KODENSHI AUK

STJ009

P-ch Trench MOSFET

Portable Equipment Application

Features

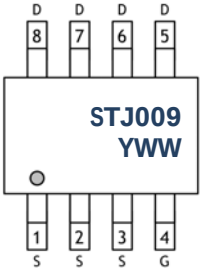
- Low drain-source On-resistance:
  $R_{DS(on)}$=72mΩ (Max.) @V_{GS}=-10V, I_D=-2.7A
- Low gate charge: Q_g=4.7nC (Typ.)
- High power and current handing capability
- RoHS compliant device

SOP-8

Ordering Information

Part Number	Marking Code	Package	Packaging
STJ009	**STJ009**	**SOP-8**	**Tape & Reel**

Marking and Pin Assignment



Column 1: Device Code
Column 2: Production Information
- YWW: Year & Week Code

Absolute Maximum Ratings (T_{amb}=25℃, Unless otherwise noted)

Characteristic	Symbol	Ratings	Unit
Drain-source voltage	V_{DSS}	-30	V
Gate-source voltage	V_{GSS}	±16	V
Drain current (DC) [1]	I_D	-5.3	A
Drain current (Pulsed) [1]	I_{DP}	-21.2	A
Power dissipation	P_D	2	W
Single avalanche current [4]	I_{AS}	-5.3	A
Single avalanche energy [4]	E_{AS}	33	mJ
Repetitive avalanche current [3]	I_{AR}	-5.3	A
Repetitive avalanche energy [3]	E_{AR}	1.6	mJ
Operating junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-55 ~ 150	°C

Note 1) Limited by maximum junction temperature

Thermal Characteristics (T_{amb}=25℃, Unless otherwise noted)

Characteristic	Symbol	Ratings	Unit
Thermal resistance, junction to ambient [2]	$R_{th(j-a)}$	62.5	°C/W

Note 2) Device mounted on FR-4 board with recommended pad layout.

Electrical Characteristics (T_{amb}=25℃, Unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	I_D=-250uA, V_{GS}=0	-30	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=-250uA, V_{DS}=V_{GS}	-1	-	-3	V
Drain-source cut-off current	I_{DSS}	V_{DS}=-30V, V_{GS}=0V	-	-	-1	uA
Gate leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
Drain-source on-resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-2.7A	-	66	72	mΩ
		V_{GS}=-5V, I_D=-2.7A	-	77	83	
Forward transfer conductance [6]	g_{fs}	V_{DS}=-5V, I_D=-5.3A	-	11	-	S
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=-10V, f=1MHz	-	390	590	pF
Output capacitance	Coss		-	97	150	
Reverse transfer capacitance	Crss		-	37	60	
Turn-on delay time [5,6]	$t_{d(on)}$	V_{DS}=-15V, I_D=-5.3A, R_G=10Ω	-	1.2	-	ns
Rise time [5,6]	t_r		-	1.1	-	
Turn-off delay time [5,6]	$t_{d(off)}$		-	2.5	-	
Fall time [5,6]	t_f		-	1.1	-	
Total gate charge [5,6]	Q_g	V_{DS}=-15V, V_{GS}=-5V I_D=-5.3A	-	4.7	7	nC
Gate-source charge [5,6]	Q_{gs}		-	1.4	2.1	
Gate-drain charge [5,6]	Q_{gd}		-	1.7	2.5	

Source-Drain Diode Rating and Characteristics (T_{amb}=25℃, Unless otherwise specified)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	-1.5	A
Source current (Pulsed) [3]	I_{SM}		-	-	-6	
Forward voltage [6]	V_{SD}	V_{GS}=0V, I_S=-1.5A	-	-	-1.2	V
Reverse recovery time	t_{rr}	I_S=-1.5A dI_F/dt=-100A/us	-	90	-	ns
Reverse recovery charge	Q_{rr}		-	0.5	-	uC

Note:
3) Repetitive rating: Pulse width limited by maximum junction temperature
4) L=2mH, I_{AS}=-5A, V_{DD}=-15V, R_G=25Ω, Starting T_J=25℃
5) Pulse Test: Pulse width≤300us, Duty cycle≤2%
6) Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

