30V N-Channel Enhancement Mode MOSFET

General Features

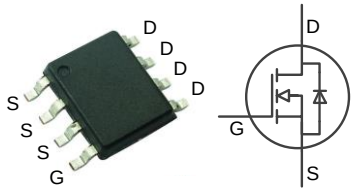
- Low $R_{DS(ON)}$
- Low Gate Charge
- Advanced high Cell density Trench Technology
- RoHS Compliant
- Halogen-free available
- 100% Avalanche Tested

BV_{DSS}	$R_{DS(ON)}$ @V_{GS}=10V	$R_{DS(ON)}$ @V_{GS}=4.5V
30V	4.2mΩ	5.3 mΩ
I_D	15A	

Applications

- Power Management in Inverter System
- Synchronous Rectification
- Load Switch

SOP-8



Ordering Information

Part Number	Package	Marking	Remark
AKE30N5P0	SOP-8	30N5P0	Halogen Free

Absolute Maximum Ratings

T_A=25℃ unless otherwise specified

Symbol	Parameter		Rating	Unit
V_{DSS}	Drain-Source Voltage[1]		30	V
V_{GS}	Gate –Source Voltage		±20	V
I_D	Continuous Drain Current	T_C=25 ℃	15	A
		T_C=100 ℃	10	A
I_{DP}	300us Pulsed Drain Current Tested[3]		60	A
EAS	Single Pulse Avalanche Energy		16	mJ
P_D	Power Dissipation		2	W
	Derating Factor above 25 ℃		0.016	W/℃
T_J and T_{STG}	Operating and Storage Temperature Range		-55 ~ 150	℃

**Drain Current limited by Maximum Junction Temperature.*
Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	℃ /W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	62	℃ /W

Electrical Characteristics

OFF Characteristics (TA=25℃ unless otherwise noted)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	30	--	--	V	V_{GS}=0V, I_D=250μA
I_{DSS}	Zero Gate Voltage Drain Current	--	--	1	μA	V_{DS}=24V, V_{GS}=0V
I_{GSS}	Gate Leakage Current	--	--	100	nA	V_{GS}=20V, V_{DS}=0V
		--	--	-100	nA	V_{GS}=-20V, V_{DS}=0V

On Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Drain-Source On-Resistance[4]	--	4.2	5.5	mΩ	V_{GS}=10V, I_D=15A
		--	5.3	7.0	mΩ	V_{GS}=4.5V, I_D=10A
$V_{GS(TH)}$	Gate Threshold Voltage	1.0	1.4	2.0	V	V_{DS} = V_{GS}, I_D=250μA
GFS	Forward Transconductance	--	66	--	S	V_{DS}=5V, I_D=15A

Dynamic Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	2729	--	pF	V_{GS}=0V,V_{DS}=15V, f=1MHz
C_{oss}	Output Capacitance	--	305	--		
C_{rss}	Reverse Transfer Capacitance	--	228	--		
Q_g	Total Gate Charge	--	13	--	nC	V_{DS}=15V,V_{GS}=4.5V, I_D=10A
Q_{gs}	Gate-Source Charge	--	5.3	--		
Q_{gd}	Gate-Drain Charge	--	6.3	--		
Rg	Gate Resistance	--	2.6	--	Ω	f=1MHz

Resistive Switch Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-On Delay Time	--	44	--	ns	V_{DD}=15V I_D=15A,V_{GS}=10V R_G=3.3Ω
t_r	Turn-On Rise Time	--	69	--		
$t_{d(off)}$	Turn-Off Delay Time	--	400	--		
t_f	Turn-Off Fall Time	--	262	--		

Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
I_{SD}	Continuous Source Current(Body Diode)	--	--	15	A	Integral P-N diode in MOSFET
I_{SM}	Maximum Pulsed Current(Body Diode)	--	--	60	A	
V_{SD}	Diode Forward Voltage	--	--	1.2	V	I_{SD}=1A,V_{GS}=0V
t_{rr}	Reverse Recovery Time	--	49	--	ns	I_{SD}=15A, dI_{SD}/dt=100A/μS
Q_{rr}	Reverse Recovery Charge	--	37	--	nC	

NOTE：

[1] T_J=+25 ℃ to +150 ℃
[2] Repetitive rating, pulse width limited by maximum junction temperature.
[3] L=0.5mH, I_{AS}=8A, Starting T_J=25 ℃.
[4] Pulse width≤380μs;duty cycle≤2%.

