RS10N80F

N Channel MOSFET

Lead Free Package and Finish

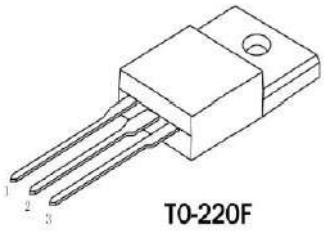
Applications:

- Adapter & Charger
- SMPS Standby Power
- AC-DC Switching Power Supply
- LED driving power

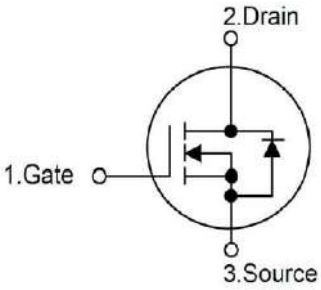
I_D	$R_{DS(ON)}$(Typ.)	V_{DSS}
10A	1.0Ω	800V

Features:

- Low On Resistance
- Low Gate Charge
- Improved dv/dt capability
- RoHS Compliant



Not to Scale



Ordering Information

Part Number	Package	Marking
RS10N80F	TO-220F	RS10N80F

Absolute Maximun Ratings Tc=25℃ unless otherwise specified

Symbol	Parameter	RS10N80F	Units
V_{DSS}	Drain-to-Source Voltage	800	V
I_D	Continuous Drain Current	10	A
I_{DM}	Pulsed Drain Current (Note*1)	40	
P_D	Power Dissipation	25	W
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Engergy (Note*2)	405	mJ
I_{AS}	Avalanche Current (Note*1)	9	A
E_{AR}	Repetitive Avalanche Energy (Note*1)	243	mJ
T_L	Maximum Temperature for Soldering Leads at 0.063in(1.6mm)from Case for 10 seconds	300	℃
T_{PKG}	Package Body for 10 seconds	260	
T_J and T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	

*Drain Current Limited by Maximum Junction Temperature

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

Thermal Resistance

Symbol	Parameter	RS10N80F	Units	Test Conditions
$R_{\theta JC}$	Junction-to-Case	5	℃/W	Drain lead soldered to water cooled heatsink,P_D adjusted for a peak junction temperature of +150℃.
$R_{\theta JA}$	Junction-to-Ambient	62.5		1 cubic foot chamber,free air.

OFF Characteristics TJ=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain-to-source Breakdown Voltage	800	--	--	V	VGS=0V,ID=250μA
IDSS	Drain-to-Source Leakage Current	--	--	1	μA	VDS=800V,VGS=0V
IGSS	Gate-to-Source Forward Leakage	--	--	100	nA	VGS=+30V VDS=0V
	Gate-to-Source Reverse Leakage	--	--	-100		VGS=-30V VDS=0V

ON Characteristics TJ=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain-to-Source On-Resistance (Note*3)	--	1.0	1.2	Ω	VGS=10V,ID=5A
VGS(th)	Gate Threshold Voltage	3.0	--	4.0	V	VGS=VDS,ID=250μA

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn-on Delay Time	--	45	--	nS	VDS=400V ID=10A RG=25Ω
trise	Rise Time	--	17	--		
td(OFF)	Turn-OFF Delay Time	--	355	--		
tfall	Fall Time	--	475	--		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	1519	--	pF	VGS=0V VDS=25V f=1.0MHz
Coss	Output Capacitance	--	162	--		
Crss	Reverse Transfer Capacitance	--	34	--		
Qg	Total Gate Charge	--	57	--	nC	VDS=640V ID=10A VGS=10V
Qgs	Gate-to-Source Charge	--	24	--		
Qgd	Gate-to-Drain("Miller"）Charge	--	7.5	--		

Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	10	A	Integral pn-diode in MOSFET
ISM	Maximum Pulsed Current	--	--	40	A	
VSD	Diode Forward Voltage	--	--	1.4	V	IS=5A,VGS=0V
trr	Reverse Recovery Time	--	562	--	ns	VGS=0V IS=10A,di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	4.4	--	μC	

Notes:

