

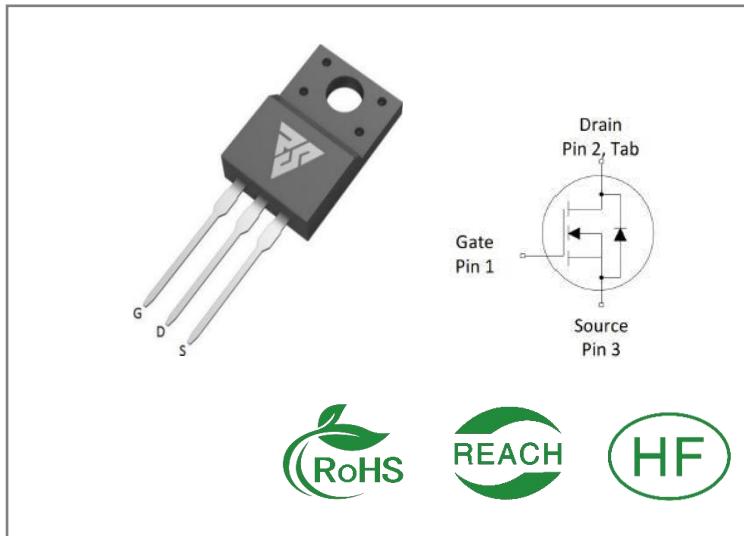
ID	R _{DS(ON)} (Typ)	V _{DSS}
20A	0.23Ω	500V

Applications:

- LED power supplies
- Cell Phone Charger
- Standby Power

Features:

- Low gate charge
- Low C_{iss}
- Fast switching


Ordering Information

Part Number	Package	Marking	Packing	Qty.
RS20N50BF	TO-220F	RS20N50BF	Tube	50 PCS

Absolute Maximum Ratings T_c = 25°C unless otherwise specified

Symbol	Parameter	RS20N50BF	Units
V _{DSS}	Drain-to-Source Voltage	500	V
ID	Continuous Drain Current T _C =25°C (Note*1)	20	A
IDM	Pulsed Drain Current (Note*2)	80	
PD	Power Dissipation T _C =25°C	98	W
V _{GS}	Gate- to- Source Voltage	±30	V
EAS	Single Pulse Avalanche Energy L = 10mH, V _D =100V, T _C =25°C	1620	mJ
TL TPKG	Maximum Temperature for Soldering	300 260	°C
	Leads at 0.063in(1.6mm)from Case for 10 seconds Package Body for 10 seconds		
TJ 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	RS20N50BF	Units	Test Conditions
R _{θJC}	Junction-to-Case	1.27	°C / W	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 150 °C
R _{θJA}	Junction-to-Ambient	56		1 cubic foot chamber, free air.

OFF Characteristics TJ= 25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain- to- source Breakdown Voltage	500	--	--	V	V _{GS} =0V ID=250μA
IDSS	Drain- to- Source Leakage Current	--	--	1	μA	V _{DS} =500V V _{GS} =0V
IGSS	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 TJ=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain- to- Source On-Resistance	--	0.23	0.27	Ω	V _{GS} =10V ID=10A
VGS(TH)	Gate Threshold Voltage	2.0	3.2	4.0	V	V _{GS} =V _{DS} ID=250μA
R _g	Gate Resistance	--	3	--	Ω	V _{GS} =0V V _{DS} =0V f=1MHz
G _{fs}	Forward Transconductance	--	10	--	S	V _{DS} =10V ID=30A

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	23	--	nS	V _{DS} =250V ID=18A RG=10Ω V _{GS} =10V
trise	Rise Time	--	37	--		
td(OFF)	Turn- OFF Delay Time	--	64	--		
tfall	Fall Time	--	36	--		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C _{iss}	Input Capacitance	--	3294	--	pF	V _{GS} =0V V _{DS} =25V f=1.0MHz
C _{oss}	Output Capacitance	--	283	--		
C _{rss}	Reverse Transfer Capacitance	--	9	--		
Q _g	Total Gate Charge	--	64	--	nC	V _{DS} =400V I _D =18A V _{GS} =10V
Q _{gs}	Gate- to- Source Charge	--	19	--		
Q _{gd}	Gate-to-Drain(" Miller") Charge	--	13	--		

Source- Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S	Continuous Source Current	--	--	20	A	Integral pn- diode in MOSFET
I _{SM}	Maximum Pulsed Current	--	--	80	A	
V _{SD}	Diode Forward Voltage	--	--	1.2	V	I _S =10A V _{GS} =0V
t _{rr}	Reverse Recovery Time	--	340	--	nS	V _{GS} =0V V _{DS} =30V I _S =1A di/dt=100A/μs
Q _{rr}	Reverse Recovery Charge	--	841	--	μC	

Notes:

* 1. Limited by T_J MAX<150°C, Maximum Duty Cycle D=0.5, TO-220 equivalent.

* 2. This single-pulse measurement was taken under T_j_Max = 150°C.