Typical Characteristics

Figure 1. Typical Output Characteristics

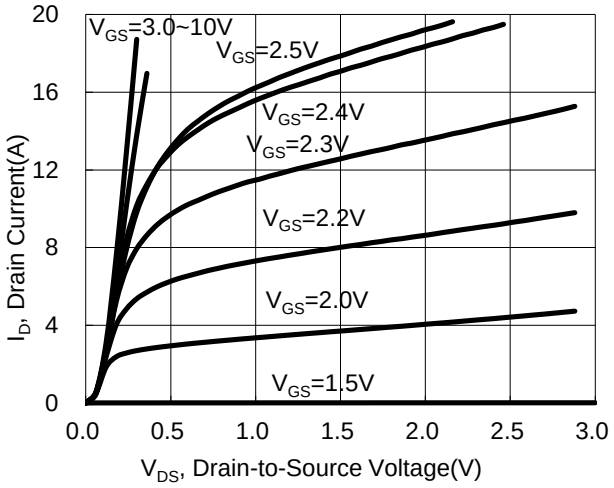


Figure 2. Typical Transfer Characteristics

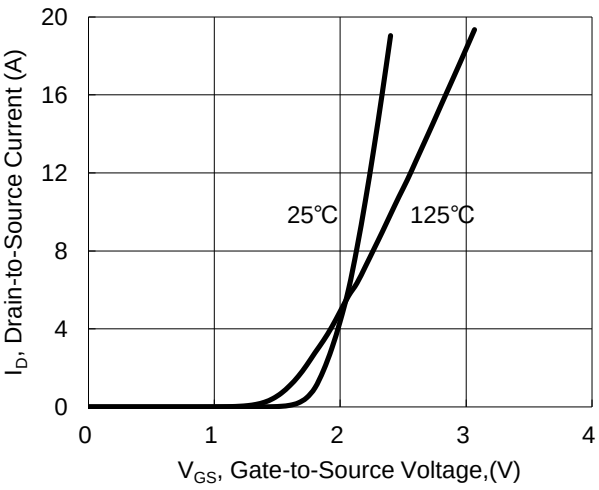


Figure 3. Typical Drain-to-Source On Resistance vs. Junction Temperature

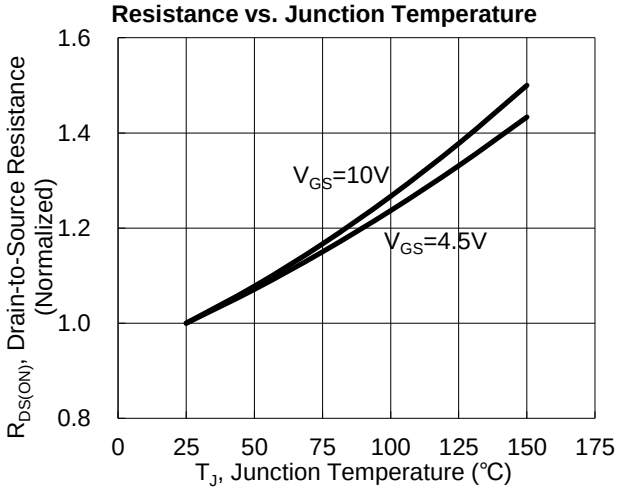


Figure 4. Typical Body Diode Transfer Characteristics

