Wuxi Unigroup Microelectronics CO.,LTD.

30V N-Channel Trench MOSFET(Preliminary)

General Description

- Trench Power technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Optimized for fast-switching applications

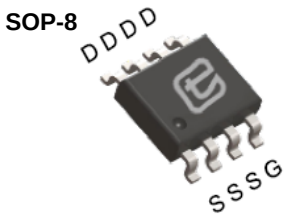
Product Summary

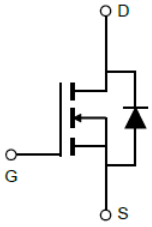
V_{DS}	30V
I_D (at V_{GS}=10V)	15A
$R_{DS(ON)}$ (at V_{GS}=10V)	<8mΩ
$R_{DS(ON)}$ (at V_{GS}=4.5V)	<10mΩ

Applications

- Synchronous Rectification in DC/DC and AC/DC Converters
- Isolated DC/DC Converters in Telecom and Industrial

RoHS





Part Number	Package Type	Form	Marking
TTJ15N03AT	SOP-8	Tape & Reel	TTJ15N03AT

Absolute Maximum Ratings (T_A =25ºC unless otherwise noted)

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [B]	T_C =25ºC	I_D	15	A
	T_C=70ºC		12	
Pulsed Drain Current [A]		I_{DM}	45	A
Avalanche Current [A]		I_{AS}	23	A
Single Pulse Avalanche Energy L =0.3mH [A]		E_{AS}	79	mJ
Power Dissipation [C]	T_C =25ºC	P_D	3.4	W
	T_C =70ºC		2.1	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	ºC

Thermal Characteristics

Parameter		Symbol	Maximum	Units
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	22	ºC/W
Maximum Junction-to-Ambient	Steady-State	$R_{\theta JA}$	100	

Electrical Characteristics(T_J =25ºC unless otherwise noted)

Symbol	Parameter	Conditions		Value			Units
				Min	Typ	Max	
STATIC PARAMETERS							
BV_{DSS}	Drain-Source Breakdown Voltage	I_D =250μA,V_{GS} =0V		30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =30V, V_{GS} =0V	T_J =25ºC			1	μA
			T_J =125ºC			100	
I_{GSS}	Gate-Body Leakage Current	V_{DS} =0V, V_{GS} =±20V				±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D =250μA		1	1.4	2	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} =10V, I_D =15A			6.7	8	mΩ
		V_{GS} =4.5V, I_D =15A			8.3	10	mΩ
g_{FS}	Forward Transconductance	V_{DS} =5V, I_D =15A			21		S
V_{SD}	Diode Forward Voltage	I_S =15A, V_{GS} =0V				1	V
I_S	Maximum Body-Diode Continuous Current [B]					15	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS} =0V, V_{DS} =15V, f =1MH_Z			1592		pF
C_{oss}	Output Capacitance				229		
C_{rss}	Reverse Transfer Capacitance				183		
R_g	Gate Resistance	f =1MH_Z			1.5		Ω
SWITCHING PARAMETERS							
Q_g (10V)	Total Gate Charge	V_{GS} =10V,V_{DS} =15V, I_D =15A			29		nC
Q_g (4.5V)	Total Gate Charge				15		
Q_{gs}	Gate Source Charge				3.8		
Q_{gd}	Gate Drain Charge				7		
$t_{D(on)}$	Turn-On Delay Time	V_{GS} =10V,V_{DS} =15V, I_D =15A, R_G =1.8Ω			33.3		ns
t_r	Turn-On Rise Time				3.3		
$T_{D(off)}$	Turn-Off Delay Time				56.6		
t_f	Turn-Off Fall Time				3.5		
t_{rr}	Body Diode Reverse Recovery Time	I_F =20A, di/dt =100A/μs			38		ns
Q_{rr}	Body Diode Reverse Recovery Charge				16.6		nC