Typical Feature Curve

Figure.1 Output Characteristics $T_J=25^\circ\text{C}$

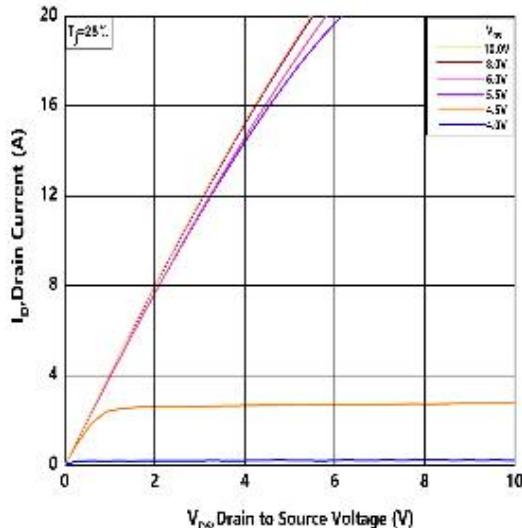


Figure.2 Transfer Characteristic for Various Junction Temperatures

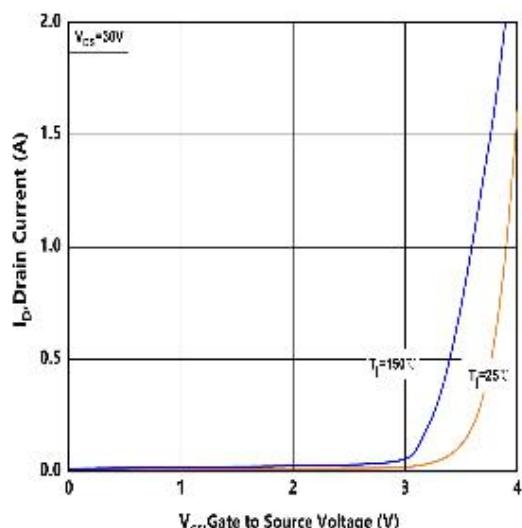


Figure.3 On-Resistance vs Drain Current For Various Gate Voltage

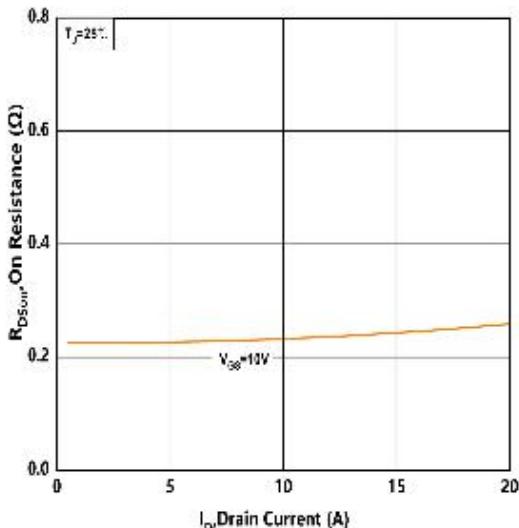
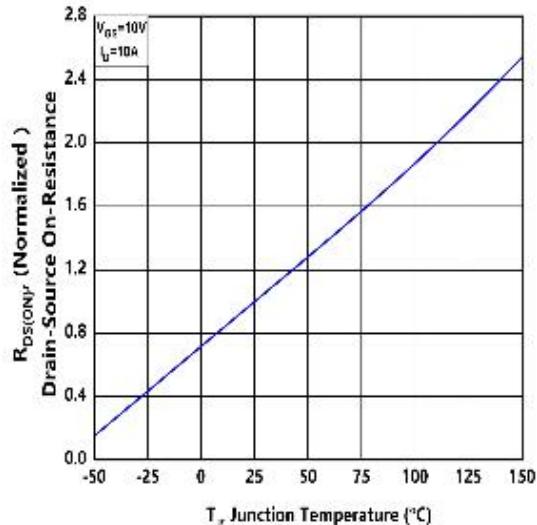


