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SLS50N06G
60V N-Channel MOSFET

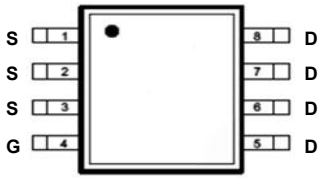
General Description

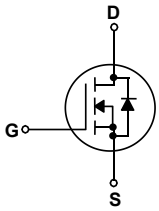
This Power MOSFET is produced using Msemitek's advanced Shielding Gate MOSFET technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for low voltage applications such as DC/DC converters and high efficiency switching for power management in portable and battery operated products.

Features

- 50A, 60V, $R_{DS(on)Typ}$ = 10.3mΩ@V_{GS} = 10 V
- Very Low On-resistance $R_{DS(ON)}$
- High ruggedness
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

SOP-8





Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Parameter	SLS50N06G	Units
V_{DSS}	Drain-Source Voltage	60	V
I_D	Drain Current - Continuous (T_C = 25℃)	50	A
	- Continuous (T_C = 100℃)	33	A
I_{DM}	Drain Current - Pulsed (Note 1)	200	A
V_{GSS}	Gate-Source Voltage	±20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	60	mJ
P_D	Power Dissipation (T_C = 25℃)	52	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.4	W/℃
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	℃
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	℃

* Drain current limited by maximum junction temperature.

Package Marking

Part Number	Top Marking	Package	Packing Method	MOQ	QTY
SLS50N06G	SLS50N06G	SOP-8	Tape & Reel	3000	60000

Electrical Characteristics

T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	60	--	--	V
$\triangle BV_{DSS}$ / $\triangle T_J$	Breakdown Voltage Temperature Coefficient	I_D = 250 uA, Referenced to 25℃	--	0.06	--	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 60 V, V_{GS} = 0 V	--	--	1	uA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 20V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -20 V, V_{DS} = 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	1.0	--	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 20 A	--	10.3	12.5	mΩ
		V_{GS} = 4.5 V, I_D = 20 A	--	13.3	15.5	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 500kHz	--	1138	--	pF
C_{oss}	Output Capacitance		--	280	--	pF
C_{rss}	Reverse Transfer Capacitance		--	11	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 30 V, I_D = 30 A, R_G = 4.7 Ω, V_{GS} = 10 V (Note 4, 5)	--	9.6	--	ns
t_r	Turn-On Rise Time		--	4.6	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	26	--	ns
t_f	Turn-Off Fall Time		--	7	--	ns
Q_g	Total Gate Charge	V_{DS} = 30 V, I_D =30 A, V_{GS} = 10 V (Note 4, 5)	--	18.7	--	nC
Q_{gs}	Gate-Source Charge		--	4.1	--	nC
Q_{gd}	Gate-Drain Charge		--	3.6	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	50	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	200	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 30 A	--	--	1.2	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S =30 A, dI_F / dt = 80 A/us (Note 4)	--	27	--	ns
Q_{rr}	Reverse Recovery Charge		--	22	--	nC

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. V_{DD} =20V,L=0.5mH, Starting T_J = 25°C
3. $I_{SD} \leq I_D$, di/dt ≤ 200A/us, $V_{DD} \leq BV_{DSS,}$ Starting T_J = 25°C
4. Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

