SPECIFICATION SHEET

SMD ESD PROTECTION DIODES CASE SOT-23 SM SERIES

SPECIFICATION SHEET NO.	S0427- SM71200000SC72	
ORIGINAL MFG/PART NO.	MDD Diodes/SM712/SOT23SM712S712/SM71200000S712	
NEXTGEN PART CODE	SM71200000SC72	Indicate This Code For RFQ /Order
DATE	Apr. 27, 2025	
REVISION	A3	Updated With Most Recent Data
DESCRIPTION AND MAIN PARAMETRICS	SMD Plastic-Encapsulate ESD Protection Diodes, SM Series, Bi-Directional Asymmetrical TVS Diode for Extended Common-Mode RS-485, Case SOT-23 Reverse Working Voltage (V_{RWM}): 7V/12V Clamping Voltage (V_C): 12VC/20VC Max.@5.0A Operating Temperature Range (T_{OPT}) -55°C ~+150°C Package in Tape/Reel, 3000pcs/Reel RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863) and Halogen Free (HF)	
CUSTOMER		
CUSTOMER PART NUMBER		
CROSS REF. PART NUMBER		
MEMO		

VENDOR APPROVE
Issued/Checked/Approved Mandy Xu — Ruby Zhang — Jack Zhang
Effective Date: Apr. 27, 2025

CUSTOMER APPROVE
Date:

DESCRIPTION

The SM712 transient voltage suppressor (TVS) diode is designed for asymmetrical (12V to -7V) protection in multi-point data transmission standard RS-485 applications. The SM712 may be used to protect devices from transient voltages resulting from electrostatic discharge (ESD), electrical fast transients (FET), and lightning. The SM712 features 400 Watts (tp=8/20µs) of power handling capability to accommodate the higher transient voltage levels which may be expected in extended common mode applications. This provides higher equipment reliability and eliminates the " guess work" required when using Zener diodes that are not rated to handle such transient conditions. The integrated design aids in reducing voltage over-shoot associated with trace inductance. The low clamping voltage of the SM712 minimizes the stress on the protected transceiver. Case SOT-23 allows flexibility in the design of "crowed" circuit boards.

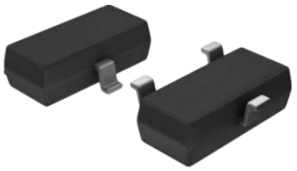


Image shown is a representation only. Exact specifications should be obtained from the product dimension.

MAIN FEATURE

- 400 Watts Peak Pulse Power per (8/20µs)
- Transient protection for asymmetrical data lines
- IEC61000-4-2 (ESD) ±15kV (air), ±8kV (contact)
- IEC61000-4-4 (EFT) 40A (5/50ns)
- IEC61000-4-5 (Lightning) 12A (8/20µs)
- Low Clamping Voltage/Low leakage current/Low capacitance
- Solid-state silicon avalanche technology
- Meet MSL 1 Requirement
- Cross Competitors Parts and More.
- RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863) and Halogen Free (HF)

APPLICATION

- Protection of RS-485 transceivers with extended
- Common-mode range
- Security systems
- Automatic Teller Machines
- HFC systems and Networks

• ELECTRICAL CHARACTERISTICS

- See Page 5 ~Page 6.
- All Parameters are Subject To NextGen Components' Final Confirmation

HOW TO ORDER

- Please Follow Up Part Code Guide And Indicate NextGen Part Code SM71200000SC72 For RFQ and Order.