A. Single pulse width limited by maximum junction temperature.

B. The maximum current rating is package limited.

C. The power dissipation P_D is based on $T_{J(MAX)}$ =150ºC, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

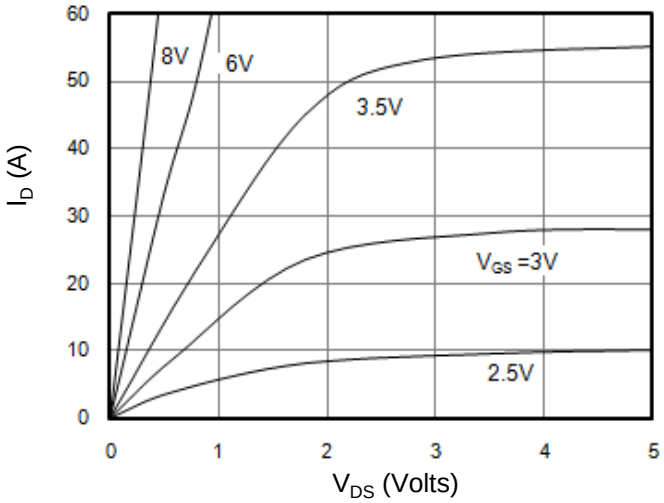


Figure 1: On-Region Characteristics