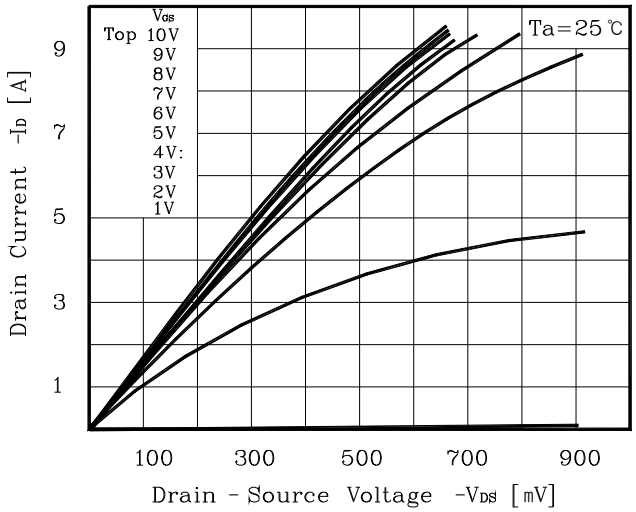


Fig. 2 I_D - V_{GS}

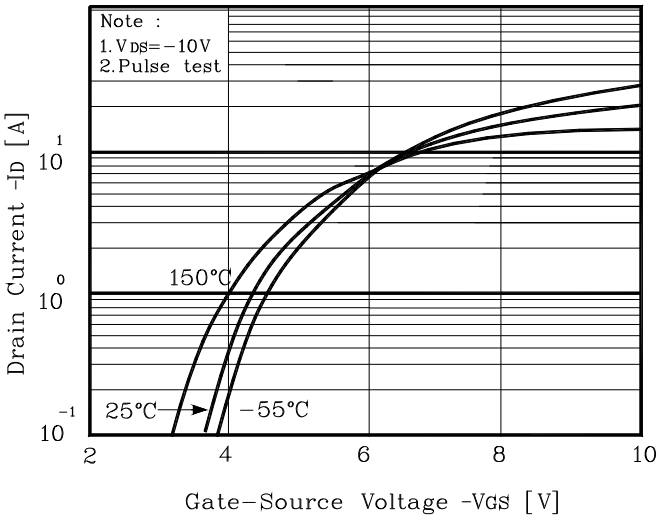


Fig. 3 $R_{DS(on)}$ - I_D

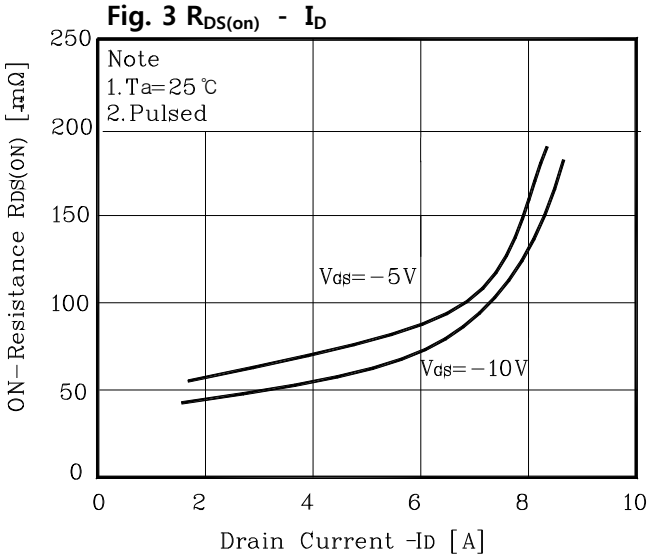