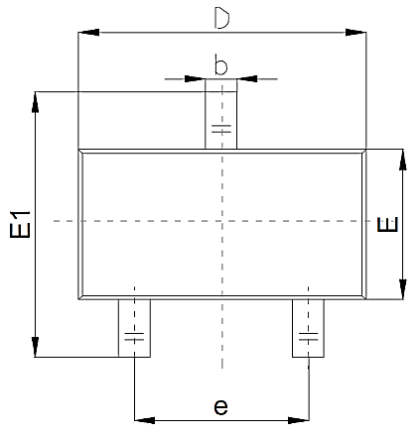
PART CODE GUIDE

RFQ
Request For Quotation

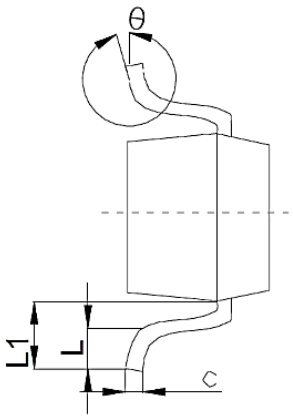
CODE	NAME	KEY SPECIFICATION OPTION
SM	Product Series Code	SMD Plastic-Encapsulate ESD Protection Diodes, SM Series, Bi-Directional Asymmetrical TVS Diode for Extended Common-Mode RS-485, Case SOT-23
712	Parameters Code	Letter or Digits (A~Z, a~z or 0~9)
00000S	Internal Control Code	Letter or Digits (A~Z, a~z or 0~9)
C72	Marking Code	Marking "C72" or "712"
XX	Special/Custom Parameters Code	Letter or Digits (A~Z, a~z or 0~9) for Special Parametric Blank: N/A

DIMENSION- Unit: mm, Case SOT-23 Outline

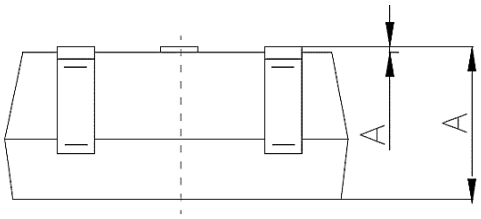
Top View



Side View

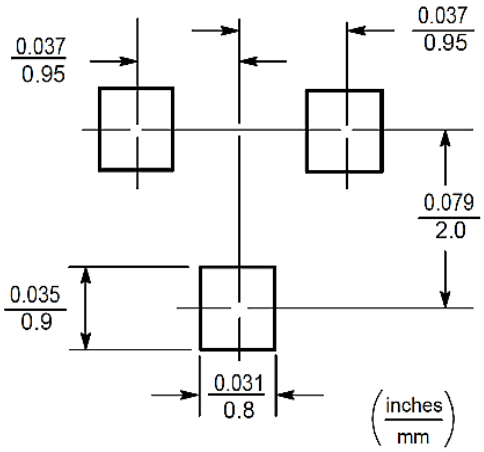


Side View

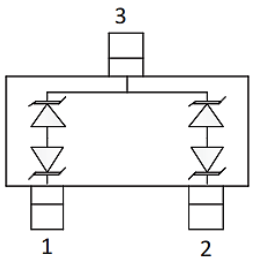


SYMBOL	DIMENSION (MM)		
	MIN.	TYP.	MAX.
A	0.65		1.40
A1	0.00		0.20
b	0.30		0.55
c	0.08		0.20
D	2.70		3.10
E	1.15		1.65
E1	2.10		2.80
e	1.70		2.10
L	0.15		0.50
L1	0.35		0.70
ϴ	0°		12°

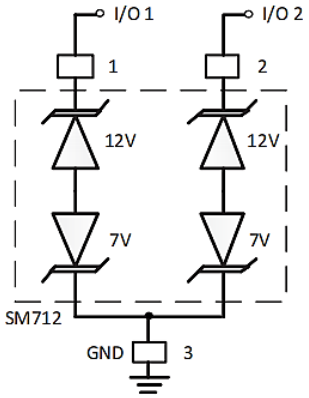
Recommend Pad Layout - Tolerance: ±0.05mm



Schematic & Pin Configuration



Circuit Diagram



MECHANICAL CHARACTERISTICS

CASE	FLAMMABILITY RATING	TERMINALS	MARKING
JEDEC SOT-23 molded plastic body	UL 94V-0	Matte tin plated, High temperature soldering guaranteed: 260℃/10s	C72 or 712

ABSOLUTE MAX. RATING & CHARACTERISTICS - T_A=25°C unless otherwise specified, For Reference Only

