Wuxi Unigroup Microelectronics CO.,LTD.

30V N-Channel Trench MOSFET(Preliminary)

General Description

- Trench Power technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- High Current Capability

Applications

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

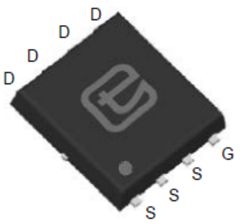
Product Summary

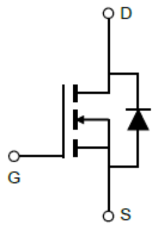
V_{DS}	30V
I_D (at V_{GS} =10V)	160A
$R_{DS(ON)}$ (at V_{GS} =10V)	< 1.8mΩ
$R_{DS(ON)}$ (at V_{GS} =4.5V)	< 2.5mΩ

100% UIS Tested

RoHS

DFN5x6





Part Number	Package Type	Form	Marking
TTG160N03AT	DFN5x6	Tape&Reel	160N03AT

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	51	A
	T_C =100ºC		51	
Pulsed Drain Current [A]		I_{DM}	480	A
Avalanche Current [A]		I_{AS}	56	A
Single Pulse Avalanche Energy	L =0.3mH [A]	E_{AS}	470	mJ
Power Dissipation [C]	T_C =25ºC	P_D	136	W
	T_C =100ºC		68	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	ºC

Thermal Characteristics

Parameter		Symbol	Maximum	Units
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	1.1	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	1.6	2.4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} =10V, I_D =30A			1.3	1.8	mΩ
		V_{GS} =4.5V, I_D =30A			2.0	2.5	mΩ
g_{FS}	Forward Transconductance	V_{DS} =10V, I_D =20A			61		S
V_{SD}	Diode Forward Voltage	I_S =30A, V_{GS} =0V				1	V
I_S	Maximum Body-Diode Continuous Current [B]					51	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS} =0V, V_{DS} =15V, f =1MH_Z			8826		pF
C_{oss}	Output Capacitance				1320		
C_{rss}	Reverse Transfer Capacitance				1386		
R_g	Gate Resistance	f =1MH_Z			1.7		Ω
SWITCHING PARAMETERS							
Q_g	Total Gate Charge	V_{GS} =10V,V_{DS} =15V, I_D =50A			177		nC
Q_{gs}	Gate Source Charge				29		
Q_{gd}	Gate Drain Charge				35		
$t_{D(on)}$	Turn-On Delay Time	V_{GS} =10V,V_{DS} =15V, I_D =50A, R_G =3Ω			30		ns
t_r	Turn-On Rise Time				29		
$T_{D(off)}$	Turn-Off Delay Time				101		
t_f	Turn-Off Fall Time				48		
t_{rr}	Body Diode Reverse Recovery Time	I_F =30A, di/dt =100A/μs			47		ns
Q_{rr}	Body Diode Reverse Recovery Charge				43		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 $T_{J(MAX)}$ =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