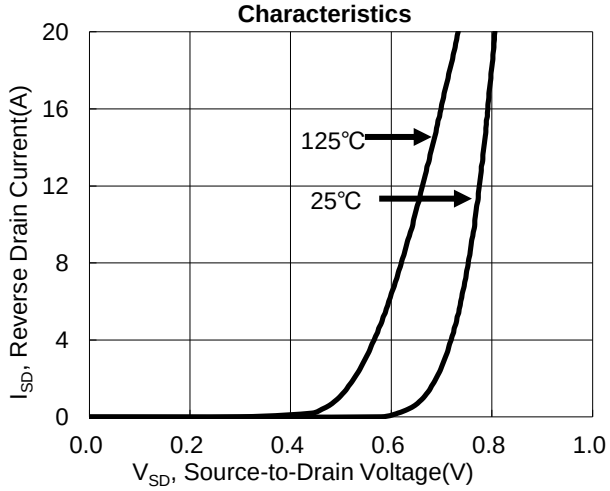


Figure 5. Typical Capacitance vs. Drain-to-Source Voltage

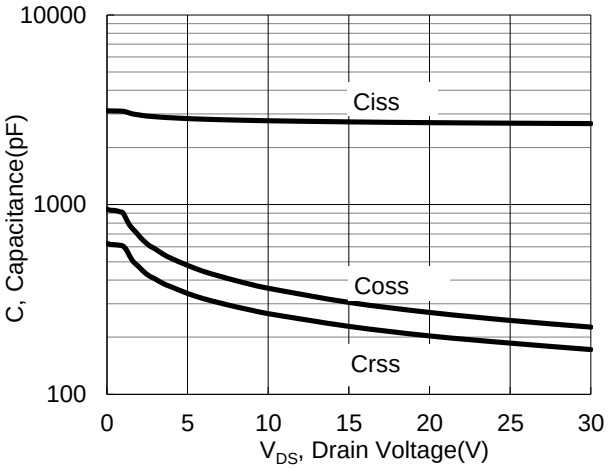


Figure 6. Typical Gate Charge vs. Gate-to-Source Voltage

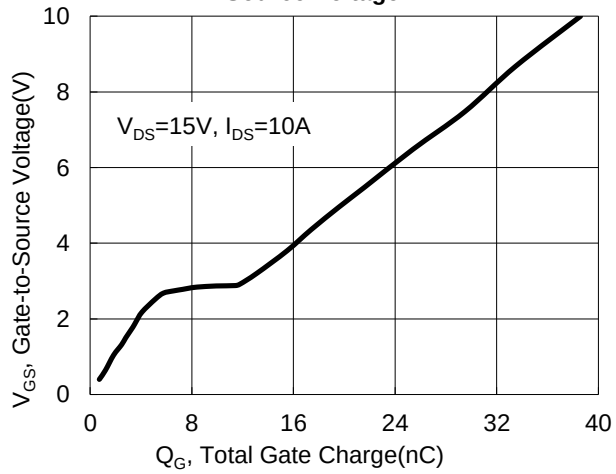


Figure 7. Maximum Effective Thermal Impedance, Junction-to-Case

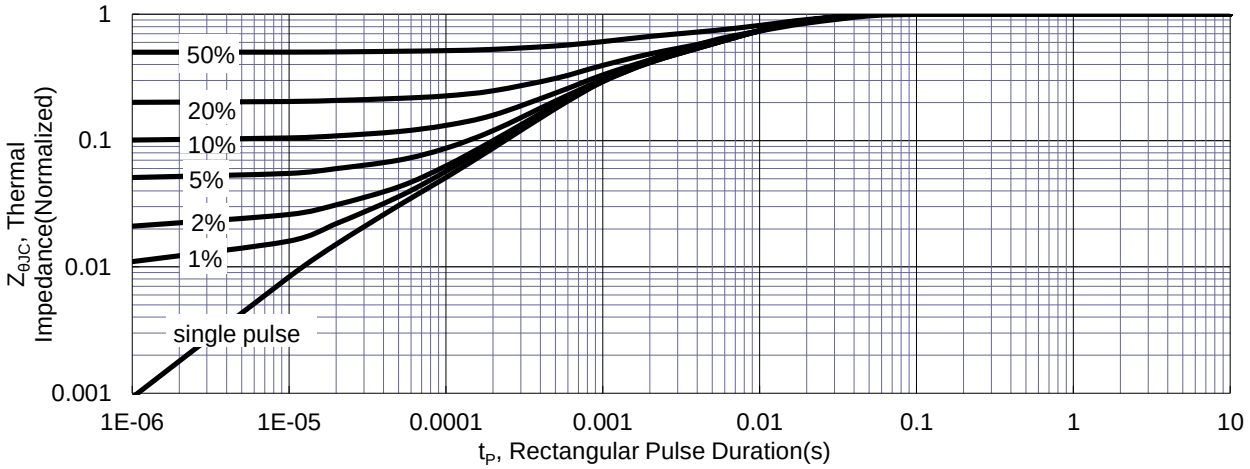
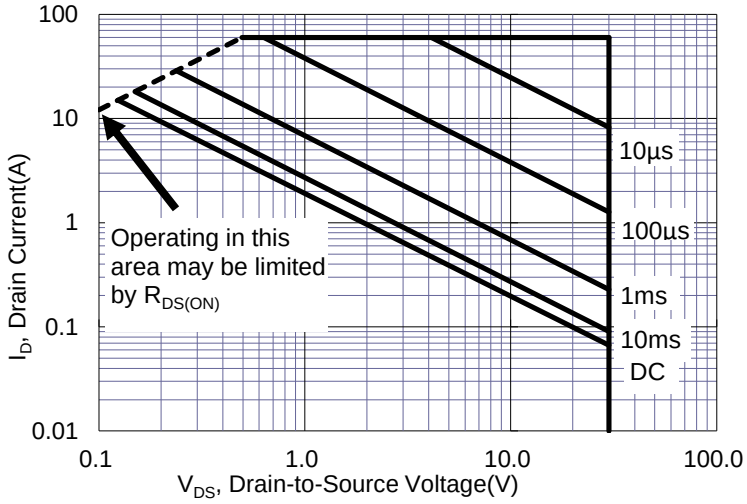


