

SK14N80B-TF

800V N-Channel MOSFET

BV_{DSS}	$R_{DS(ON),typ.}$	I_D
800V	550mΩ	14A

General Features

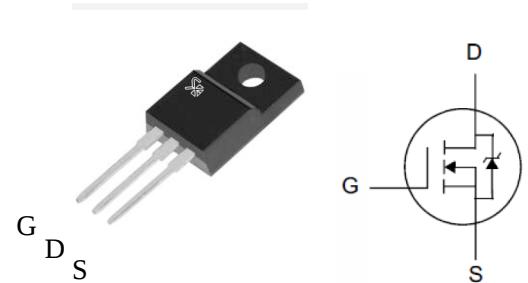
- Advanced Planar Process
- $R_{DS(ON),typ.}=550\text{ m}\Omega@V_{GS}=10V$
- Low Gate Charge Minimize Switching Loss
- Rugged Polysilicon Gate Structure

Applications

- BLDC Motor Driver
- Electric Welder
- High Efficiency SMPS

Ordering Information

Part Number	Package
SK14N80B-TF	TO-220F



TO-220F Package

Absolute Maximum Ratings

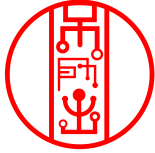
$T_C=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	SK14N80B-TF	Unit
V_{DSS}	Drain-to-Source Voltage ^[1]	800	V
V_{GSS}	Gate-to-Source Voltage	± 30	
I_D	Continuous Drain Current	14	A
$I_D @ T_C=100^{\circ}\text{C}$	Continuous Drain Current @ $T_C=100^{\circ}\text{C}$	9	
I_{DM}	Pulsed Drain Current at $V_{GS}=10V$ ^[2]	40	
E_{AS}	Single Pulse Avalanche Energy	500	mJ
dv/dt	Peak Diode Recovery dv/dt ^[3]	5.0	V/ns
P_D	Power Dissipation	77	W
	Derating Factor above 25°C	0.61	W/ $^{\circ}\text{C}$
T_L T_{PAK}	Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds	300 260	$^{\circ}\text{C}$
$T_J \& T_{STG}$	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	14N80B-TF	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.62	$^{\circ}\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	100	



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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	800	--	--	V	$V_{GS}=0V, I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	--	--	1	μA	$V_{DS}=800V, V_{GS}=0V$
		--	--	125		$V_{DS}=640V, V_{GS}=0V, T_J = 125^\circ\text{C}$
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 ^[5]	--	550	720	m Ω	$V_{GS}=10V, I_D=7A$
$V_{GS(TH)}$	Gate Threshold Voltage	2.0	--	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
g_{FS}	Forward Transconductance	--	32	--	S	$V_{DS}=25V, I_D=7A$

Dynamic Characteristics

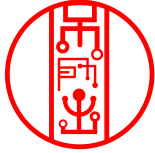
Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	4.20	--	nF	$V_{GS}=0V, V_{DS}=25V, f=1.0\text{MHz}$
C_{rss}	Reverse Transfer Capacitance	--	0.20	--		
C_{oss}	Output Capacitance	--	1.40	--		
Q_g	Total Gate Charge	--	78	--	nC	$V_{DD}=350V, I_D=14A, V_{GS}=0 \text{ to } 10V$
Q_{gs}	Gate-to-Source Charge	--	21	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	20	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	32	--	ns	$V_{DD}=350V, I_D=14A, V_{GS}=10V, R_G=10\Omega$
t_{rise}	Rise Time	--	65	--		
$t_{d(OFF)}$	Turn-Off Delay Time	--	57	--		
t_{fall}	Fall Time	--	66	--		



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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]	--	--	14	A	Integral PN-diode in MOSFET
I_{SM}	Pulsed Source Current ^[2]	--	--	40		
V_{SD}	Diode Forward Voltage	--	--	1.5	V	$I_S=14\text{A}$, $V_{GS}=0\text{V}$
t_{rr}	Reverse recovery time	--	630	--	ns	$V_{GS}=0\text{V}$, $I_F=14\text{A}$, $di_F/dt=100\text{A}/\mu\text{s}$
Q_{rr}	Reverse recovery charge	--	6.0	--	μC	

Note:

[1] $T_J=+25^{\circ}\text{C}$ to $+150^{\circ}\text{C}$.

