

DATASHEET

N-Channel Enhancement Mode Power MOSFET

Description

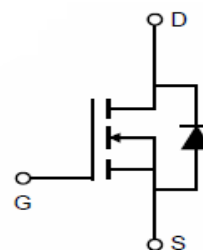
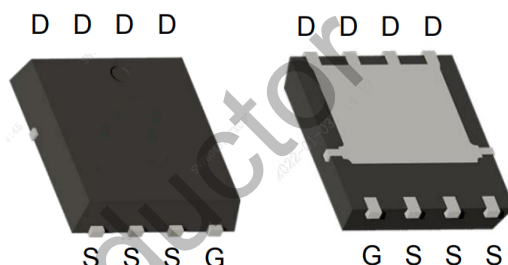
This Power MOSFET is produced using advanced Trench technology.

This devices provide an excellent gate charge and $R_{DS(on)}$, which leads to extremely communication and conduction losses. So it is very suitable for AC/DC power conversion, load switch and industrial power applications.

Features

- $V_{DS}=30V$, $I_D=120A$
- $R_{DS(on)}$ Typ=2.1m Ω @ $V_{GS}=10V$
- $R_{DS(on)}$ Typ=3.7m Ω @ $V_{GS}=4.5V$
- Low FOM $R_{DS(on)} \times Q_{gd}$
- 100% avalanche tested
- Easy to use/drive
- RoHS compliant

PDFN5*6-8L



Schematic diagram

Applications

- Power Management
- PWM Application
- Load Switch

100% UIS TESTED!

100% ΔV_{ds} TESTED!



Package Marking and Ordering Information

Device	Marking	Package	Packing	Reel size	Reel (pcs)	Per Carton (pcs)
120N03		PDFN5*6	Reel	13inch	5000	50000

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Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-source Voltage		V_{DS}	30	V
Gate-source Voltage		V_{GS}	± 20	V
Continuous Drain Current ⁽²⁾	$T_C=25^{\circ}\text{C}$	I_D	120	A
	$T_C=100^{\circ}\text{C}$		78	
Pulsed Drain Current($T_C=25^{\circ}\text{C}$, T_p Limited By T_{jmax}) ⁽³⁾		I_{DM}	360	A
Maximum Power Dissipation($T_C=25^{\circ}\text{C}$)		P_D	68	W
Avalanche energy , single Pulse($L=0.5\text{mH}$) ⁽¹⁾		E_{AS}	342	mJ
Operating Junction And Storage Temperature		T_j, T_{stg}	-55 To 150	$^{\circ}\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		T_L	300	$^{\circ}\text{C}$

* Drain current limited by maximum junction temperature.

Thermal Resistance

Parameter	Symbol	Max	Unit
Junction-to-Case	$R_{\theta JC}$	1.83	$^{\circ}\text{C/W}$

Notes:

- 1) EAS Condition: $L=0.5\text{mH}$, $V_{DD}=30\text{V}$, $V_G=10\text{V}$ Start $T_j=25^{\circ}\text{C}$, $I_{AS}=25\text{A}$
- 2) Pulse test: Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$
- 3) Repetitive Rating: Pulse width limited by maximum junction temperature.