Figure 8. Maximum Forward Safe Operation Area



Test Circuit

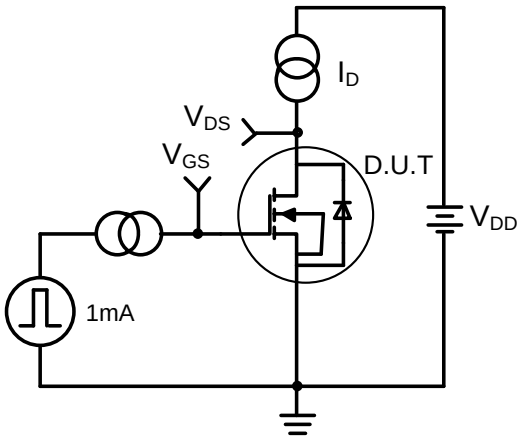


Figure 9. Gate Charge Test Circuit

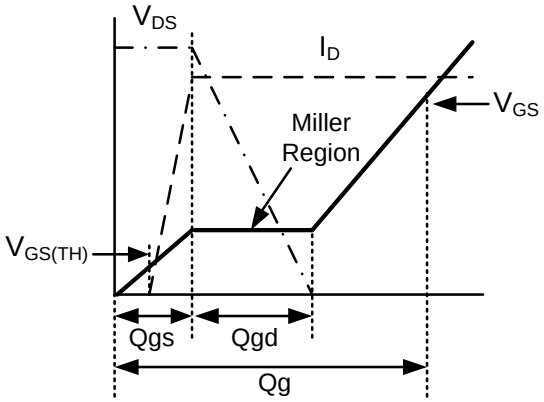


Figure 10. Gate Charge Waveform

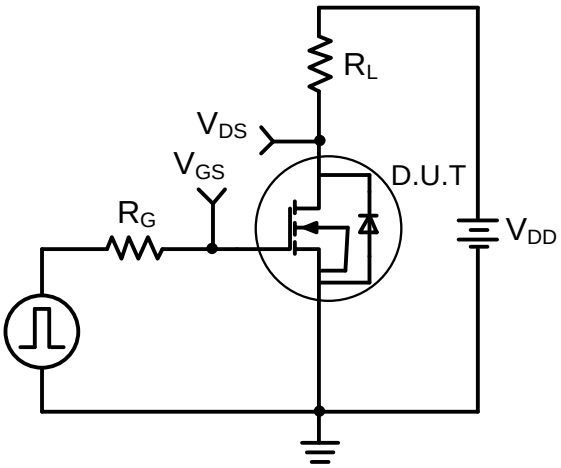


Figure 11. Resistive Switching Test Circuit

