Wuxi Unigroup Microelectronics CO.,LTD.

30V P-Channel Trench MOSFET(Preliminary)

General Description

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

Applications

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

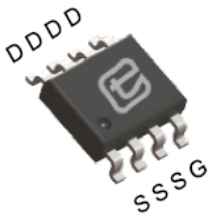
Product Summary

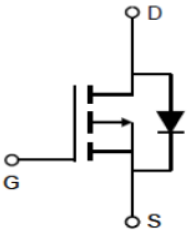
V_{DS}	-30V
I_D (at V_{GS}=-10V)	-6A
$R_{DS(ON)}$ (at V_{GS}=-10V)	< 50mΩ
$R_{DS(ON)}$ (at V_{GS}=-4.5V)	< 79mΩ

100% UIS Tested

RoHS

SOP-8





Part Number	Package Type	Form	Marking
TTJ06P03AT	SOP-8	Tape&Reel	06P03AT

Absolute Maximum Ratings (T_A =25°C 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 =25°C	I_D	-6	A
	T_C =100°C		-4.2	
Pulsed Drain Current [A]		I_{DM}	-24	A
Avalanche Current [A]		I_{AS}	-4.8	A
Single Pulse Avalanche Energy L =0.3mH [A]		E_{AS}	3.46	mJ
Power Dissipation [C]	T_C =25°C	P_D	3	W
	T_C =100°C		1.5	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Maximum	Units
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	50	°C/W
Maximum Junction-to-Ambient	Steady-State	$R_{\theta JA}$	64	

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			-25	
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	-1.6	-2.4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} =-10V, I_D =-6A			43	50	mΩ
		V_{GS} =-4.5V, I_D =-6A			66	79	mΩ
g_{FS}	Forward Transconductance	V_{DS} =-5V, I_D =-6A			6.7		S
V_{SD}	Diode Forward Voltage	I_S =-6A, V_{GS} =0V				-1	V
I_S	Maximum Body-Diode Continuous Current [B]					-6	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS} =0V, V_{DS} =-15V, f =1MH_Z			651		pF
C_{oss}	Output Capacitance				71		
C_{rss}	Reverse Transfer Capacitance				64		
R_g	Gate Resistance	f =1MH_Z			7		Ω
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS} =-10V,V_{DS} =-15V, I_D =-6A			16		nC
Q_{gs}	Gate Source Charge				3		
Q_{gd}	Gate Drain Charge				3		
$t_{D(on)}$	Turn-On Delay Time	V_{GS} =-10V,V_{DS} =-15V, I_D =-6A, R_G =2.5Ω			10		ns
t_r	Turn-On Rise Time				16		
$t_{D(off)}$	Turn-Off Delay Time				17		
t_f	Turn-Off Fall Time				11		

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 $T_{J(MAX)}$ =175ºC, 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