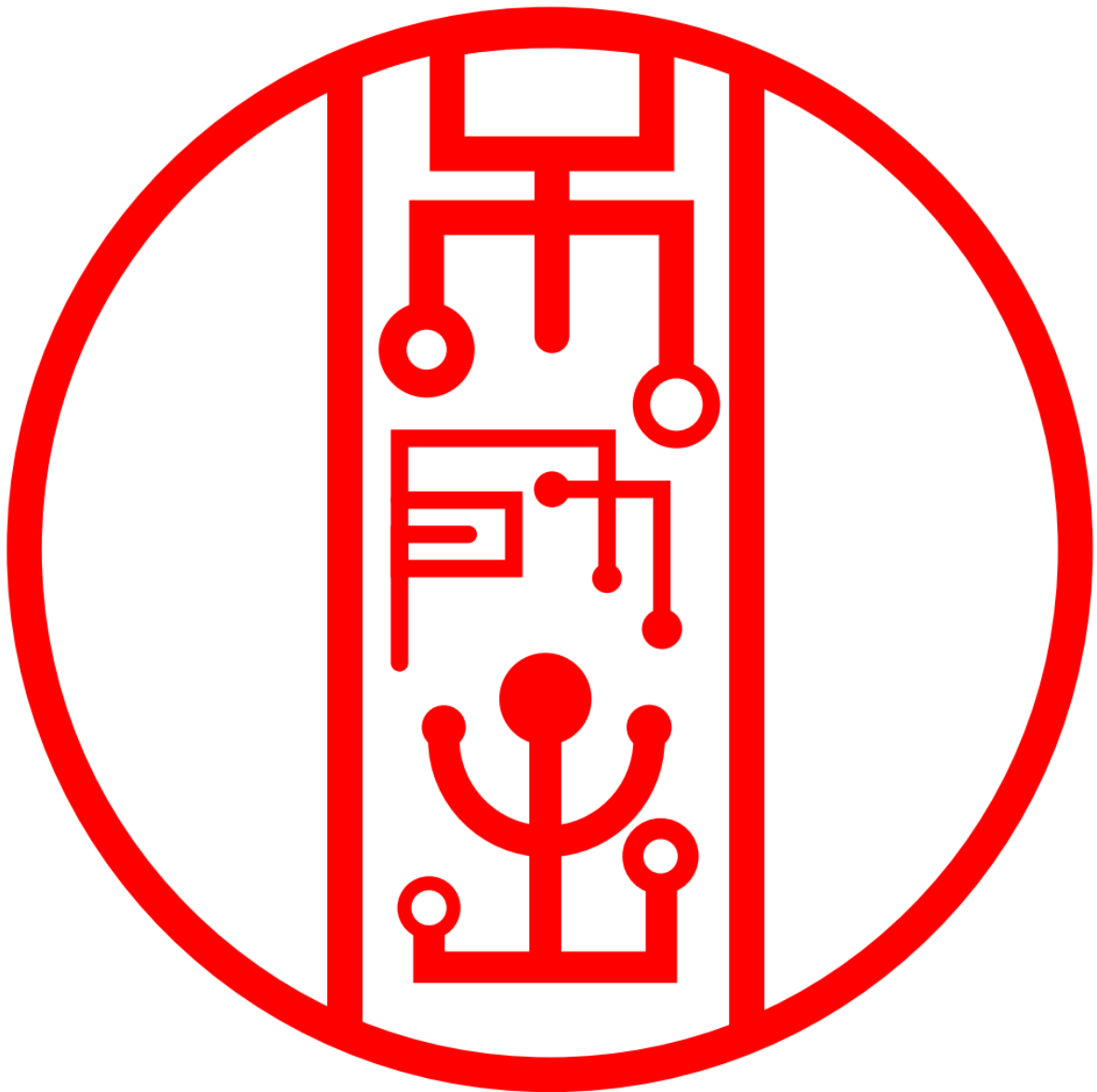
[2] Silicon limited current only.