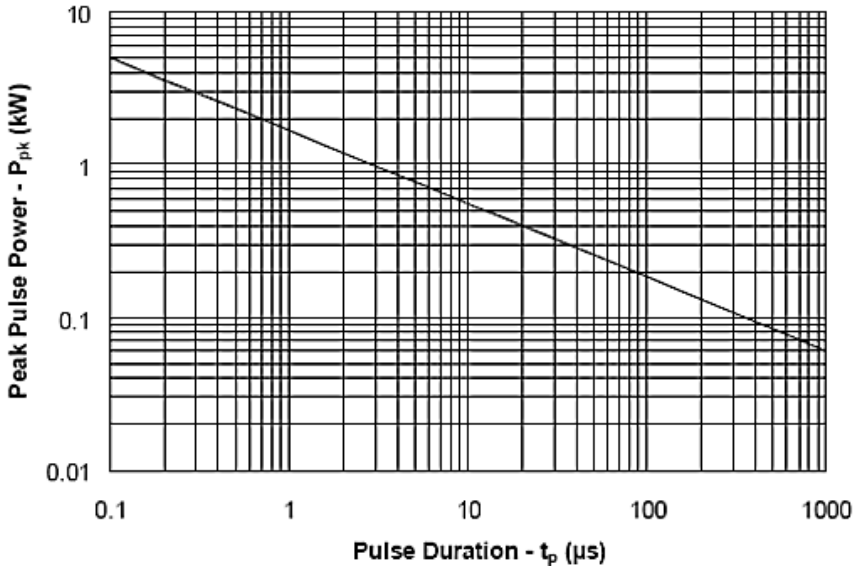
PARAMETER	SYMBOLS	VALUE	UNITS
ESD per IEC 61000-4-2 (Air)	V_{ESD}	±15	KV
ESD per IEC 61000-4-2 (Contact)	V_{ESD}	±8	KV
Peak Pulse Power (tp=8/20us waveform)	P_{PP}	400	W
Peak Pulse Current (tp=8/20us waveform)	I_{PP}	17	A
Operating Temperature Range	T_{OPT}	-55 ~ +150	°C
Storage Temperature Range	T_{STG}	-55 ~ +150	°C
Lead Solder Temperature- Max. (10s Duration)	T_L	260 /10s	°C

ELECTRICAL CHARACTERISTICS - T_A=25°C unless otherwise specified, For Reference Only

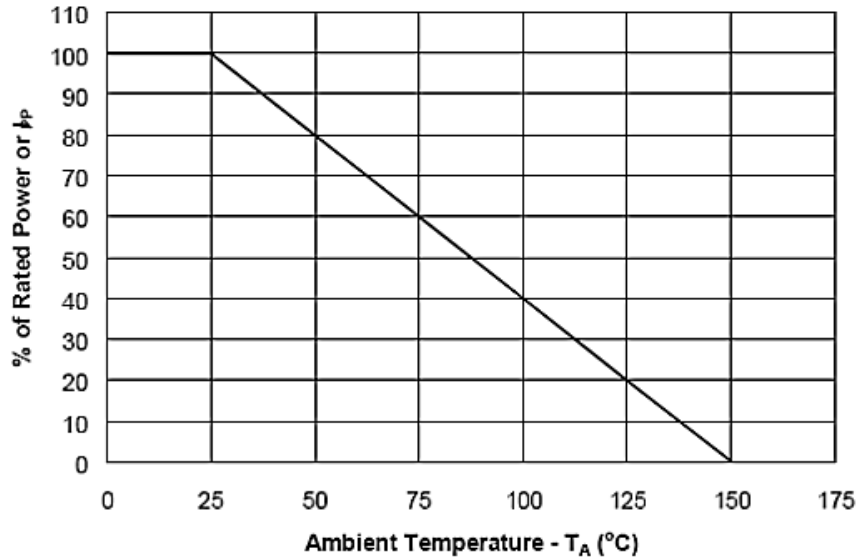
PARAMETER	TEST CONDITION	SYMBOLS	PIN 1 TO 3 AND PIN 2 TO 3 (12V) TVS			PIN 3 TO 1 AND PIN 3 TO 2 (7V TVS)			UNITS
			MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Reverse Working Voltage	Pin 3 to 1 or Pin 2 to 1	V_{RWM}	-	-	12	-	-	7	V
Reverse Breakdown Voltage	I_T = 1mA	V_{BR}	13.3	-		7.5	-	-	V
Reverse Leakage Current	V_{RWM} = 24V	I_R	-	-	1	-	-	20	µA
Clamping Voltage	I_{PP} = 5A, tp = 8/20µs	V_{C1}	-	-	20	-	-	12	V
	I_{PP} = 17A, tp = 8/20µs	V_{C2}	-	-	26	-	-	16	V
Junction Capacitance	V_R = 0V, f = 1MHz	C_{J1}	-	-	75			75	pF
	V_R = V_{RWM}, f = 1MHz	C_{J2}	45	-	-		45	-	pF

RATINGS AND CHARACTERISTICS CURVES- For Reference Only, Ta=25℃ Unless Otherwise Specified.