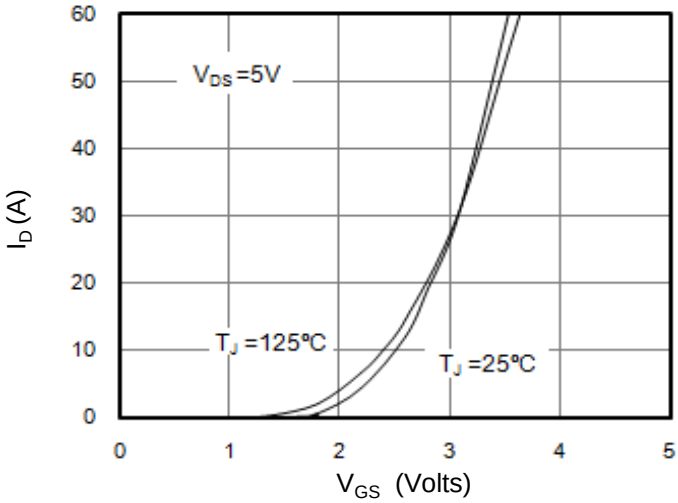


Figure 2: Transfer Characteristics

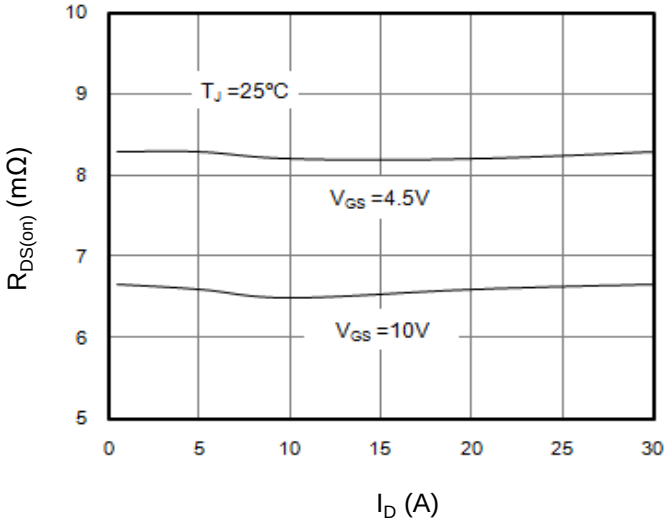


Figure 3: On-Resistance vs. Drain Current

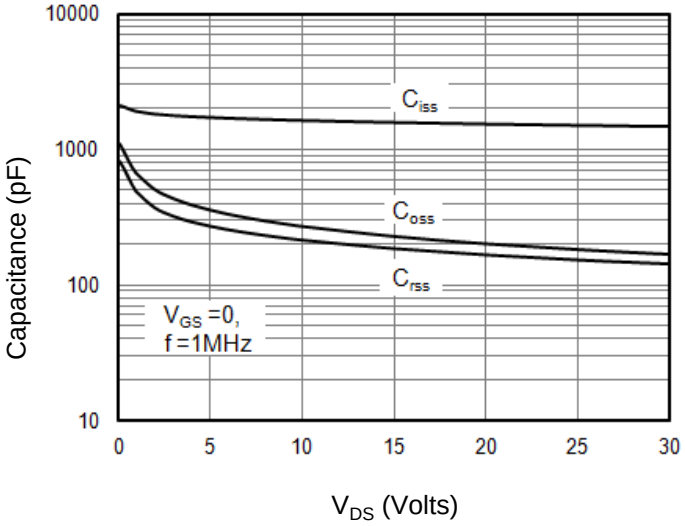


Figure 4: Capacitance Characteristics

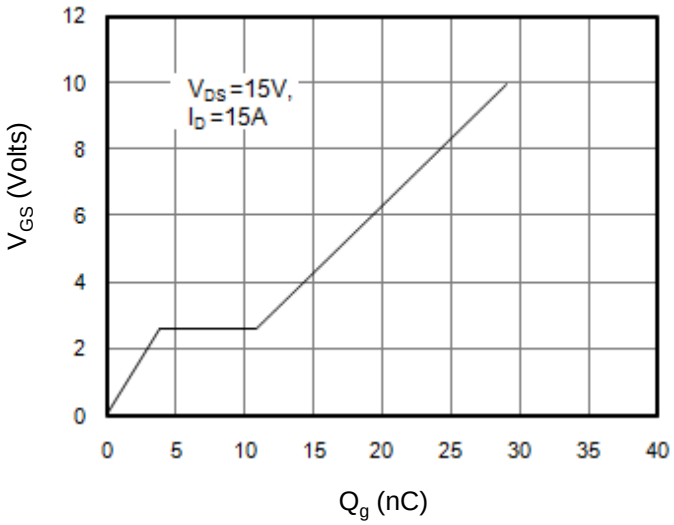


Figure 5: Gate Charge Characteristics