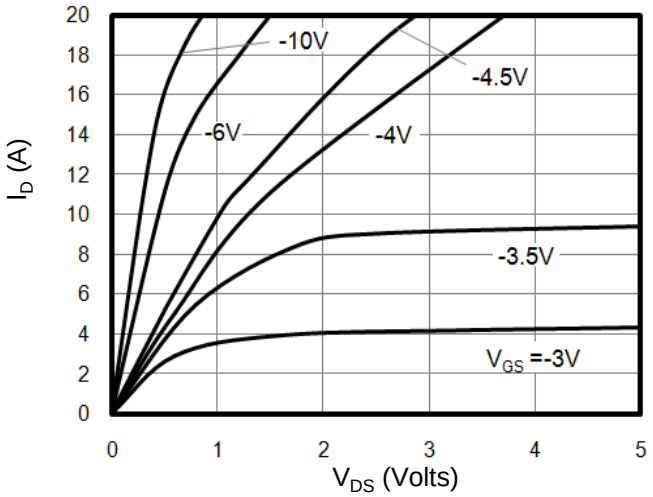


Figure 1: On-Region Characteristics

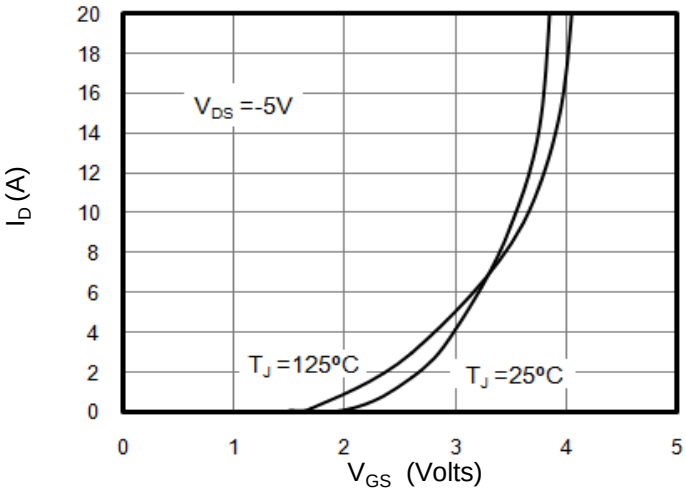


Figure 2: Transfer Characteristics

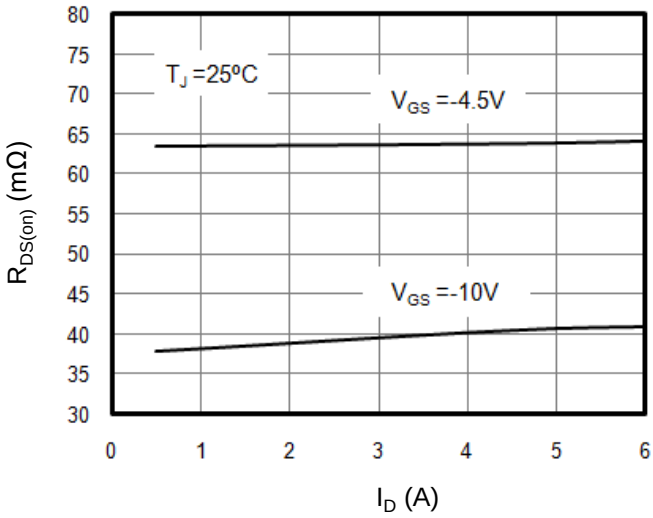


Figure 3: On-Resistance vs. Drain Current