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Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Off Characteristic						
Drain-source breakdown voltage	BV _{DSS}	30	-	-	V	V _{GS} =0V, I _D =250μA
Zero gate voltage drain current	I _{DSS}	-	-	1	μA	V _{DS} =30V, V _{GS} =0V, T _J =25℃
Gate-source leakage current	I _{GSS}	-	-	± 100	nA	V _{GS} = ± 20V, V _{DS} =0V
On Characteristics						
Gate threshold voltage	V _{GS(th)}	1.0	1.5	2.2	V	V _{DS} =V _{GS} , I _D =250μA
Drain-source on-state resistance	R _{DS(on)}	-	2.1	3.1	mΩ	V _{GS} =10V, I _D =20A
Drain-source on-state resistance	R _{DS(on)}	-	3.7	5.5	mΩ	V _{GS} =4.5V, I _D =15A
Dynamic Characteristic						
Input Capacitance	C _{iss}	-	3833	-	PF	V _{GS} =0V, V _{DS} =15V, f=1.0MHz
Output Capacitance	C _{oss}	-	437	-		
Reverse Transfer Capacitance	C _{rss}	-	350	-		
Switching Characteristics						
Turn-on delay time	t _{d(on)}	-	14	-	nS	V _{DS} = 15V, V _{GS} =10V R _G = 3Ω, I _D =30A
Turn-on Rise time	t _r	-	18	-		
Turn-off delay time	t _{d(off)}	-	40	-		
Turn-off Fall time	t _f	-	12	-		
Gate Total Charge	Q _G	-	72	-	nC	V _{GS} =10V, V _{DS} =15V, I _D =30A
Gate-Source Charge	Q _{gs}	-	46	-		
Gate-Drain Charge	Q _{gd}	-	13	-		
Drain-Source Diode Characteristics						
Body Diode Forward Voltage	V _{SD}	-	-	1.2	V	V _{GS} =0V, I _{SD} =30A, T _J = 25℃
Body Diode Forward Current	I _S	-	-	120	A	-
Max Pulsed Drain-source diode forward current	I _{SM}	-	-	360	A	

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N- Channel Typical Characteristics