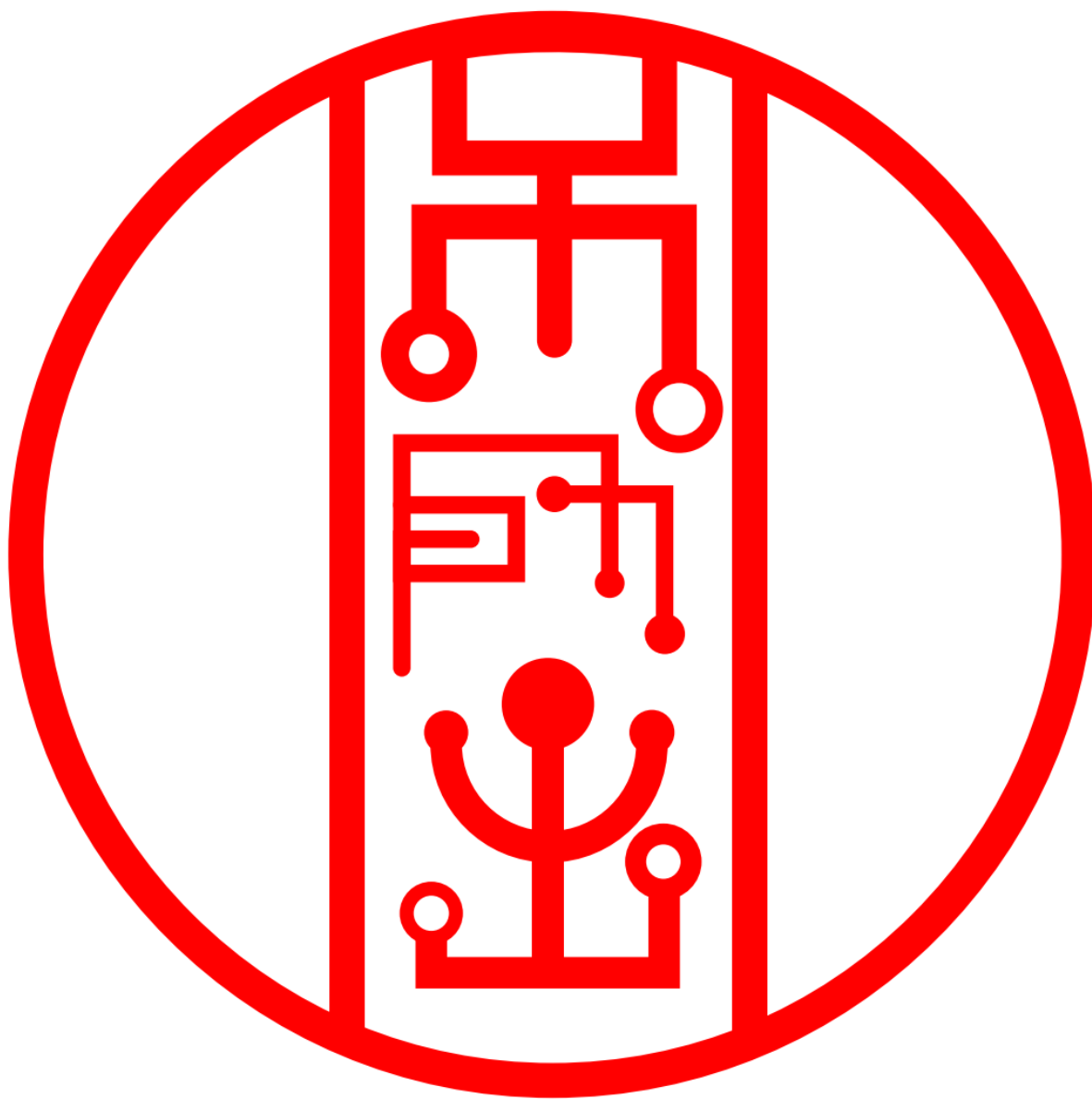
[3] Package limited current.