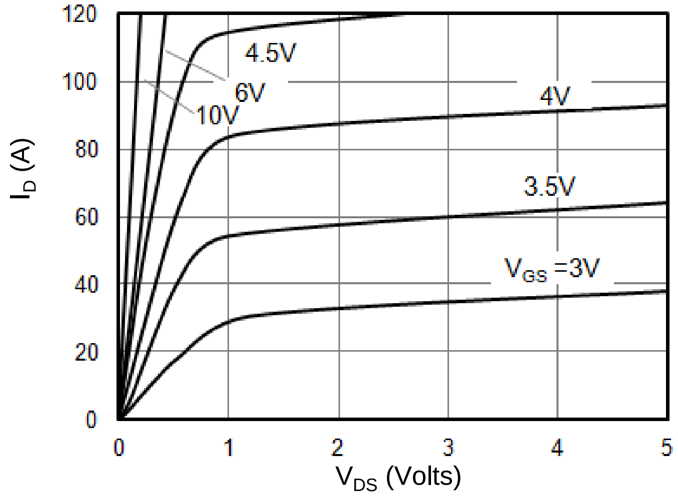


Figure 1: On-Region Characteristics

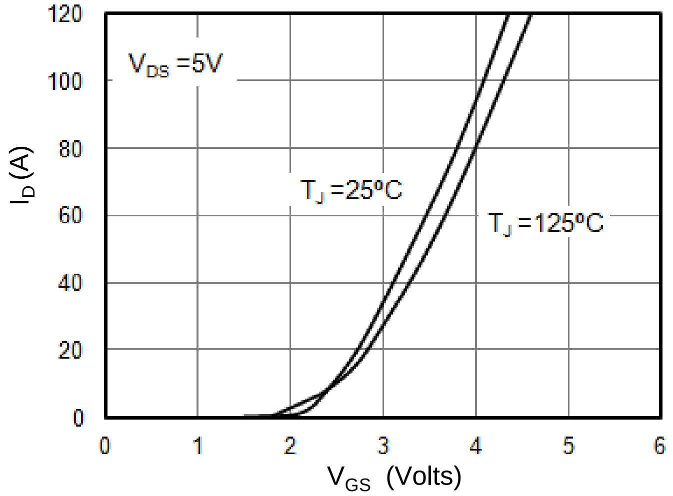


Figure 2: Transfer Characteristics

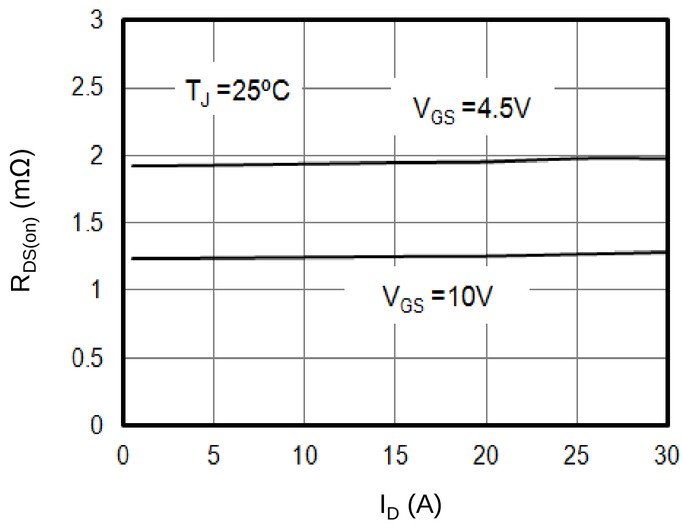


Figure 3: On-Resistance vs. Drain Current