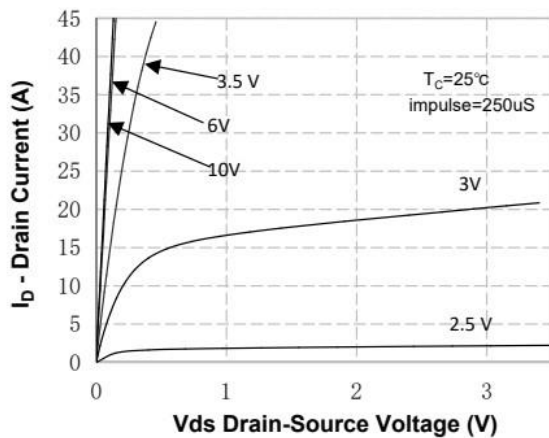


Figure 1. On-Region Characteristics

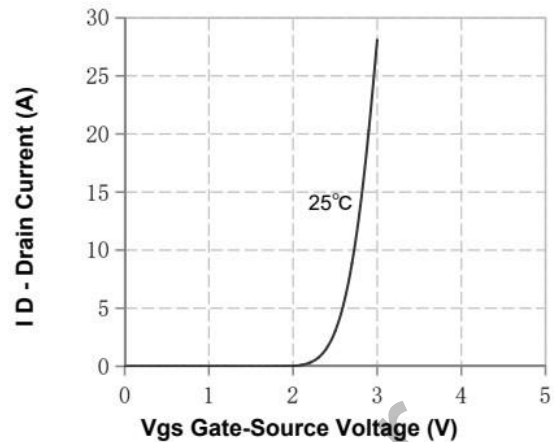


Figure 2. Transfer Characteristics

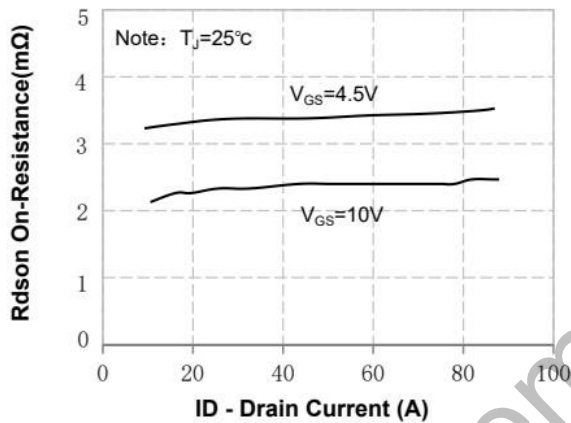


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

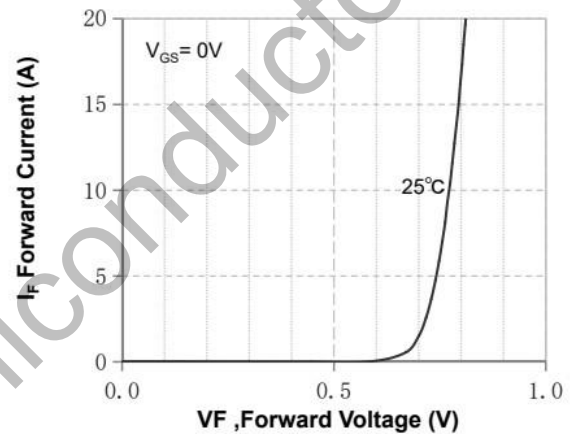


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

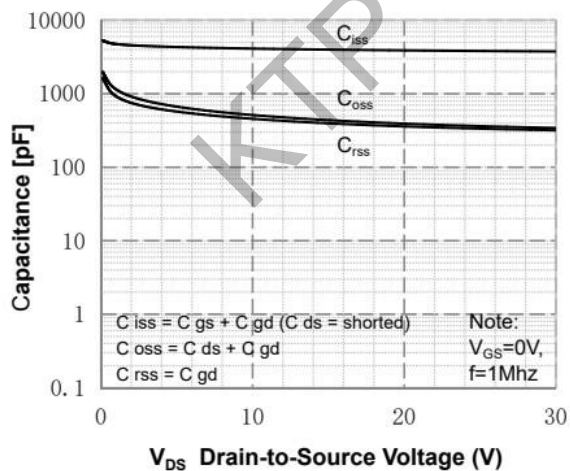


Figure 5. Capacitance Characteristics

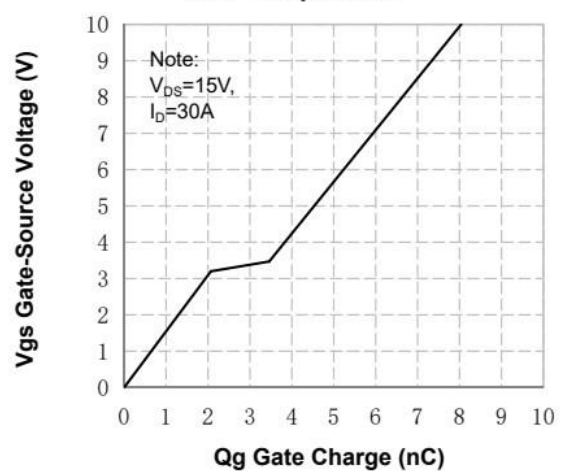


Figure 6. Gate Charge Characteristics

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N- Channel Typical Characteristics (Continued)