Non-Repetitive Peak Pulse Power vs. Pulse Time

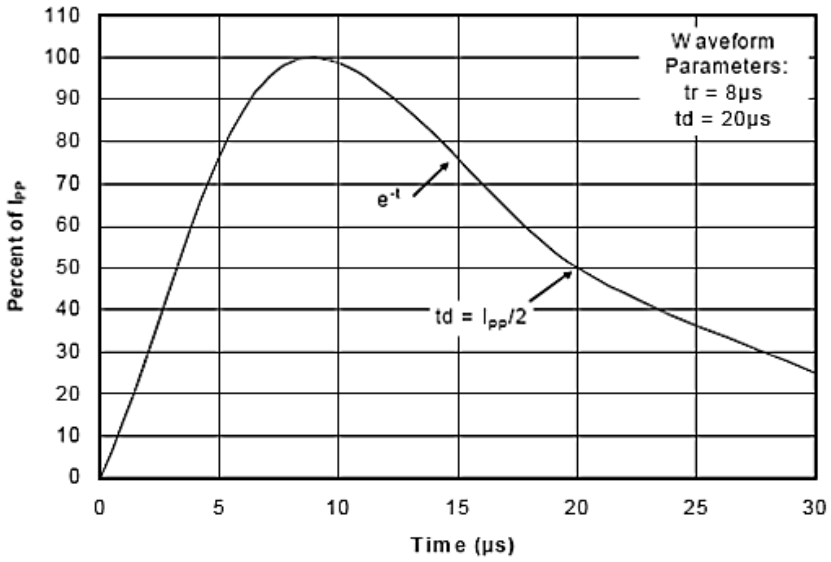


Power Derating Curve

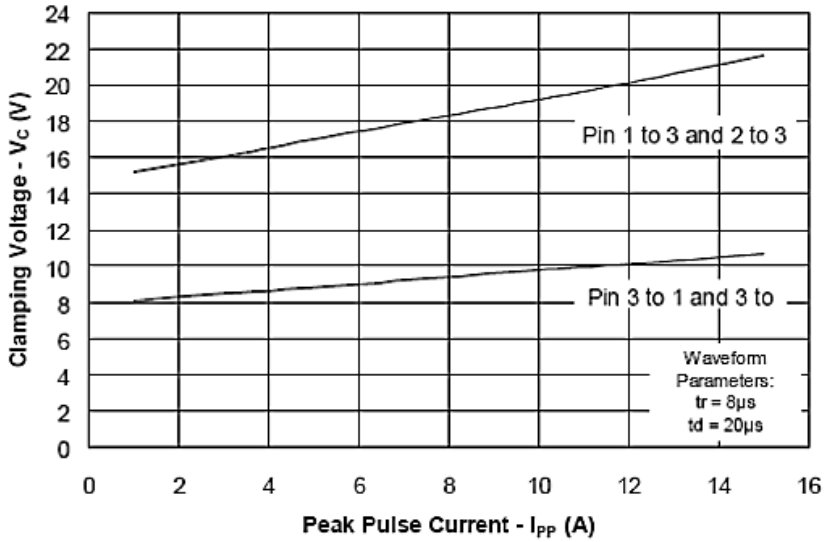


RATINGS AND CHARACTERISTICS CURVES- For Reference Only, Ta=25℃ Unless Otherwise Specified.