Figure.4 Typical On-Resistance vs Junction Temperature



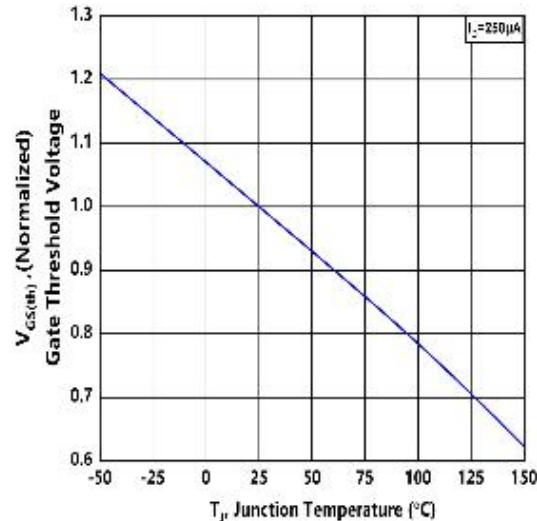
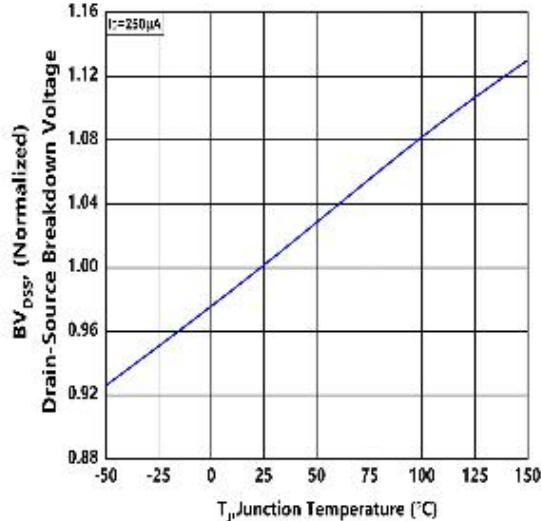
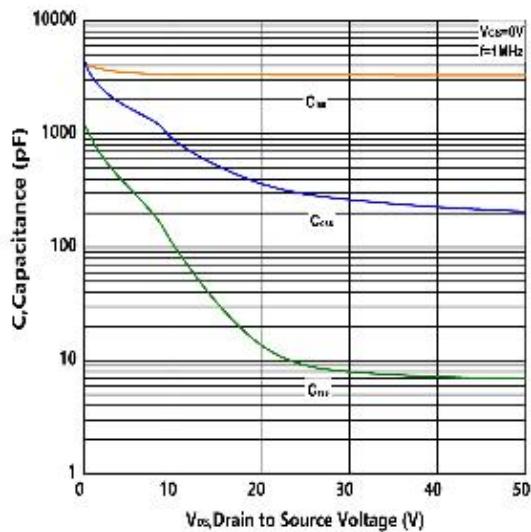
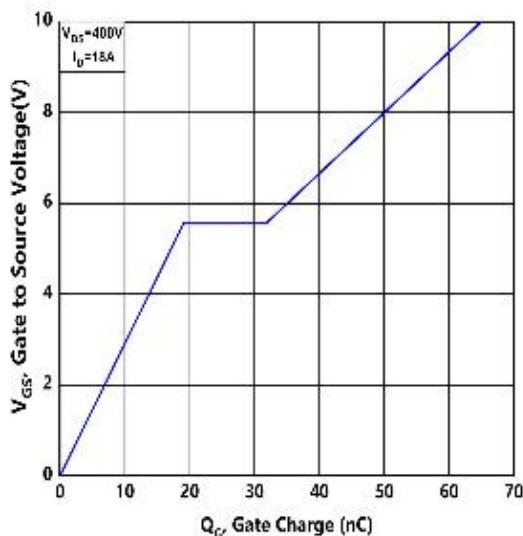
Typical Feature Curve
Figure.5 Typical Threshold Voltage vs Junction Temperature