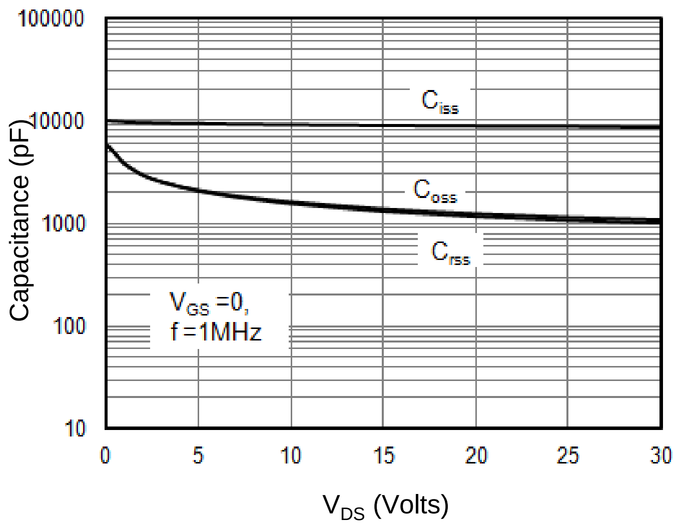


Figure 4: Capacitance Characteristics

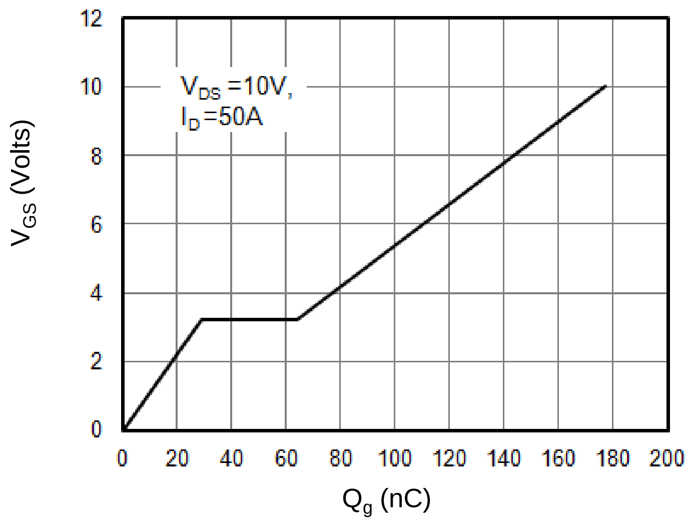


Figure 5: Gate Charge Characteristics

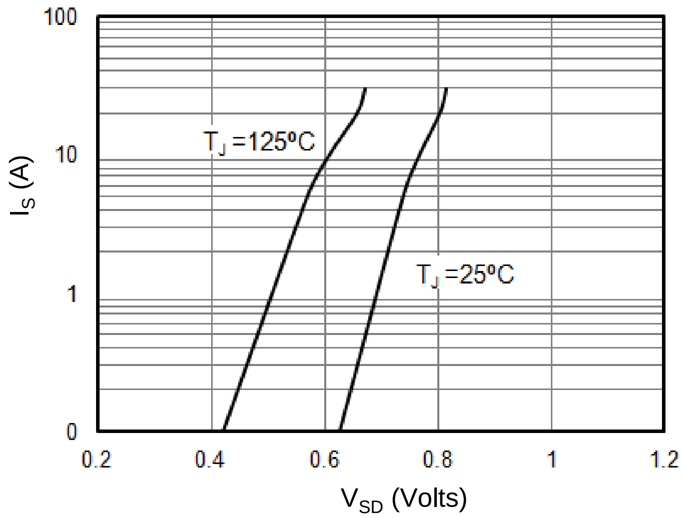


Figure 6: Body Diode Forward Voltage

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