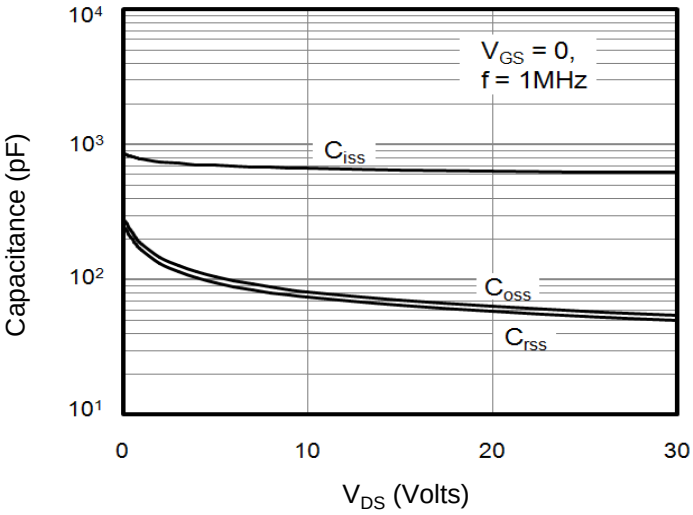


Figure 4: Capacitance Characteristics

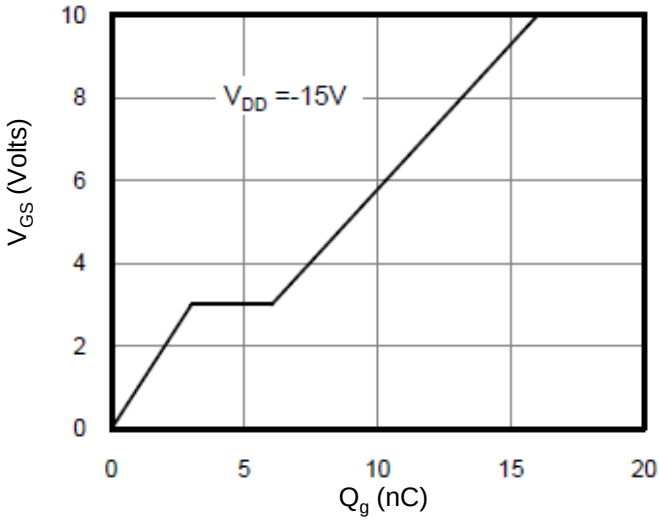


Figure 5: Gate Charge Characteristics

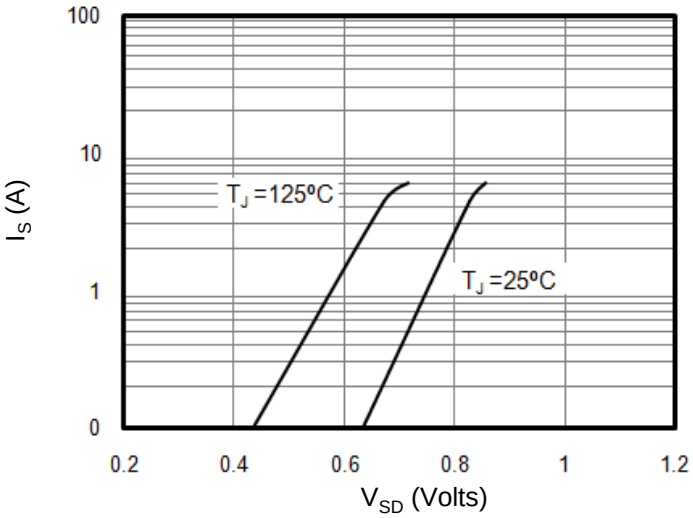


Figure 6: Body Diode Forward Voltage

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