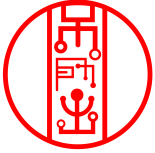
[4] Repetitive rating; pulse width limited by maximum junction temperature.

[5] Pulse width $\leq 380\mu\text{s}$; duty cycle $\leq 2\%$.

Typical Characteristics







TestCircuitsandWaveforms

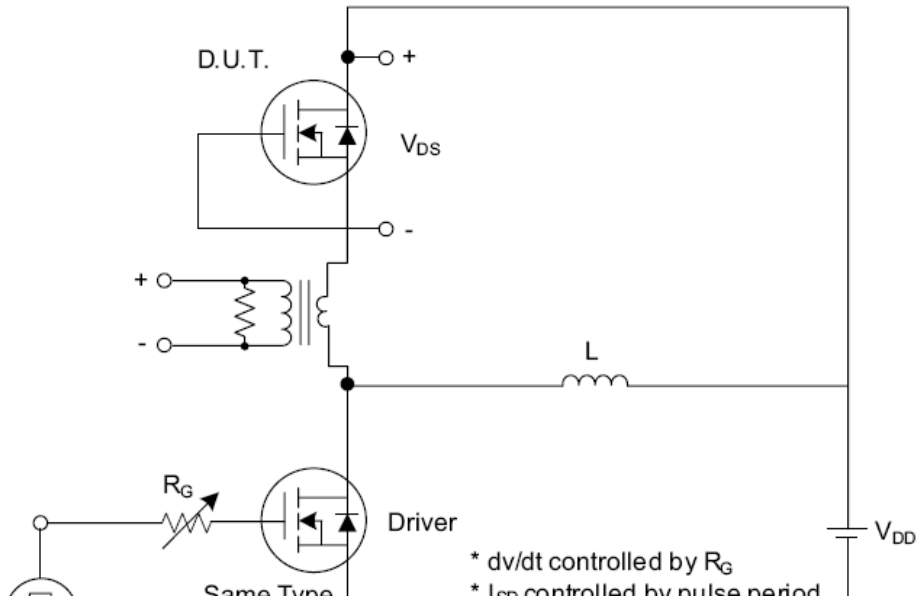