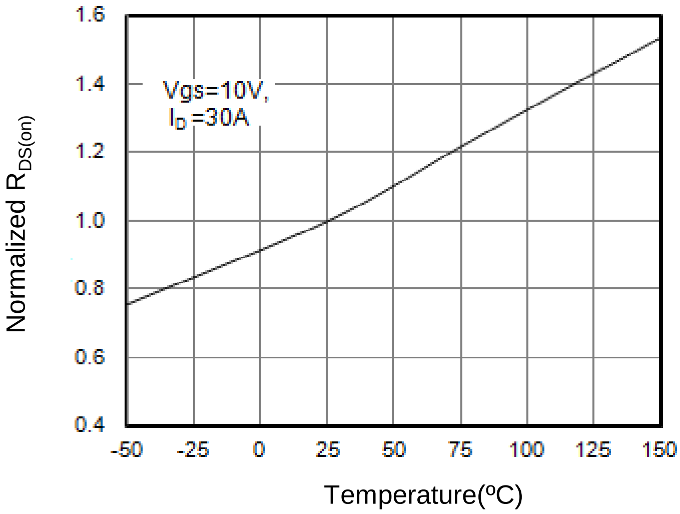


Figure 7: On-Resistance vs. Junction Temperature

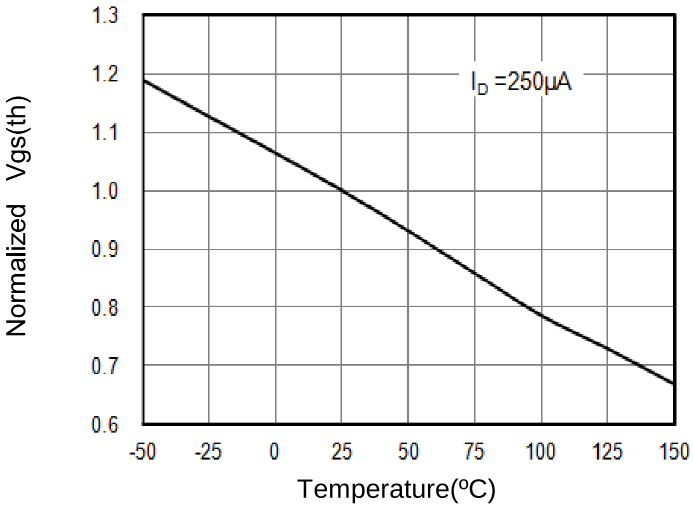


Figure 8: Vgs(th) vs. Junction Temperature

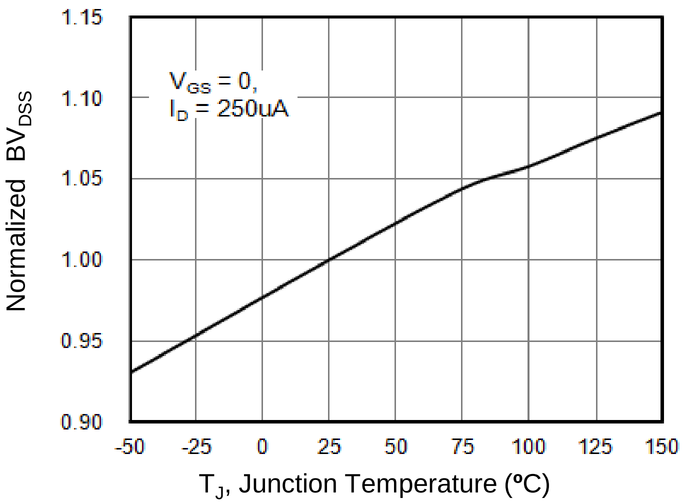