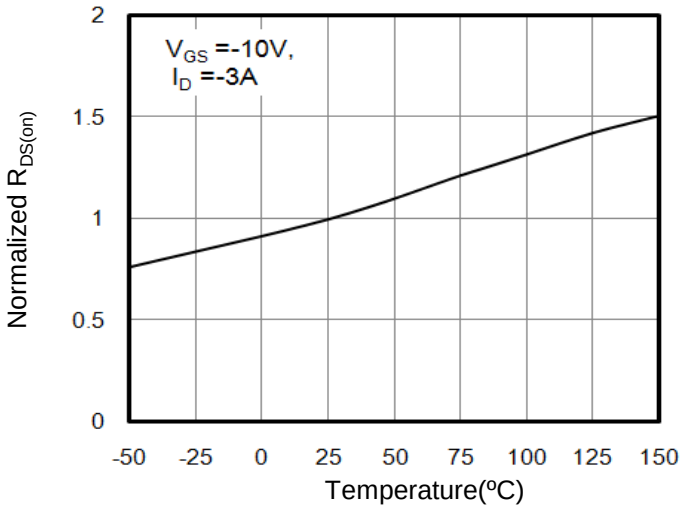


Figure 7: On-Resistance vs. Junction Temperature

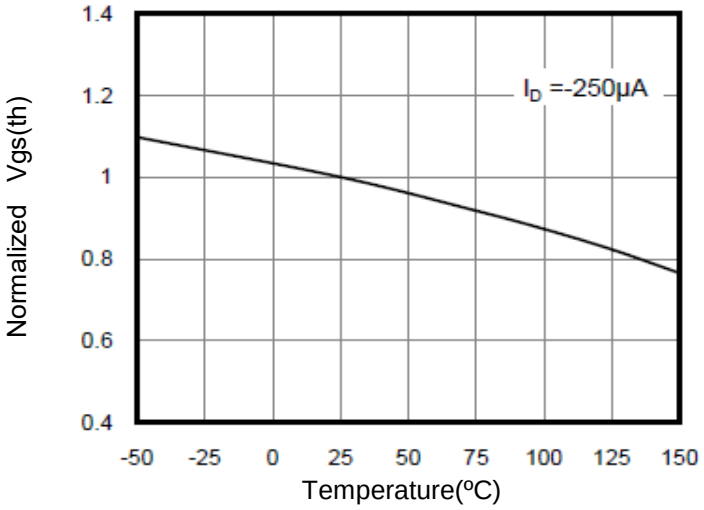


Figure 8: Vgs(th) vs. Junction Temperature

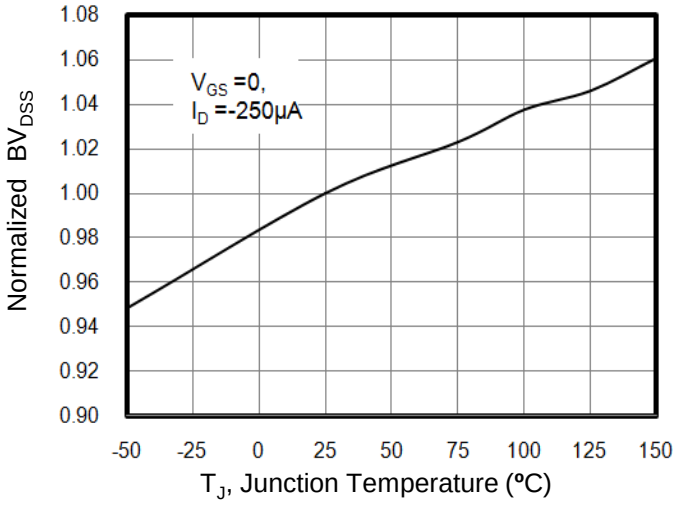