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

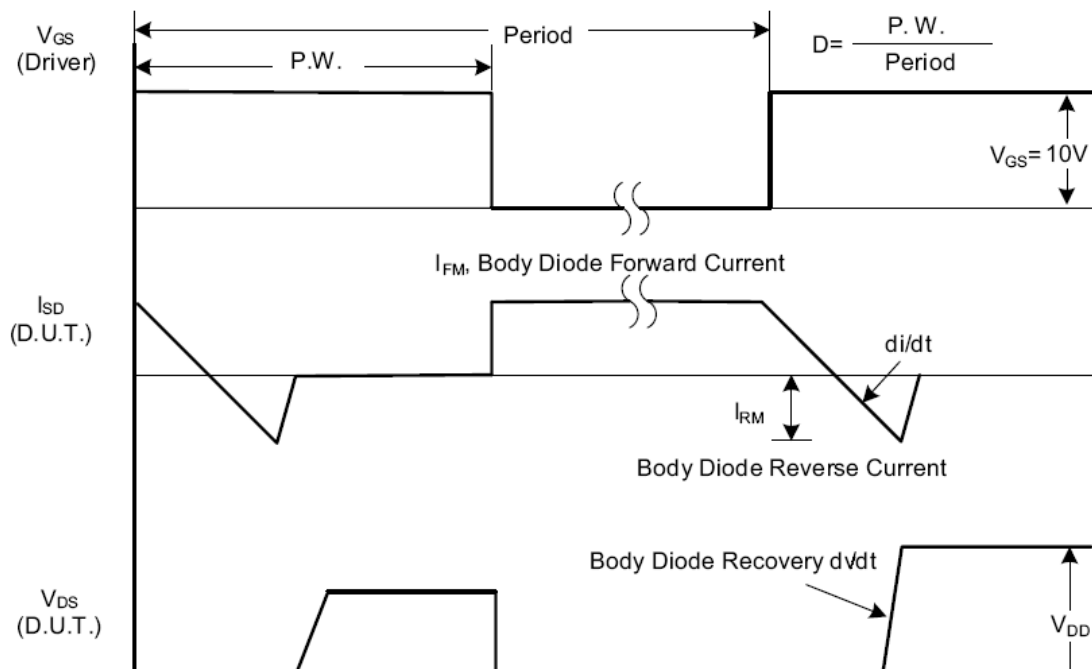
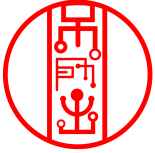
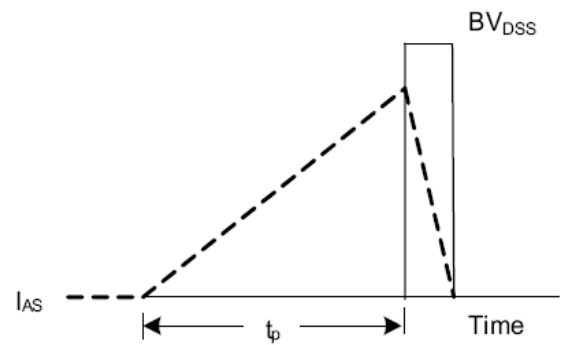
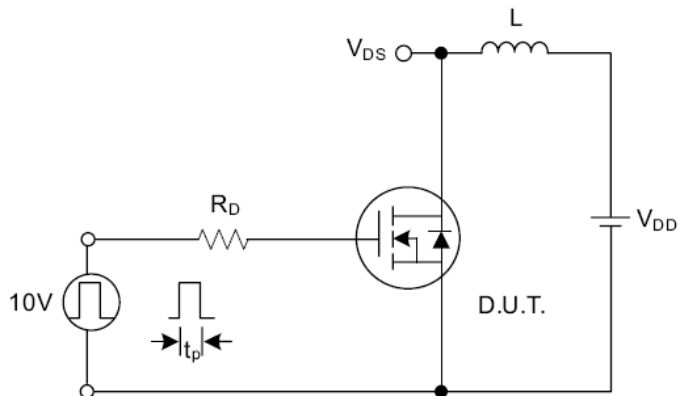
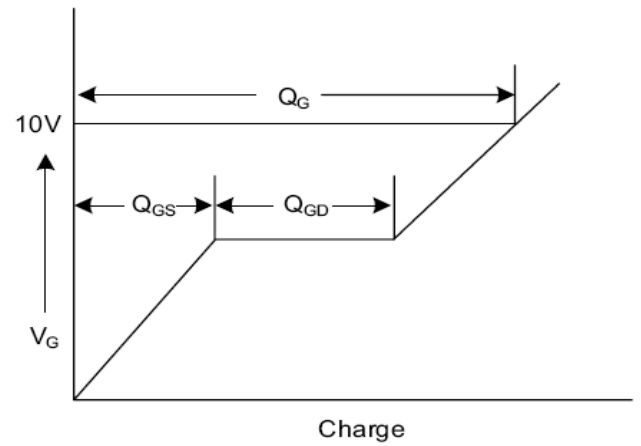
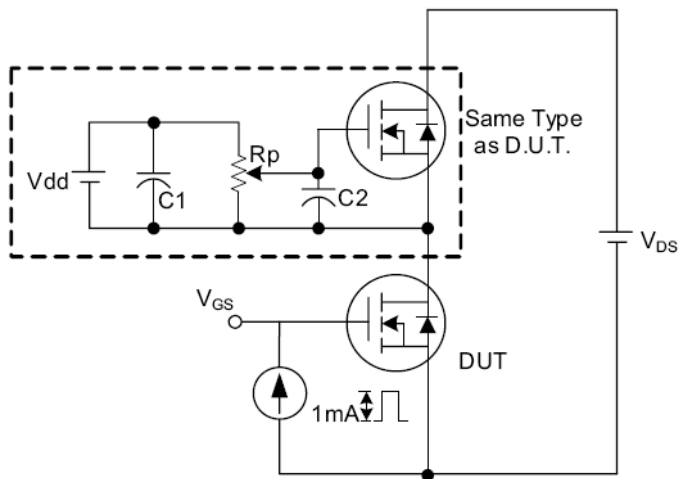
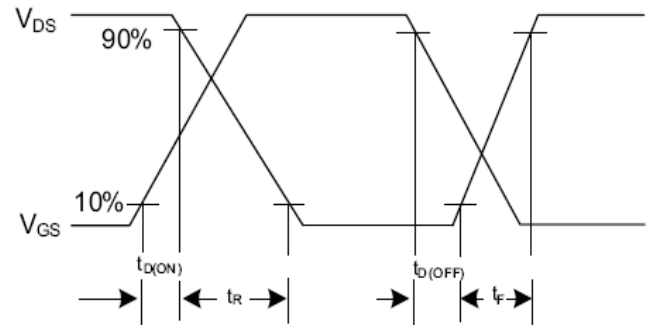