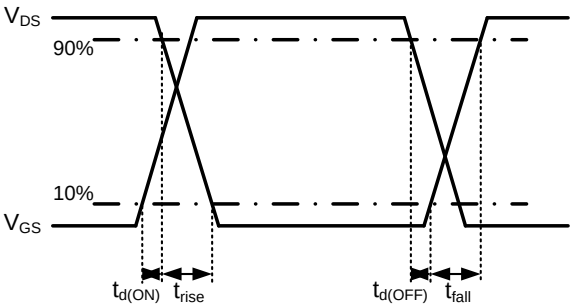


Figure 12. Resistive Switching Waveforms

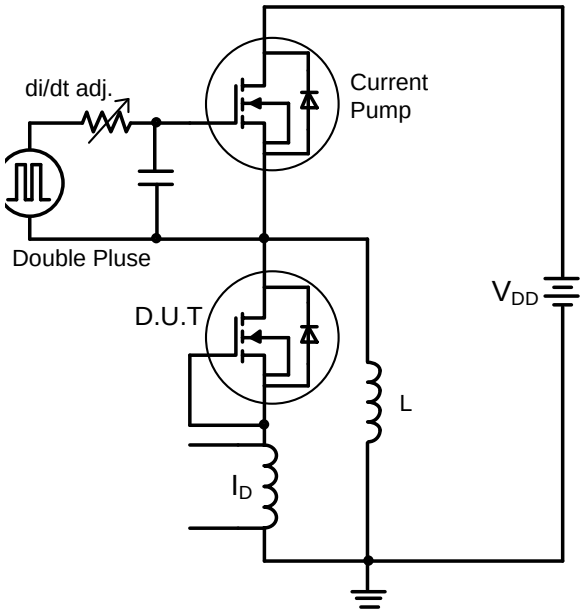


Figure 13. Diode Reverse Recovery Test Circuit

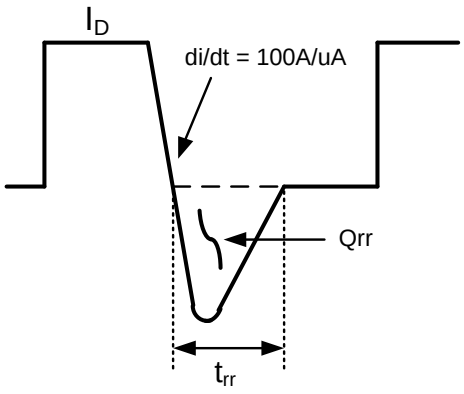


Figure 14. Diode Reverse Recovery Waveform

