Multi-Epi Super Junction MOSFETs

Lead Free Package and Finish

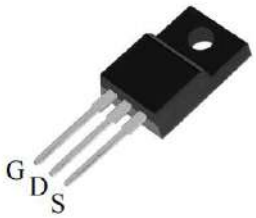
I_D	$R_{DS(ON)}$(Max.)	V_{DSS}
15A	260mΩ	650V

Applications:

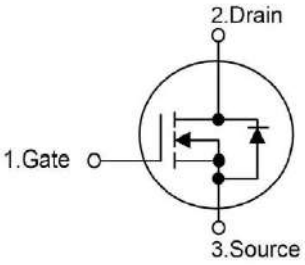
- Switch Mode Power Supply(SMPS)
- Uninterruptible Power Supply(UPS)
- PFC stages for server & telecom
- Consumer

Features:

- New revolutionary high voltage technology
- Better RDS(on) in TO-220F
- Ultra Low Gate Charge cause lower driving requirements
- Periodic avalanche rated
- Ultra low effective capacitances



Not to Scale



Ordering Information

Part Number	Package	Marking
RSU15N65F	TO-220F	RSU15N65F

Absolute Maximun Ratings Tc=25℃ unless otherwise specified

Symbol	Parameter	RSU15N65F	Units
V_{DSS}	Drain-to-Source Voltage	650	V
I_D	Continuous Drain Current (TC = 25℃)	15	A
	Continuous Drain Current (TC = 100℃)	9	
I_{DM}	Pulsed Drain Current (Note*1)	45	
P_D	Power Dissipation(Tc=25℃)	37.8	W
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Engergy (Note*2)	290	mJ
I_{AR}	Avalanche Current (Note*1)	2.4	A
E_{AR}	Repetitive Avalanche Engergy (Note*1)	0.44	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	RSU15N65F	Units	Test Conditions
RθJC	Junction-to-Case	3.3	℃/W	Drain lead soldered to water cooled heatsink,PD Adjusted for a peak junction temperature of +150℃.
RθJA	Junction-to-Ambient	62		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	650	--	--	V	VGS = 0V, ID = 250μA, TJ= 25℃
		--	650	--	V	VGS = 0V, ID = 250μA, TJ= 150℃
IDSS	Drain-to-Source Leakage Current	--	--	1.0	μA	VDS=650V,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	--	240	260	mΩ	VGS=10V,ID=7.5A
VGS(TH)	Gate Threshold Voltage	2.5	--	4.5	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	--	25	--	ns	VDS=400V ID=15A RG=25Ω VGS=10V
trise	Rise Time	--	63	--		
td(OFF)	Turn-OFF Delay Time	--	100			
tfall	Fall Time	--	50			

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	1202	--	pF	VGS=0V VDS=100V f=1.0MHz
Coss	Output Capacitance	--	43	--		
Crss	Reverse Transfer Capacitance	--	5	--		
Qg	Total Gate Charge	--	27	--	nC	VDS=520V ID=15A VGS=10V
Qgs	Gate-to-Source Charge	--	6	--		
Qgd	Gate-to-Drain("Miller"）Charge	--	11	--		

Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	15	A	Integral pn-diode in MOSFET
ISM	Maximum Pulsed Current	--	--	45	A	
VSD	Diode Forward Voltage	--	0.9	1.2	V	IS=15A,VGS=0V Tj=25℃
trr	Reverse Recovery Time	--	410	--	nS	VR=400V,VGS=0V IS=15A,di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	4.1	--	μC	
Irrm	Peak Reverse Recovery Current	--	20	--	A	

Notes:

*1.Repetitive rating;pulse width limited by maximum junction temperature.
*2. IAS = 2.4A, VDD = 50V, RG = 25Ω, Starting TJ = 25°CPulse width tp limited by Tj,max