*1.Repetitive rating;pulse width limited by maximum junction temperature.
*2.L=10mH, VDD = 50V, RG = 25 Ω, Starting TJ = 25 ºC
*3.Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Typical Feature curve TJ = 25ºC, unless otherwise noted

Figure 1. Output Characteristics (T_J = 25ºC)

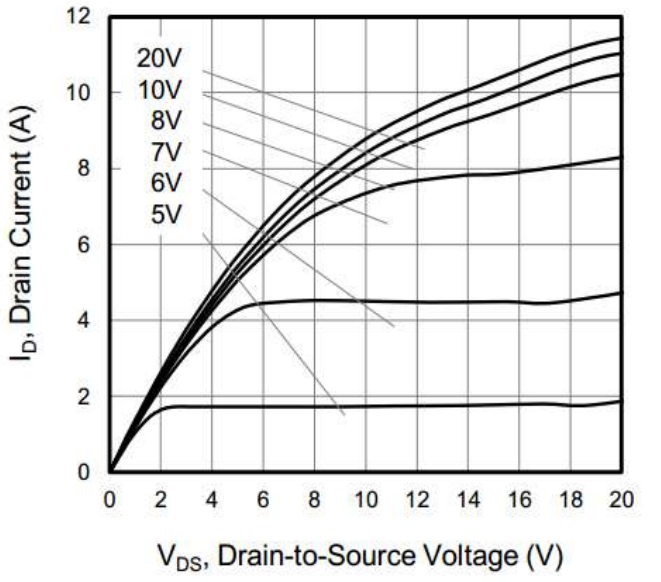


Figure 2. Body Diode Forward Voltage

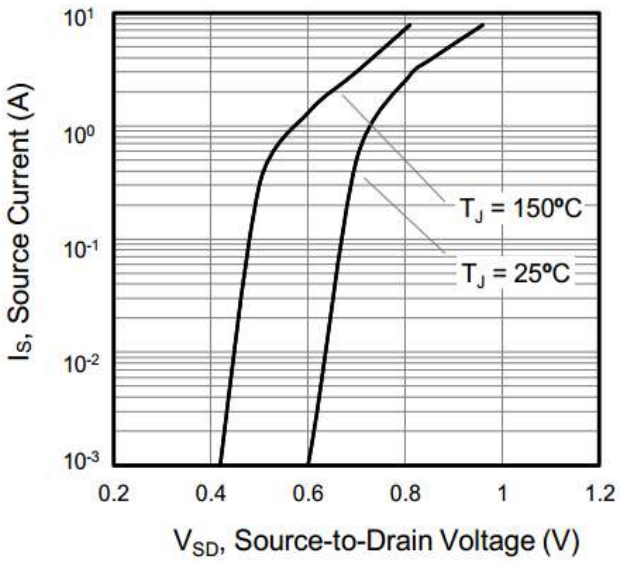


Figure 3. Drain Current vs. Temperature

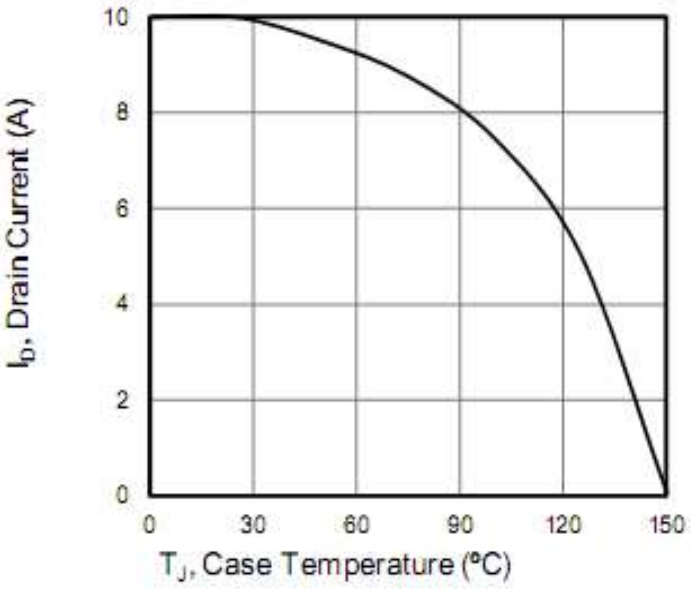


Figure 4. BV_{DSS} Variation vs. Temperature

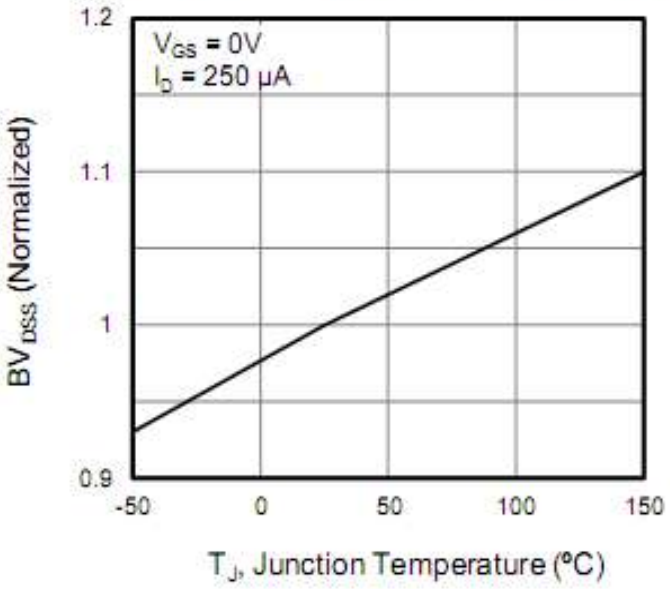


Figure 5. Transfer Characteristics