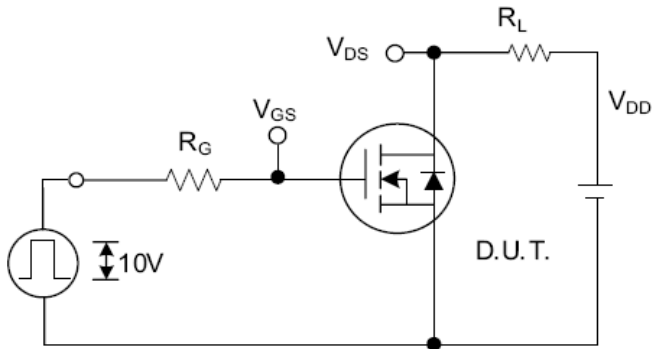


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms



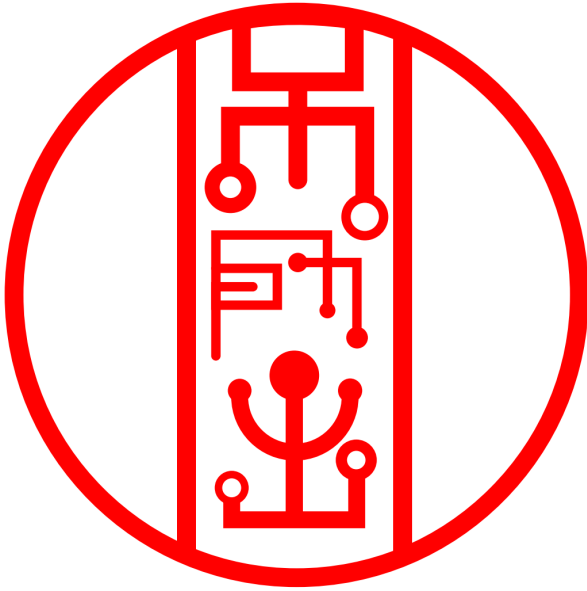
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Test Circuits and Waveforms (Cont.)



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
Φ P	3.00	3.30