Typical Feature curve T_J=25℃, unless otherwise noted

Figure1. Output Characteristics

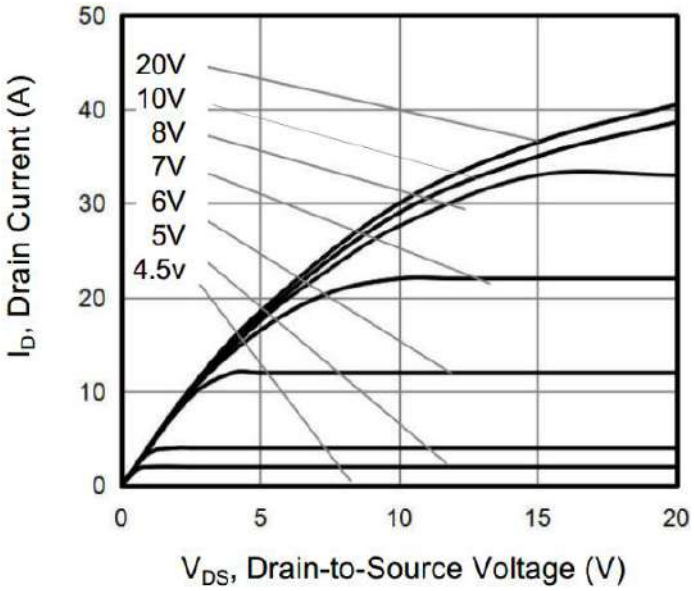


Figure2. Transfer Characteristics

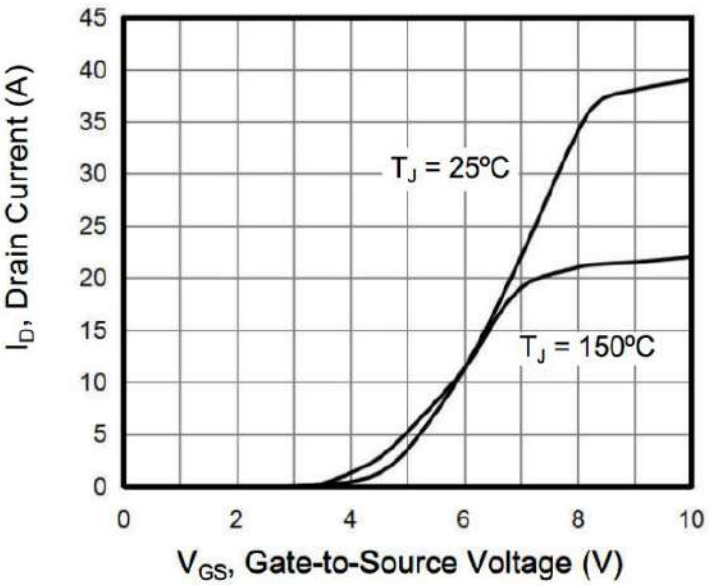


Figure 3. On-Resistance VS.Drain Current