Figure.6 Typical Breakdown Voltage vs Junction Temperature

Figure.7 Typical Capacitance vs Drain to Source Voltage

Figure.8 Typical Gate Charge vs Gate to Source Voltage


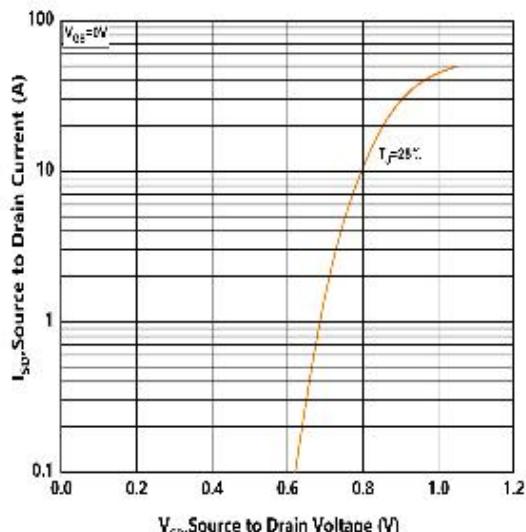
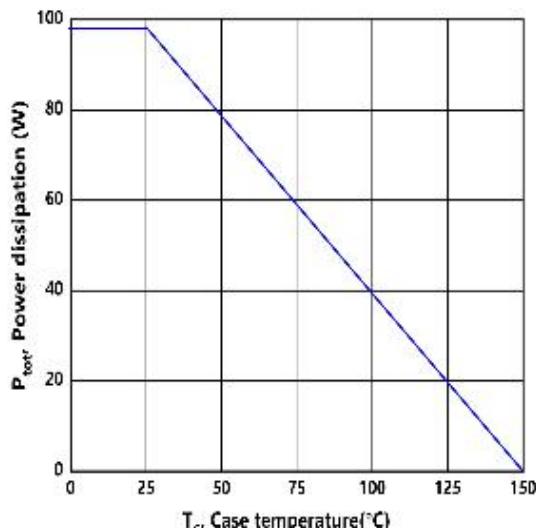
