

General Description

The TF030N04MG combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

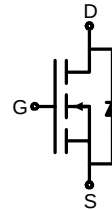
Features

Advance high cell density Trench technology
Low $R_{DS(ON)}$ to minimize conductive loss
Low Gate Charge for fast switching
Low Thermal resistance

Application

MB/VGA Vcore
SMPS 2nd Synchronous Rectifier
POL application
BLDC Motor driver

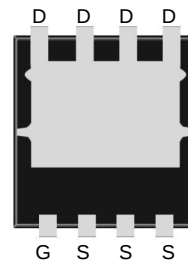
Product Summary



$$V_{DS} = 40V \quad I_D = 90A$$

$$R_{DS(ON)}(10V_{typ}) = 2.7m\Omega$$

$$R_{DS(ON)}(4.5V_{typ}) = 3.5m\Omega$$



PDFNWB3.3x3.3-8L

Ordering Information:

Part NO.	TF030N04MG
Marking 1	030N04MG:TF030N04MG
Marking 2	TF:tuofeng; AA:device code; Y:year code; X:Week
MOQ	5000

Absolute Maximum Ratings ($T_C = 25^\circ C$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D @ T_C = 25^\circ C$	90	A
	$I_D @ T_C = 75^\circ C$	63	A
	$I_D @ T_C = 100^\circ C$	54	A
Pulsed Drain Current ①	I_{DM}	300	A
Total Power Dissipation	$P_D @ T_C = 25^\circ C$	60	W
Total Power Dissipation	$P_D @ T_A = 25^\circ C$	1.0	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ C$
Storage Temperature	T_{STG}	-55 to 150	$^\circ C$

Note: ① Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;



Shenzhen Tuofeng Semiconductor Technology Co., Ltd

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

SGT MOS、低内阻、低结电容开关损耗小

TF030N04MG

Single Pulse Avalanche Energy	E _{AS}	100			mJ	
Avalanche Current	I _{AS} I _{AR}	25			A	
●Thermal resistance						
Parameter	Symbol	Min.	Typ.	Max.	Unit	
Thermal resistance, junction - case	R _{thJC}	-	-	3.0	° C/W	
Thermal resistance, junction - ambient	R _{thJA}	-	-	60	° C/W	
Soldering temperature, wave soldering for 8s	T _{sold}	-	-	265	° C	
●Electronic Characteristics						
Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	40			V
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	1.1	1.7	2.5	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V			1.0	uA
Gate- Source Leakage Current	I _{GSS}	V _{GS} =±20V ,V _{DS} =0V			±100	nA
Static Drain-source On Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A		2.7	4.0	mΩ
		V _{GS} =4.5V, I _D =15A		3.5	5.0	mΩ
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =20A		45		S
Source-drain voltage	V _{SD}	I _S =20A			1.20	V
●Electronic Characteristics						
Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C _{iss}	V _{ds} =25V,V _{gs} =0V f = 1MHz	-	1980	-	pF
Output capacitance	C _{oss}		-	455	-	
Reverse transfer capacitance	C _{rss}		-	29	-	
●Gate Charge characteristics(T _a = 25°C)						
Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Gate Resistance	R _g	f = 1MHz		1.7		Ω
Total gate charge	Q _g	V _{DD} = 20V I _D = 20A V _{GS} = 10V	-	32.0	-	nC
Gate - Source charge	Q _{gs}		-	4.70	-	
Gate - Drain charge	Q _{gd}		-	5.30	-	
Turn-ON Delay time	t _{D(on)}	V _{GS} =10V ,V _{DS} =20V R _G =3.0Ω, I=20A		7.40		ns
Turn-ON Rise time	t _r			4.70		ns
Turn-Off Delay time	t _{D(off)}			29.2		ns
Turn-Off Fall time	t _f			7.30		ns

