

N Channel MOSFET

Lead Free Package and Finish

Applications:

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

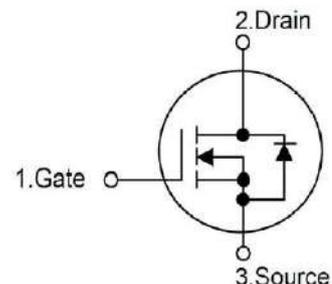
Features:

- Low On Resistance
- Low Gate Charge
- Peak Current vs Pulse Width Curve
- RoHS Compliant

I_D	$R_{DS(ON)}(Typ.)$	V_{DSS}
8.0A	1.0Ω	650V



Not to Scale

**Ordering Information**

Part Number	Package	Marking
RS8N65F	TO-220F	RS8N65F

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	RS8N65F	Units
V_{DSS}	Drain-to-Source Voltage (Note*1)	650	V
I_D	Continuous Drain Current	8.0	A
$I_{D@ 100^\circ\text{C}}$	Continuous Drain Current	5.5	
I_{DM}	Pulsed Drain Current (Note*2)	32.0	
PD	Power Dissipation	48	W
	Derating Factor above 25°C	0.38	W/ $^\circ\text{C}$
V_{GS}	Gate-to-Source Voltage	± 30	V
EAS	Single Pulse Avalanche Energy $L=10\text{mH}$ $V_{DD}=50\text{V}$ $R_G=25\Omega$ $T_J=25^\circ\text{C}$	311	mJ
TL TPKG	Maximum Temperature for Soldering	300 260	$^\circ\text{C}$
	Leads at 0.063in(1.6mm)from Case for 10 seconds		
	Package Body for 10 seconds		
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	RS8N65F	Units	Test Conditions
$R_{\theta JC}$	Junction-to-Case	2.72	$^\circ\text{C}/\text{W}$	Drain lead soldered to water cooled heatsink, P_D adjusted for a peak junction temperature of $+150^\circ\text{C}$.
$R_{\theta JA}$	Junction-to-Ambient	120		1 cubic foot chamber,free air.

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-source Breakdown Voltage	650	--	--	V	$V_{GS}=0V, I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	--	--	1.0	μA	$V_{DS}=650V, V_{GS}=0V$
I_{GSS}	Gate-to-Source Forward Leakage	--	--	100	nA	$V_{GS}=+30V, V_{DS}=0V$
	Gate-to-Source Reverse Leakage	--	--	-100		$V_{GS}=-30V, V_{DS}=0V$

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	--	1.0	1.3	Ω	$V_{GS}=10V, I_D=4A$
$V_{GS(TH)}$	Gate Threshold Voltage	2.0	--	4.0	V	$V_{GS}=V_{DS}, I_D=250\mu A$

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	25.2	--	nS	$V_{DS}=325V$ $I_D=8.0A$ $R_G=25\Omega$ (Note:3,4)
t_{rise}	Rise Time	--	16.8	--		
$t_{d(OFF)}$	Turn-OFF Delay Time	--	42.5	--		
t_{fall}	Fall Time	--	16.5	--		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C_{iss}	Input Capacitance	--	1250	--	pF	$V_{GS}=0V$ $V_{DS}=25V$ $f=1.0MHz$
C_{oss}	Output Capacitance	--	110	--		
C_{rss}	Reverse Transfer Capacitance	--	12	--		
Q_g	Total Gate Charge	--	23	--	nC	$V_{DS}=520V$ $I_D=8.0A$ $V_{GS}=10V$ (Note:3,4)
Q_{gs}	Gate-to-Source Charge	--	5.9	--		
Q_{gd}	Gate-to-Drain("Miller") Charge	--	9.46	--		

Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S	Continuous Source Current	--	--	8.0	A	Integral pn-diode in MOSFET
I _{SM}	Maximum Pulsed Current	--	--	32.0	A	
V _{SD}	Diode Forward Voltage	--	--	1.5	V	I _S =8A, V _{GS} =0V
t _{rr}	Reverse Recovery Time	--	335	--	nS	V _{GS} =0V I _S =8A, di/dt=100A/μs
Q _{rr}	Reverse Recovery Charge	--	3.1	--	μC	

Notes:

- *1. T_J=±25°C to +150°C.
- *2. Repetitive rating; pulse width limited by maximum junction temperature.
- *3. Pulse width ≤ 300μs; duty cycle ≤ 2%.
- *4. Basically not affected by temperature.