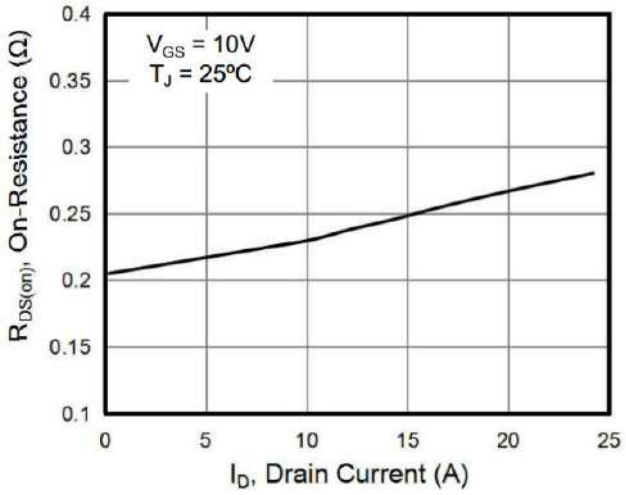


Figure 4. Capacitance

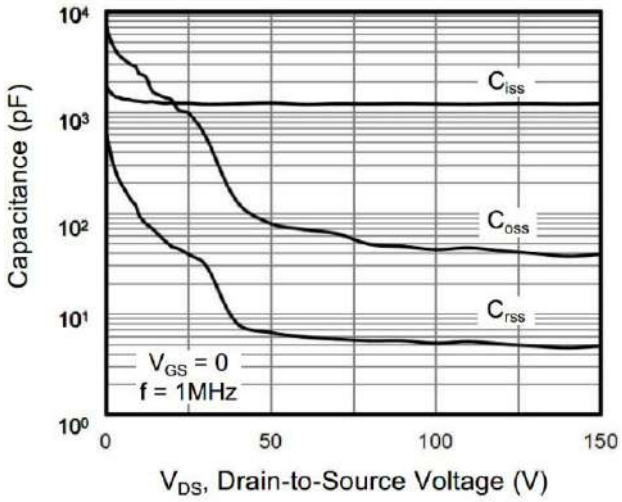


Figure 5. Gate Charge

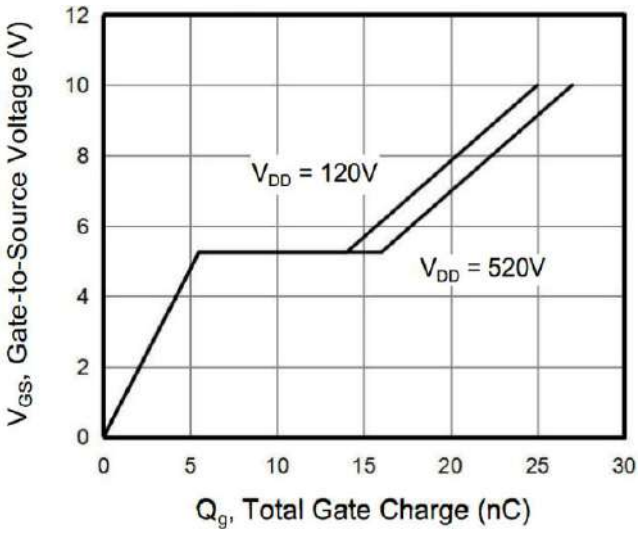


Figure 6.Body Diode Forward Voltage