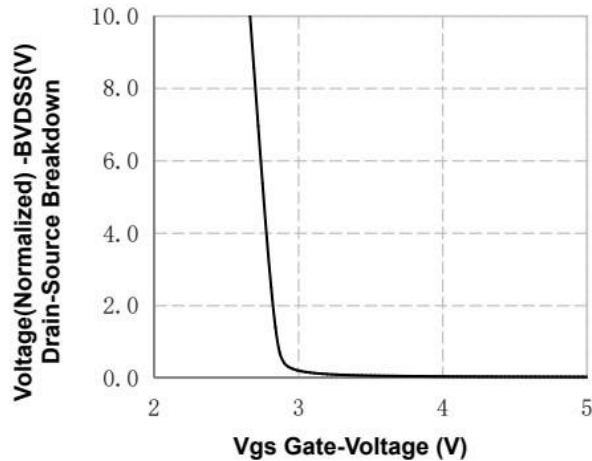


Figure 7. Breakdown Voltage Variation vs Gate-Voltage

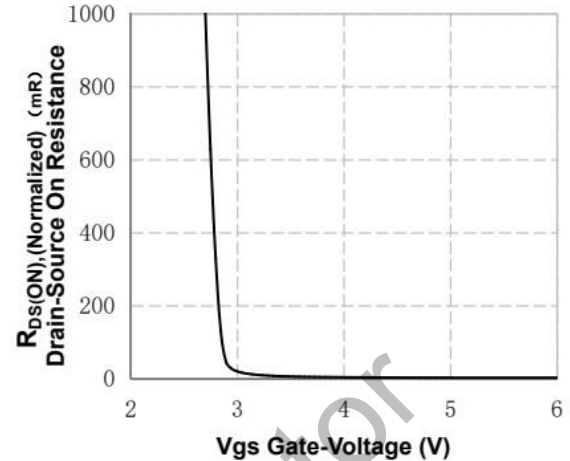


Figure 8. On-Resistance Variation vs Gate Voltage

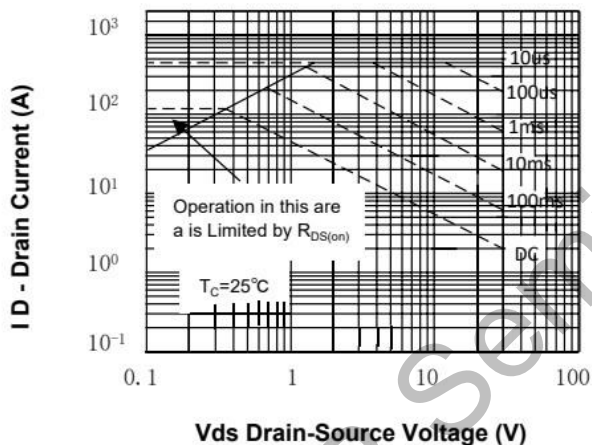


Figure 9. Maximum Safe Operating Area

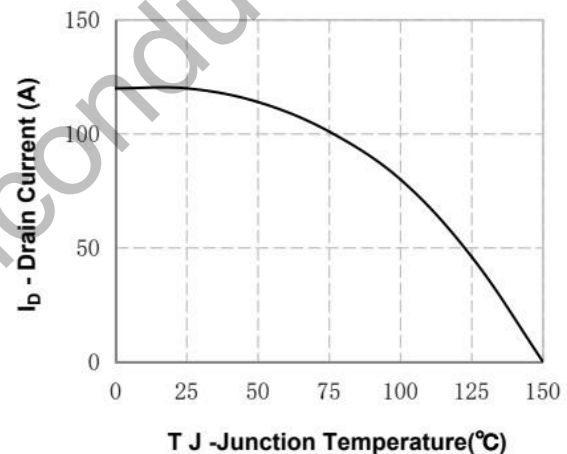


Figure 10. Maximum PContinuous Drain Current vs Case Temperature