Typical Feature curve

T_J = 25°C, unless otherwise noted

Figure 1. Output Characteristics

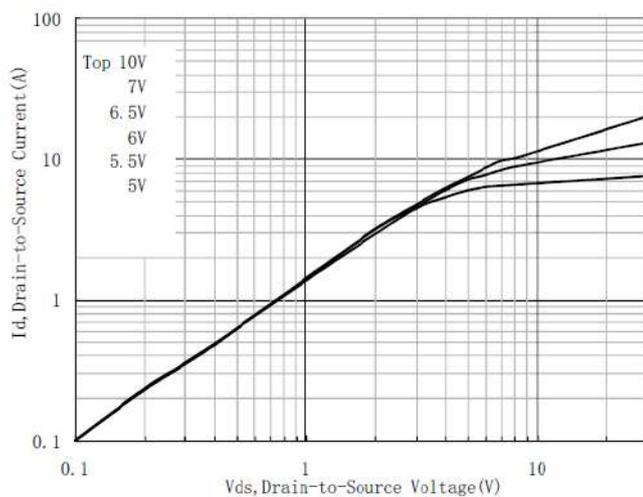


Figure 2. Typical Transfer Characteristics

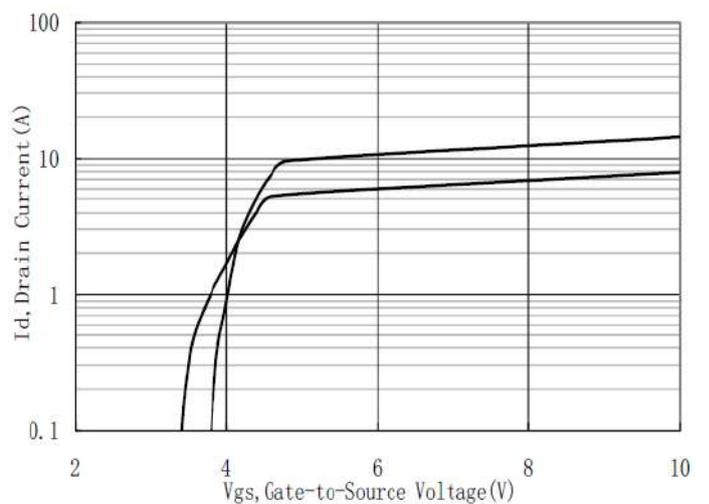


Figure 3. On-Resistance versus Drain Current