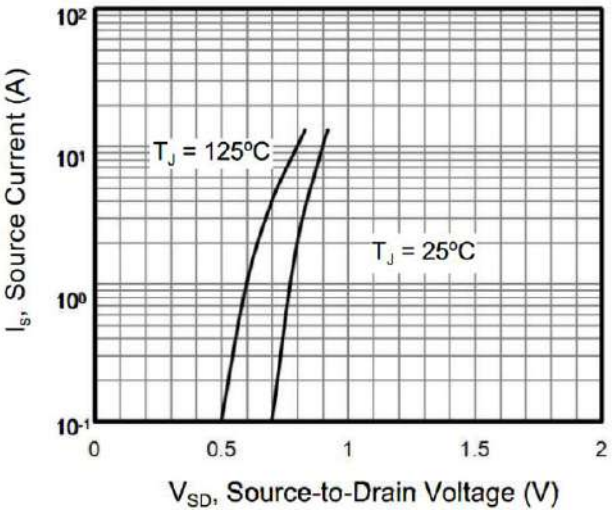


Figure 7.On-Resistan ce vs. Junction Temperature

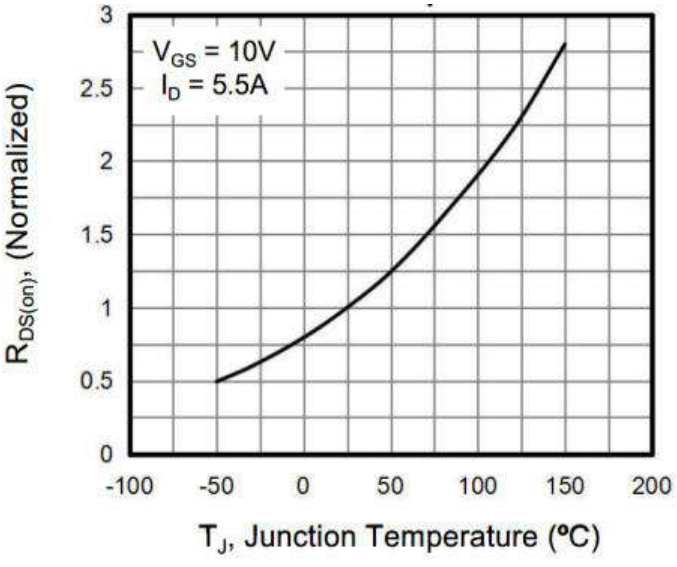


Figure 8.Threshold Voltage vs. Junction Temperature

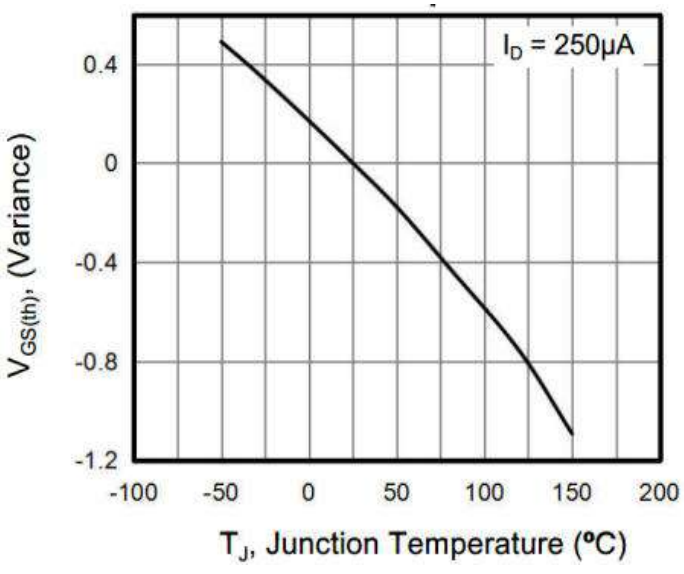