Figure 9: BV_{DSS} vs. Junction Temperature

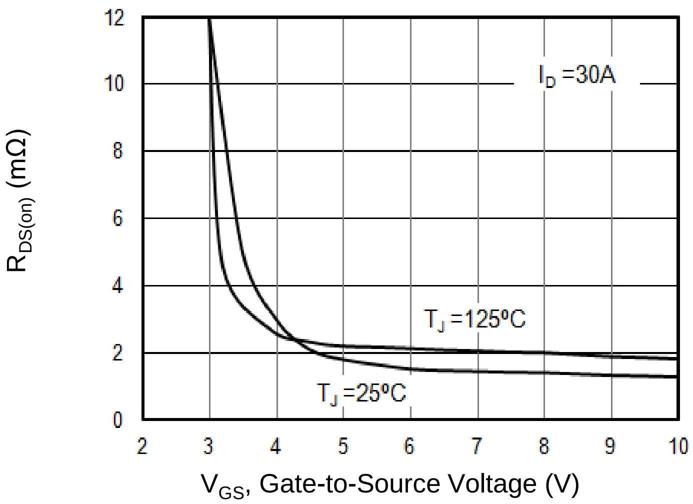


Figure 10: On-Resistance vs. Gate-Source Voltage

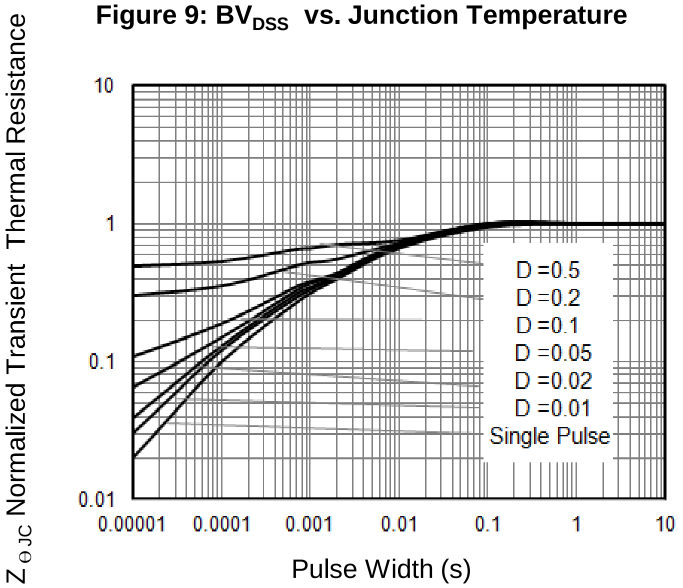


Figure 11: Normalized Transient Thermal Resistance

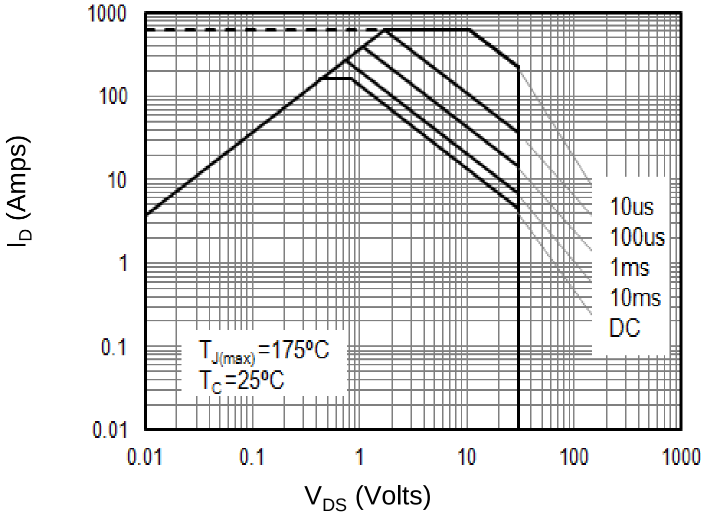