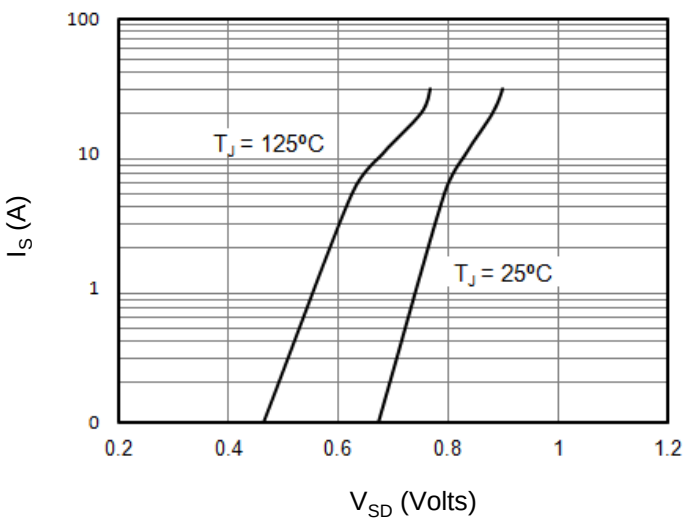


Figure 6: Body Diode Forward Voltage

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

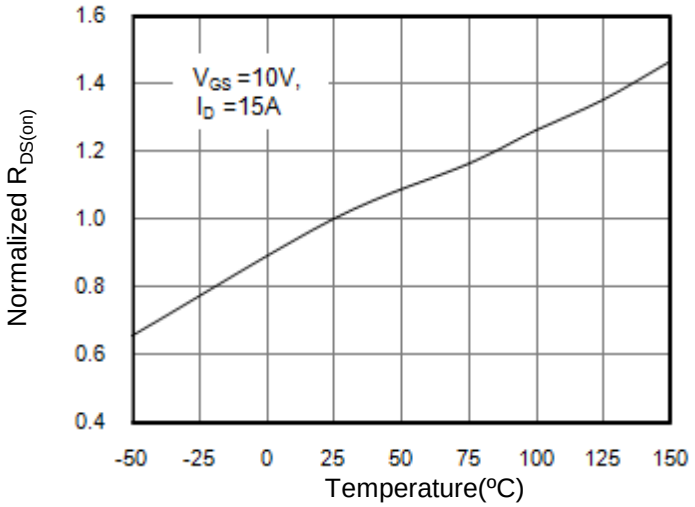


Figure 7: On-Resistance vs. Junction Temperature

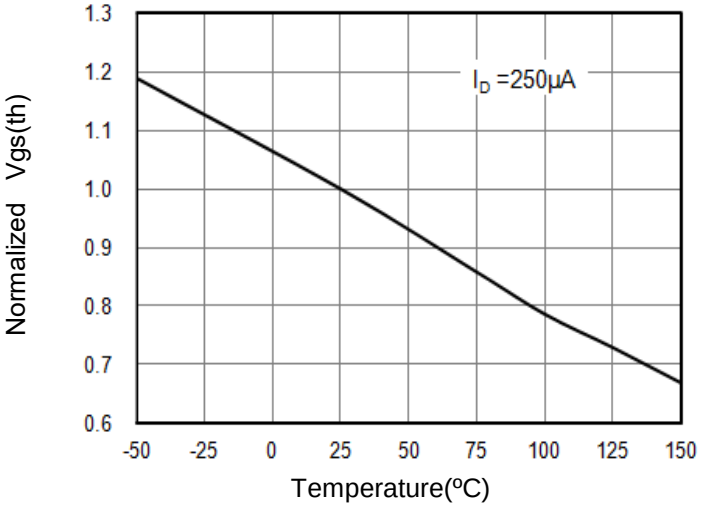


Figure 8: Vgs(th) vs. Junction Temperature