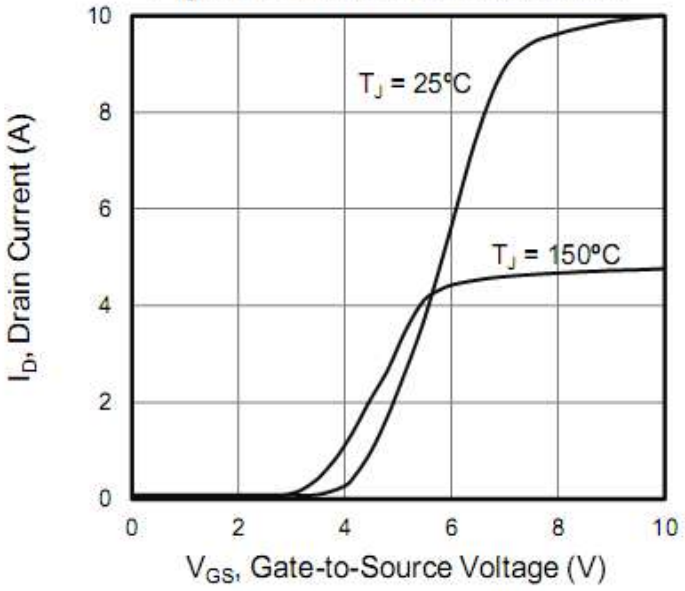


Figure 6. On-Resistance vs. Temperature

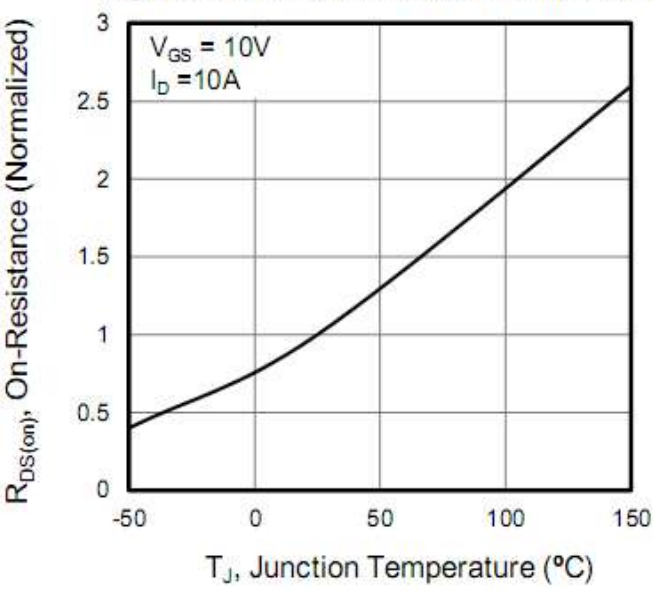


Figure 7. Capacitance

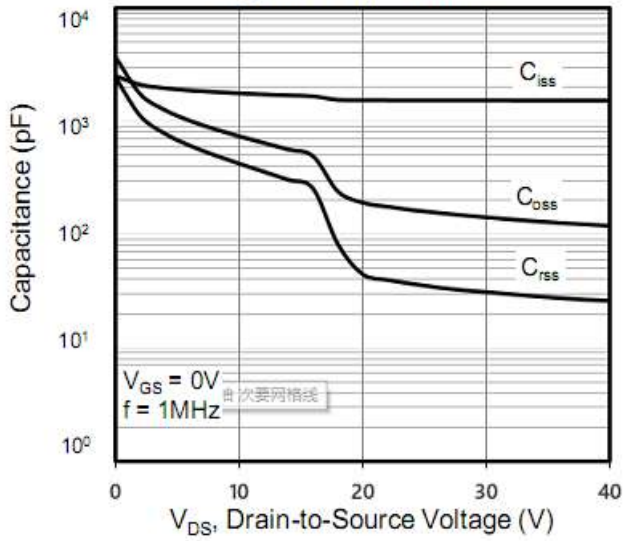


Figure 8. Gate Charge

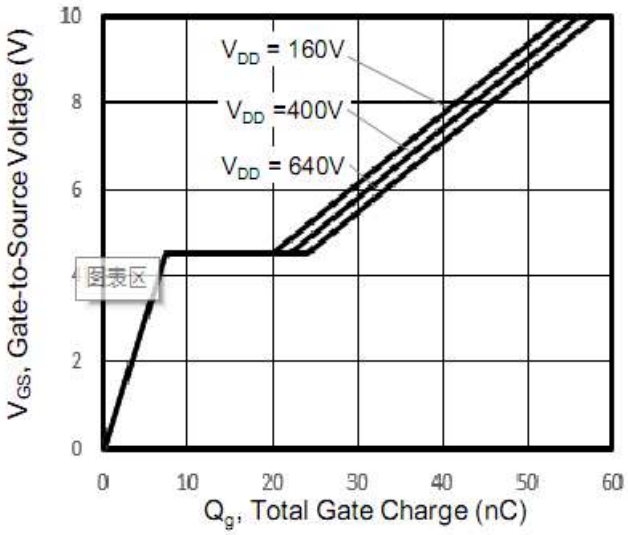
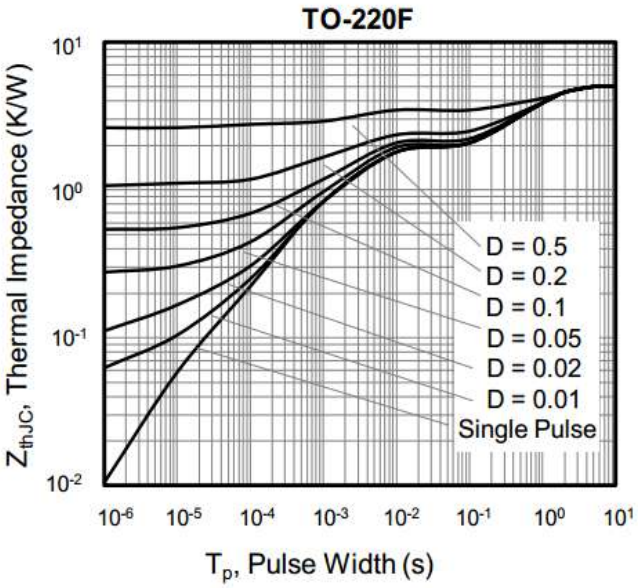