N- Channel Typical Characteristics

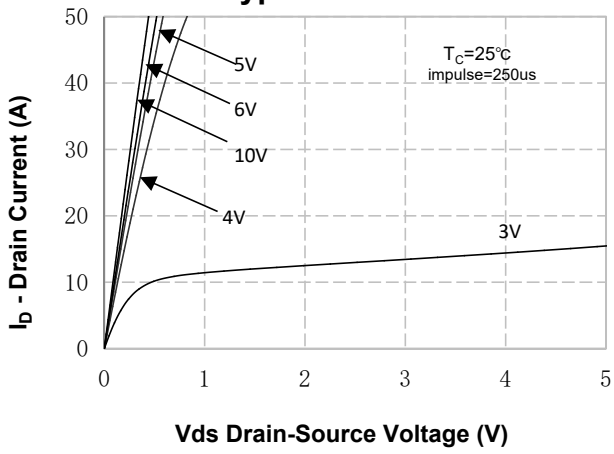


Figure 1. On-Region Characteristics

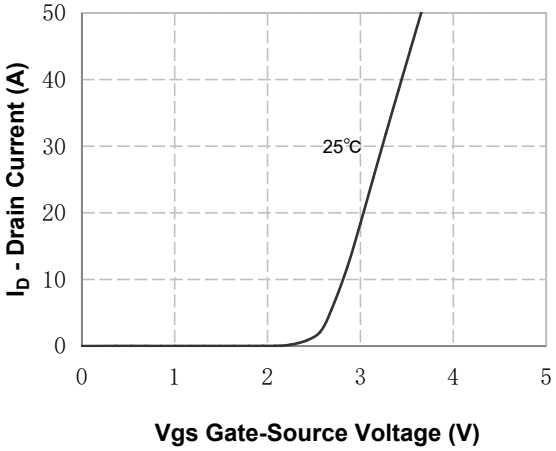


Figure 2. Transfer Characteristics

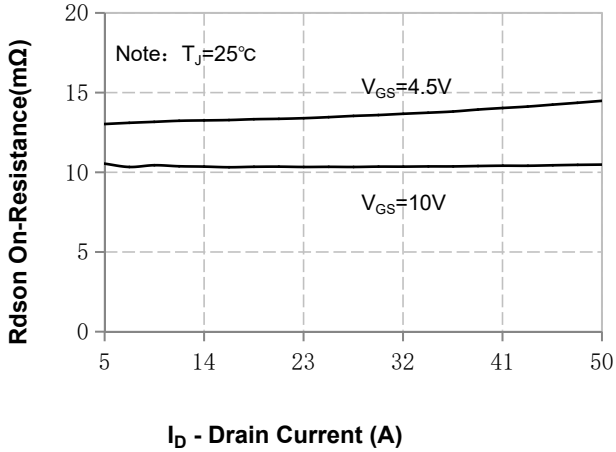


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

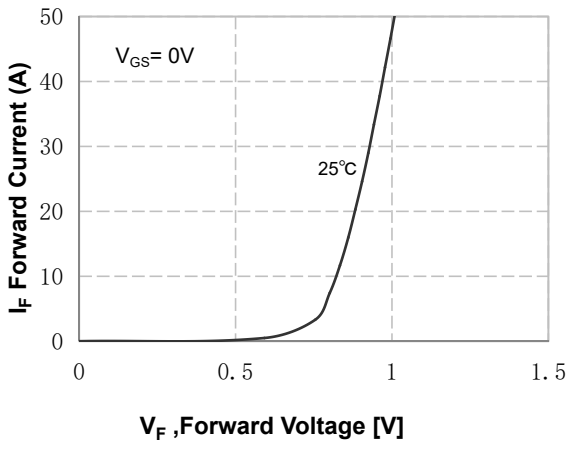


Figure 4. Body Diode Forward Voltage Variation vs Source Current

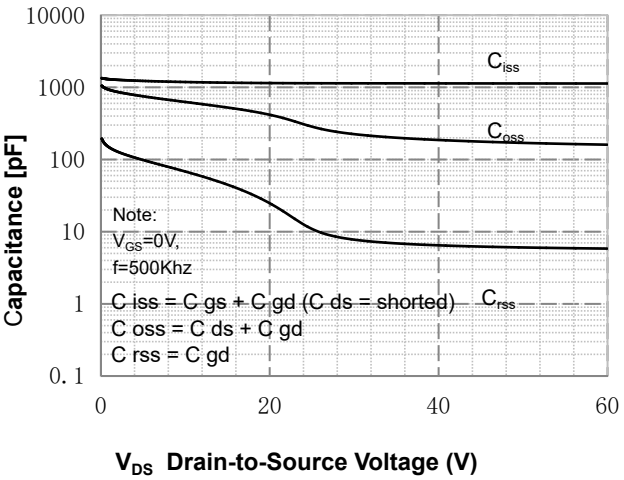


Figure 5. Capacitance Characteristics

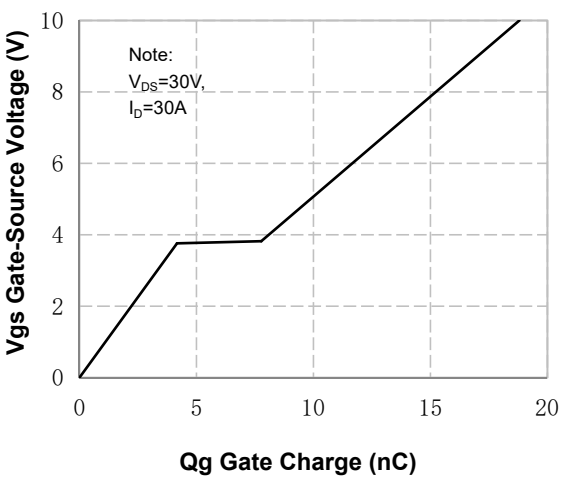


Figure 6. Gate Charge Characteristics

N- Channel Typical Characteristics (Continued)