Fig. 4 I_S - V_{SD}

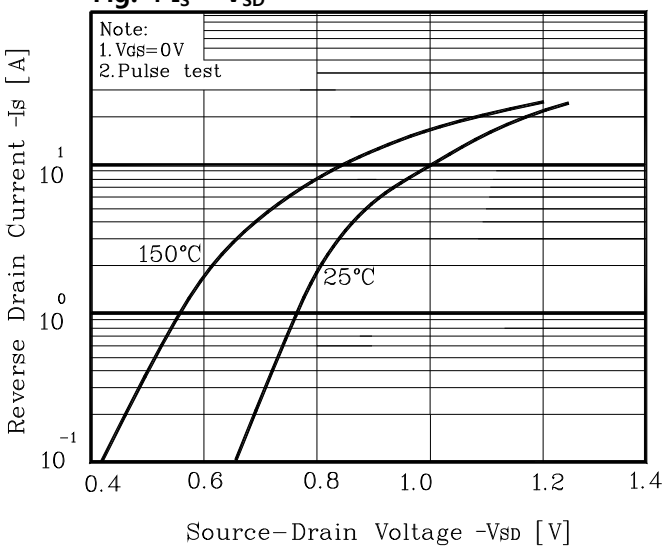


Fig. 5 Capacitance - V_{DS}

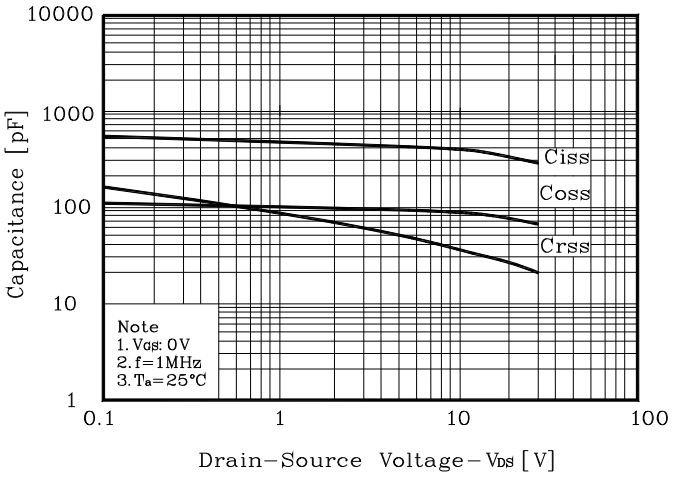
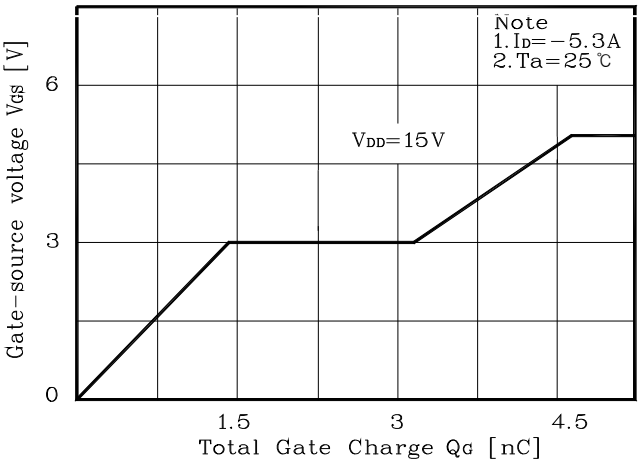