Typical Characteristics

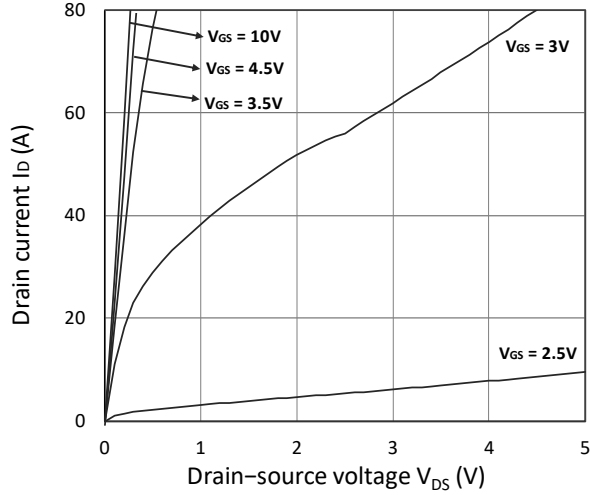


Figure 1. Output Characteristics

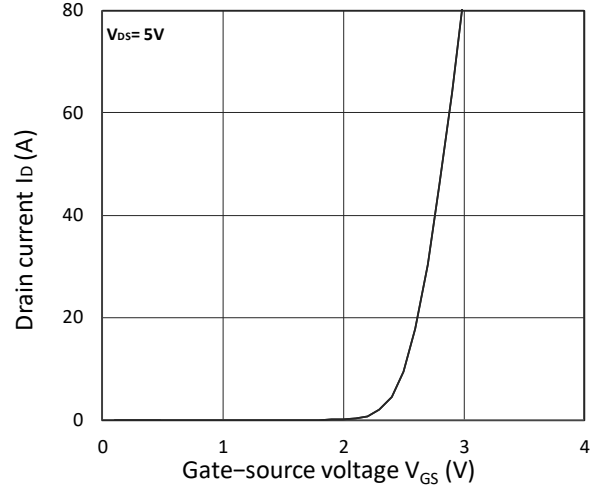


Figure 2. Transfer Characteristics

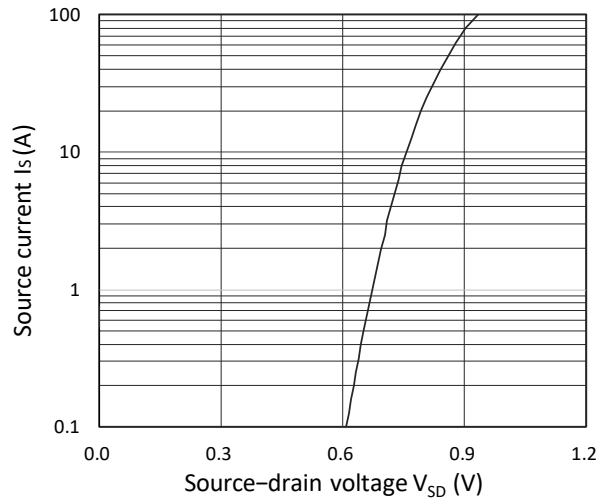


Figure 3. Forward Characteristics of Reverse

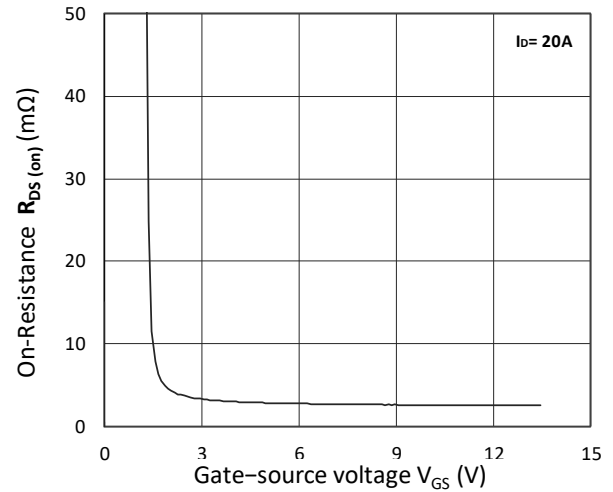