Figure 9.Breakdown voltage vs. Junction Temperature

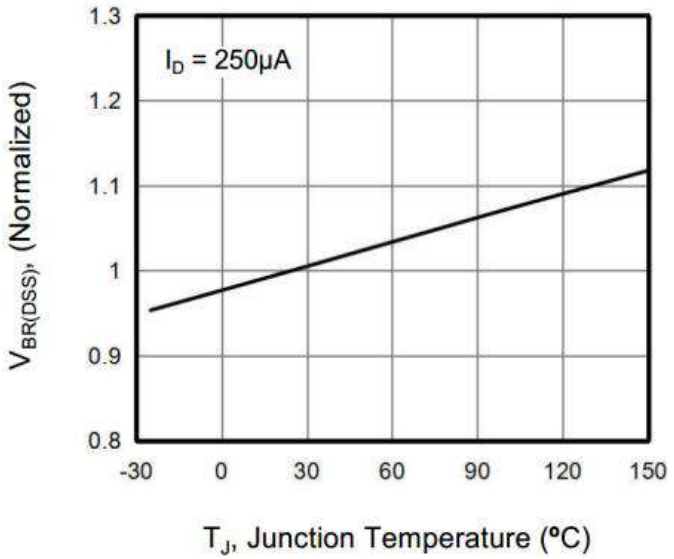


Figure 10.Transient Thermal Impedance TO-220F

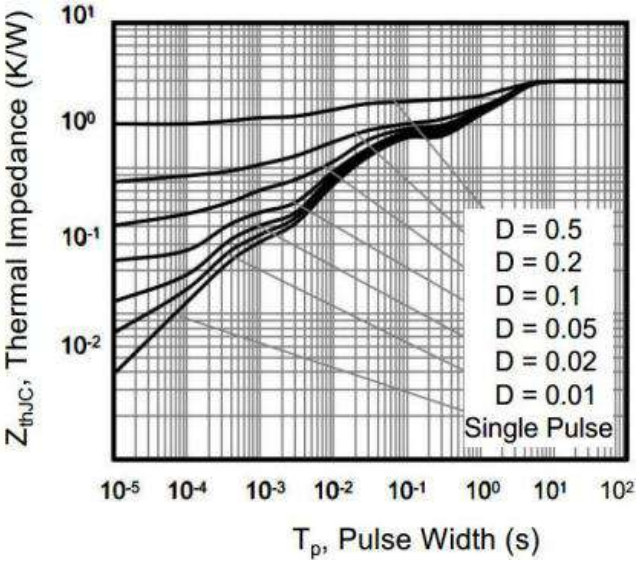
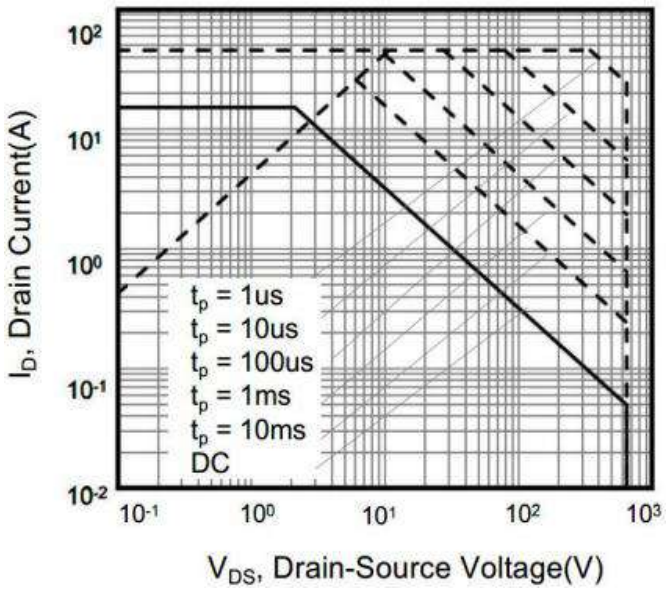