Figure 9. Transient Thermal Impedance



Test Circuits and Waveforms

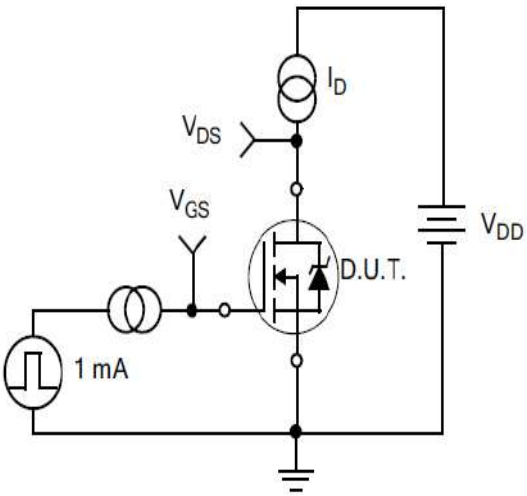


Figure A.
Gate Charge Test Circuit

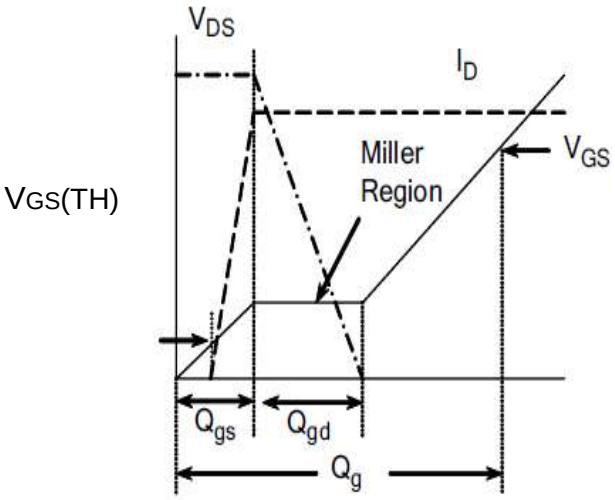


Figure B.
Gate Charge Waveform

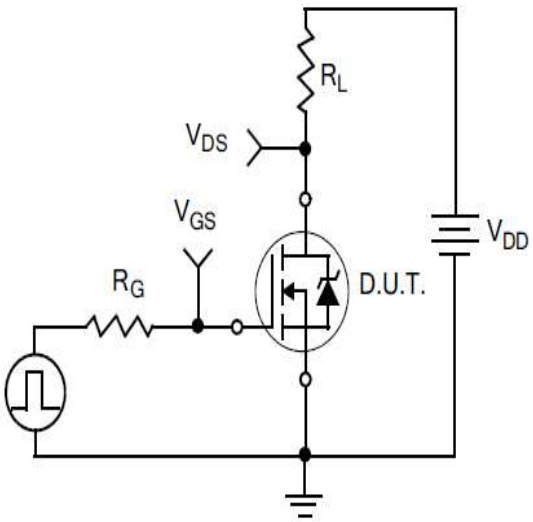


Figure C.
Resistive Switching Test Circuit

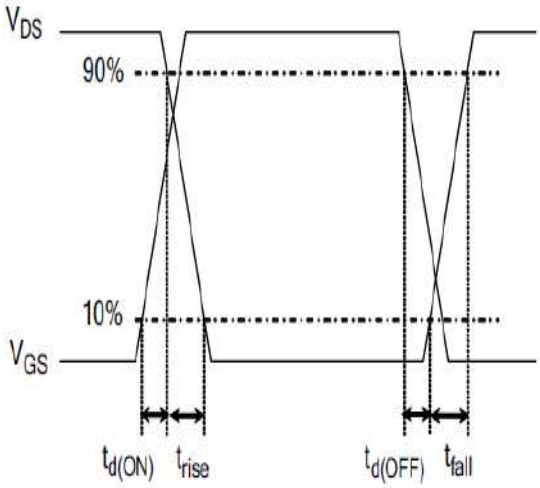


