

1. Description

The SI4431CDY-T1-GE3(ES) uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product SI4431CDY-T1-GE3(ES) Pb-free.

2. Features

- -30V $R_{DS(ON)}=14m\Omega(Typ.) @V_{GS}=-10V$
 $R_{DS(ON)}=23m\Omega(Typ.) @V_{GS}=-4.5V$
- Fast Switching
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

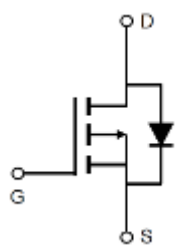
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
SI4431CDY-T1-GE3(ES)	SOP8	ES4419/LOT	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	13 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
4	Gate	Note 1 	
1/2/3	Source		
5/6/7/8	Drain		

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter		Symbol	Limited	Unit
Drain-Source Voltage		BV_{DSS}	-30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	$T_C=25^{\circ}\text{C}$	I_D	-11.3	A
	$T_C=100^{\circ}\text{C}$		-7.1	
Maximum Power Dissipation	$T_C=25^{\circ}\text{C}$	P_D	4.1	W
Pulsed Drain Current		I_{DM}	-45.4	A
Avalanche Current, Single Pulsed ²		I_{AS}	-21	A
Avalanche Energy, Single Pulsed ²		E_{AS}	59	mJ
Operating Junction Temperature		T_J	-55 to +150	°C
Lead Temperature		T_L	260	°C
Storage Temperature Range		T_{stg}	-55 to +150	°C

Thermal resistance ratings

Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Case Thermal Resistance ($t \leq 10\text{s}$)	$R_{\theta JC}$		30	°C/W

Notes:

1. This diagram is only an electrical schematic, and the actual pin size is based on POD.
2. EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=-30\text{V}$, $V_G=-10\text{V}$, $L=0.3\text{mH}$, $R_g=25\Omega$.

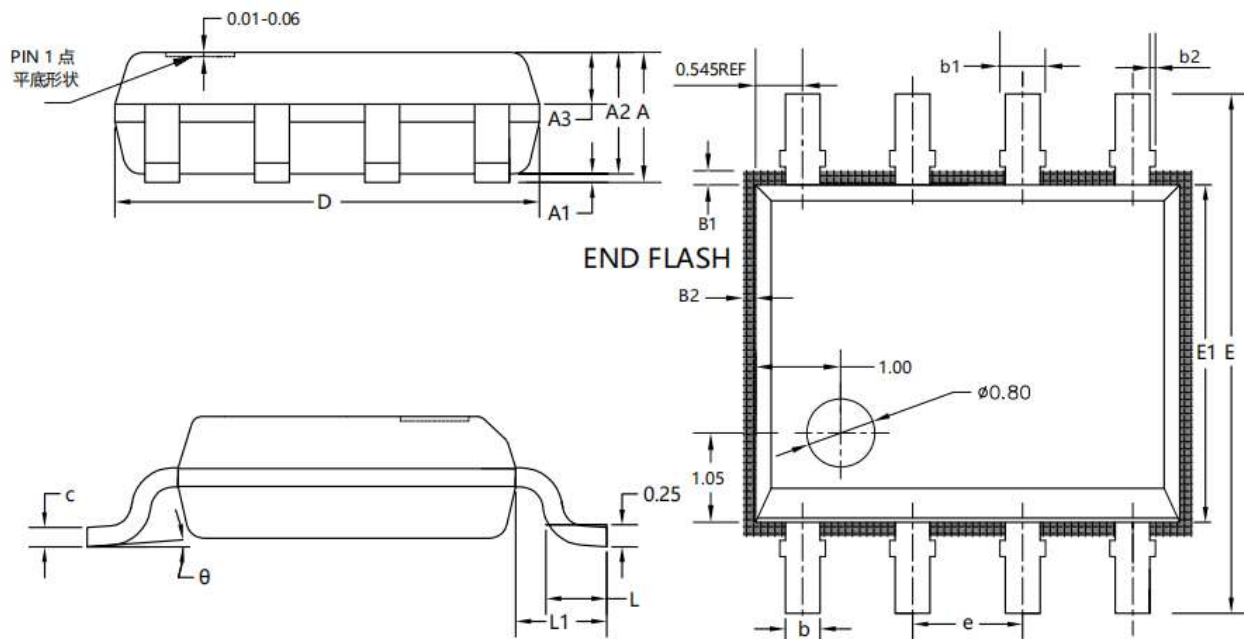
Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250uA	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} =0V, V _{DS} =-30V			-1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =-250uA	-1.1	-1.5	-2.2	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-8A		14	19	mΩ
		V _{GS} =-4.5V, I _D =-6A		23	29	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =-15V f=1MHz		965		pF
Output Capacitance	C _{OSS}			140		
Reverse Transfer Capacitance	C _{RSS}			118		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =0 to -10V, V _{DS} =-15V, I _D =-5A		13		nC
Gate-to-Source Charge	Q _{GS}			4.5		
Gate-to-Drain Charge	Q _{GD}			3.8		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =-10V, V _{DD} =-15V I _D =-8A, R _G =5Ω		14		ns
Rise Time	t _r			18		
Turn-Off Delay Time	t _{d(OFF)}			32		
Fall Time	t _f			12		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =-8A	-0.45		-1.5	V