Figure 4. $R_{DS(on)}$ vs. V_{GS}

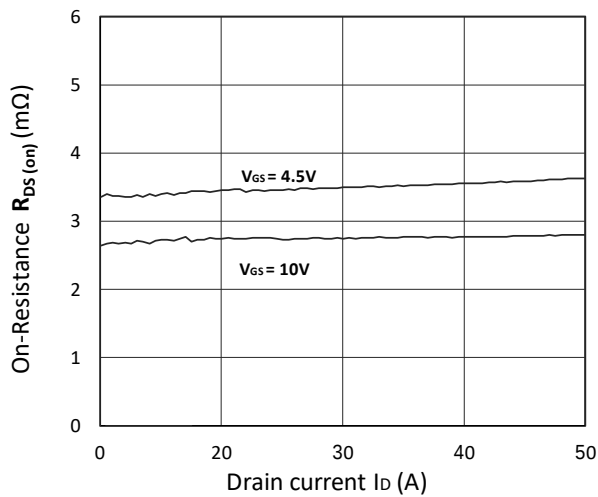


Figure 5. $R_{DS(on)}$ vs. I_D

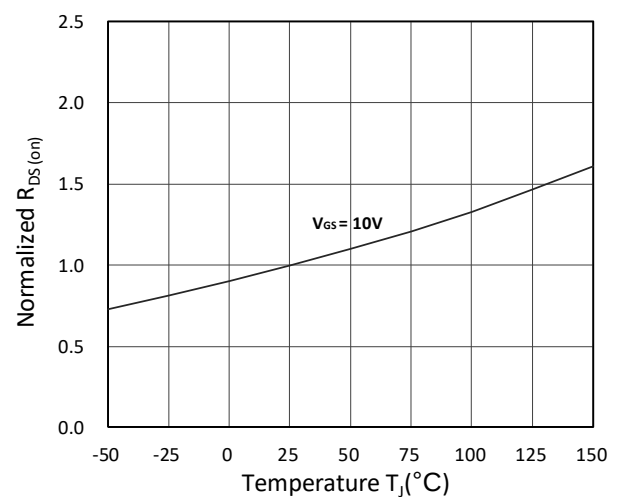


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

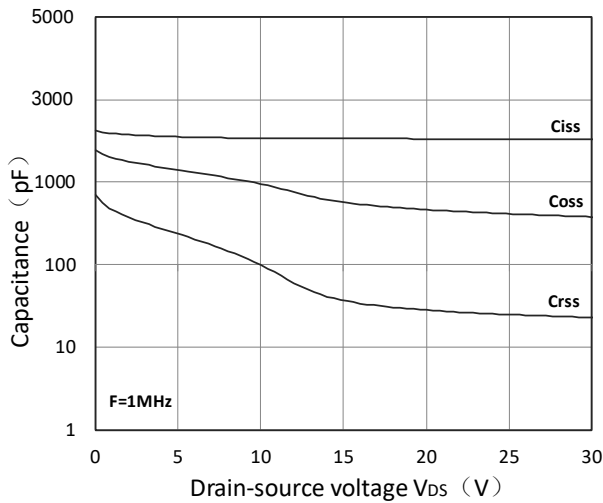


Figure 7. Capacitance Characteristics