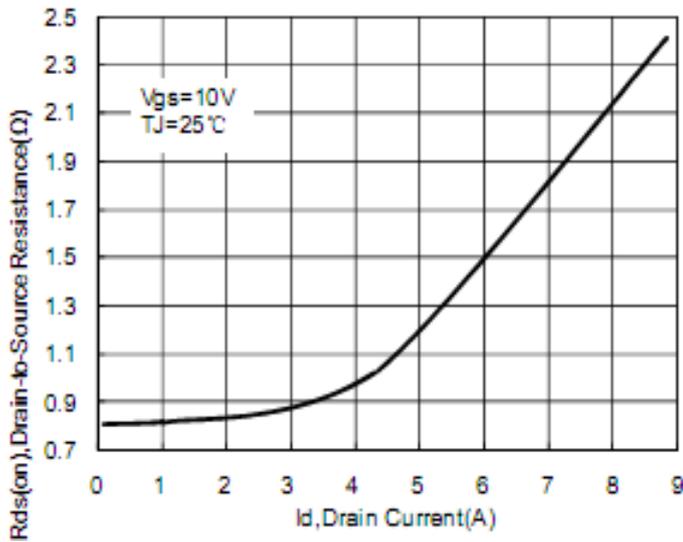


Figure 4. Diode Forward Voltage vs. Current

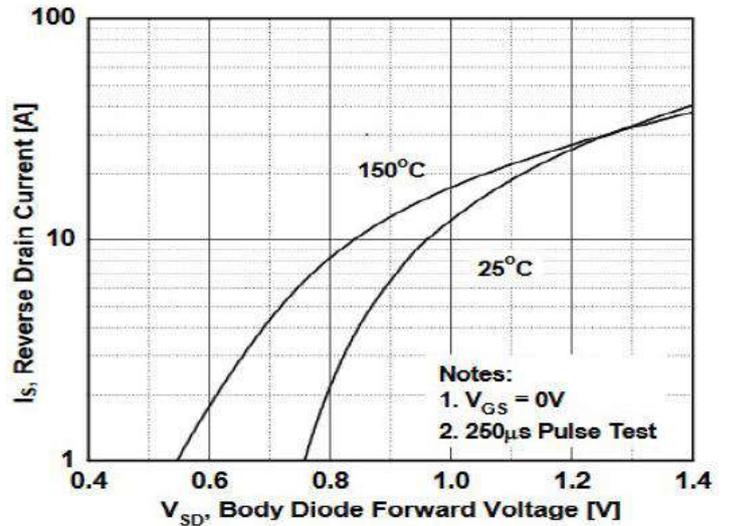


Figure 5. Capacitance vs. Drain-to-Source

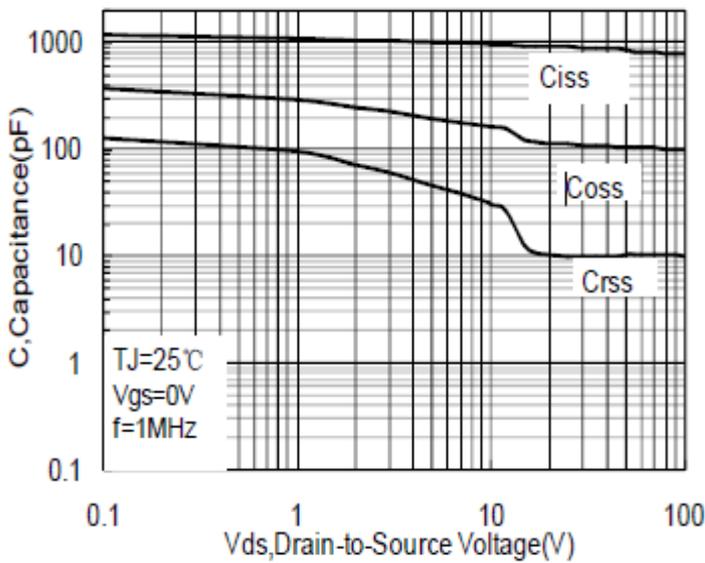


Figure 6. Gate Charge vs. V_{gs}

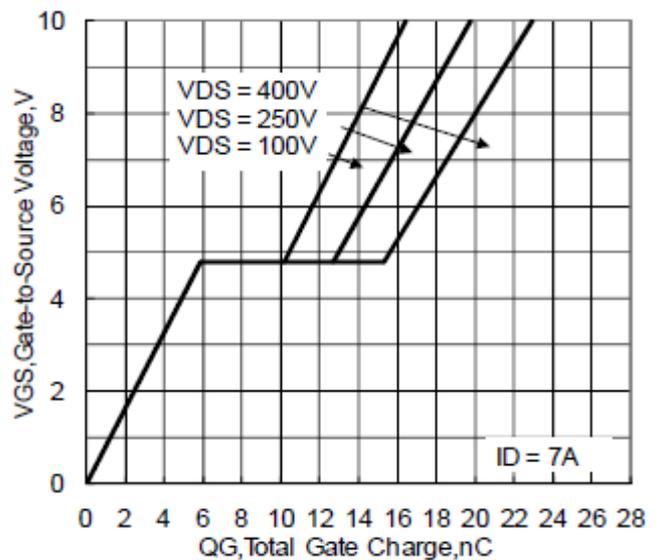


