

1200V N-chPlanar MOSFET

General Features

- RoHS Compliant
- $R_{DS(ON),typ.}=6\Omega@V_{GS}=10V$
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

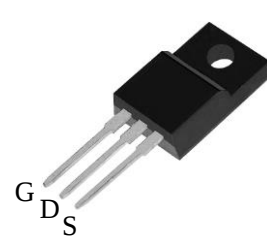
Applications

- Adaptor
- Charger
- SMPS Standby Power

Ordering Information

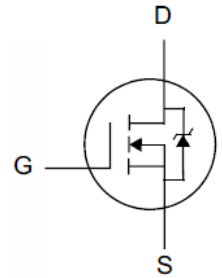
Part Number	Package
SK03N120B-TF	TO-220F

BV_{DSS}	$R_{DS(ON),typ.}$	I_D
1200V	6Ω	3.0A



TO-220F

Package No to Scale



Absolute Maximum Ratings

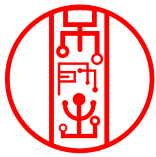
$T_C=25^{\circ}C$ unless otherwise specified

Symbol	Parameter		Unit
V_{DSS}	Drain-to-Source Voltage	1200	V
V_{GSS}	Gate-to-Source Voltage	±30	
I_D	Continuous Drain Current	3.0	A
I_{DM}	Pulsed Drain Current at $V_{GS}=10V$	12	
E_{AS}	Single Pulse Avalanche Energy	100	mJ
dv/dt	Peak Diode Recovery dv/dt ^[3]	5.0	V/ns
P_D	Power Dissipation	30	W
	Derating Factor above 25°C	0.24	W/°C
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300	°C
T_J & T_{STG}	Operating and Storage Temperature Range	-55 to 150	

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter		Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	4.17	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	100	



Electrical Characteristics

OFF Characteristics

 $T_J = 25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	1200	--	--	V	$V_{GS}=0V, I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	--	--	1	μA	$V_{DS}=1200V, V_{GS}=0V$
		--	--	100		$V_{DS}=960V, V_{GS}=0V, T_J=125^{\circ}\text{C}$
I_{GSS}	Gate-to-Source Leakage Current	--	--	+100	nA	$V_{GS}=+30V, V_{DS}=0V$
		--	--	-100		$V_{GS}=-30V, V_{DS}=0V$

ON Characteristics

 $T_J = 25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	6.0	7.5	Ω	$V_{GS}=10V, I_D=1.5A$
$V_{GS(TH)}$	Gate Threshold Voltage	2.5	--	4.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
gfs	Forward Transconductance	--	4	--	S	$V_{DS}=20V, I_D=1.5A$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	860	--	pF	$V_{GS}=0V, V_{DS}=25V, f=1.0\text{MHz}$
C_{rss}	Reverse Transfer Capacitance	--	22	--		
C_{oss}	Output Capacitance	--	60	--		
Q_g	Total Gate Charge	--	17.5	--	nC	$V_{DD}=600V, I_D=3A, V_{GS}=0 \text{ to } 10V$
Q_{gs}	Gate-to-Source Charge	--	5	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	5.5	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	17	--	ns	$V_{DD}=600V, I_D=3A, V_{GS}=10V, R_g=4.7\Omega$
t_{rise}	Rise Time	--	6	--		
$t_{d(OFF)}$	Turn-Off Delay Time	--	23	--		
t_{fall}	Fall Time	--	11	--		