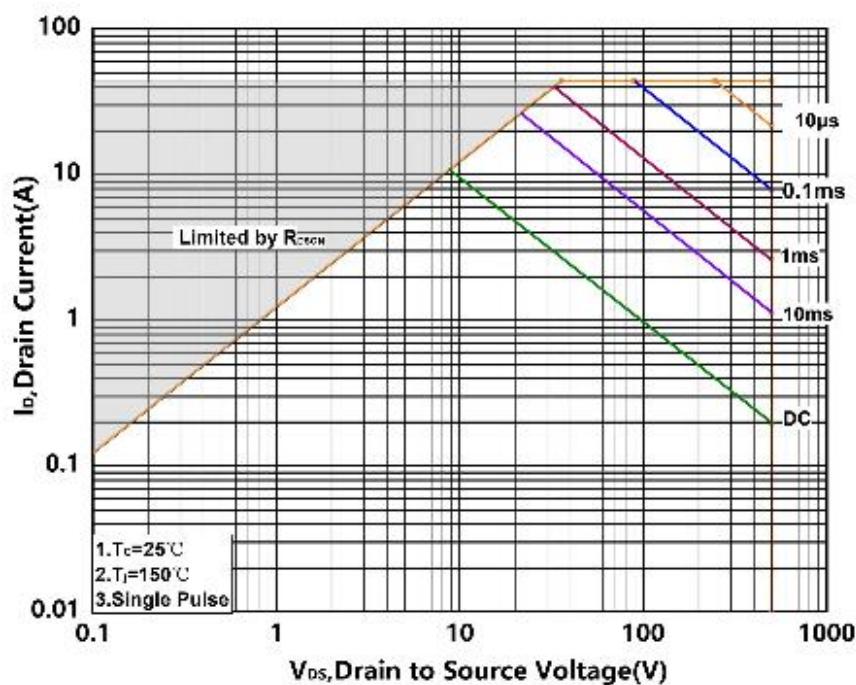
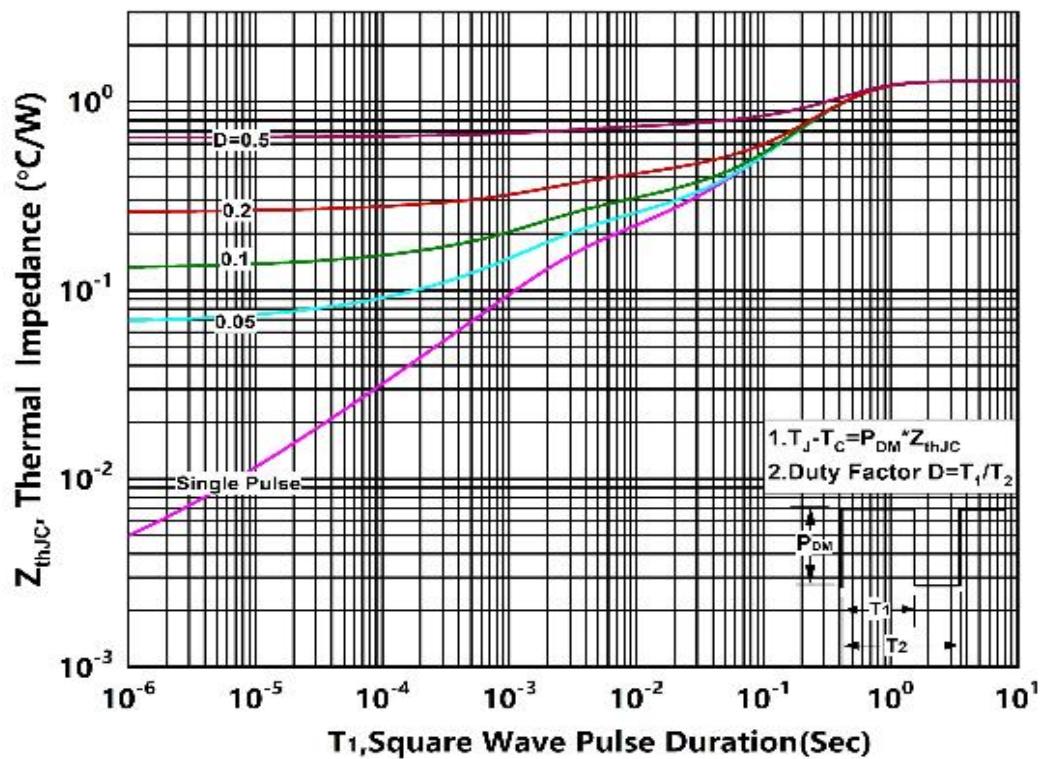
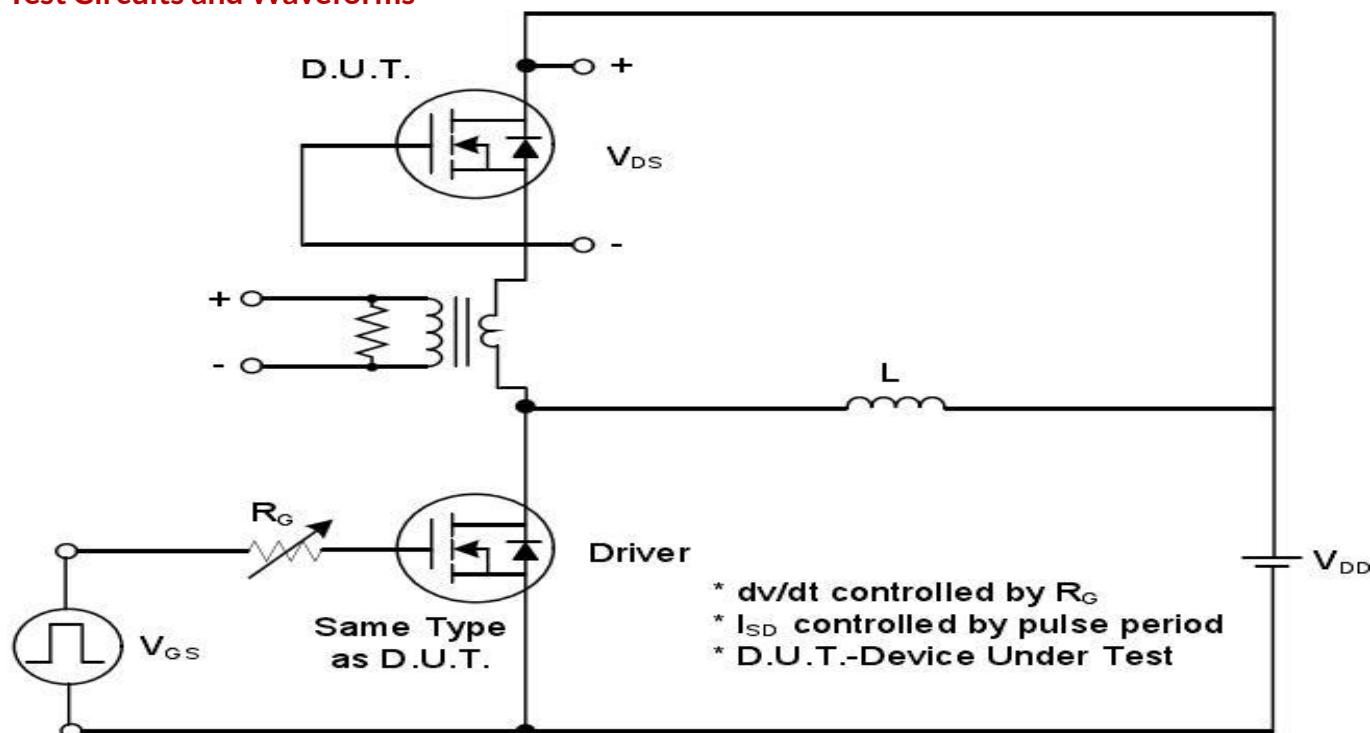
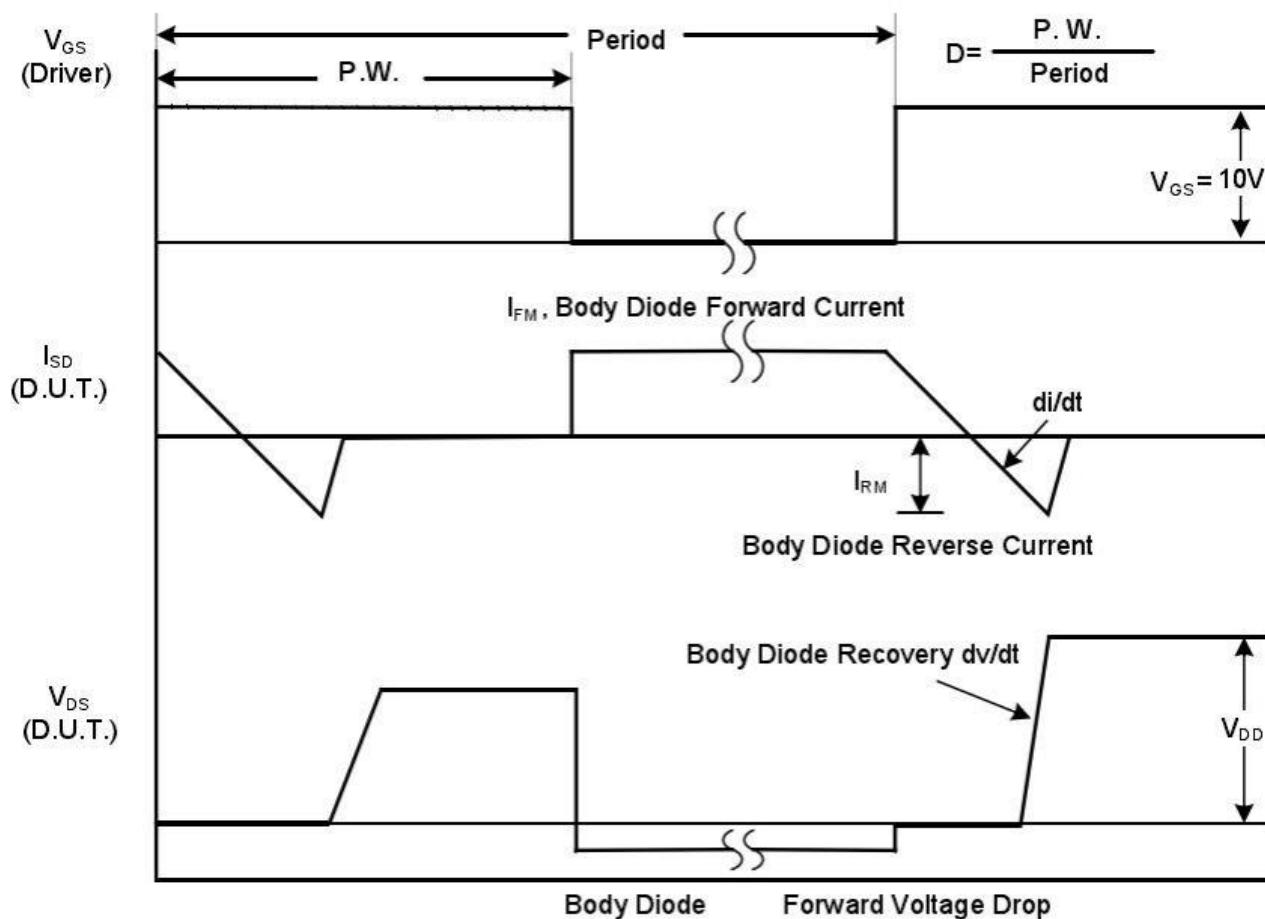
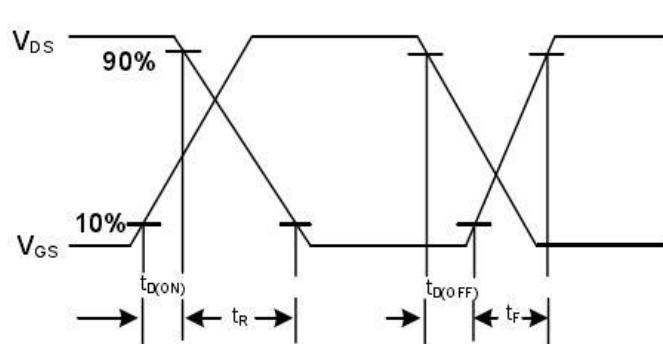
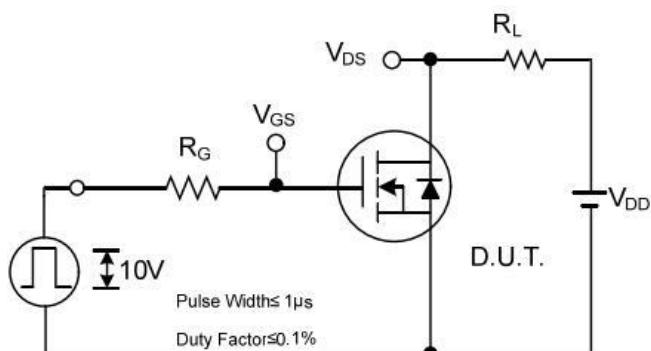
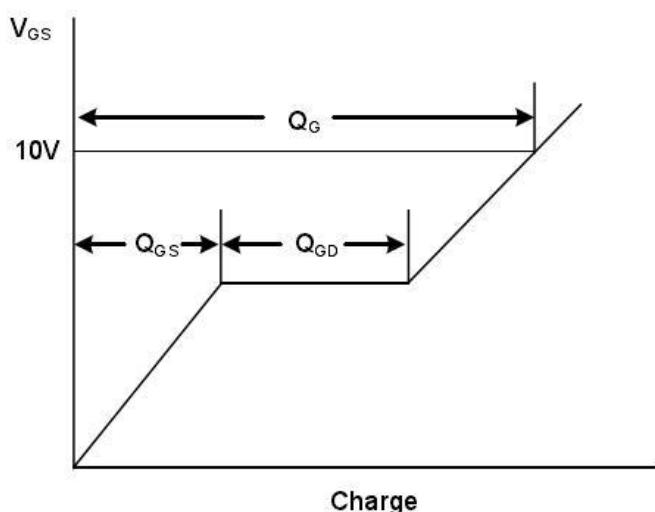