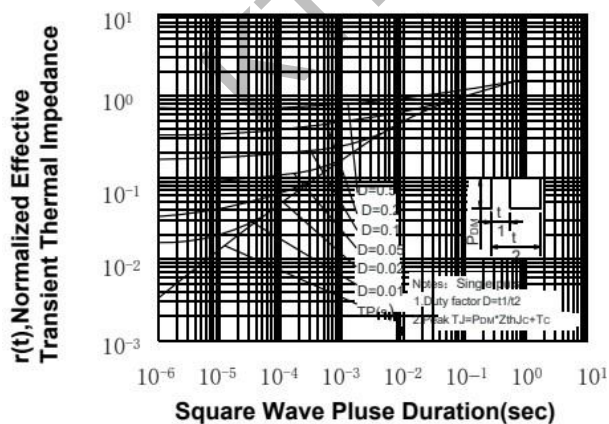
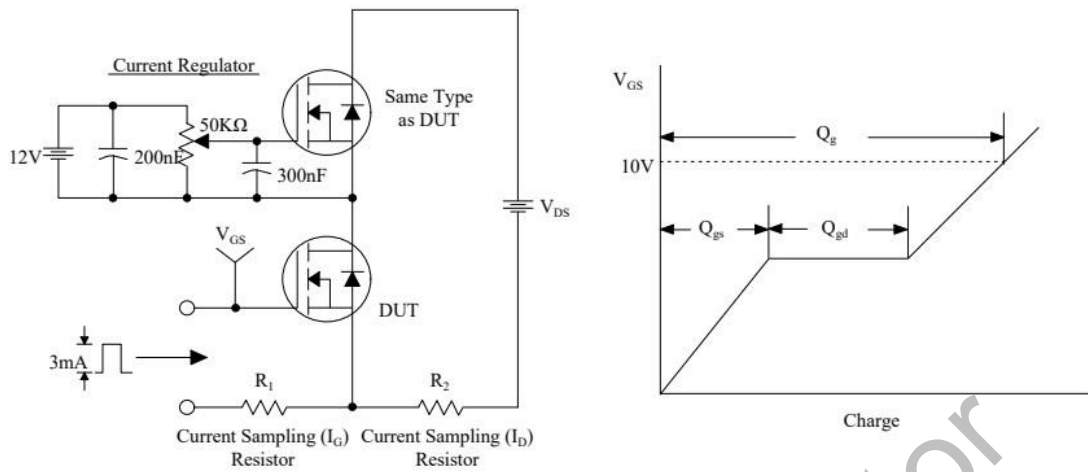


Figure 11. Transient Thermal Response Curve

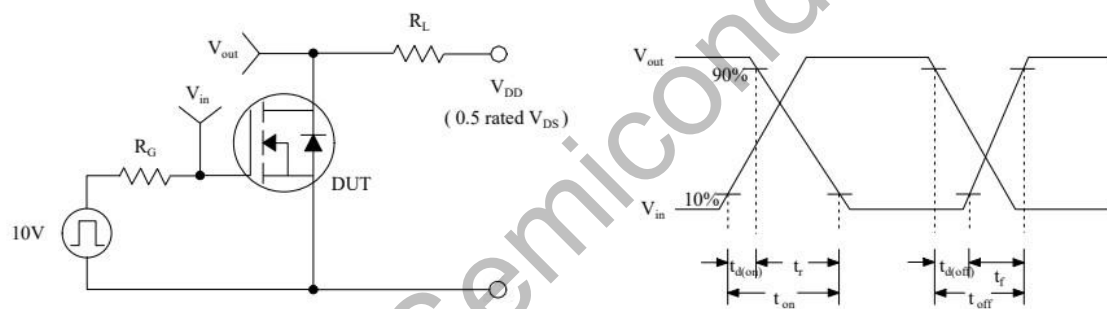
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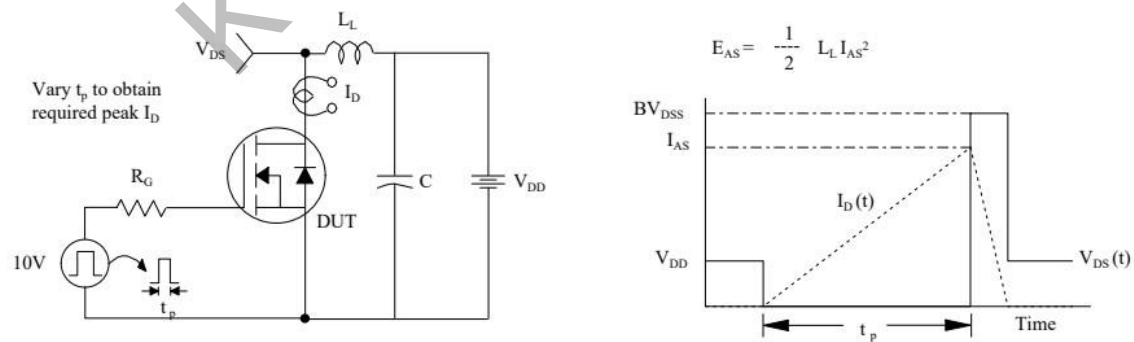
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