Pulse Waveform

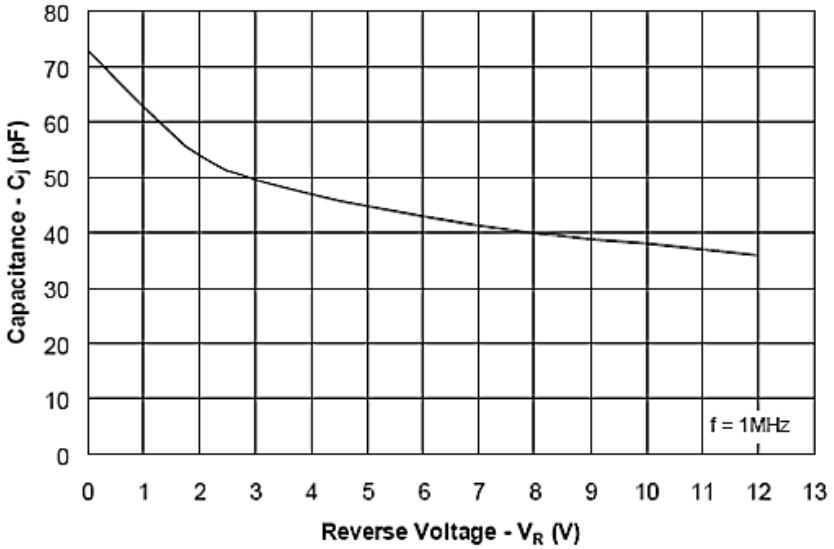


Clamping Voltage vs. Peak Pulse Current

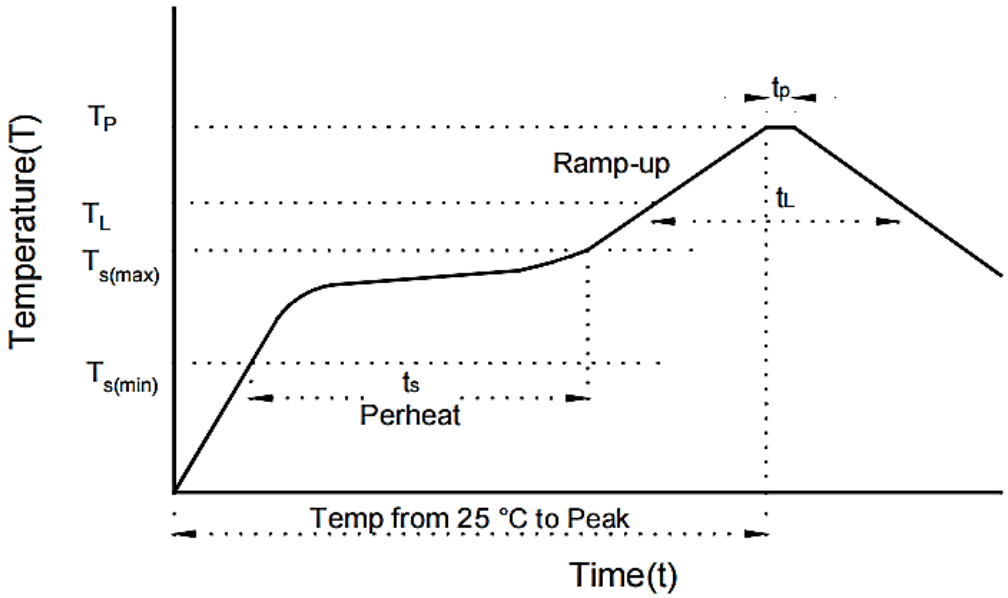


RATINGS AND CHARACTERISTICS CURVES- For Reference Only, Ta=25℃ Unless Otherwise Specified.