Figure 9: BV_{DSS} vs. Junction Temperature

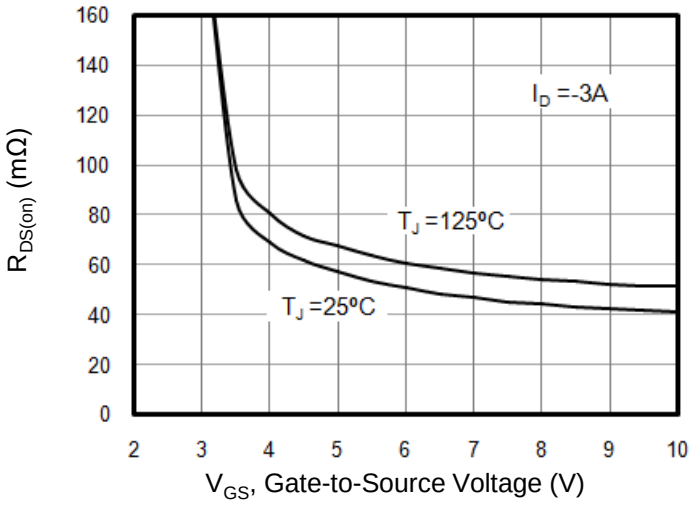


Figure 10: On-Resistance vs. Gate-Source Voltage

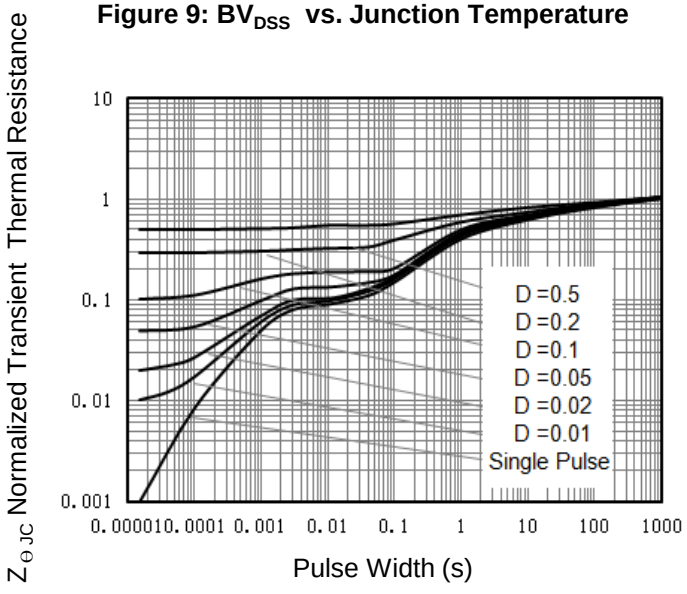


Figure 11: Normalized Transient Thermal Resistance

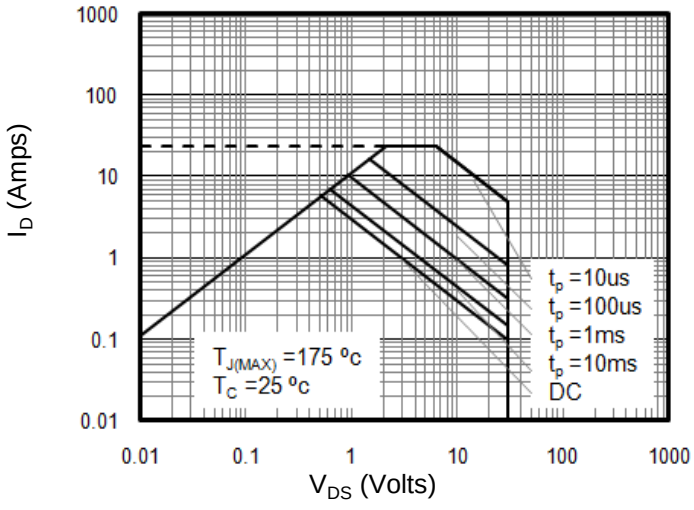