Fig. 6 V_{GS} - Q_G



Electrical Characteristic Curves

Fig. 7 V_{DSS} - T_J

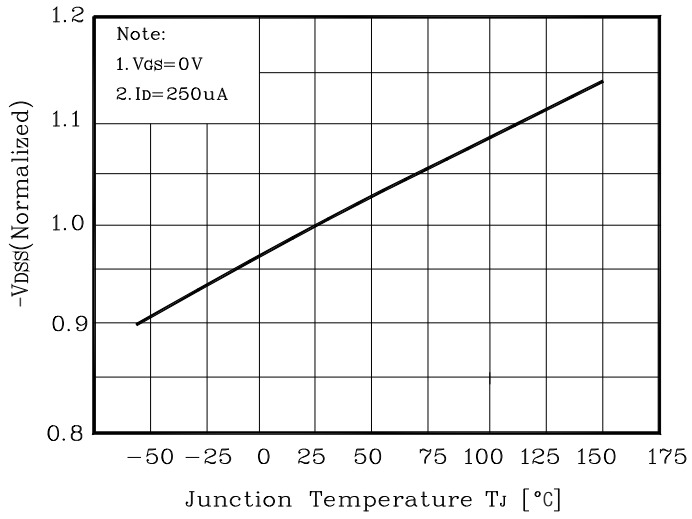


Fig. 8 $R_{DS(on)}$ - T_J

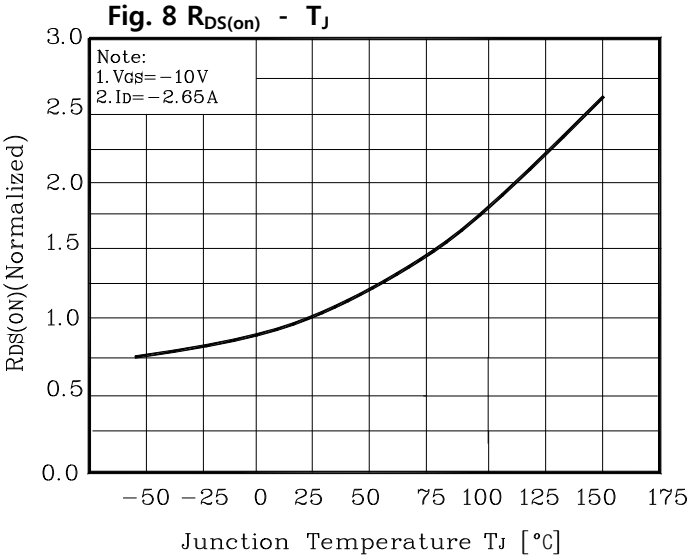


Fig. 9 I_D - T_a

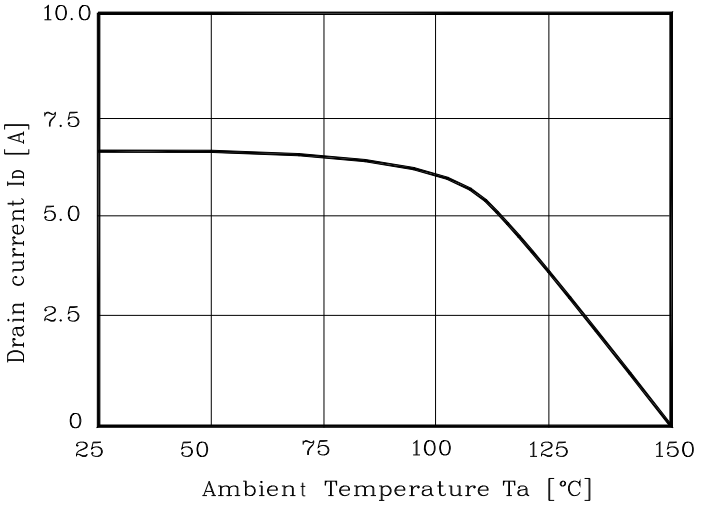


Fig. 10 Safe Operating Area

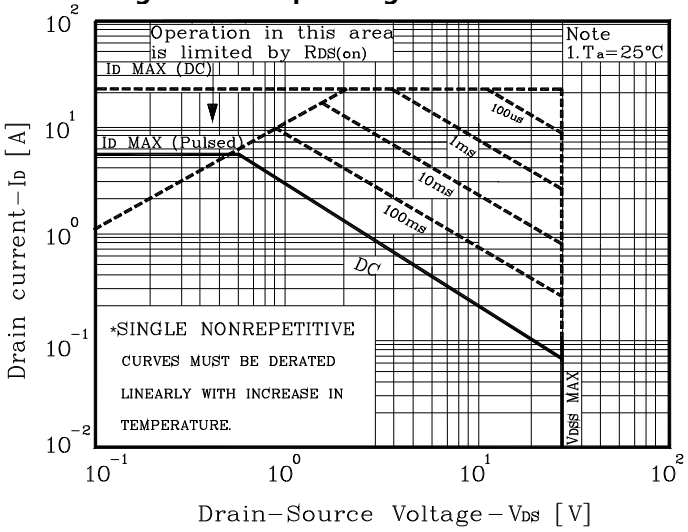
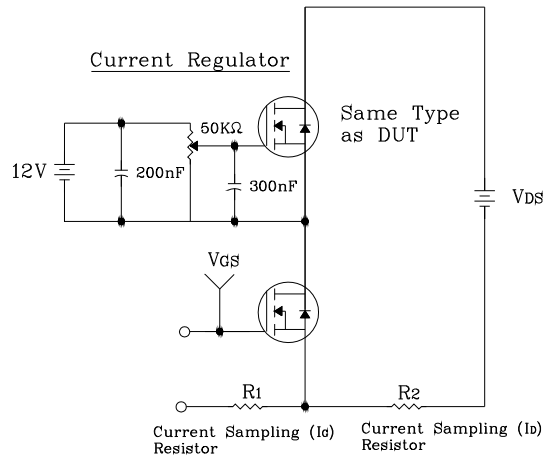