Figure 12: Safe Operating Area

Figure A：Gate Charge Test Circuit and Waveforms

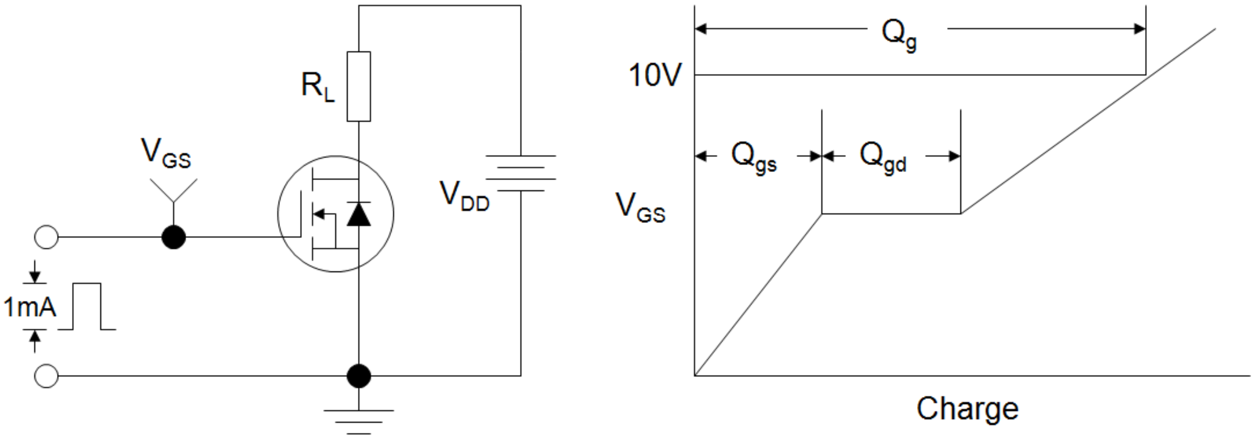


Figure B：Resistive Switching Test Circuit and Waveforms

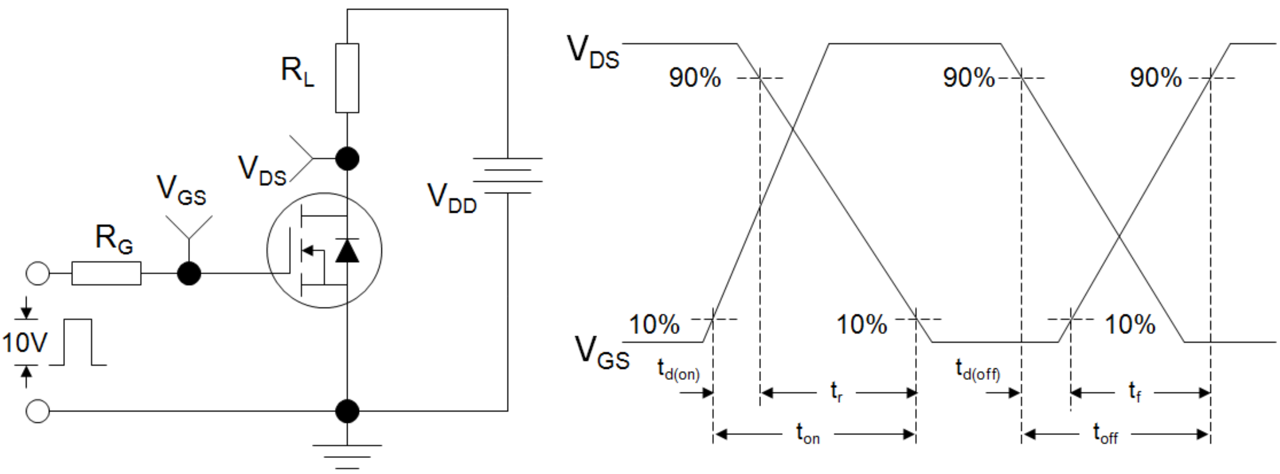
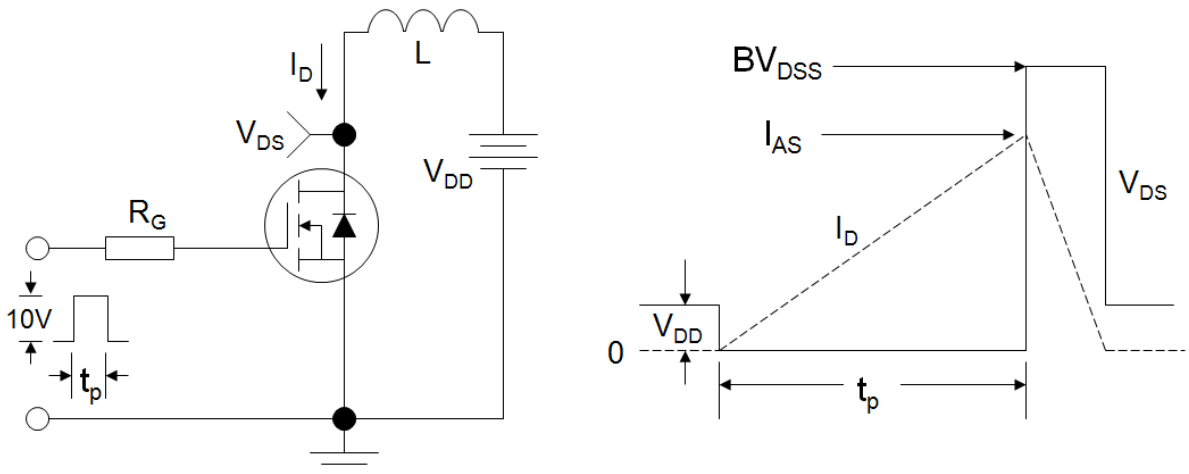


