t_{RPD}		2	5	μs	
V_{CC} Slew Rate ($V_{CCTP(MAX)} - V_{CCTP(MIN)}$)	t_F	300			μs	7
V_{CC} Slew Rate ($V_{CCTP(MIN)} - V_{CCTP(MAX)}$)	t_R	0			ns	
V_{CC} Detect to $\overline{RST}$	t_{RPU}	100	150	300	ms	5
Pushbutton Detect to $\overline{RST}$	t_{PB}	1			μs	
Pushbutton Reset	t_{PBRST}	100	150	300	ms	

NOTES:

- 1) All voltages are referenced to ground.
- 2) Measured with $V_{CC} \geq 2.7V$.
- 3) A $1k\Omega$ external resistor may be required in some applications for proper operation of the microprocessor reset control circuit.
- 4) Measured with $\overline{RST}$ output open.
- 5) $t_R = 5\mu s$.
- 6) V_{OH} and I_{OH} are a function of the value of R_P and the associated output load conditions.
- 7) This value is for reference in defining values for t_{RPD} and should not be considered a requirement for proper operation or use of the device.

PART MARKING CODES

“A,” “B,” and “C” represent the device type.

810 DS1810
 811 DS1811
 812 DS1812
 813 DS1813
 815 DS1815
 816 DS1816
 817 DS1817
 818 DS1818

“D” represents the device tolerance.

A 5%
 B 10%
 C 15%
 D 20%

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DS1813

Part Number Table

Notes:

1. See the [DS1813 QuickView Data Sheet](#) for further information on this product family or download the [DS1813 full data sheet](#) (PDF, 212kB).
2. Other options and links for purchasing parts are listed at: <http://www.maxim-ic.com/sales>.
3. [Didn't Find What You Need?](#) Ask our applications engineers. Expert assistance in finding parts, usually within one business day.
4. Part number suffixes: T or T&R = tape and reel; + = RoHS/lead-free; # = RoHS/lead-exempt. More: See [full data sheet](#) or [Part Naming Conventions](#).
5. * Some packages have variations, listed on the drawing. "PkgCode/Variation" tells which variation the product uses.

Part Number	Notes	Free Sample	Buy Direct	Package: TYPE PINS SIZE DRAWING CODE/VAR *	Temp	RoHS/Lead-Free? Materials Analysis
DS1813R-10/T&R/C03				SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3-4*	-40C to +85C	RoHS/Lead-Free: No Materials Analysis
DS1813R-15+T&R	5V-15% 3000/Reel			SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3+4*	-40C to +85C	RoHS/Lead-Free: Yes Materials Analysis
DS1813R-10+T&R	5V-10% 3000/Reel			SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3+4*	-40C to +85C	RoHS/Lead-Free: Yes Materials Analysis
DS1813R-15-U	5V-15% Partial Reel			SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3-4*	-40C to +85C	RoHS/Lead-Free: No Materials Analysis

DS1813R-10-U	5V-10% Partial Reel	SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3-4*	-40C to +85C RoHS/Lead-Free: No Materials Analysis
DS1813R-5-U	5V-5% Partial Reel	SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3-4*	-40C to +85C RoHS/Lead-Free: No Materials Analysis
DS1813R-15/T&R	5V-15% 3000/Reel	SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3-4*	-40C to +85C RoHS/Lead-Free: No Materials Analysis
DS1813R-10/T&R	5V-10% 3000/Reel	SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3-4*	-40C to +85C RoHS/Lead-Free: No Materials Analysis
DS1813R-5-U+		SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3+4*	-40C to +85C RoHS/Lead-Free: Yes Materials Analysis
DS1813R-5+T&R	5V-5% 3000/Reel	SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3+4*	-40C to +85C RoHS/Lead-Free: Yes Materials Analysis
DS1813R-15-U+		SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3+4*	-40C to +85C RoHS/Lead-Free: Yes Materials Analysis
DS1813R-10-U+		SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3+4*	-40C to +85C RoHS/Lead-Free: Yes Materials Analysis
DS1813R-5/T&R	5V-5% 3000/Reel	SOT23;3 pin;50 Dwg: 21-0051G (PDF) Use pkgcode/variation: U3-4*	-40C to +85C RoHS/Lead-Free: No Materials Analysis
DS1813-5+T&R	5V-5% 2000/Reel	TO92;3 pin;185 Dwg: 56-G0006-003A (PDF) Use pkgcode/variation: Q3+4*	-40C to +85C RoHS/Lead-Free: Yes Materials Analysis
DS1813-10+T&R	5V-10% 2000/Reel	TO92;3 pin;185 Dwg: 56-G0006-003A (PDF) Use pkgcode/variation: Q3+4*	-40C to +85C RoHS/Lead-Free: Yes Materials Analysis

DS1813-5+		TO92;3 pin;185 Dwg: 56-G0006-001A (PDF) Use pkgcode/variation: Q3+1*	-40C to +85C RoHS/Lead-Free: Yes Materials Analysis
DS1813-15+T&R	5V-15% 2000/Reel	TO92;3 pin;185 Dwg: 56-G0006-003A (PDF) Use pkgcode/variation: Q3+4*	-40C to +85C RoHS/Lead-Free: Yes Materials Analysis
DS1813-15/T&R	5V-15% 2000/Reel	TO92;3 pin;185 Dwg: 56-G0006-003A (PDF) Use pkgcode/variation: Q3-4*	-40C to +85C RoHS/Lead-Free: No Materials Analysis
DS1813-10/T&R	5V-10% 2000/Reel	TO92;3 pin;185 Dwg: 56-G0006-003A (PDF) Use pkgcode/variation: Q3-4*	-40C to +85C RoHS/Lead-Free: No Materials Analysis
DS1813-5/T&R	5V-5% 2000/Reel	TO92;3 pin;185 Dwg: 56-G0006-003A (PDF) Use pkgcode/variation: Q3-4*	-40C to +85C RoHS/Lead-Free: No Materials Analysis
DS1813-15	5V-15% Monitor	TO92;3 pin;185 Dwg: 56-G0006-001A (PDF) Use pkgcode/variation: Q3-1*	-40C to +85C RoHS/Lead-Free: No Materials Analysis
DS1813-10	5V-10% Monitor	TO92;3 pin;185 Dwg: 56-G0006-001A (PDF) Use pkgcode/variation: Q3-1*	-40C to +85C RoHS/Lead-Free: No Materials Analysis
DS1813-5	5V-5% Monitor	TO92;3 pin;185 Dwg: 56-G0006-001A (PDF) Use pkgcode/variation: Q3-1*	-40C to +85C RoHS/Lead-Free: No Materials Analysis
DS1813-10+		TO92;3 pin;185 Dwg: 56-G0006-001A (PDF) Use pkgcode/variation: Q3+1*	-40C to +85C RoHS/Lead-Free: Yes Materials Analysis
DS1813-15+		TO92;3 pin;185 Dwg: 56-G0006-001A (PDF) Use pkgcode/variation: Q3+1*	-40C to +85C RoHS/Lead-Free: Yes Materials Analysis

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