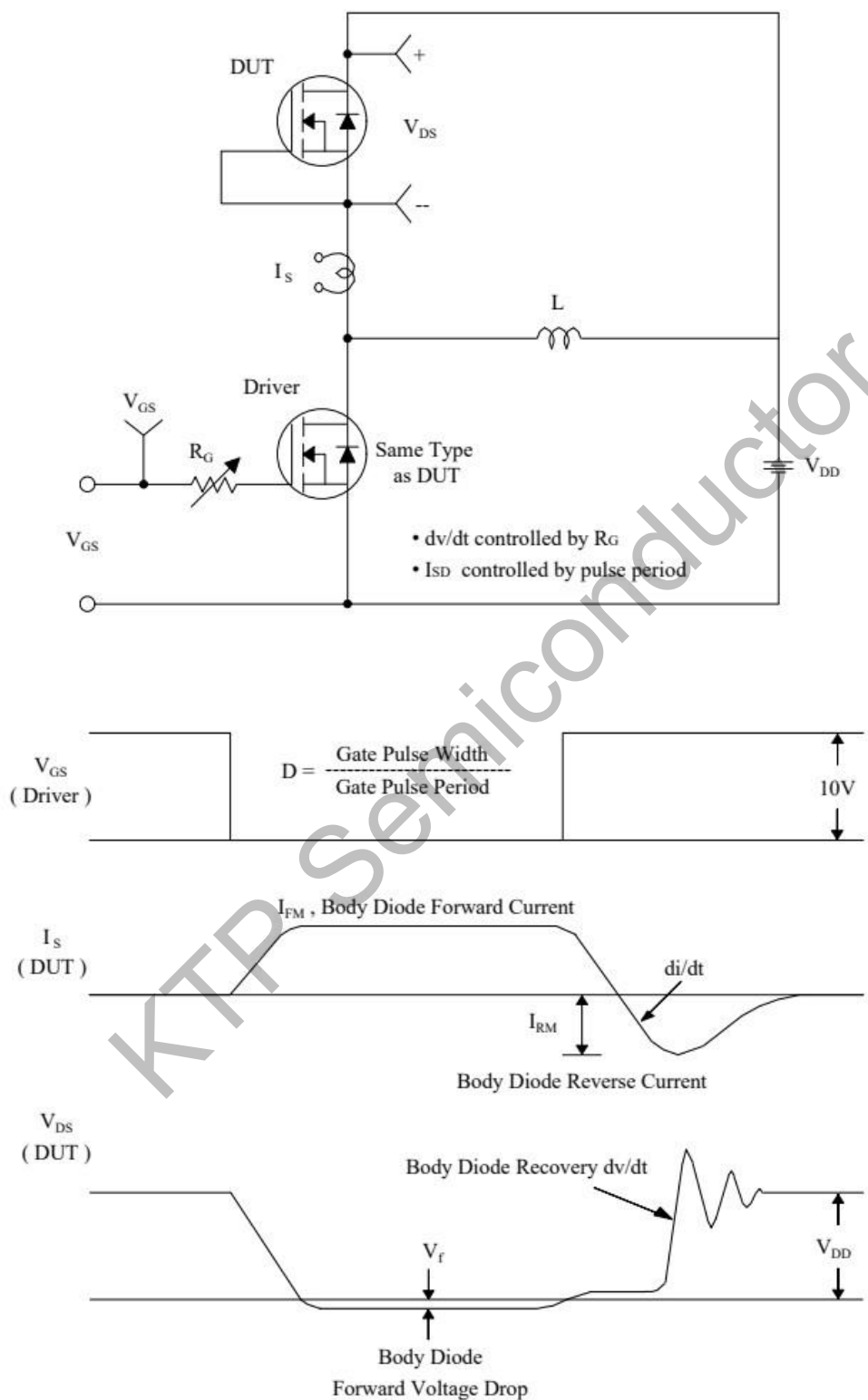
Unclamped Inductive Switching Test Circuit & Waveforms