Figure C：Unclamped Inductive Switching (UIS) Test Circuit and Waveforms



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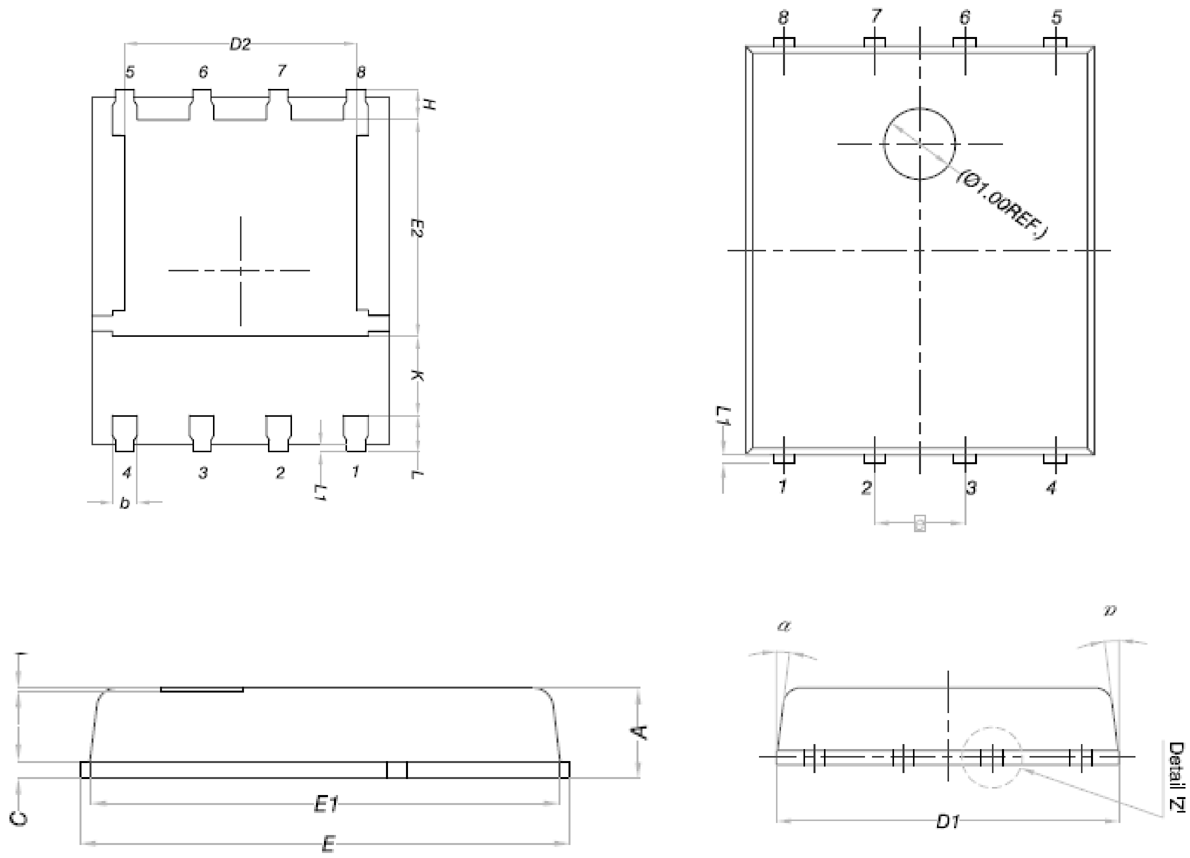

DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96

DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°

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