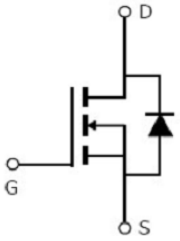
Main Product Characteristics:

V_{DSS}	650V
R_{DS}(on)	0.9ohm(typ.)
I_D	7A

TO220F

Marking and Pin Assignment



Schematic Diagram

Features and Benefits:

- Advanced trench MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150℃ operating temperature

Description:

It utilizes the latest trench processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications

Absolute max Rating:

Symbol	Parameter	Max.	Units
I_D @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V ①	7	A
I_D @ TC = 100°C	Continuous Drain Current, V_{GS} @ 10V ①	4.4	
I_{DM}	Pulsed Drain Current ②	28	
P_D @TC = 25°C	Power Dissipation ③	48	W
	Linear Derating Factor	0.38	W/°C
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy @ L=15.7mH	331.7	mJ
I_{AS}	Avalanche Current @ L=15.7mH	6.5	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

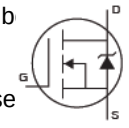
Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ③	—	2.6	℃/W
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	—	62	℃/W
	Junction-to-Ambient (PCB mounted, steady-state) ④	—	40	℃/W

Electrical Characterizes @T_A=25℃ unless otherwise specified

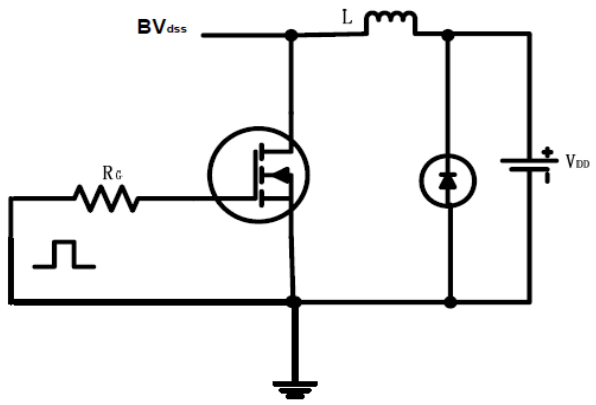
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	650	—	—	V	V_{GS} = 0V, ID = 250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	0.9	1.0	Ω	V_{GS}=10V,I_D = 2A
		—	2.03	—		T_J = 125℃
$V_{GS(th)}$	Gate threshold voltage	2	—	4	V	V_{DS} = V_{GS}, I_D = 250μA
		—	2.1	—		T_J = 125℃
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	V_{DS} = 650V,V_{GS} = 0V
		—	—	50		T_J = 125℃
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V_{GS} =30V
		—	—	-100		V_{GS} = -30V
Q_g	Total gate charge	—	40.6	—	nC	I_D = 7A,
Q_{gs}	Gate-to-Source charge	—	5.9	—		V_{DS}=480V,
Q_{gd}	Gate-to-Drain("Miller") charge	—	17.9	—		V_{GS} = 10V
$t_{d(on)}$	Turn-on delay time	—	15.7	—	ns	V_{GS}=10V, V_{DS} =300V,
t_r	Rise time	—	35.2	—		R_L=42.85Ω,
$t_{d(off)}$	Turn-Off delay time	—	136.2	—		R_{GEN}=25Ω
t_f	Fall time	—	58.7	—		I_D =7A
C_{iss}	Input capacitance	—	1270	—	pF	V_{GS} = 0V
C_{oss}	Output capacitance	—	57	—		V_{DS} = 100V
C_{rss}	Reverse transfer capacitance	—	9.3	—		f = 100kHz