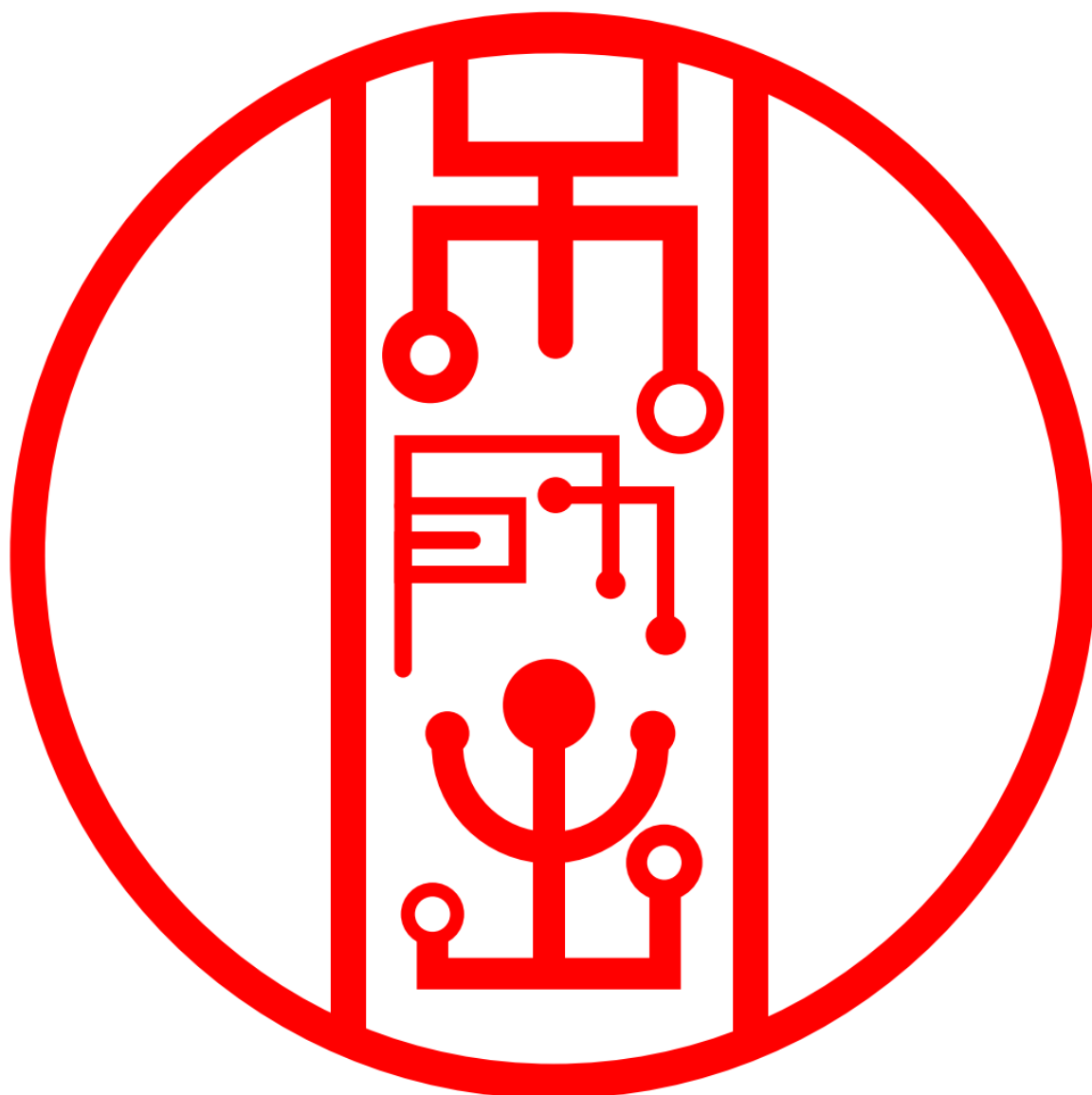
SK03N120B-TF

Source-Drain Body Diode Characteristics

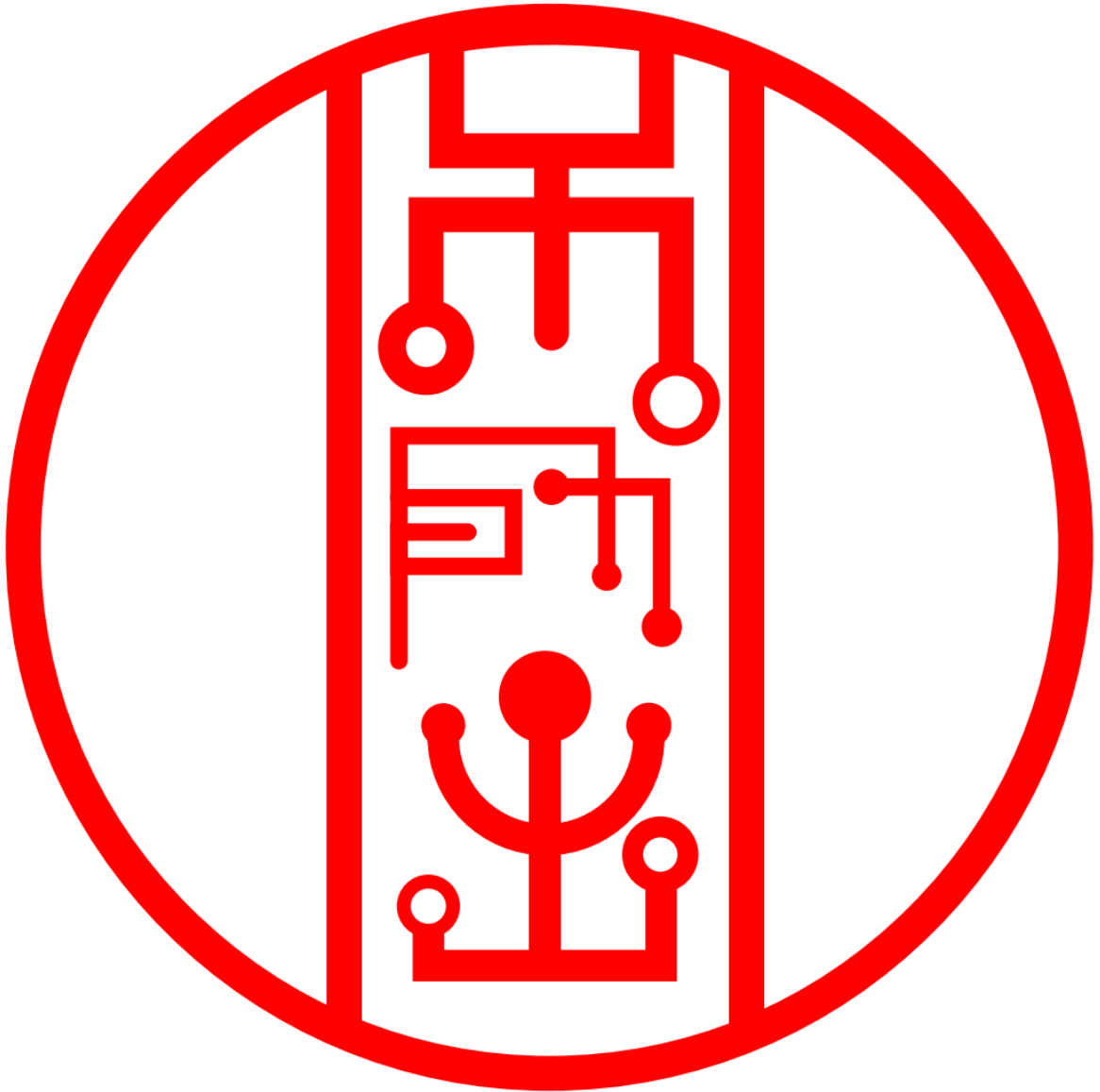
$T_J=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min	Typ.	Max.	Unit	Test Conditions
I_{SD}	Continuous Source Current ^[2]	--	--	3	A	Integral pn-diode in MOSFET
I_{SM}	Pulsed Source Current ^[2]	--	--	12		
V_{SD}	Diode Forward Voltage	--	--	1.5	V	$I_S=3\text{A}$, $V_{GS}=0\text{V}$
t_{rr}	Reverse Recovery Time	--	200	--	ns	$V_{GS}=0\text{V}$ $I_F=I_S$, $di/dt=100\text{A}/\mu\text{s}$
Q_{rr}	Reverse Recovery Charge	--	760	--	nC	