Capacitance vs. Reverse Voltage

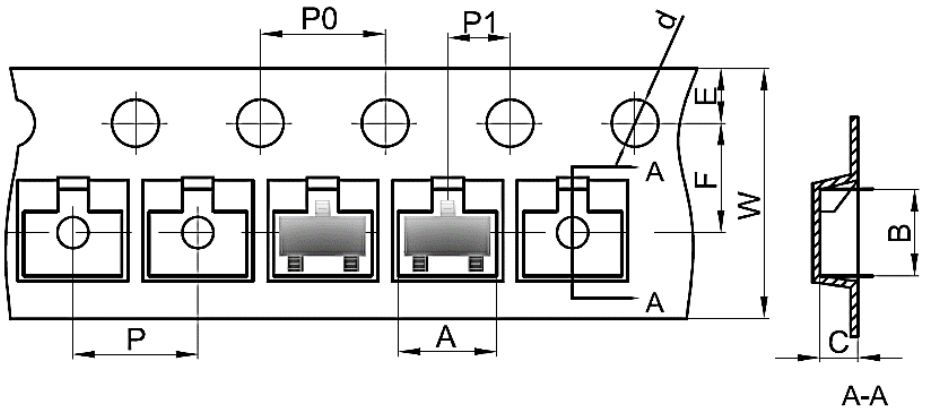


RECOMMENDED SOLDERING PARAMETERS – FOR REFERENCE ONLY

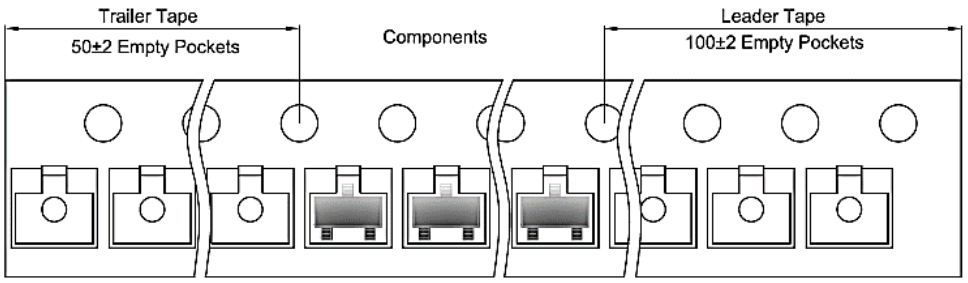


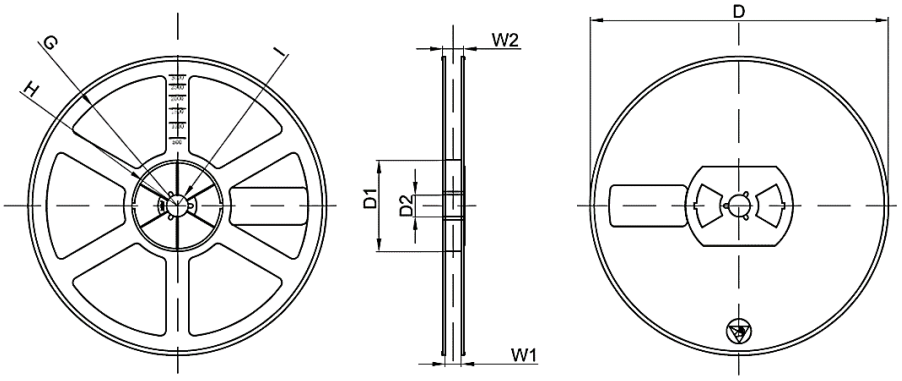
PROFILE FEATURE		PB-FREE ASSEMBLY
Average Ramp-up Rate (T_L Max to T_p)		3°C/second Max
Preheat	Temperature Min (T_s Min.)	150°C
	Temperature Max (T_s Max.)	200°C
	Time (t_s Min. to t_s Max.)	60 ~ 180 seconds
Time maintained above	Temperature (T_L)	217°C
	Time (t_L)	60 ~ 150 seconds
Peak/Classification Temperature (T_p)		260 °C
Time within 5°C of actual Peak Temperature (t_p)		10 seconds Max.
Ramp-down Rate		6 °C /Second Max.
Time 25 °C to Peak Temperature		8 Minutes Max.
Suggest reflow times		3 Times Max.

TAPE/REEL - Unit: mm, All Devices are packed in accordance with EIA standard RS-481-A and specifications



Case	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.5	1.75	3.5	4.0	4.0	2.0	8.0





Reel Size	D	D1	D2	G	H	I	W1	W2	Qty. (pcs)
7”	Ø178	54.4	13.0	R78.0	R25.6	R6.5	9.5	12.3	3000

IMPORTANT NOTES AND DISCLAIMER

1. ROHS COMPLIANCE: The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU RoHS Directive (EU) 2015/863 EC (RoHS3). RoHS Test Report for this product can be obtained can be obtained at Download Center.
2. REACH COMPLIANCE: REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, REACH Test Report for this product can be obtained can be obtained at Download Center.
3. All Product parametric performance is indicated in the Electrical Characteristics for the listed herein test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.
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