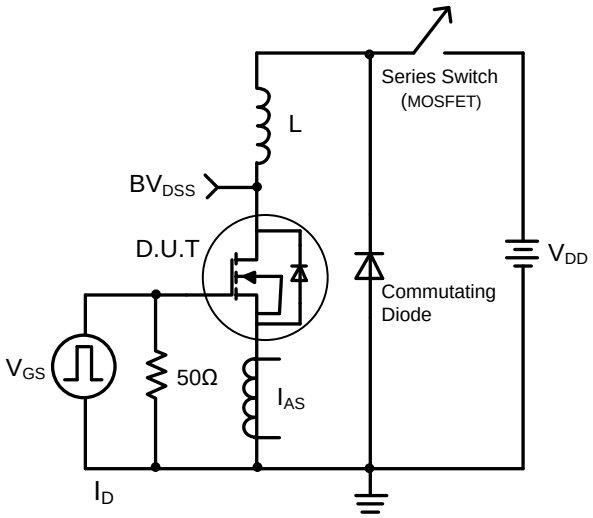


Figure 15. Unclamped Inductive Switching Test Circuit

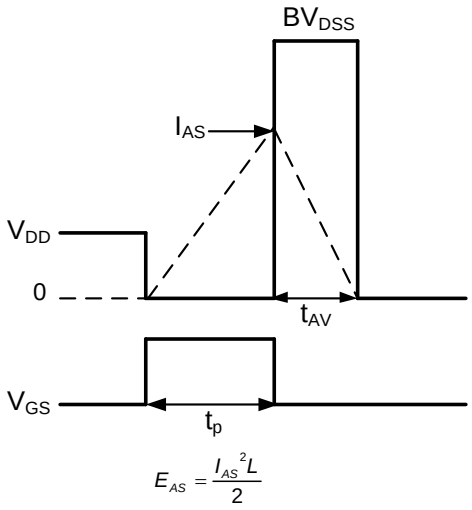
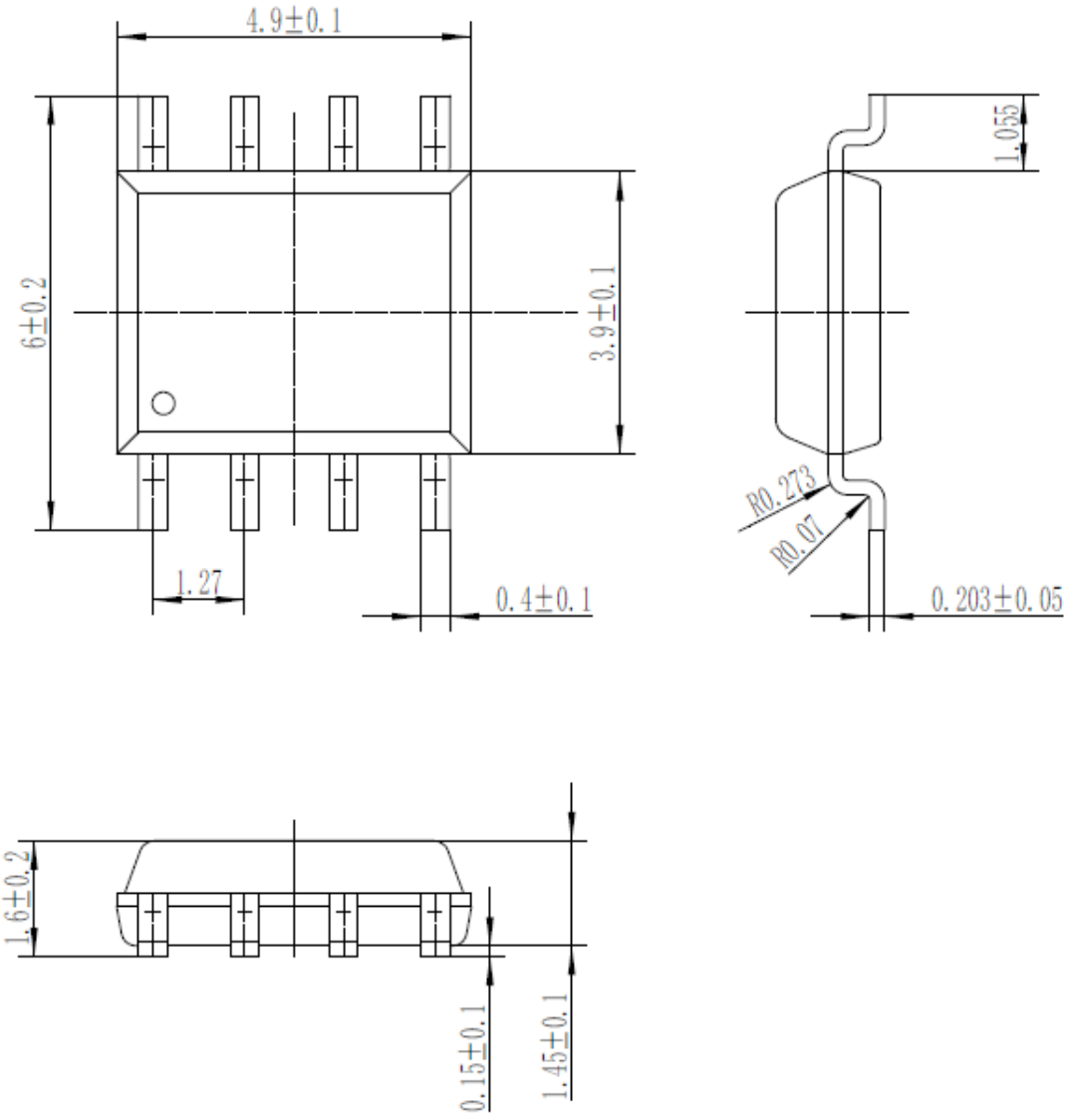


Figure 16. Unclamped Inductive Switching Waveforms

Package Dimensions

SOP-8



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