Figure D.
Resistive Switching Waveforms

Test Circuits and Waveforms

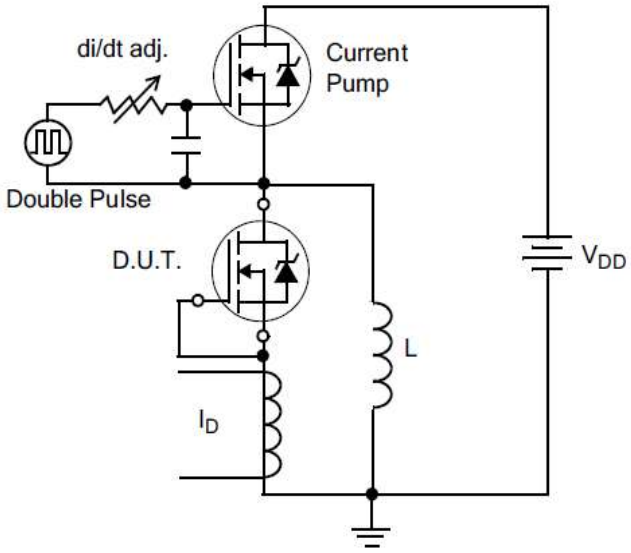


Figure E.Diode Reverse Recovery Test Circuit

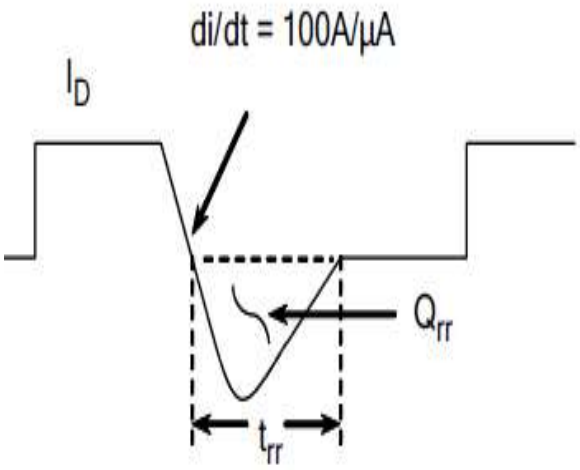


Figure F.Diode Reverse Recovery Waveform

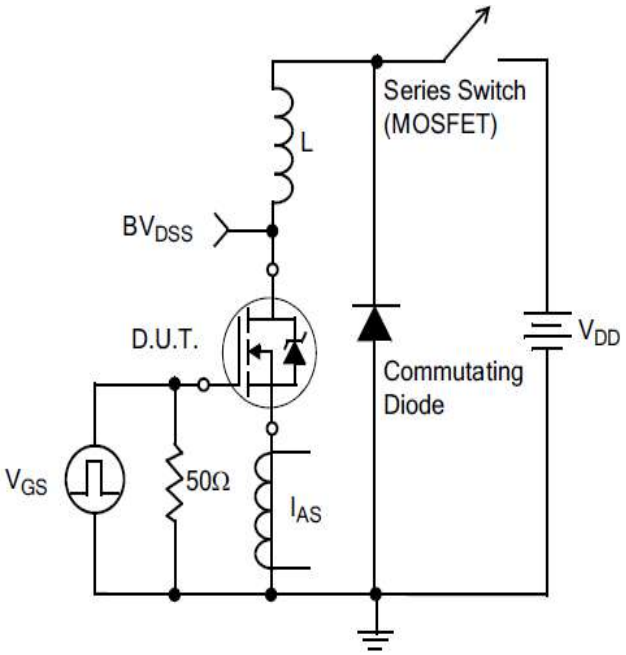
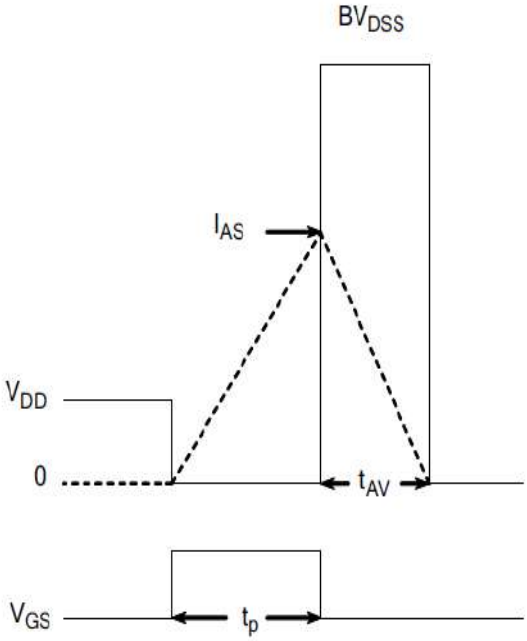