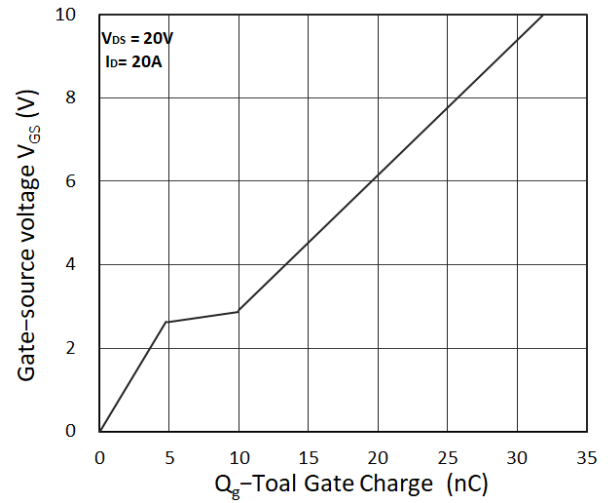


Figure 8. Gate Charge Characteristics

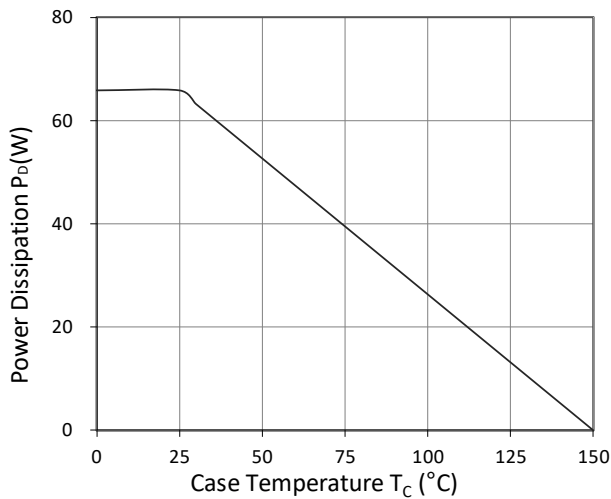


Figure 9. Power Dissipation

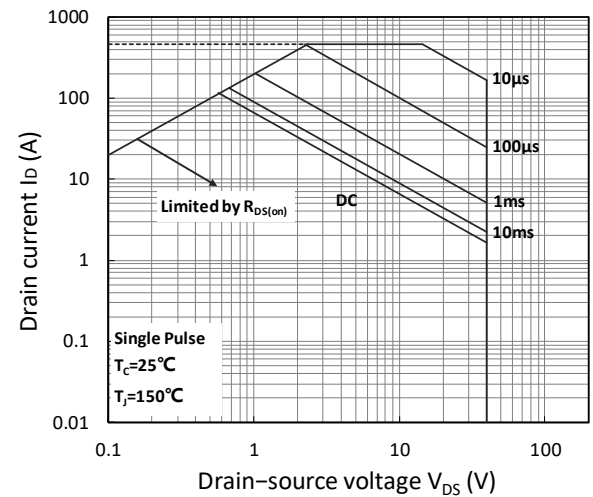


Figure10. Safe Operating Area

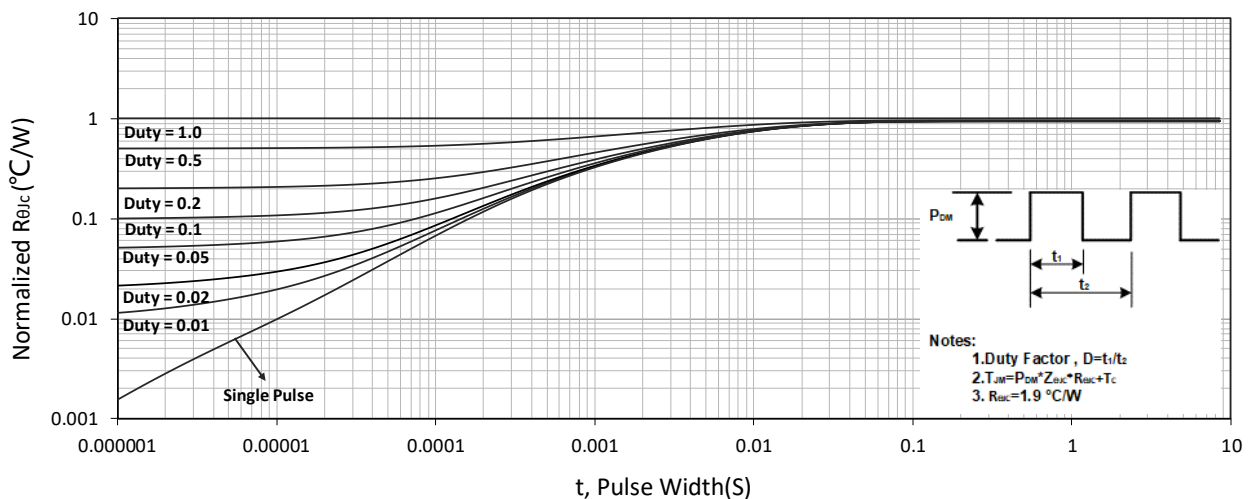