Source-Drain Ratings and Characteristics

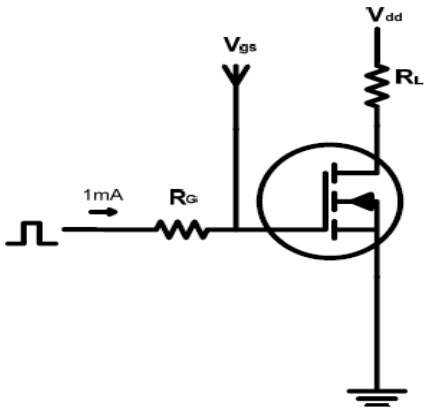
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	7	A	MOSFET symb showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	28	A	
V_{sd}	Diode Forward Voltage	—	0.85	1.3	V	I_S=7A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	—	368.7	—	ns	T_J = 25°C, I_F =7A, di/dt = 100A/μs
Q_{rr}	Reverse Recovery Charge	—	3790	—	nC	

Test circuits and Waveforms

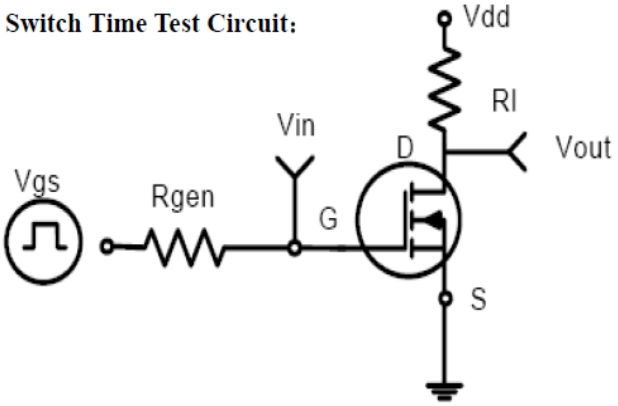
EAS test circuits:



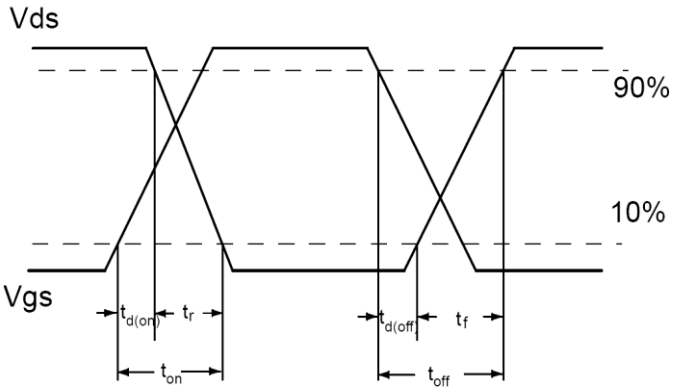
Gate charge test circuit:



Switch Time Test Circuit:



Switch Waveforms:



Notes:

①Calculated continuous current based on maximum allowable junction temperature.

②Repetitive rating; pulse width limited by max. junction temperature.

③The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.