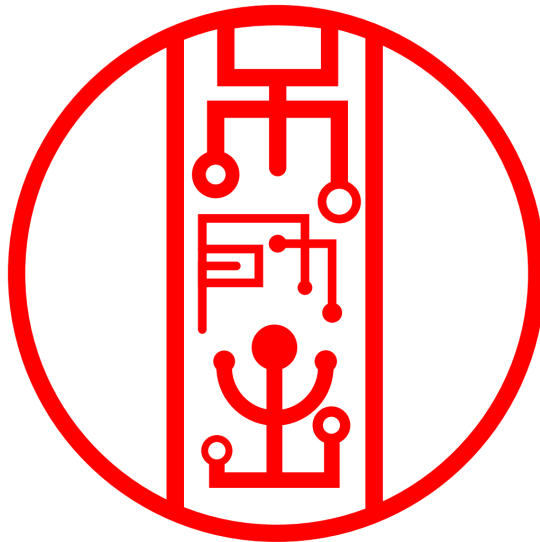
Typical Characteristics



Typical Characteristics(Cont.)



Typical Characteristics(Cont.)



TestCircuitsandWaveforms

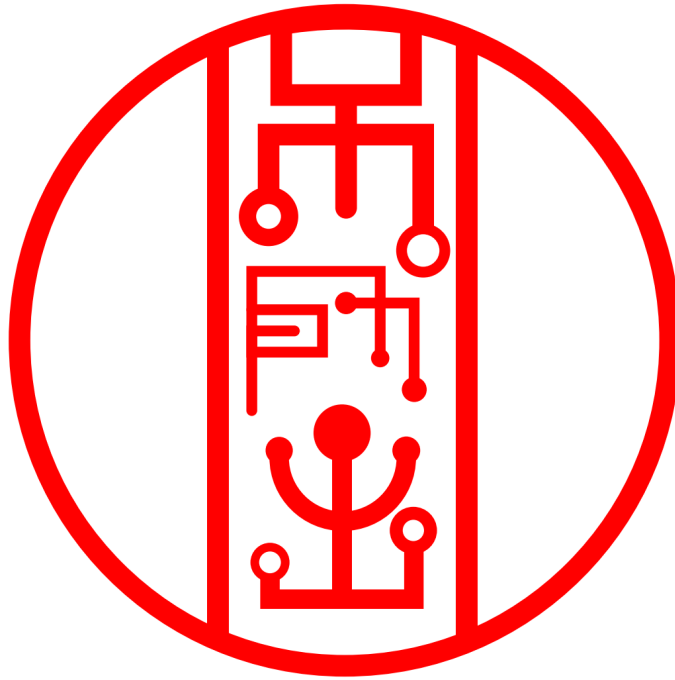


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