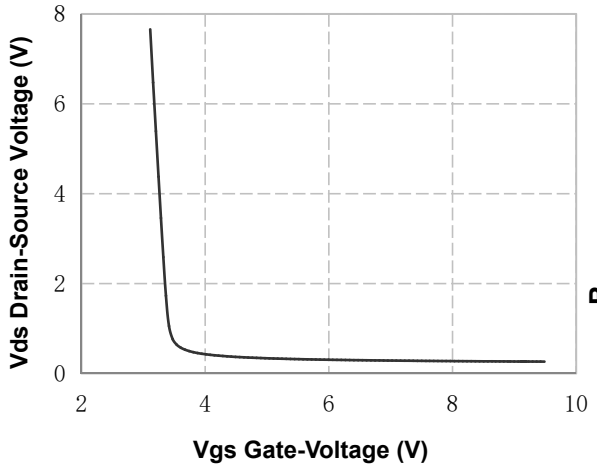


Figure 7. Vds Drain-Source Voltage vs Gate Voltage

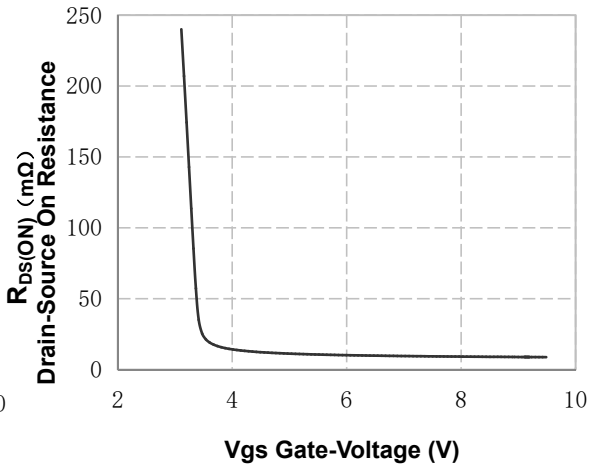


Figure 8. On-Resistance vs Gate Voltage

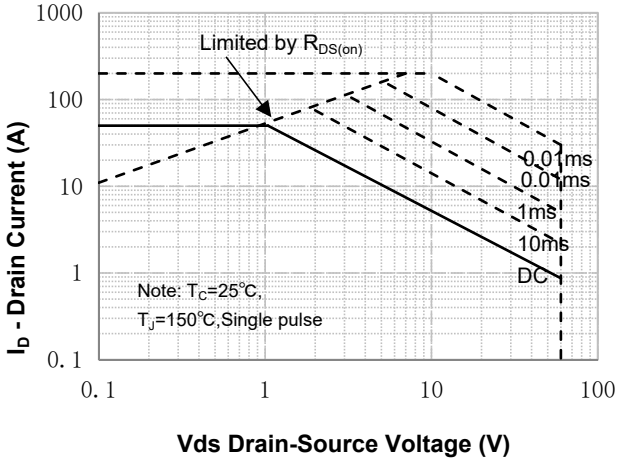


Figure 9. Maximum Safe Operating Area

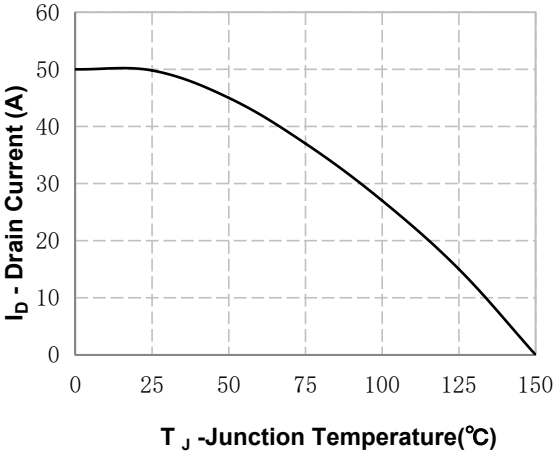