Figure 7. Bvdss Variation with Temperature

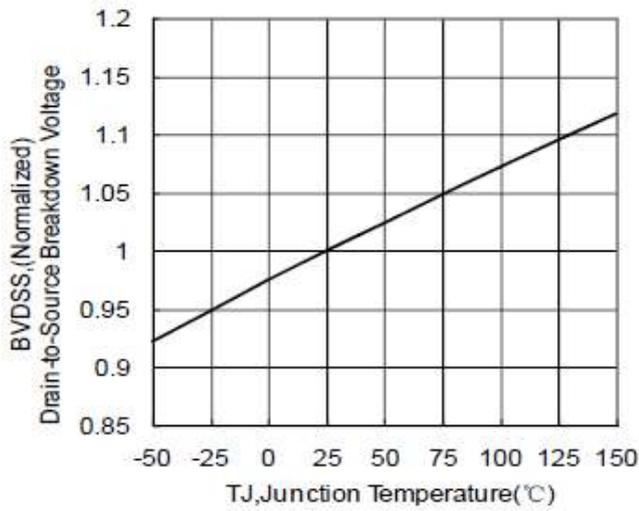


Figure 8. On-Resistance Variation with Temperature

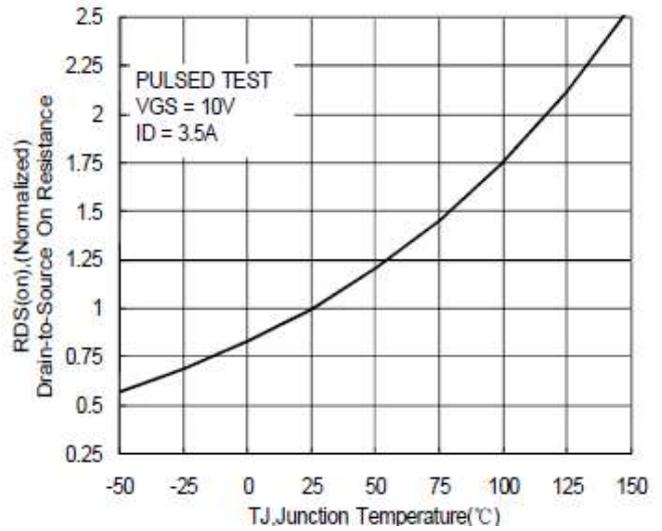


Figure 9. Maximum Safe Operating Area

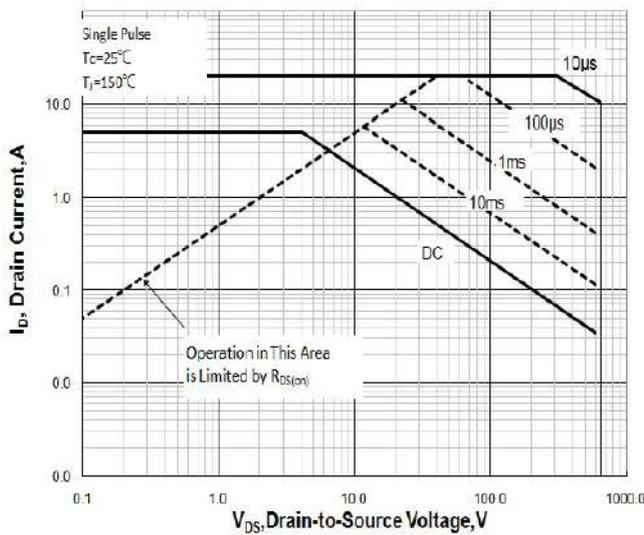
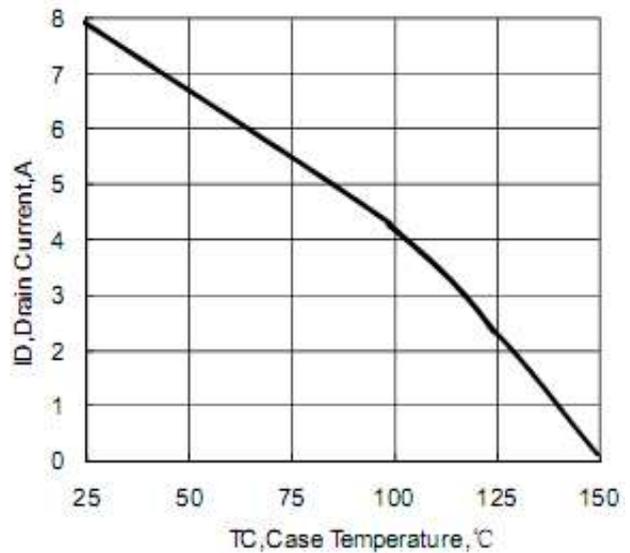