Figure 11.Safe operation area for TO-220F



Test Circuits and Waveforms

Figure A: Gate Charge Test Circuit and Waveform

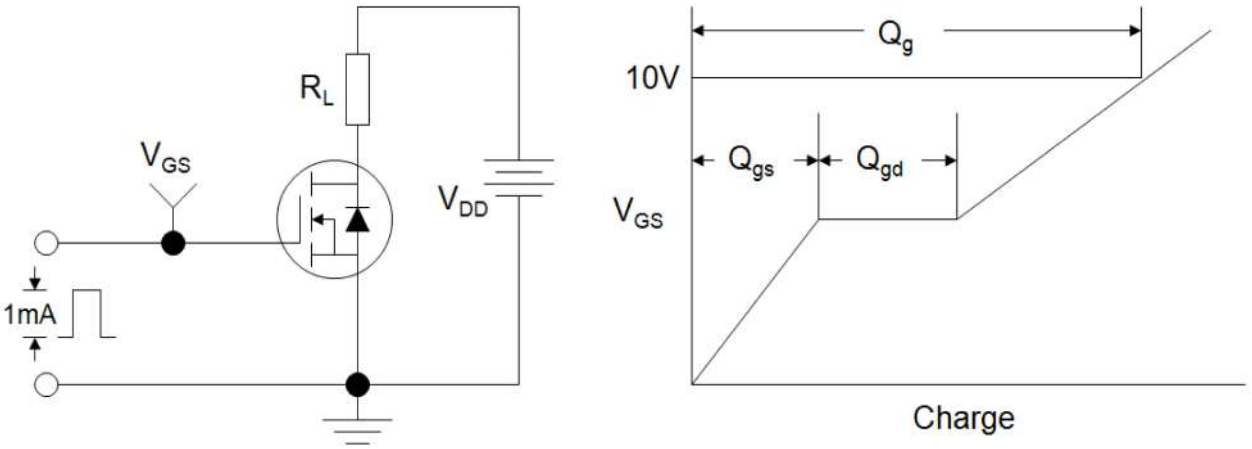


Figure B: Resistive Switching Test Circuit and Waveform

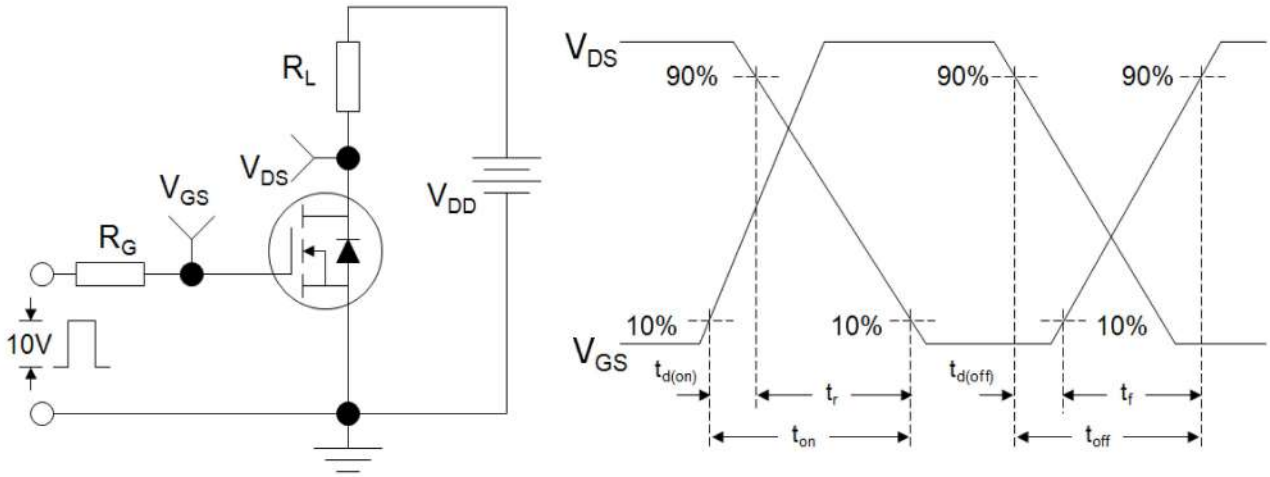