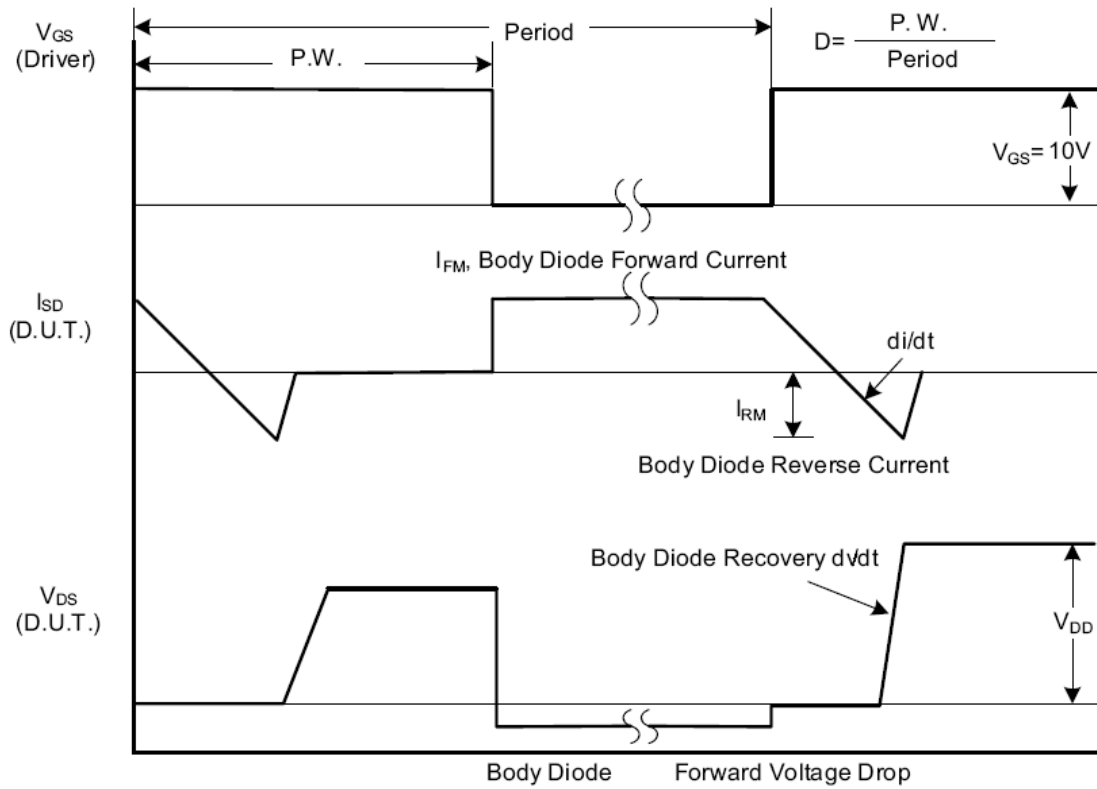


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

Test Circuits and Waveforms (Cont.)

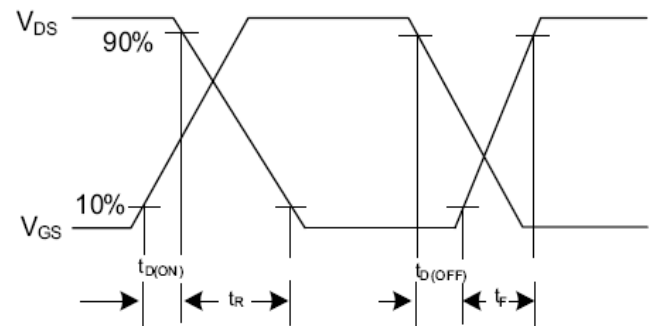
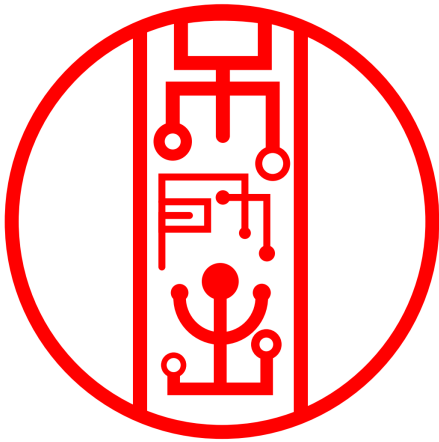