Figure 10. Maximum Continuous Drain



Test Circuits and Waveforms

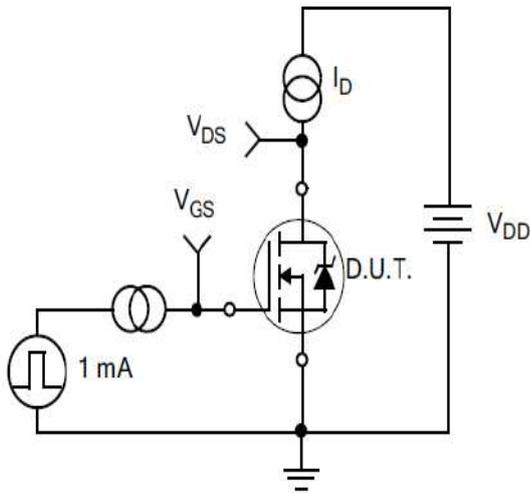


Figure 11.
Gate Charge Test Circuit

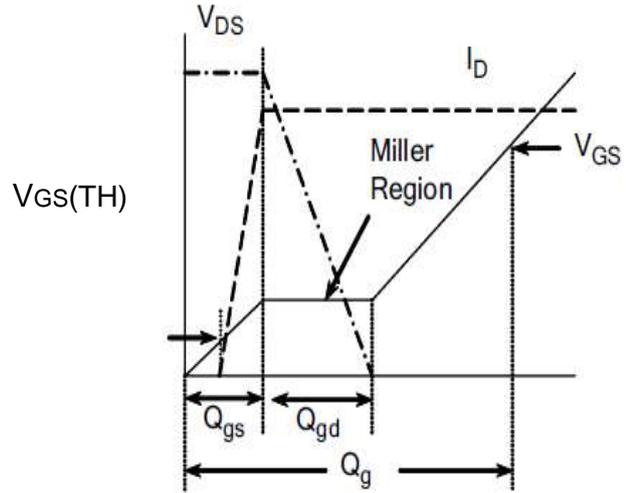


Figure 12.
Gate Charge Waveform

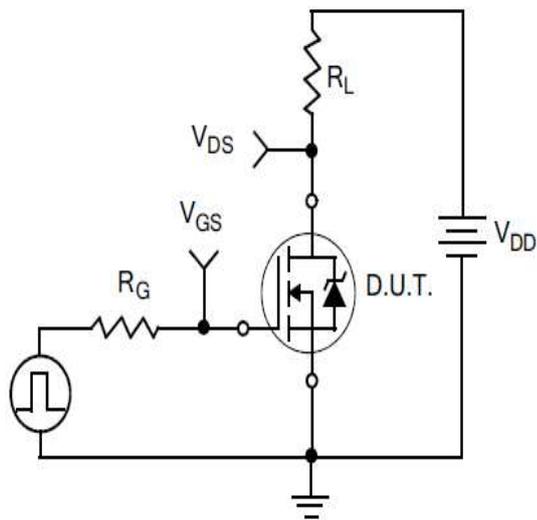


Figure 13.
Resistive Switching Test Circuit

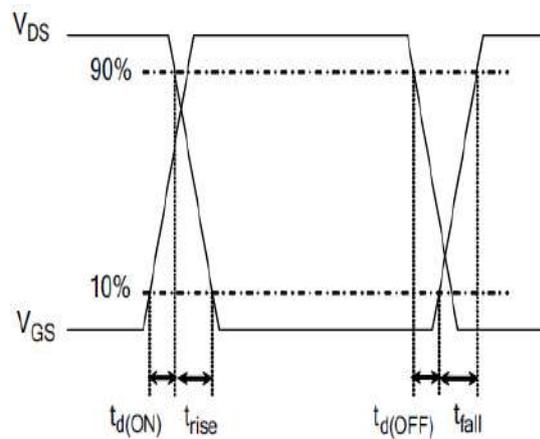