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

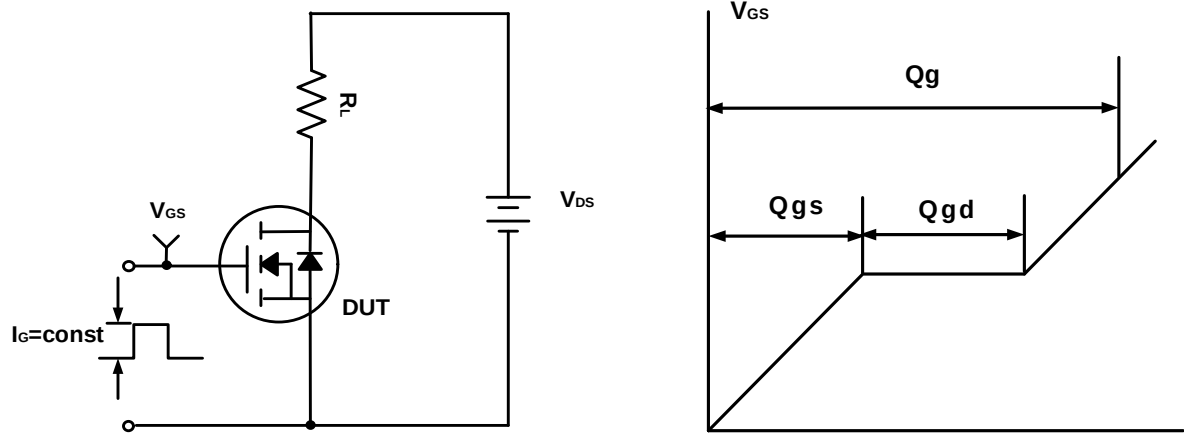


Figure A. Gate Charge Test Circuit & Waveforms

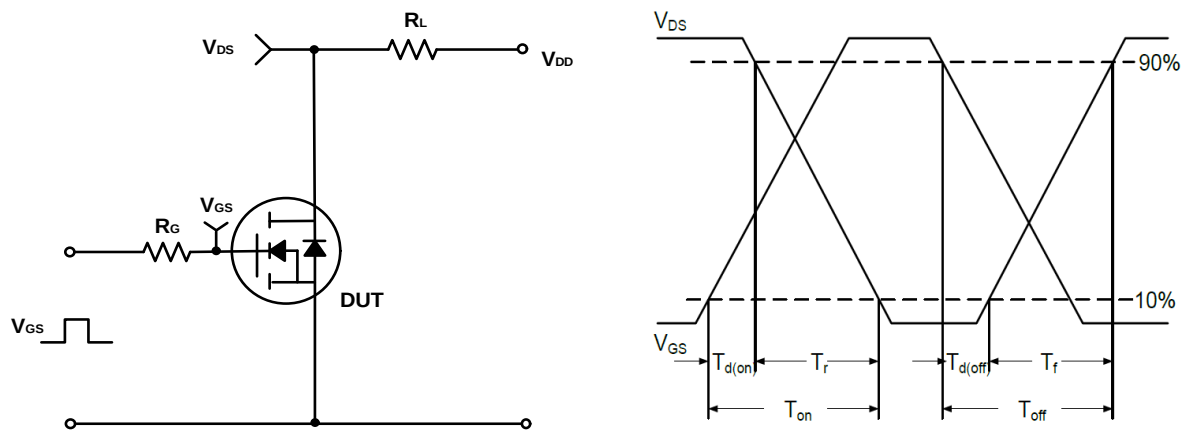


Figure B. Switching Test Circuit & Waveforms

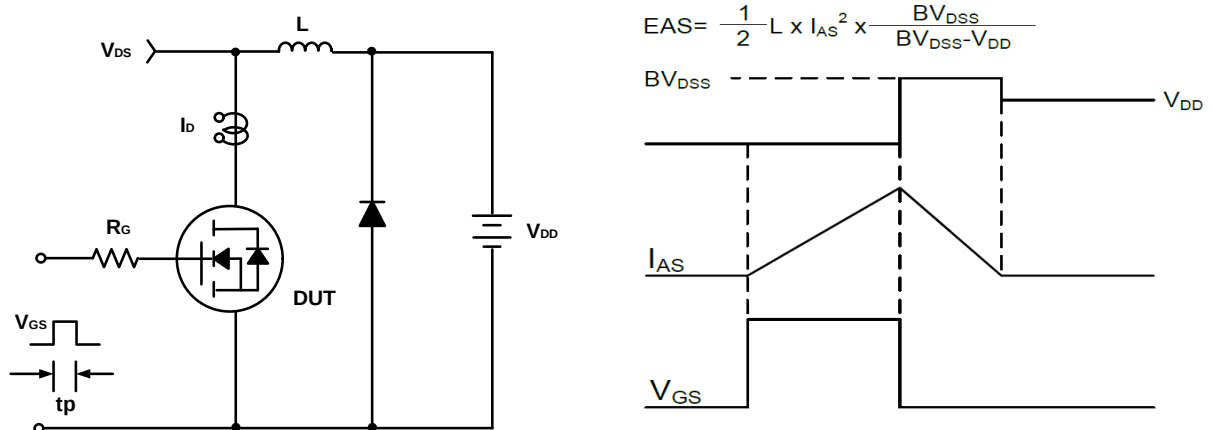
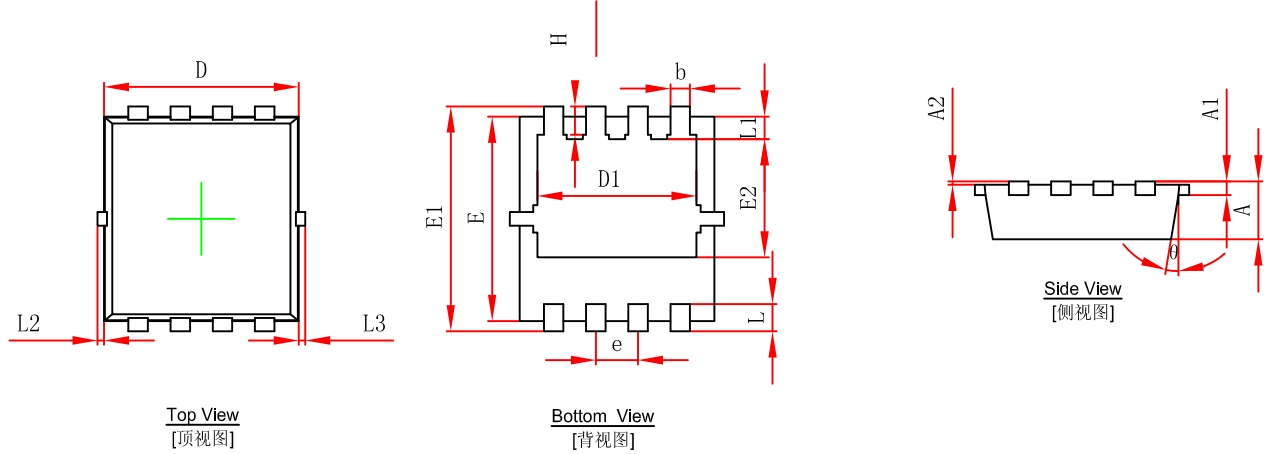


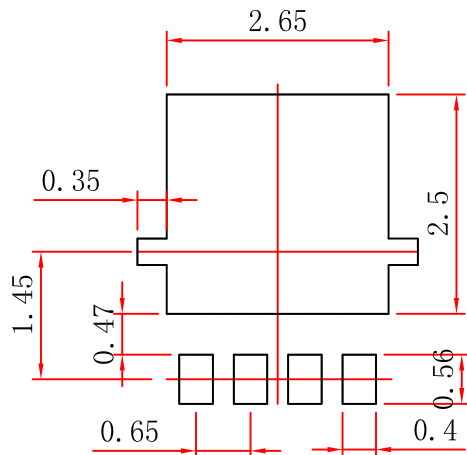
Figure C. Unclamped Inductive Switching Circuit & Waveforms

PDFNWB3.3x3.3-8L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°

PDFNWB3.3x3.3-8L Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.05 mm.
3. The pad layout is for reference purposes only.