Figure 10. Maximum Continuous Drain Current vs Temperature

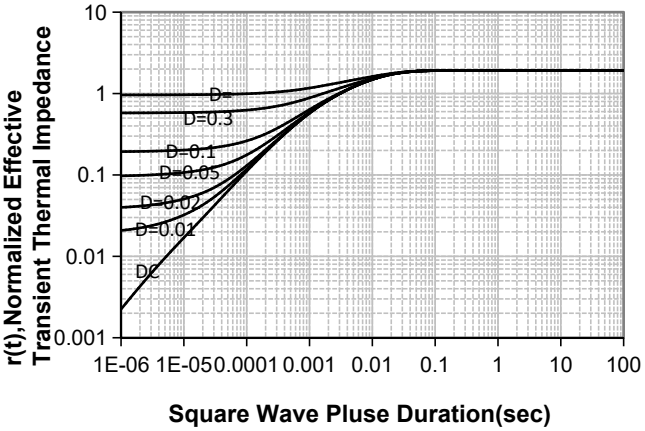
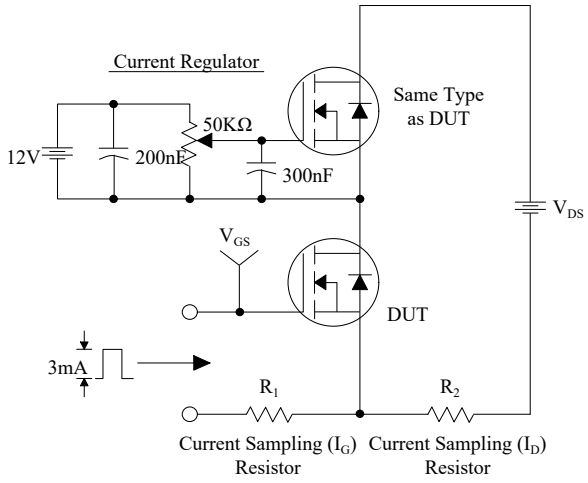
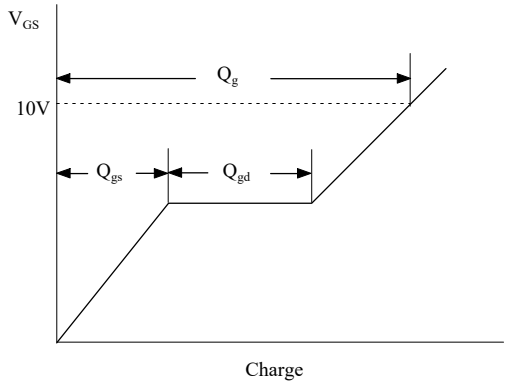


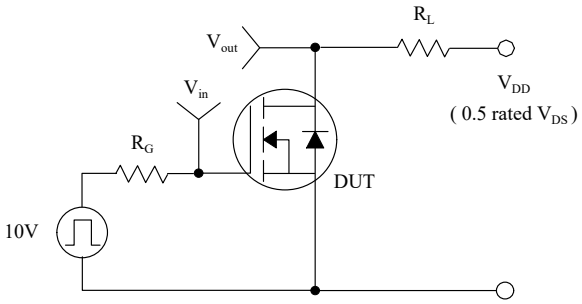
Figure 11. Transient Thermal Response Curve