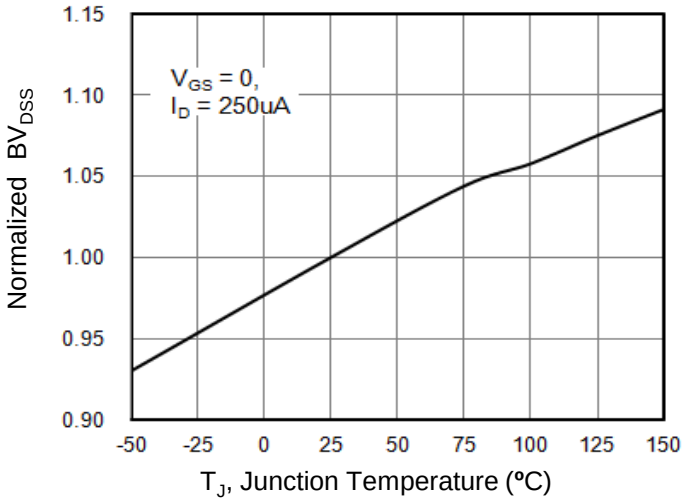


Figure 9: BV_{DSS} vs. Junction Temperature

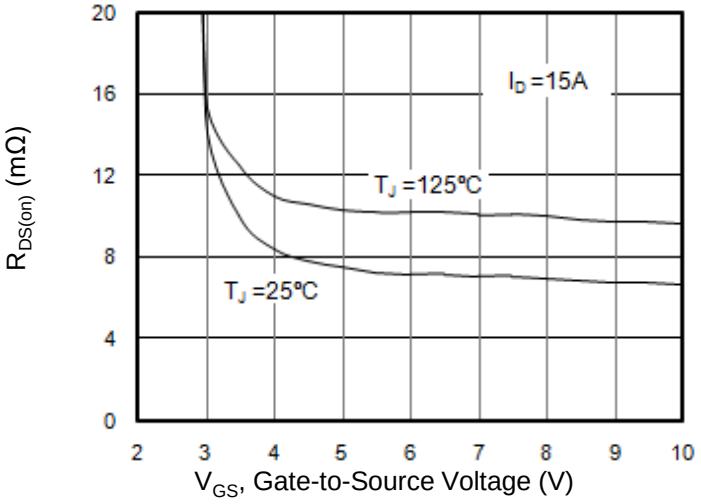


Figure 10: On-Resistance vs. Gate-Source Voltage

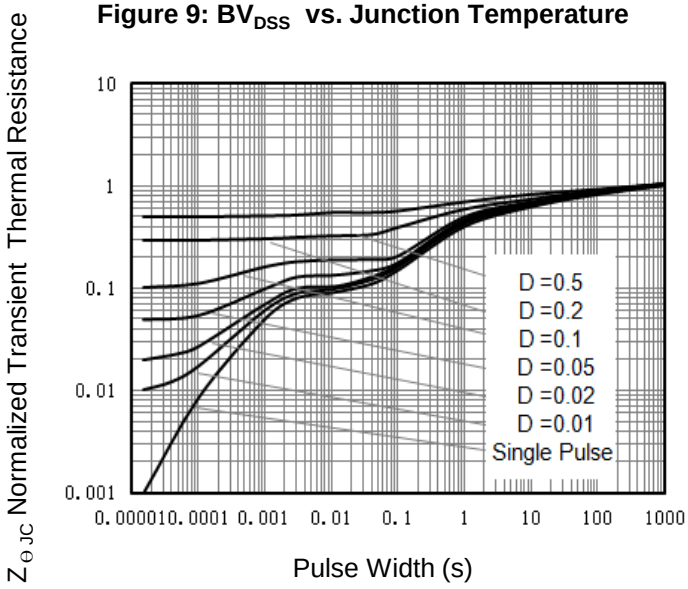


Figure 11: Normalized Transient Thermal Resistance

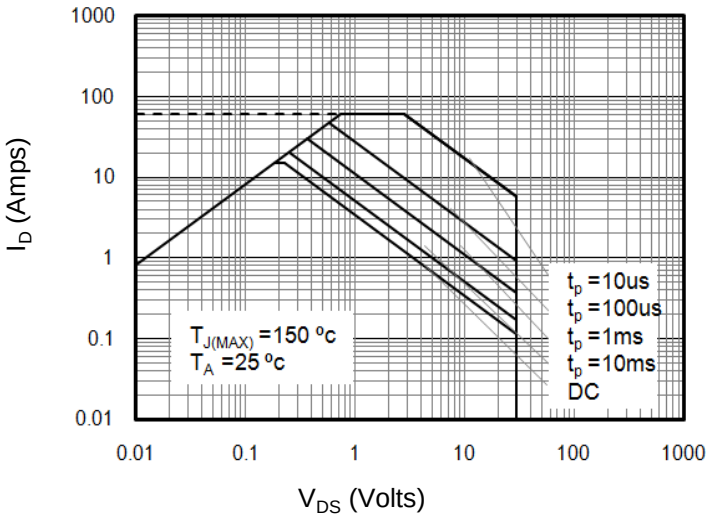