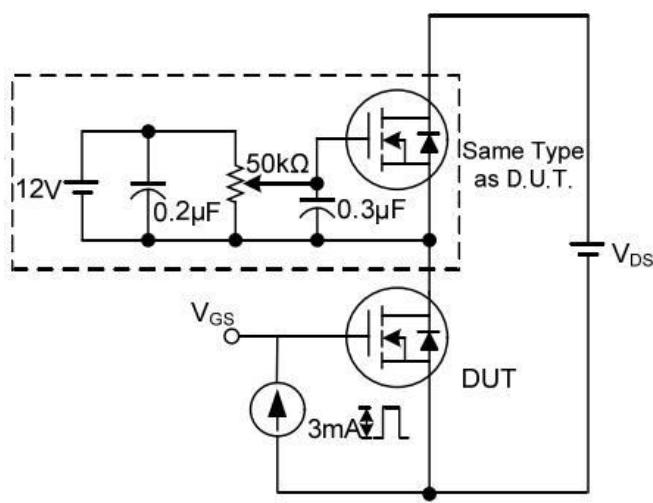
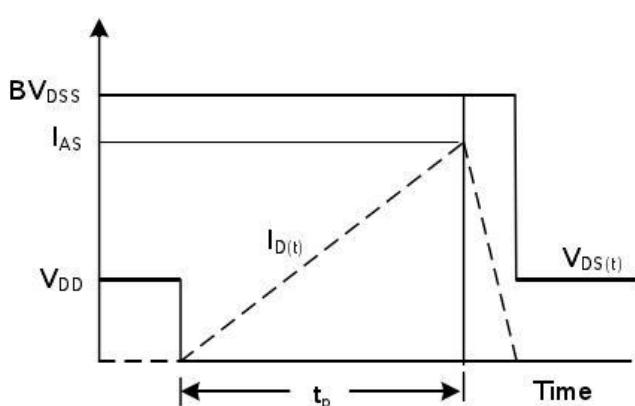
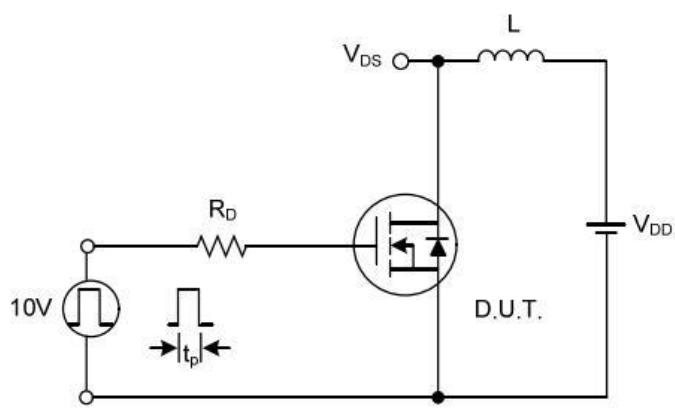
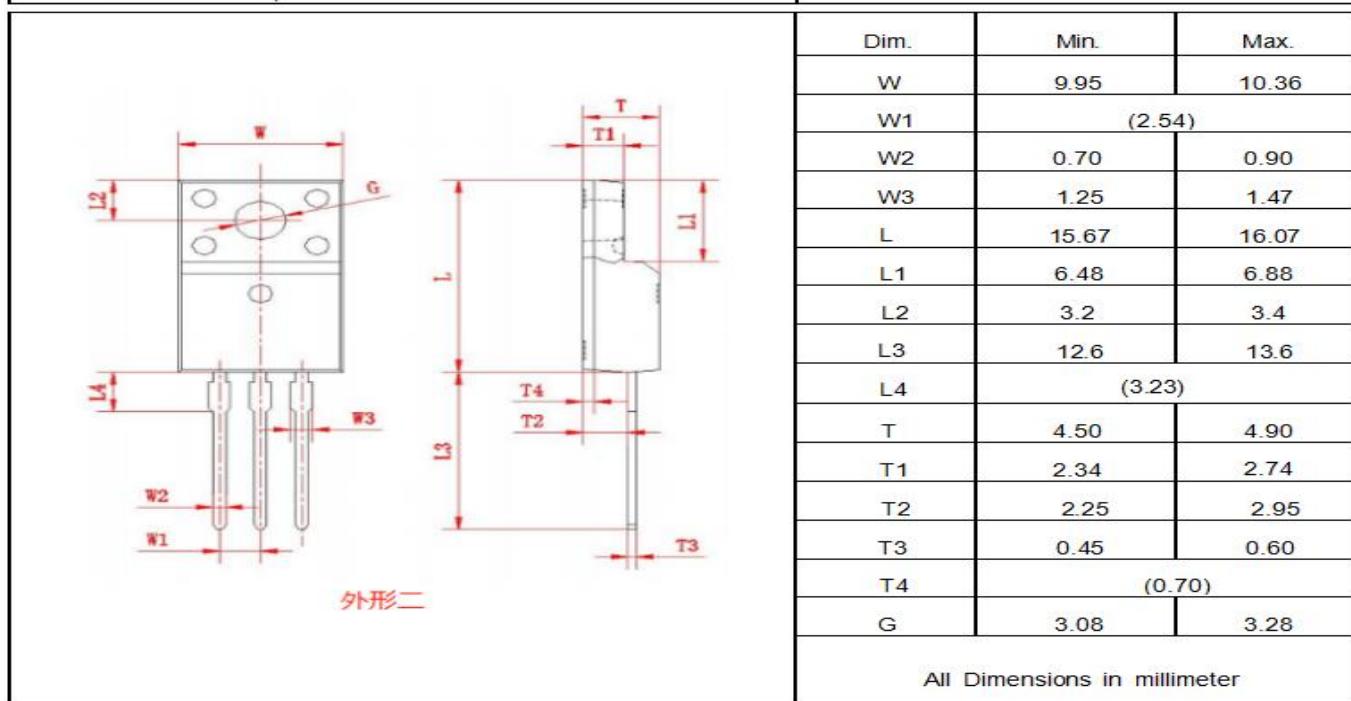
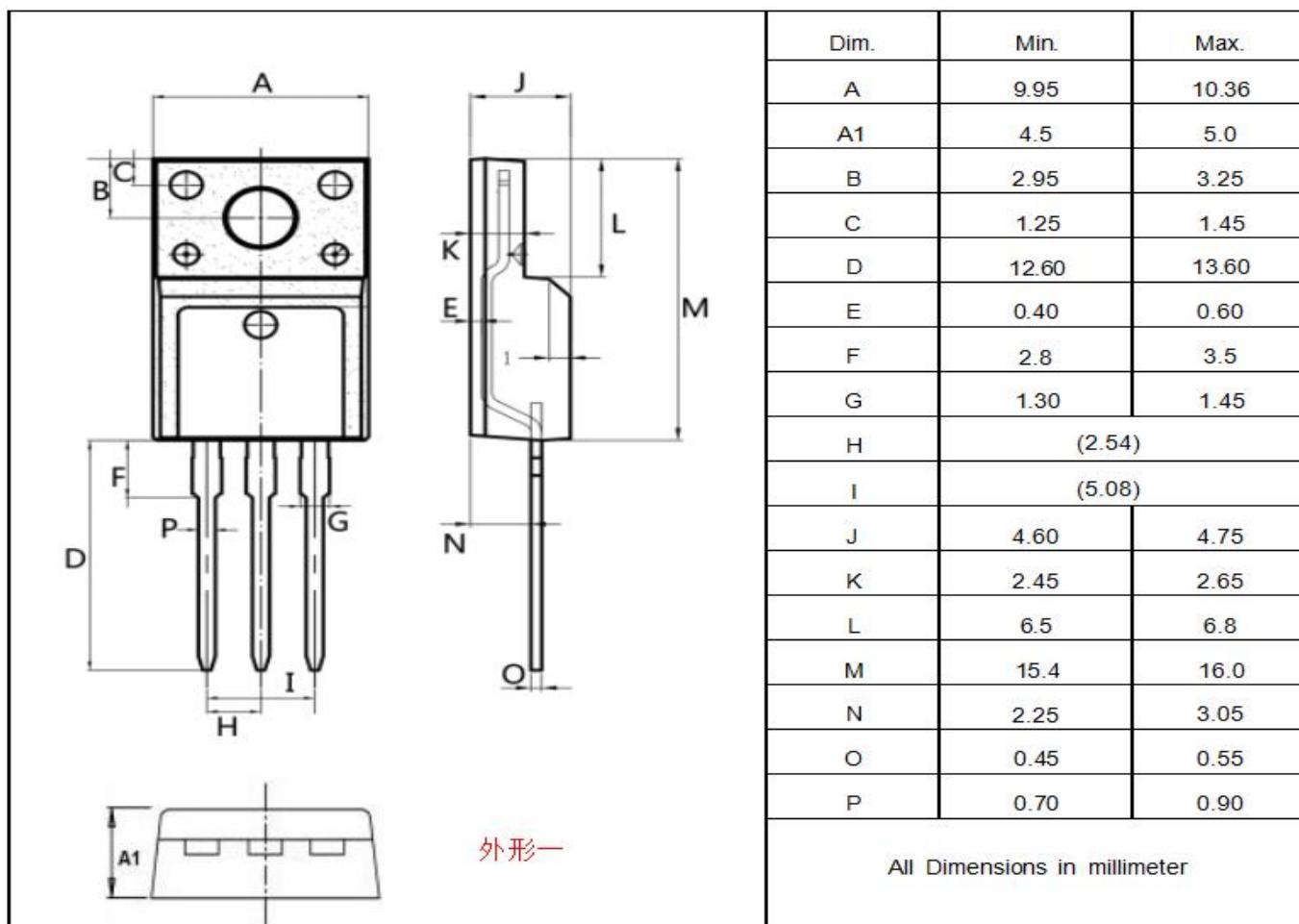
Figure.9 Typical Body Diode Characteristics

Figure.10 Maximum power Dissipation Derating vs Case Temperature

Figure.11 Safe Operating Area


Figure.12 Transient Thermal Impedance (Junction - Case)



Test Circuits and Waveforms

Peak Diode Recovery dv/dt Test Circuit

Peak Diode Recovery dv/dt Waveforms


Switching Test Circuit
Switching Waveforms

Gate Charge Test Circuit
Gate Charge Waveform

Unclamped Inductive Switching Test Circuit
Unclamped Inductive Switching Waveforms

Package outline drawing(TO-220F Unit: mm)


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