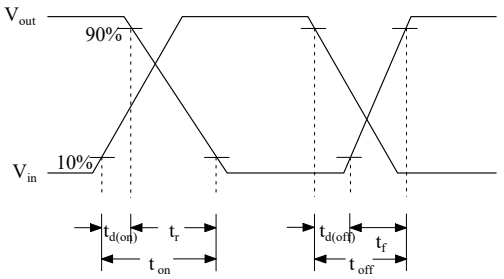
Gate Charge Test Circuit & Waveform



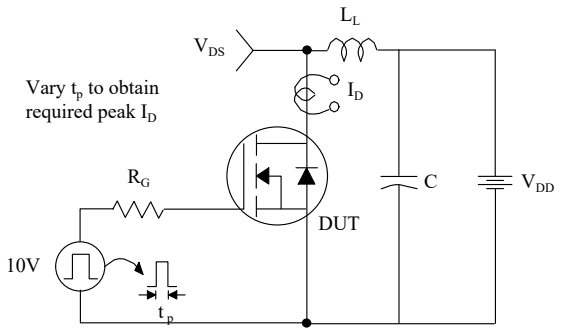


Resistive Switching Test Circuit & Waveforms

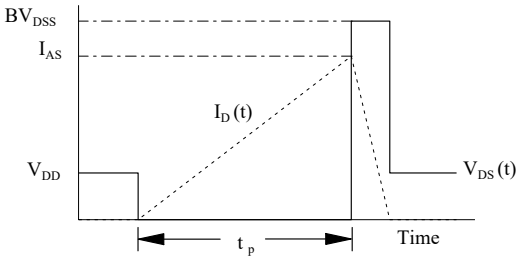




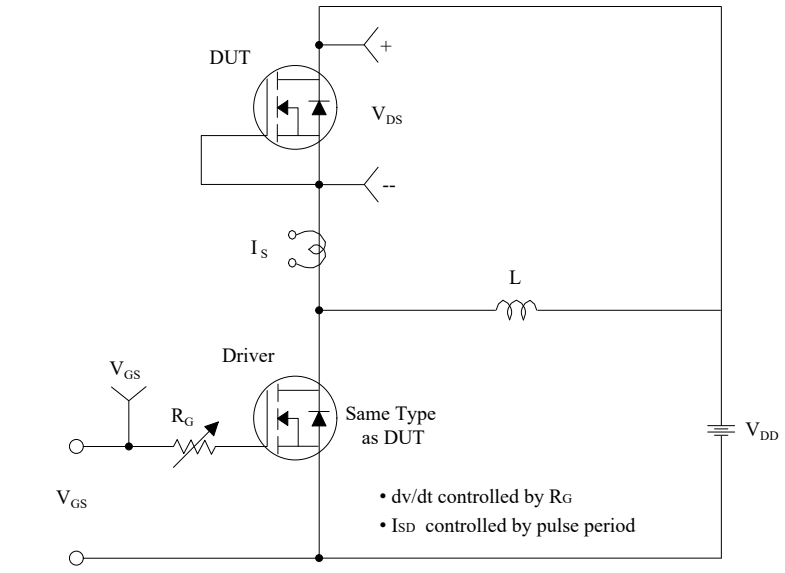
Unclamped Inductive Switching Test Circuit & Waveforms

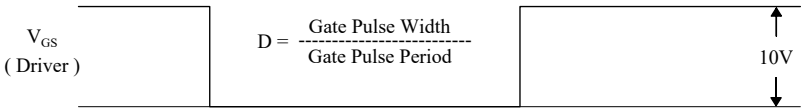


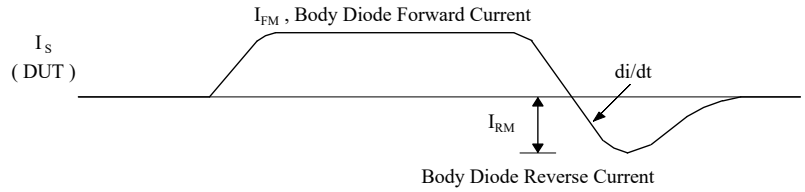
$$E_{AS} = \frac{1}{2} L_L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