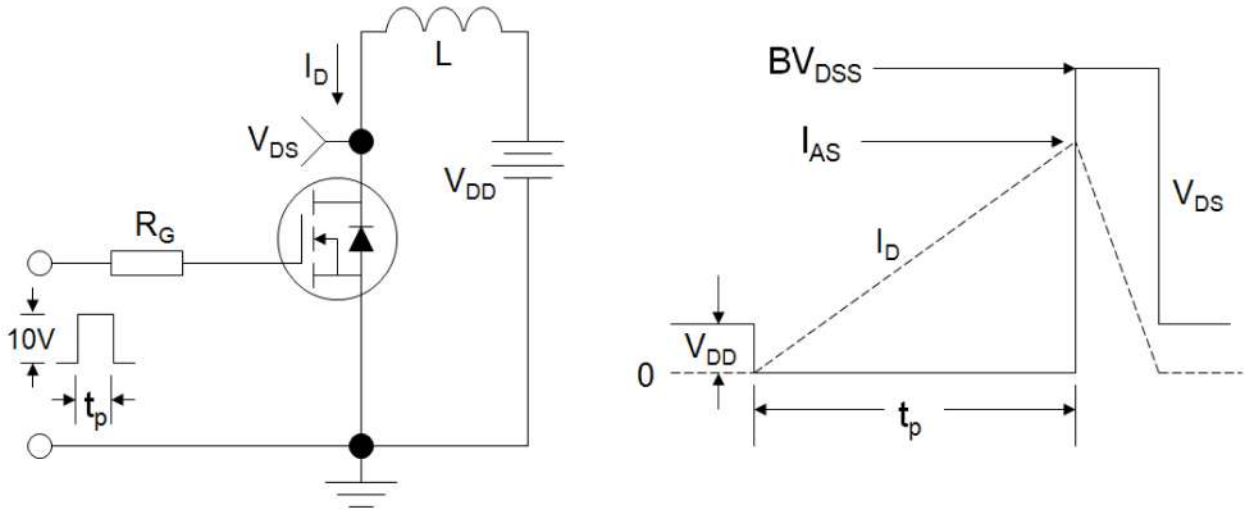
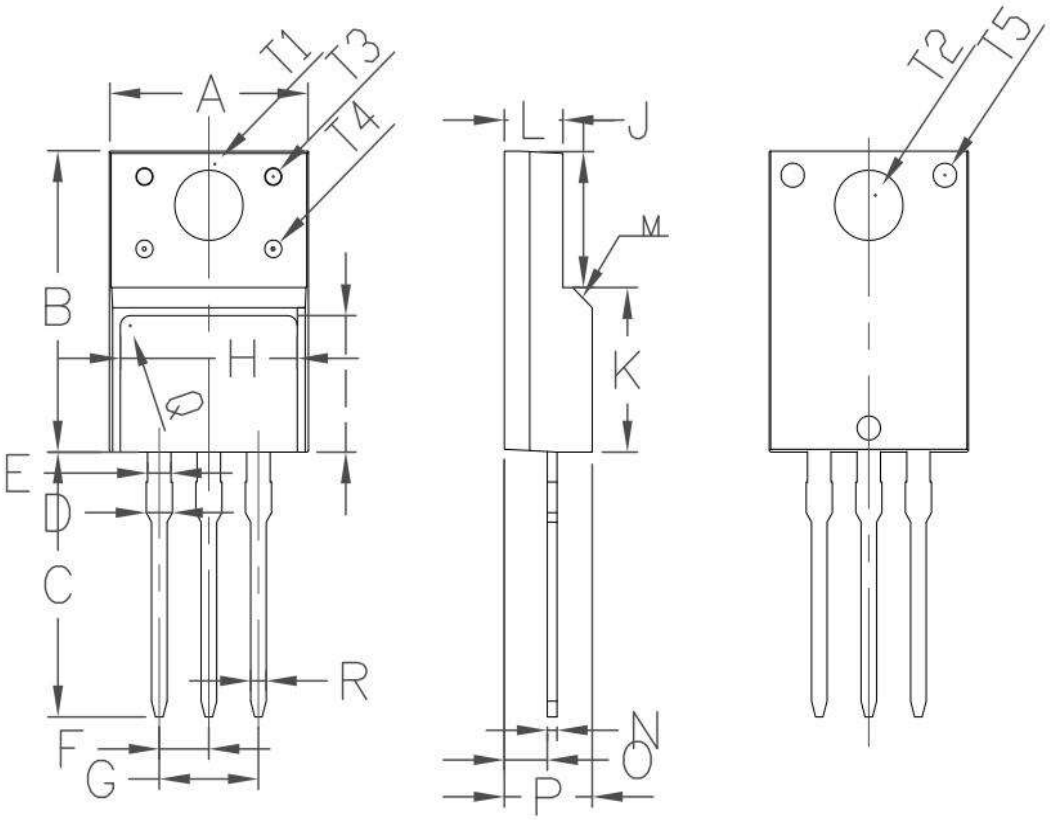


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



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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