Figure 12: Safe Operating Area

Figure A：Gate Charge Test Circuit and Waveforms

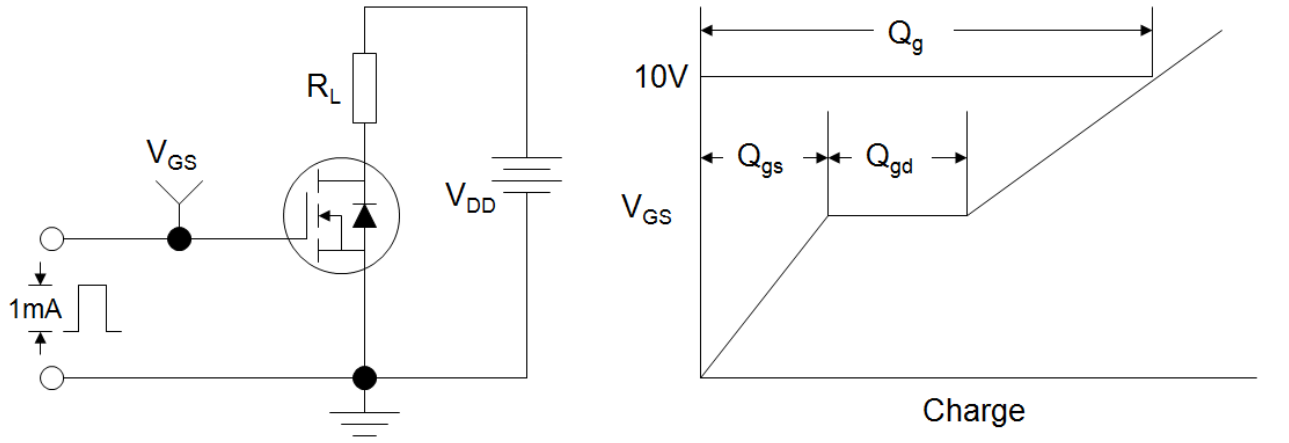


Figure B：Resistive Switching Test Circuit and Waveforms

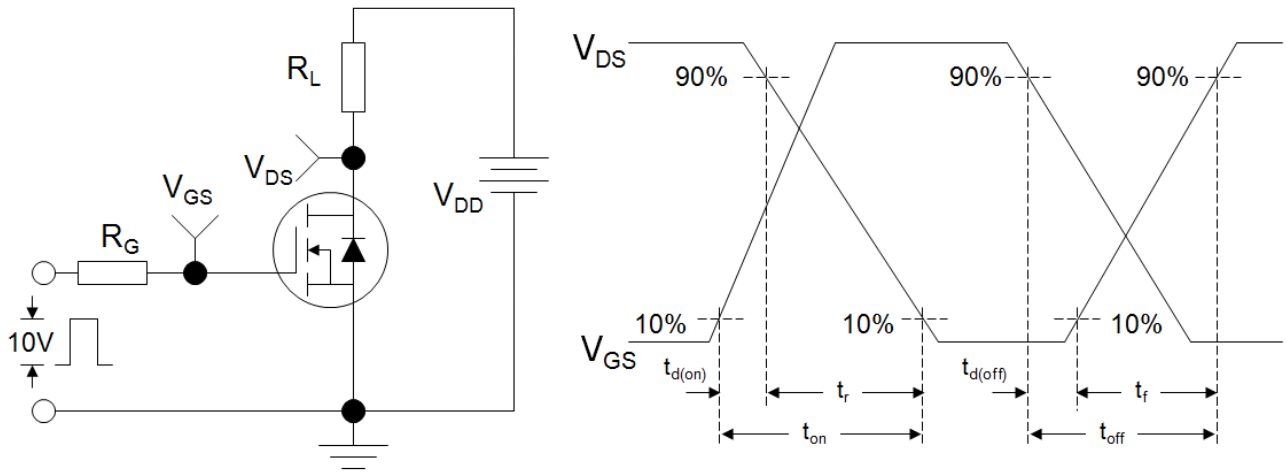
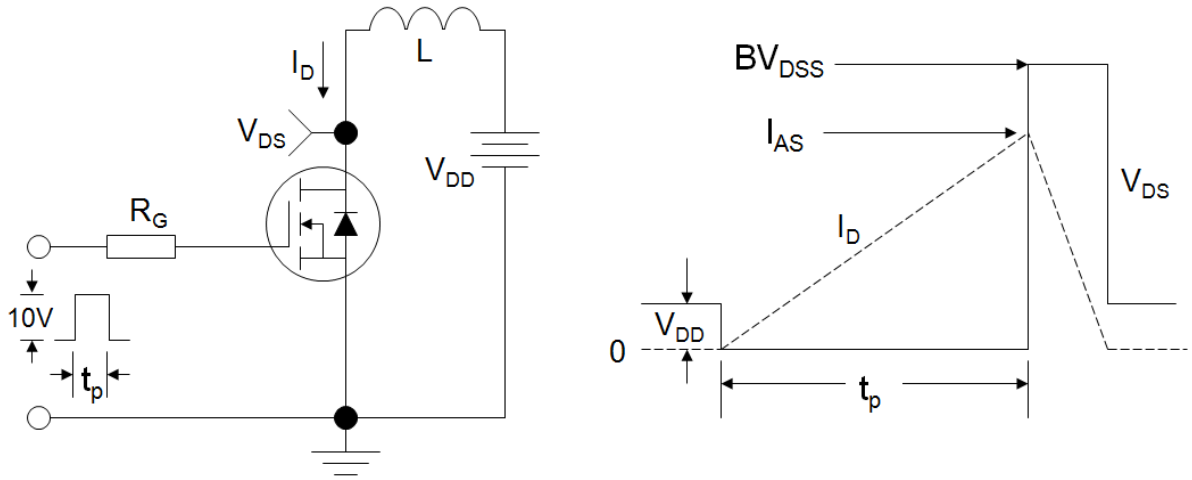
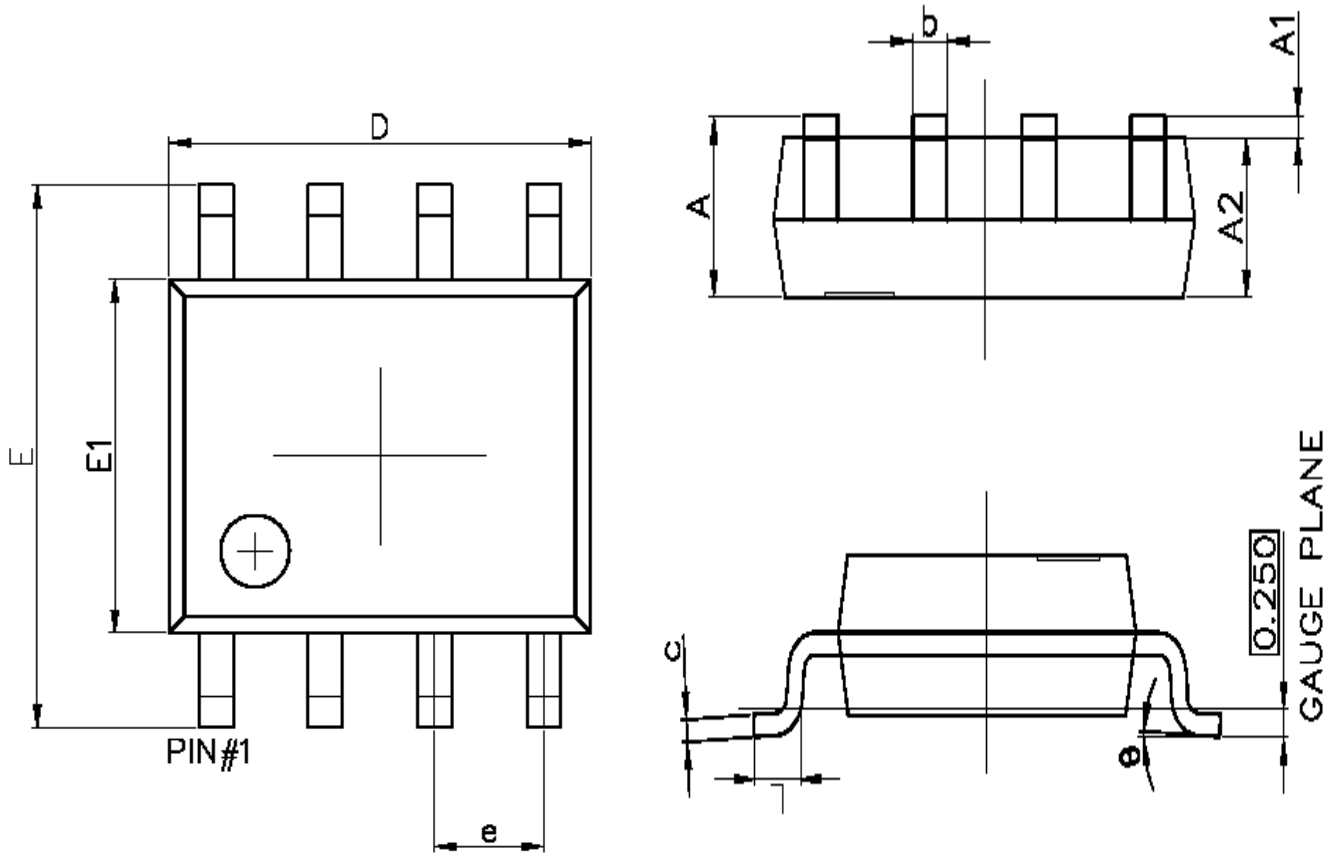


Figure C：Unclamped Inductive Switching (UIS) Test Circuit and Waveforms



SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.450	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
e	1.270 （BSC）		0.050 （BSC）	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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