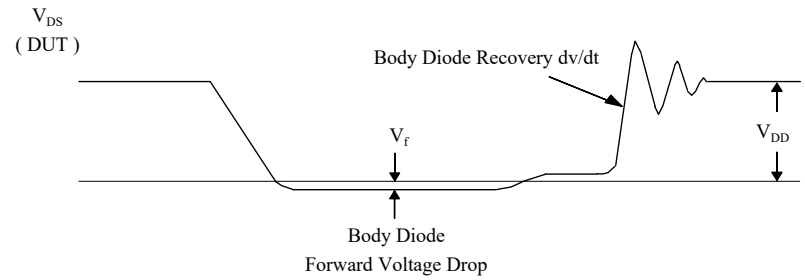


Peak Diode Recovery dv/dt Test Circuit & Waveforms

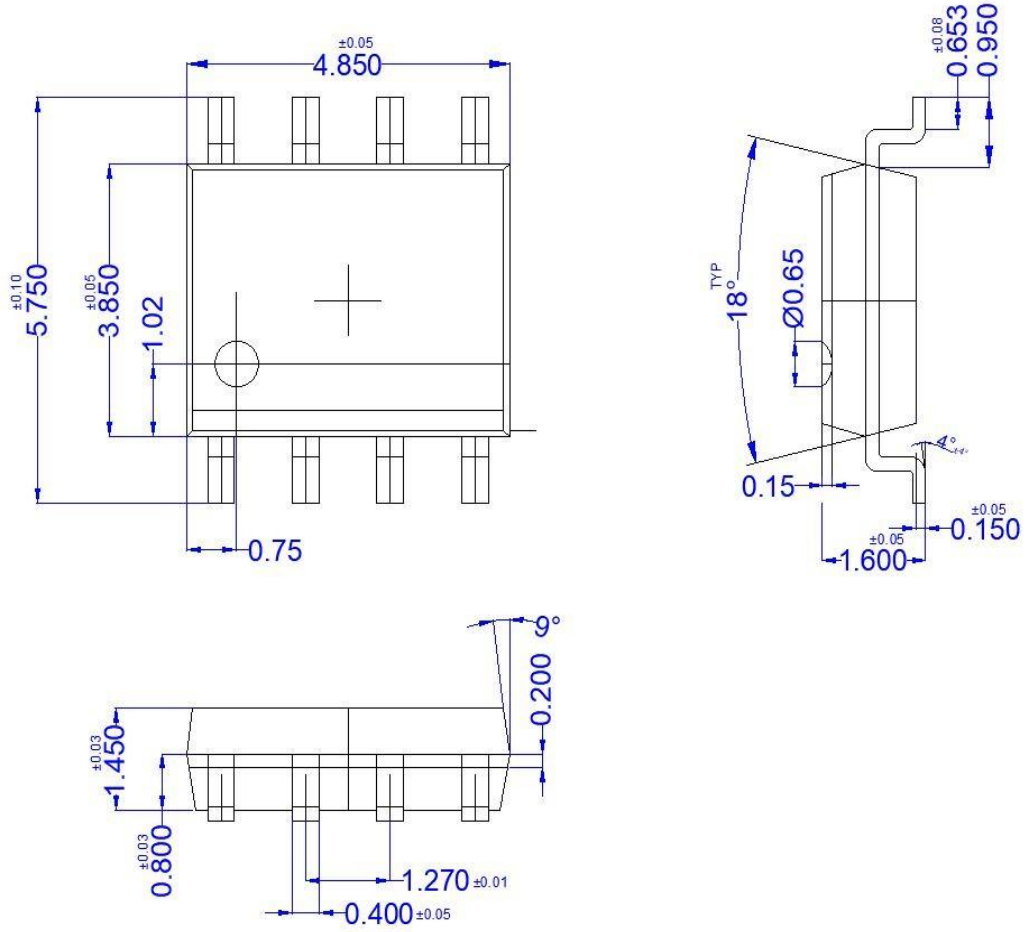








SOP-8 OUTLINE



NAME	SOP-8 OUTLINE	UNIT	mm	DESIGNED	Shawn	THIRD ANGLE SYSTEM
DWGNO		PAGE	1 OF 1	CHECKED		
VERSION	Ver1.0	ISSUE DATE		APPROVED		

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