Figure 14.
Resistive Switching Waveforms

Test Circuits and Waveforms

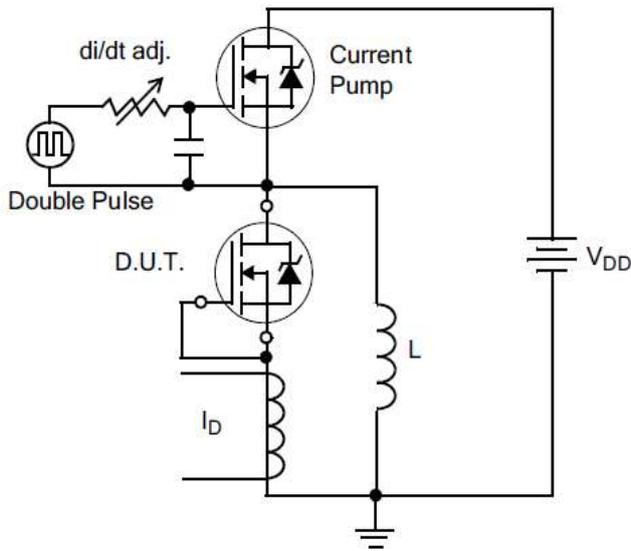


Figure15.Diode Reverse Recovery Test Circuit

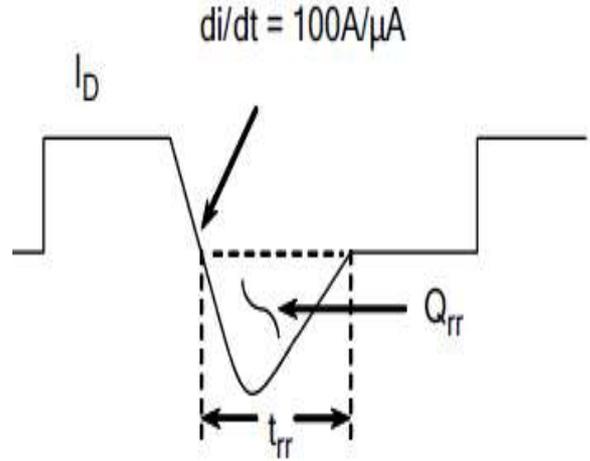


Figure16.Diode Reverse Recovery Waveform

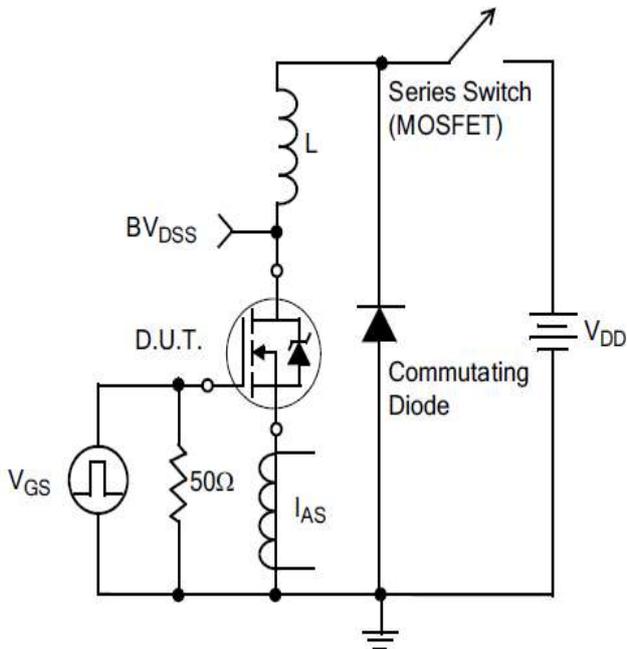
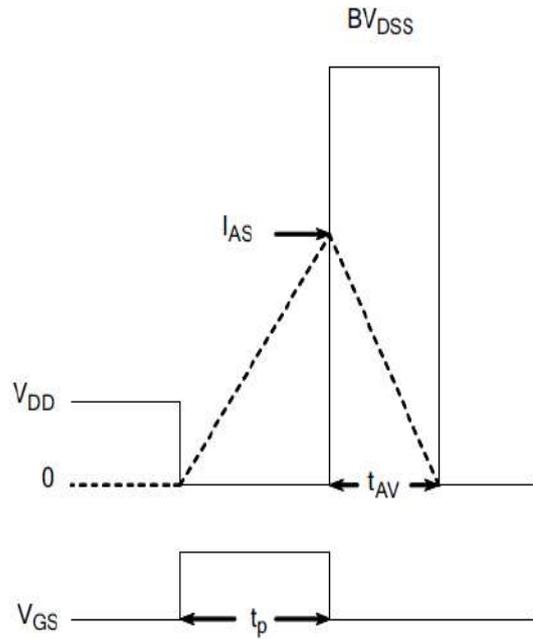