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Peak Diode Recovery dv/dt Test Circuit & Waveforms

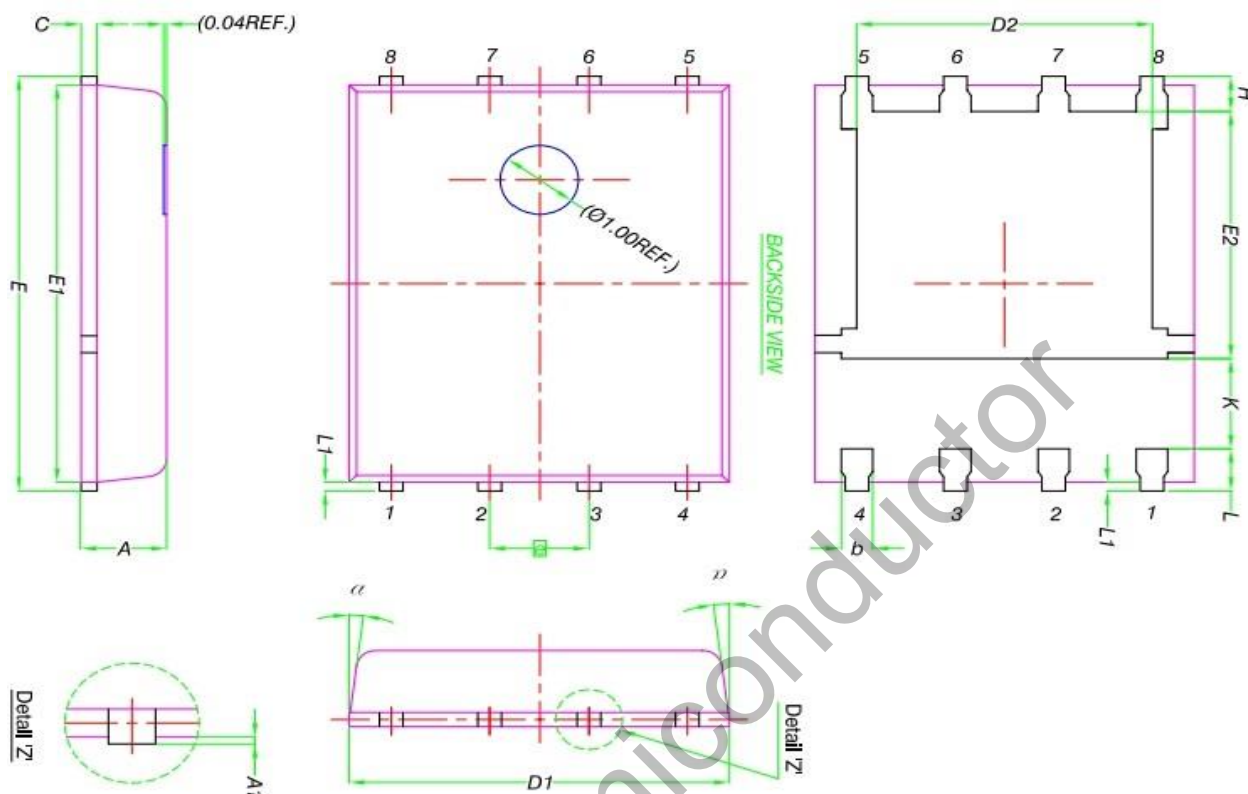


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Package Information

PDFN5*6-8L



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
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
	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°