7. Dimension (SOP8)

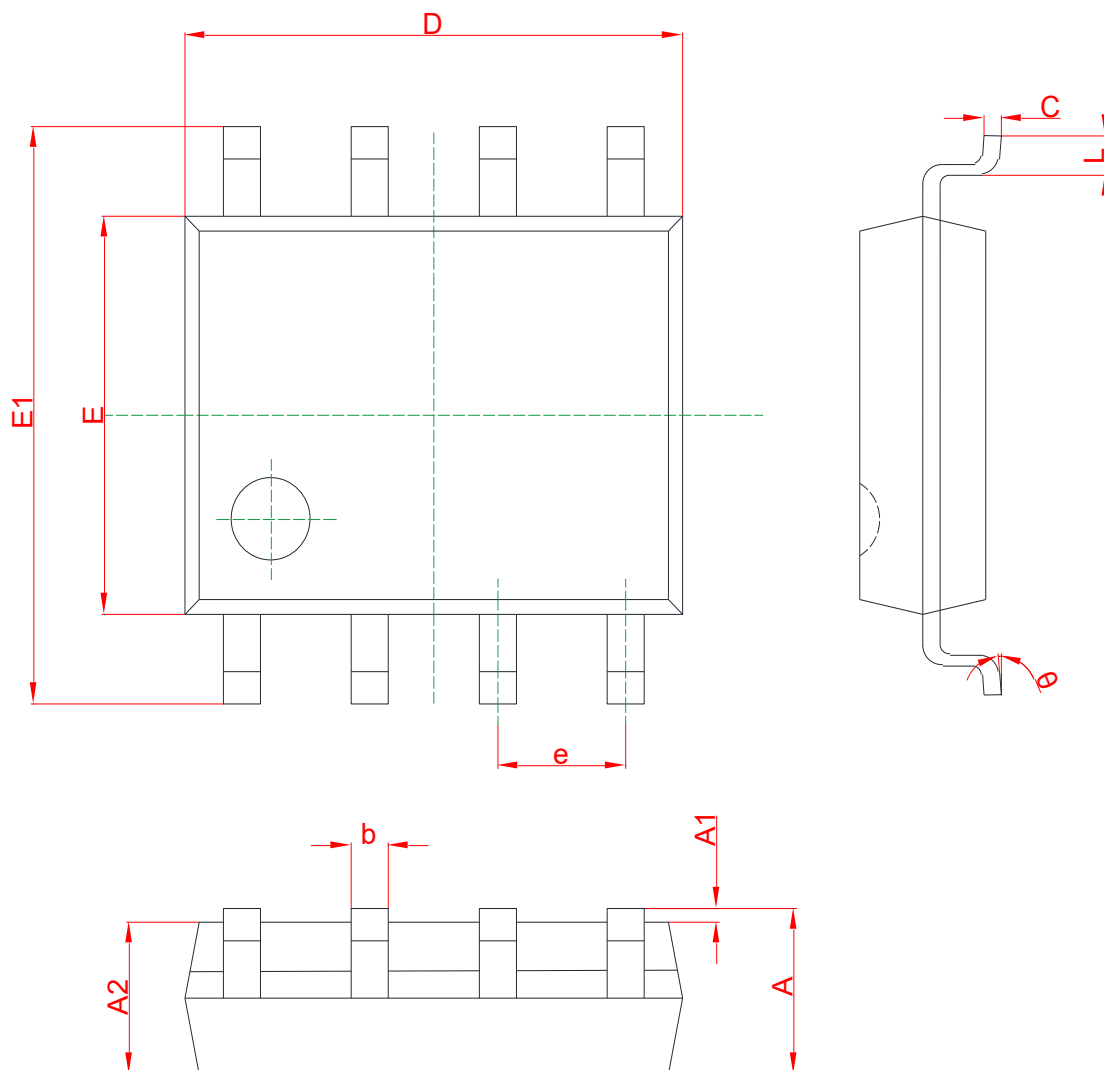
POD A(C)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