Figure17.Unclamped Inductive Switching Test Circuit



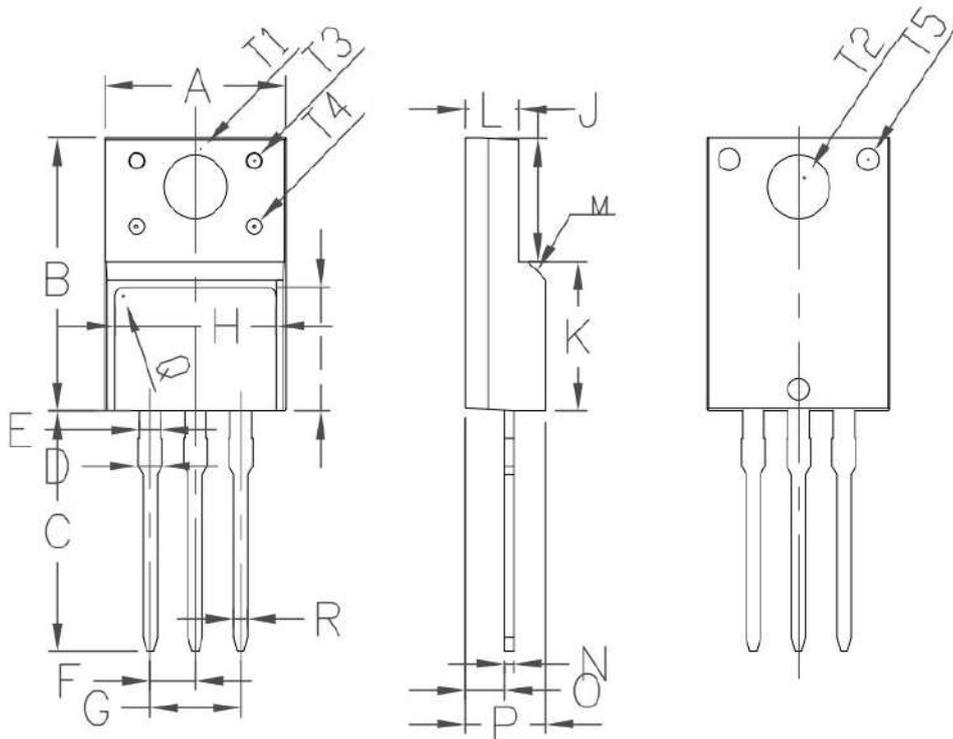
$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Figure18.Unclamped Inductive Switching Waveforms

Package outline drawing

Unit: mm

TO-220F



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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