Fig. 2.2 Switching Waveforms

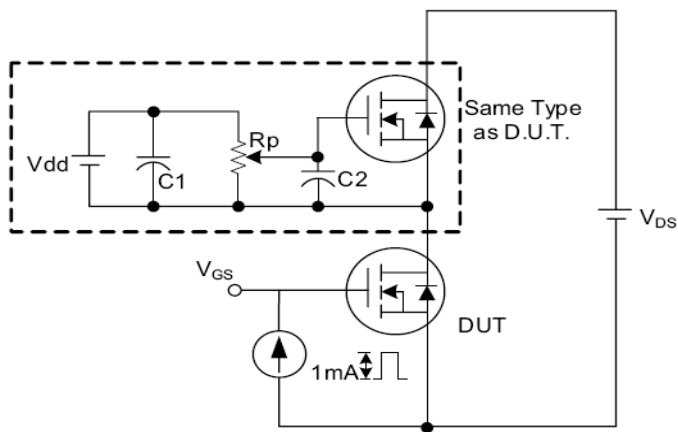


Fig. 3.1 Gate Charge Test Circuit

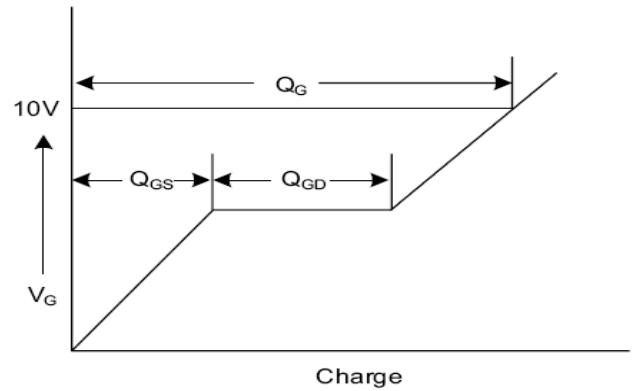


Fig. 3.2 Gate Charge Waveform

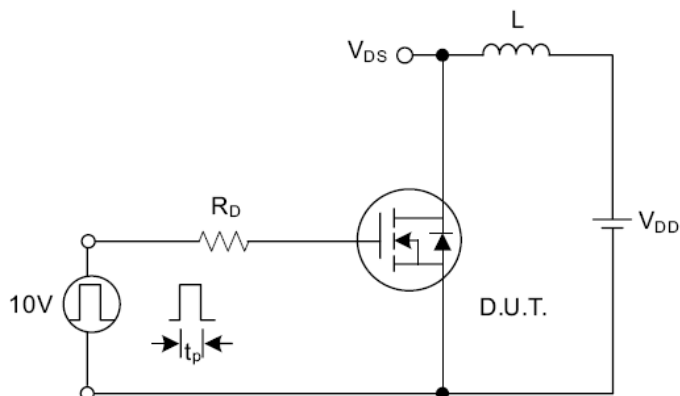


Fig. 4.1 Unclamped Inductive Switching Test Circuit

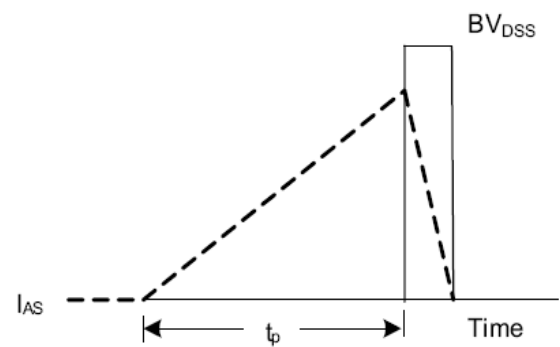


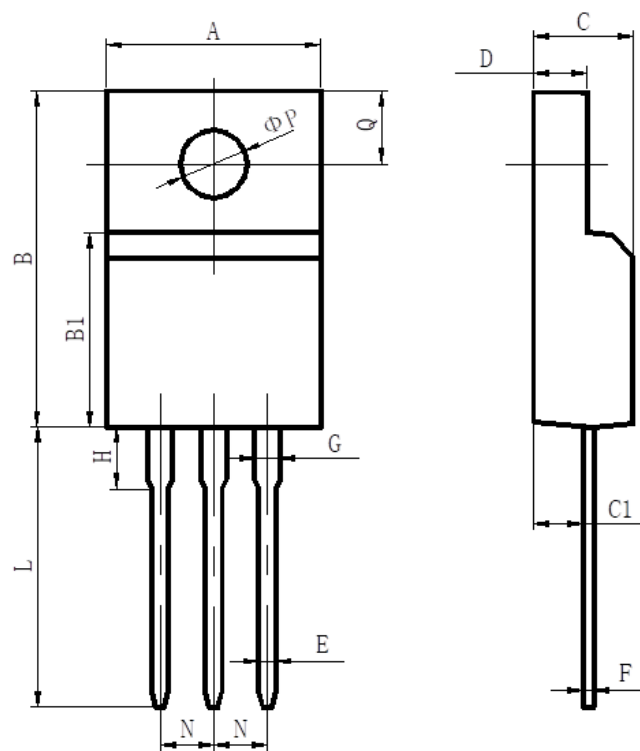
Fig. 4.2 Unclamped Inductive Switching Waveforms



SK03N120B-TF

PACKAGE OUTLINE

TO-220F



	Unit (mm)	
	MIN	MAX
A	9.70	10.30
B	15.50	16.10
B1	8.99	9.39
C	4.40	4.80
C1	2.15	2.55
D	2.50	2.90
E	0.70	0.90
F	0.40	0.60
G	1.12	1.42
H	3.40	3.80
L	12.6	13.6
N	2.34	2.74
Q	3.15	3.55
ΦP	3.00	3.30