Figure 12: Safe Operating Area

Figure A：Gate Charge Test Circuit and Waveform

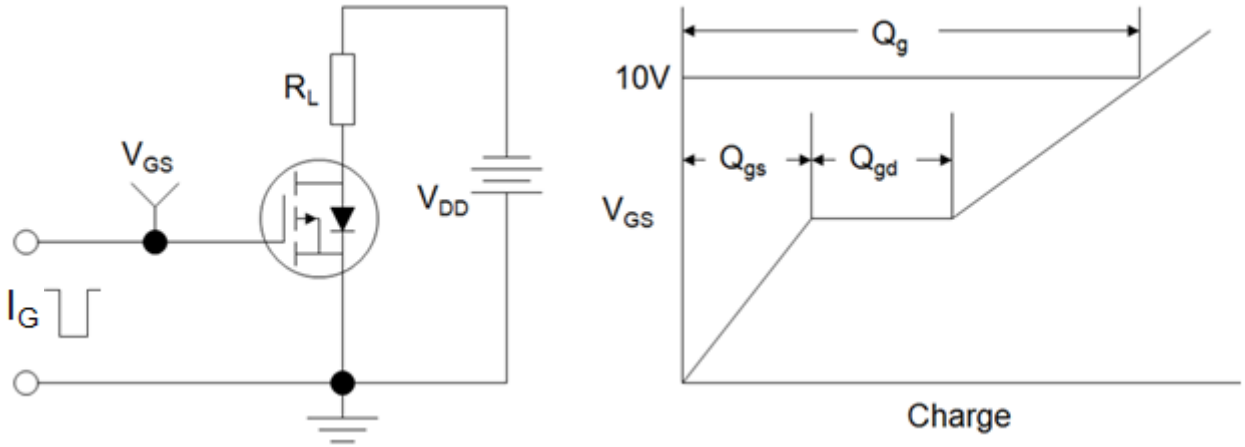


Figure B：Resistive Switching Test Circuit and Waveform

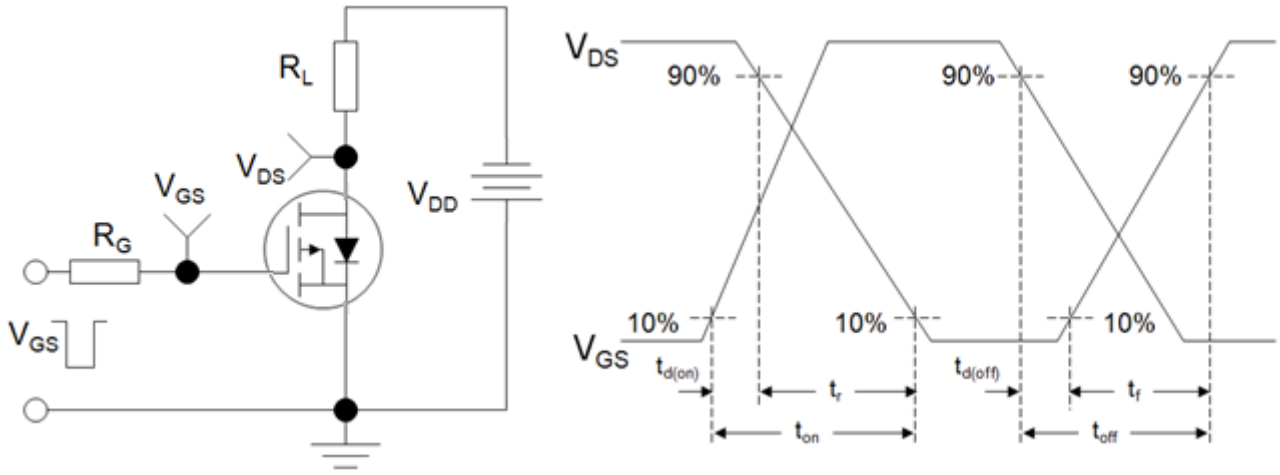
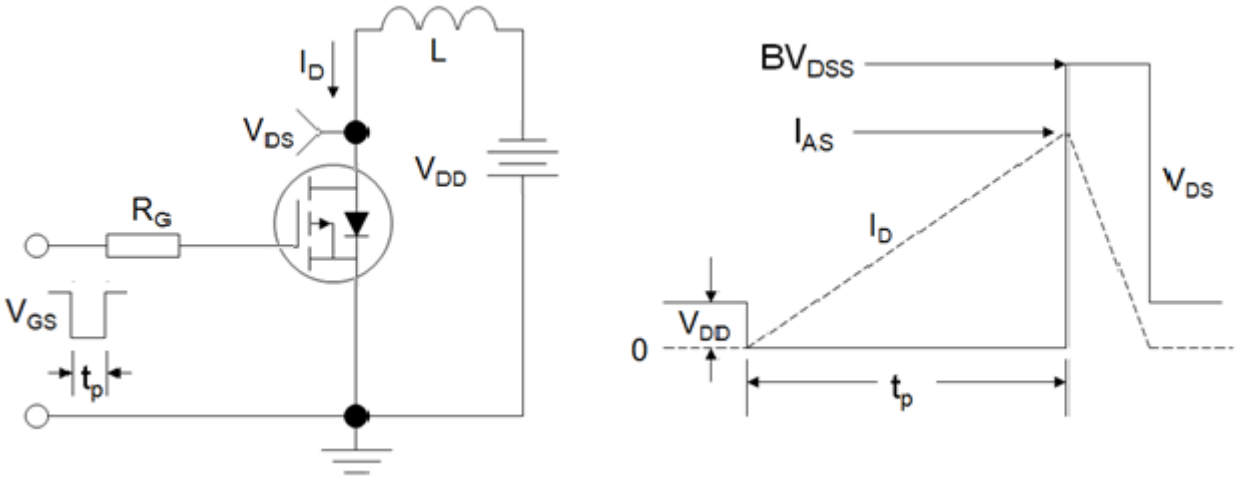