④The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C

Typical electrical and thermal characteristics

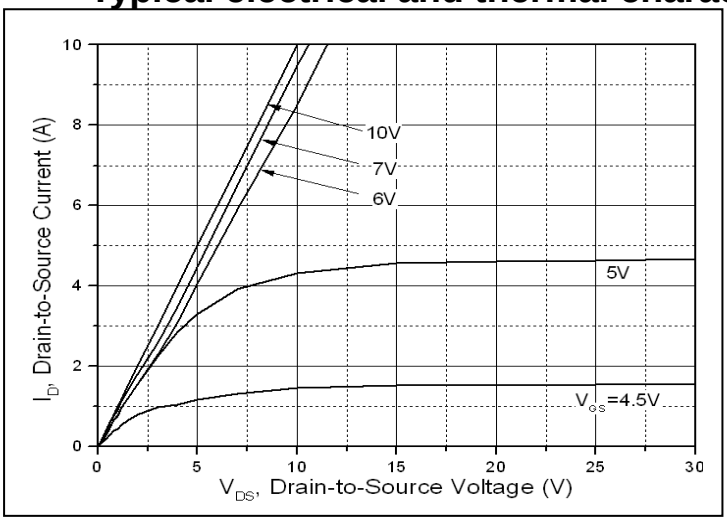


Figure 1: Typical Output Characteristics

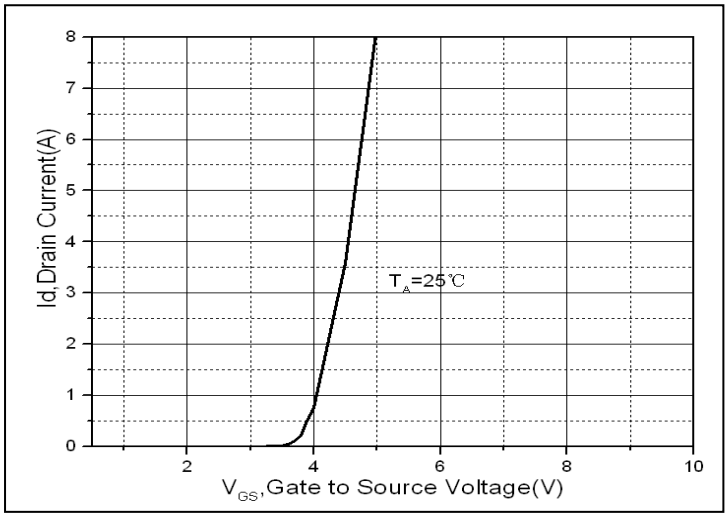


Figure2.Transfer Curve

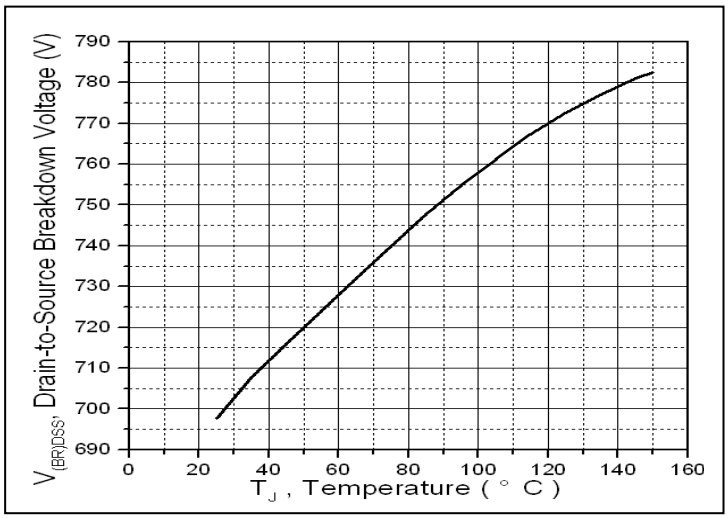


Figure 3. Drain-to-Source Breakdown Voltage vs. Temperature

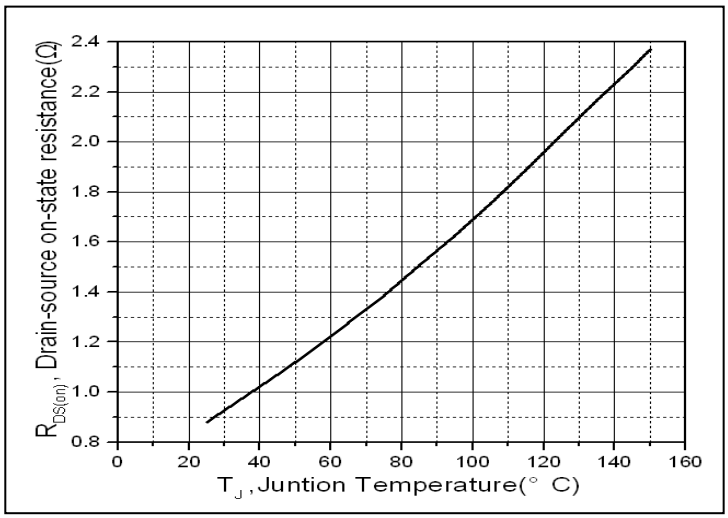