Figure G.Unclamped Inductive Switching Test Circuit

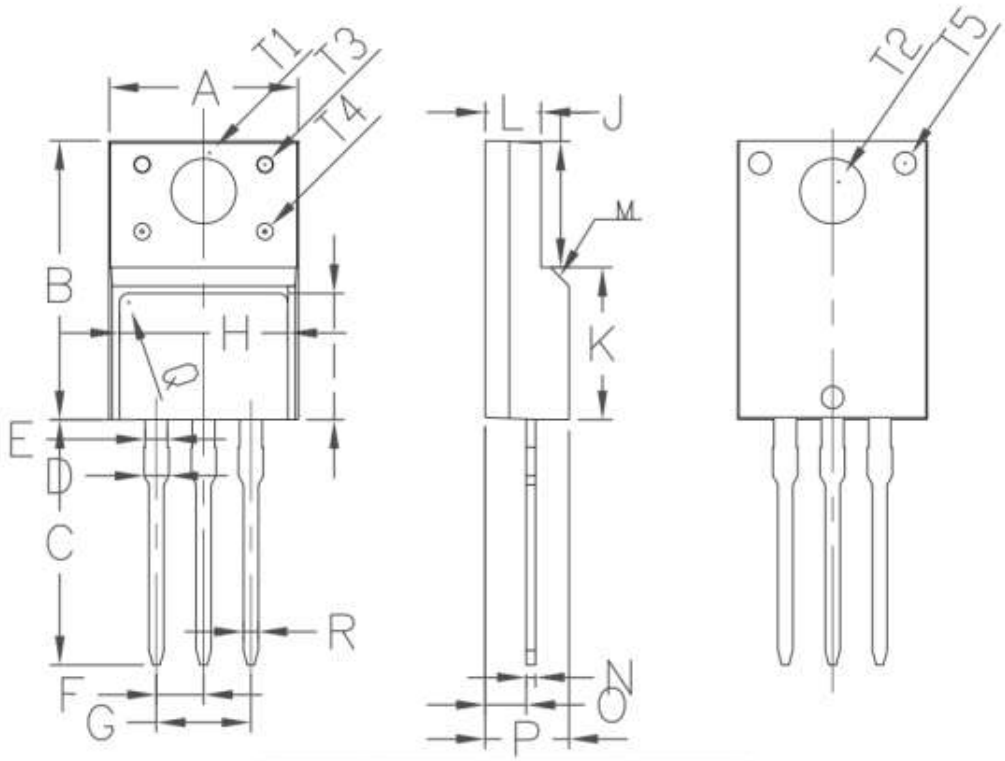


$$E_{AS}=\frac{I_{AS}^2 L}{2}$$

Figure H.Unclamped Inductive Switching Waveforms

Package outline drawing

Unit: mm



Symbol	Min	Non	Max
A	9.96	10.16	10.36
B	15.67	15.87	16.07
C	13.14	13.34	13.54
D	1.20	1.30	1.40
E		1.20	
F		2.54	
G		5.08	
H	7.60	7.80	8.00
I	7.10	7.30	7.50
J	6.48	6.68	6.88
K	8.99	9.19	9.39
L	2.34	2.54	2.74
M		45°	
N	0.49	0.50	0.52
O	2.15	2.35	2.55
P	4.50	4.70	4.90
Q		0.50	
S	4°	4.5°	5°
T1		3.45	
T2		3.18	
T3		1.50	
T4		1.20	
T5		1.50	
R	0.77	0.8	0.83

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