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



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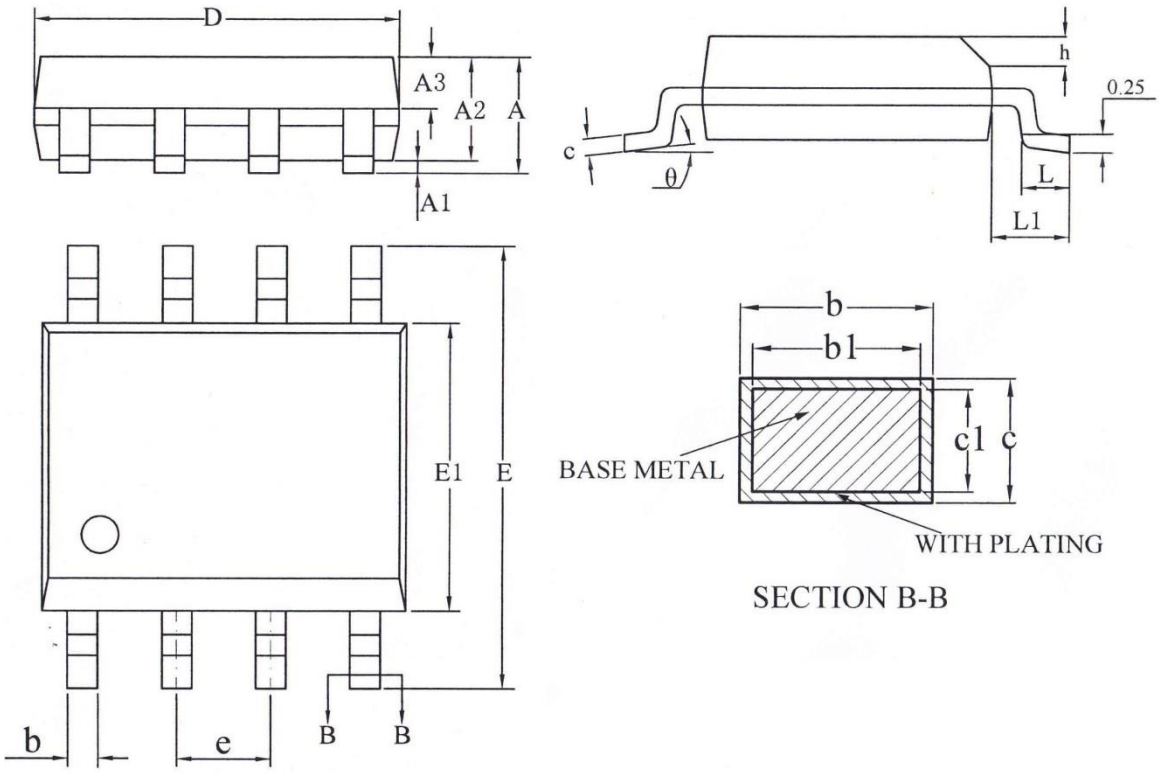

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.75
A1	0.10	—	0.225
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	—	0.48
b1	0.38	0.41	0.43
c	0.21	—	0.26
c1	0.19	0.20	0.21

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
D	4.70	4.90	5.10
E	5.80	6.00	6.20
E1	3.70	3.90	4.10
e	1.27BSC		
h	0.25	—	0.50
L	0.50	—	0.80
L1	1.05BSC		
θ	0	—	8°

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