Fig. 11 Gate Charge Test Circuit & Waveform



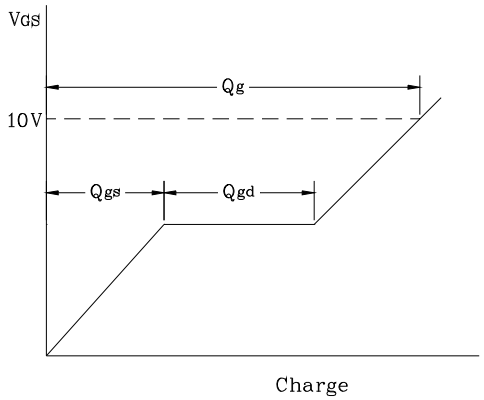
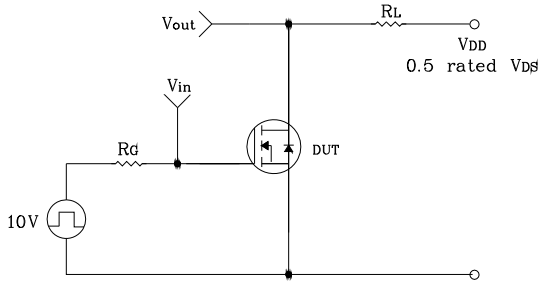


Fig. 12 Resistive Switching Test Circuit & Waveform



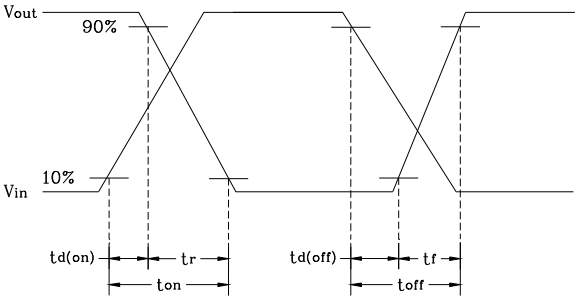
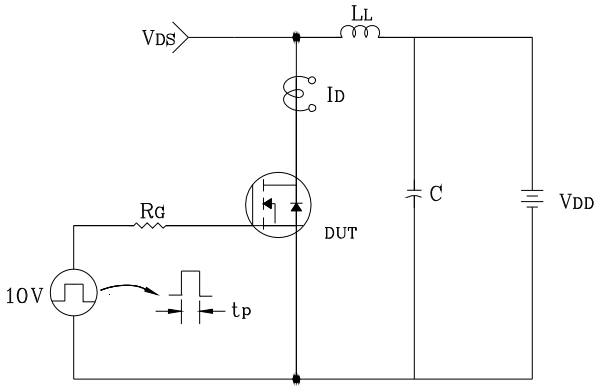


Fig. 13 E_{AS} Test Circuit & Waveform



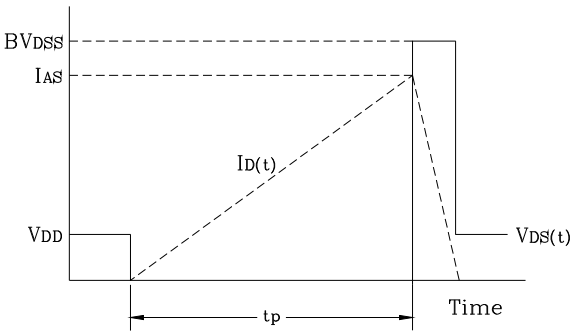
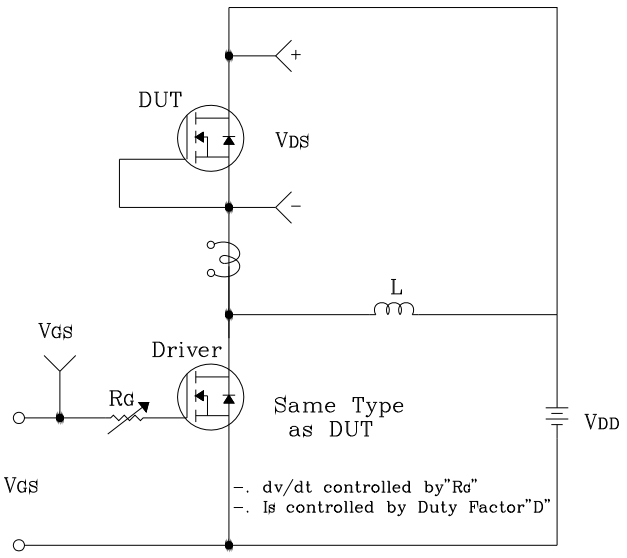
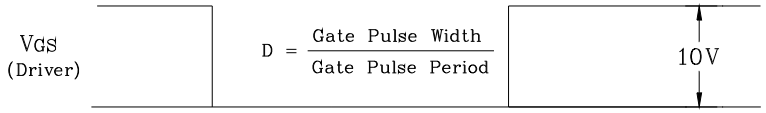
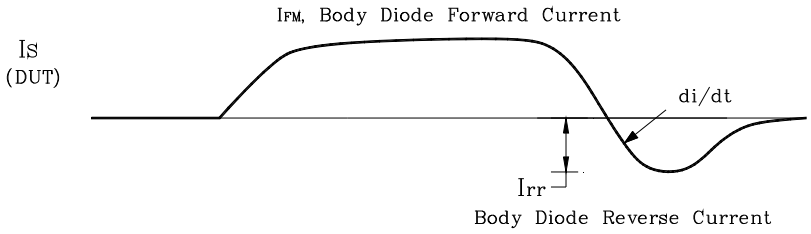
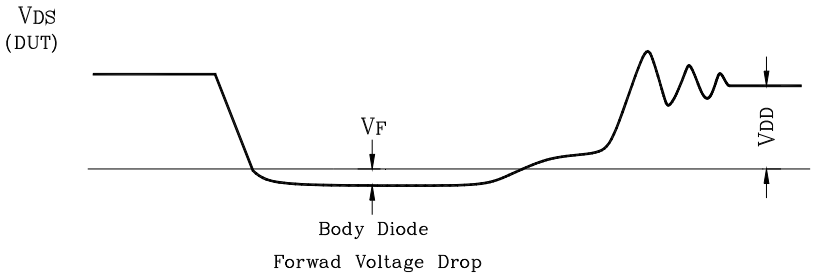