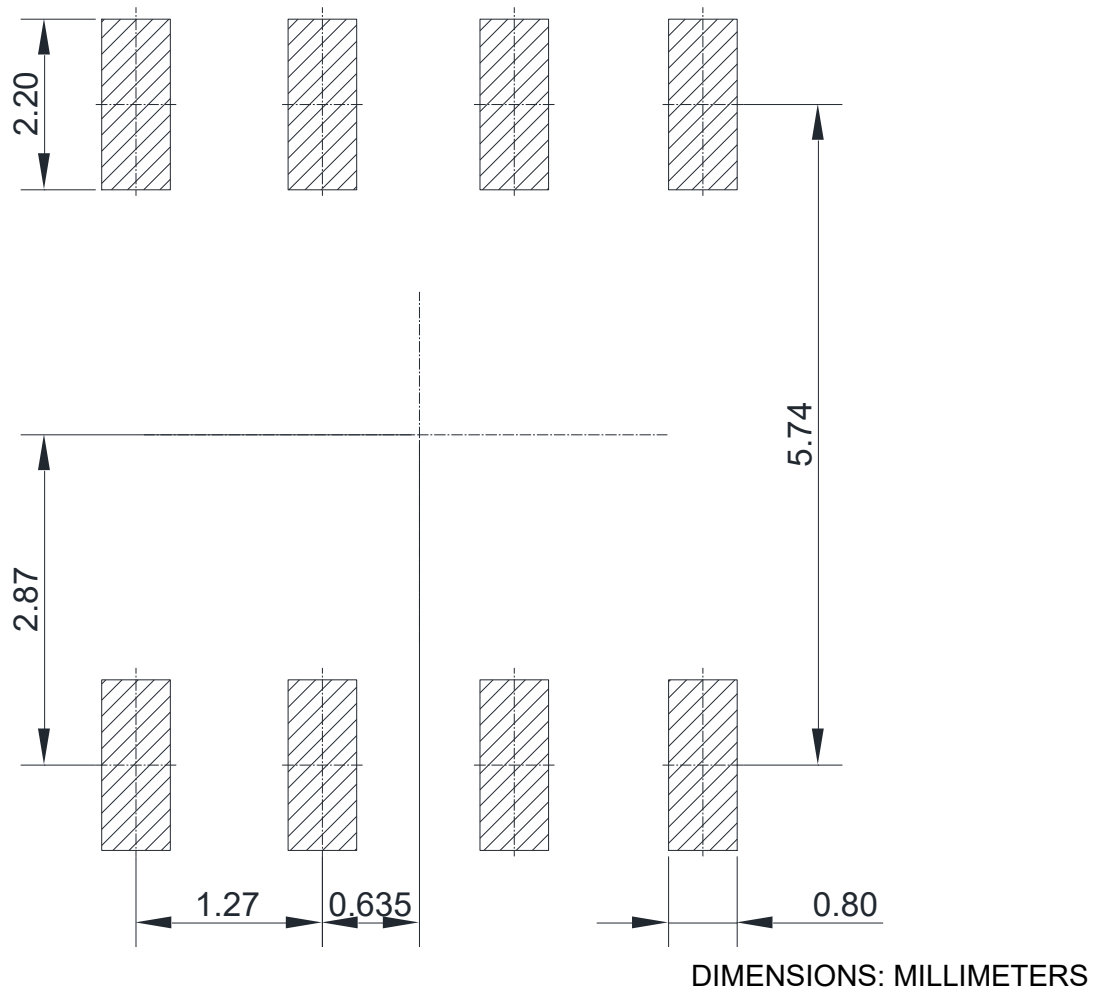
Symbol	Dimensions			Symbol	Dimensions		
	Min.	NOM.	Max.		Min.	NOM.	Max.
A	1.55	1.65	1.75	L	0.50	0.60	0.70
A1	0.06	0.11	0.16	L1	0.90	1.05	1.20
A2	1.35	1.45	1.55	θ	0°	4°	8°
A3	0.60	0.70	0.80	B1	0.14MAX		
b	0.30	0.40	0.50	B2	0.12MAX		
c	0.17	0.20	0.25	b1	0.66MAX		
D	4.80	4.90	5.00	b2	0	0.04	0.08
E	5.80	6.00	6.20	e	1.27BSC		
E1	3.80	3.90	4.00				

POD B(X)



Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
L	0.40	0.60	e	1.27 TYP	
D	4.95	5.05	c	0.15	0.25
E	3.8	4.0	A2	1.33	1.50
E1	5.80	6.20	A1	0.04	0.20
b	0.4 TYP		θ	0°	8°

8. Recommended Soldering Footprint



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