Figure 4: Normalized On-Resistance Vs. Case Temperature

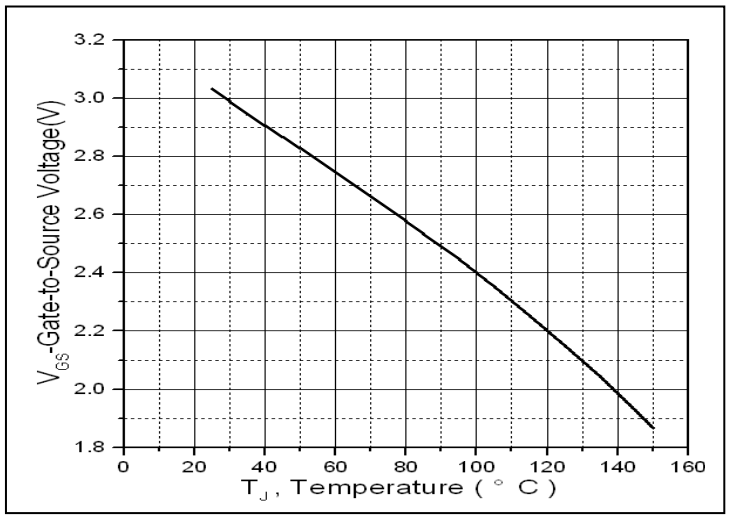


Figure 5. Gate to source cut-off voltage

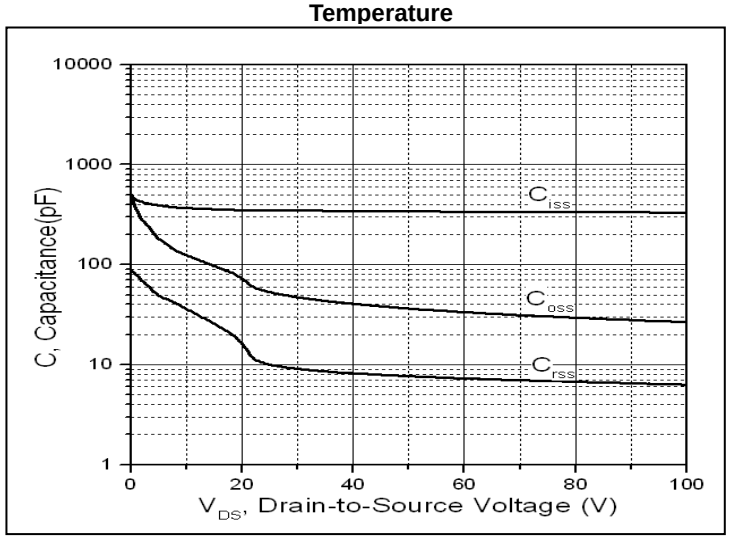
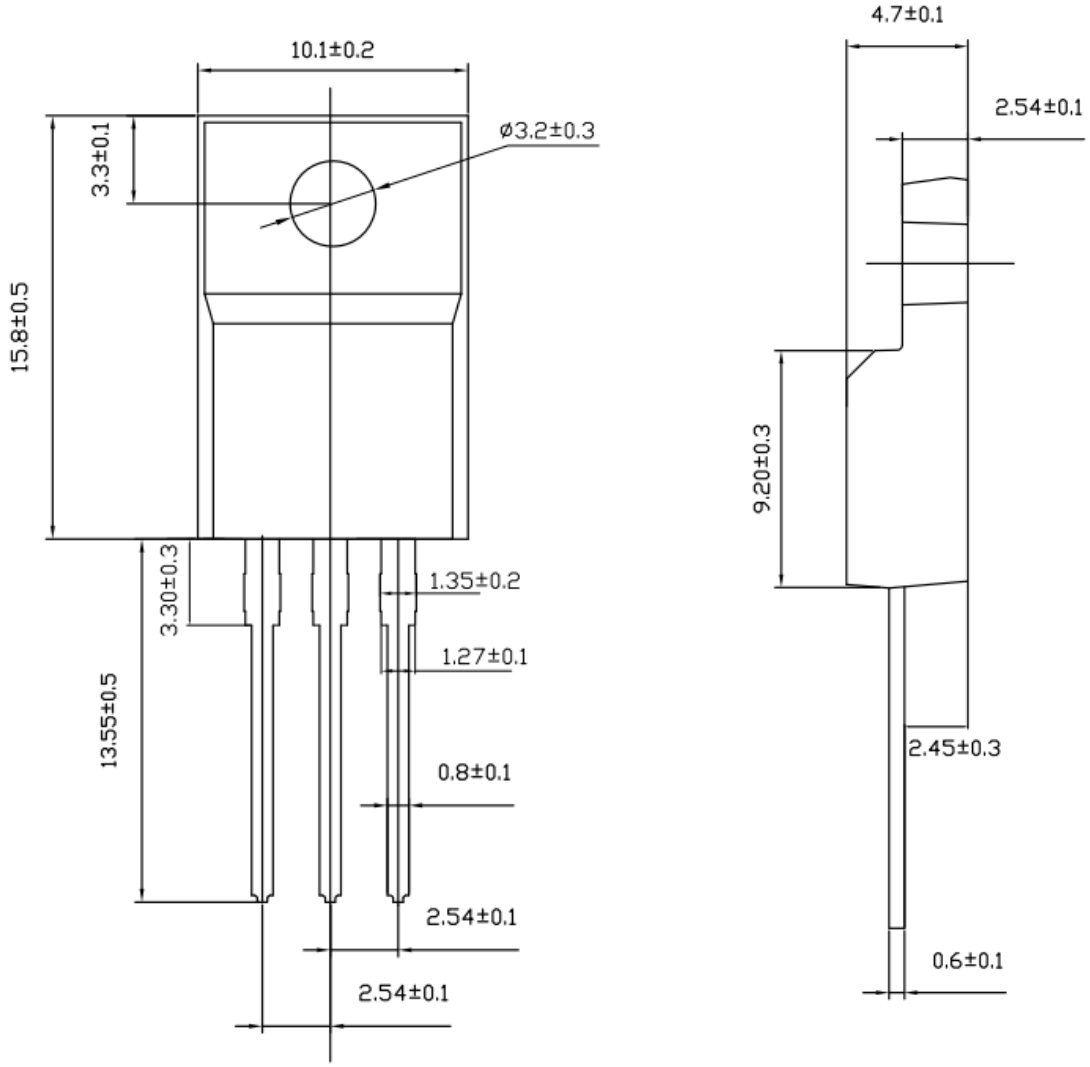
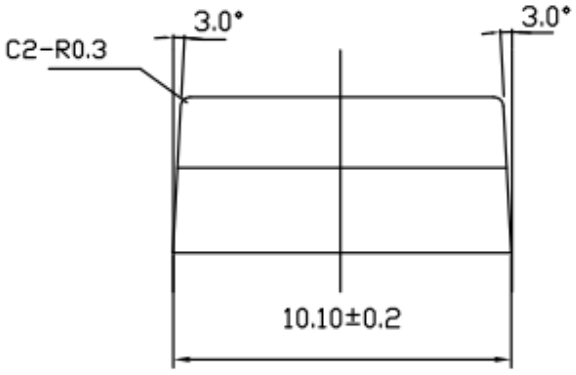


Figure 6.Typical Capacitance Vs. Drain-to-Source Voltage

Mechanical Data：





Ordering and Marking Information

Device Marking: SSF7N65BF

Package (Available)

TO220F

Operating Temperature Range

C : -55 to 150 ºC

Devices per Unit

Package Type	Units/ Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO220F	50	20	1000	6	6000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	T_j=125℃ to 150℃ @ 80% of Max V_{DSS}/V_{CES}/VR	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	T_j=150℃ @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices

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