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform

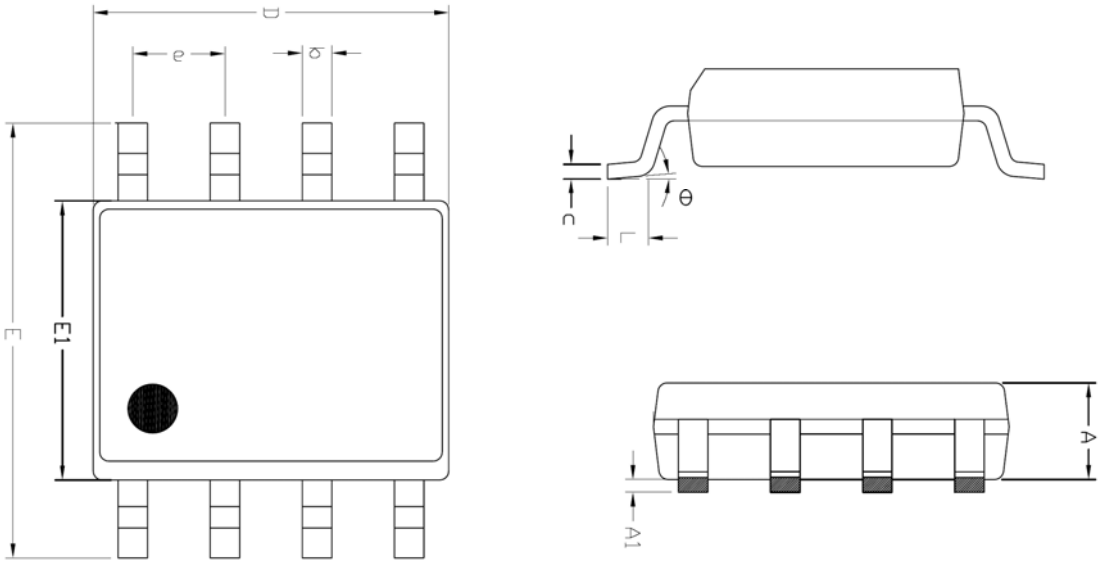






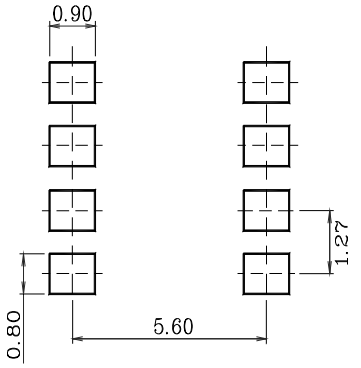


Package Outline Dimensions



SYMBOL	MILLIMETER(mm)			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	1.245	—	1.445	
A1	0.125	0.175	0.275	
b	0.320	0.420	0.520	
c	0.170	0.220	0.270	
D	4.802	4.902	5.002	
E	5.870	6.020	6.170	
E1	3.761	3.861	3.961	
e	1.270 BSC			
L	0.462	0.562	0.662	
θ	0 °	—	8 °	

※ Recommended Land Pattern [unit: mm]



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