REASUNOS

RSU13N65F

Multi-Epi Super Junction MOSFETs

Lead Free Package and Finish

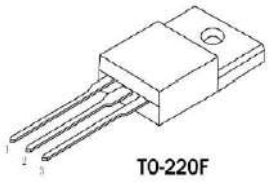
Applications:

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

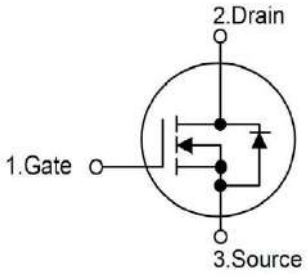
I_D	$R_{DS(ON)}$(Max.)	V_{DSS}
13A	380mΩ	650V

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
RSU13N65F	TO-220F	RSU13N65F

Absolute Maximun Ratings Tc=25℃ unless otherwise specified

Symbol	Parameter	RSU13N65F	Units
V_{DSS}	Drain-to-Source Voltage (Note*1)	650	V
I_D	Continuous Drain Current	13	A
I_{DM}	Pulsed Drain Current (Note*2)	46	
P_D	Power Dissipation(Tc=25℃)	33	W
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Engergy L=60mH, IAS=3A, VDD=150V, Starting TJ=25 ℃	280	mJ
I_{AR}	Avalanche Current	2.3	A
E_{AR}	Repetitive Avalanche Engergy	1.2	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	RSU13N65F	Units	Test Conditions
RθJC	Junction-to-Case	3.78	℃/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℃
		--	700	--	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 (NOTE*3)	--	340	380	mΩ	VGS=10V,ID=6.5A
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	--	17	--	ns	VDS=400V ID=6.5A RG=20Ω VGS=10V
trise	Rise Time	--	12	--		
td(OFF)	Turn-OFF Delay Time	--	130			
tfall	Fall Time	--	10			

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	780	--	pF	VGS=0V VDS=25V f=1.0MHz
Coss	Output Capacitance	--	23	--		
Crss	Reverse Transfer Capacitance	--	1.9	--		
Qg	Total Gate Charge	--	34	--	nC	VDS=400V ID=6.5A VGS=10V
Qgs	Gate-to-Source Charge	--	4.5	--		
Qgd	Gate-to-Drain("Miller"）Charge	--	19	--		

Source-Drain Diode Characteristics

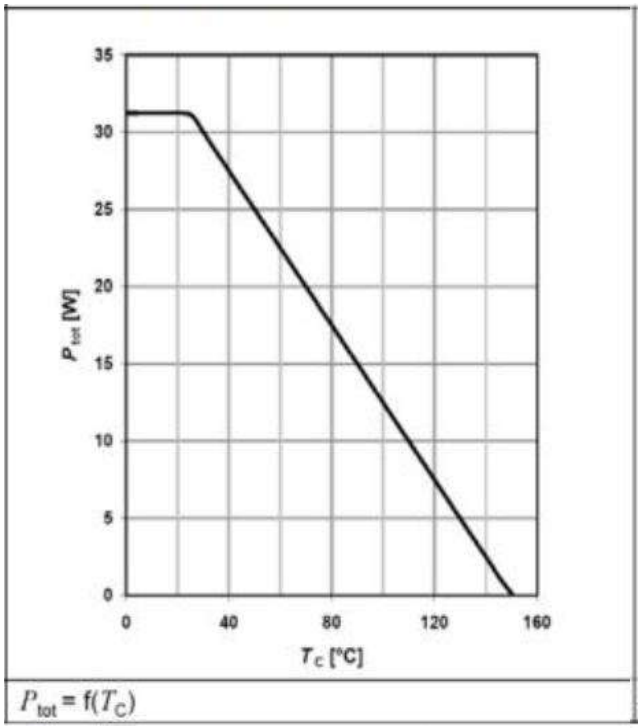
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	10.0	A	Integral pn-diode in MOSFET
ISM	Maximum Pulsed Current	--	--	35	A	
VSD	Diode Forward Voltage	--	0.9	1.5	V	IS=6.5A,VGS=0V Tj=25℃
trr	Reverse Recovery Time	--	300	--	nS	VGS=0V IS=6.5A,di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	3.5	--	μC	

Notes:

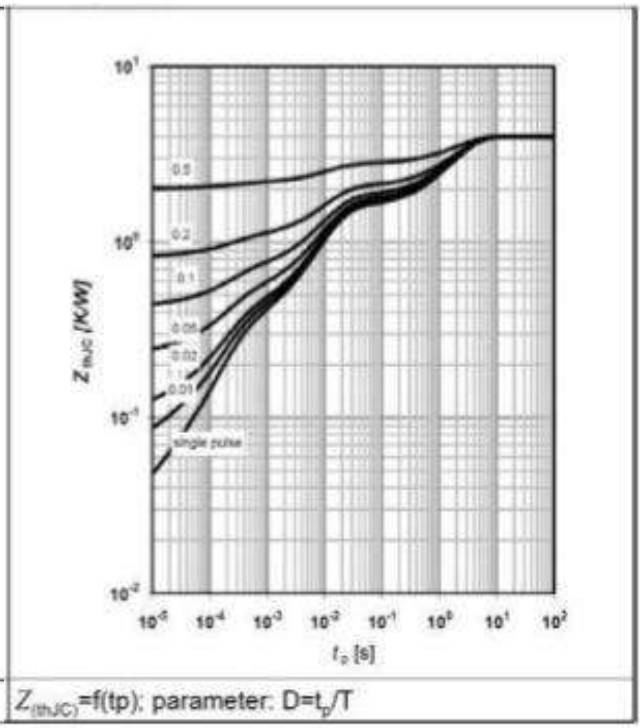
*1.TJ=±25℃ to +150℃.
*2.Repetitive rating;pulse width limited by maximum junction temperature.
*3.. Pulse Test: Pulse width ≤ 300us, Duty Cycle ≤2%

Typical Feature curve T_J=25℃, unless otherwise noted

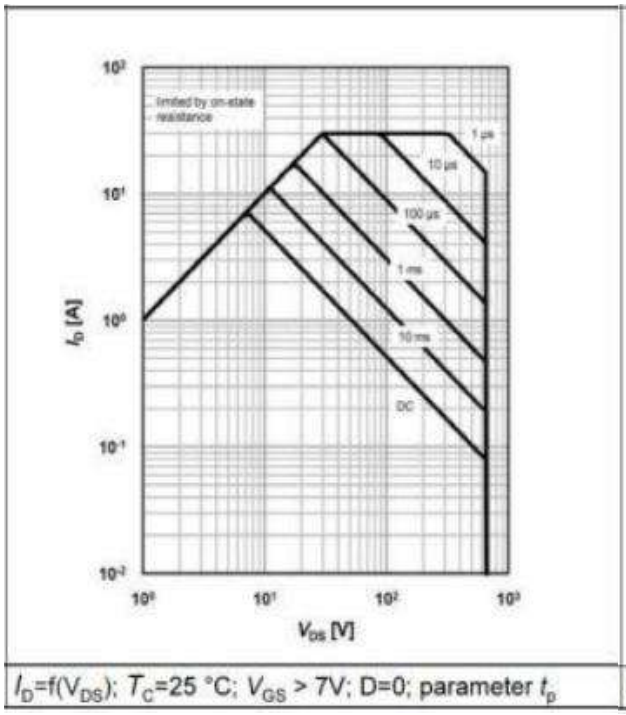
Fingure1. Power dissipation



Fingure2. Max. transient thermal impedance

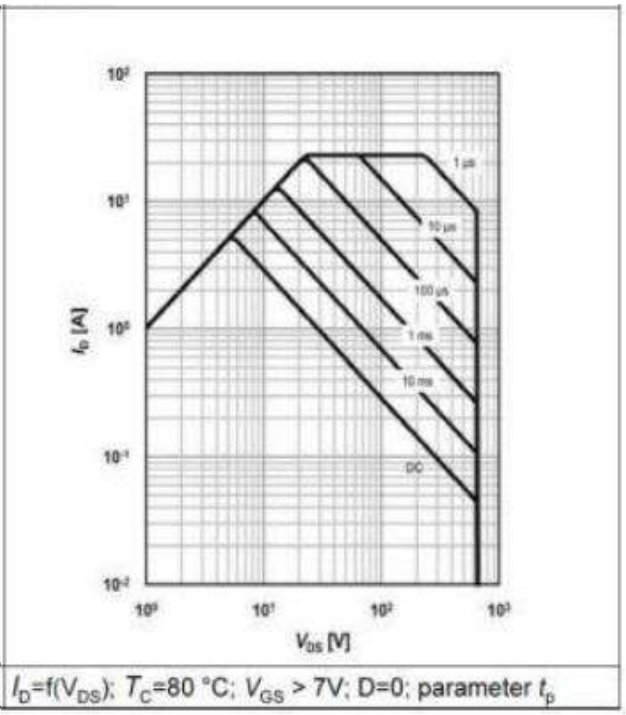


Fingure3. Safe operating areaTc=25℃



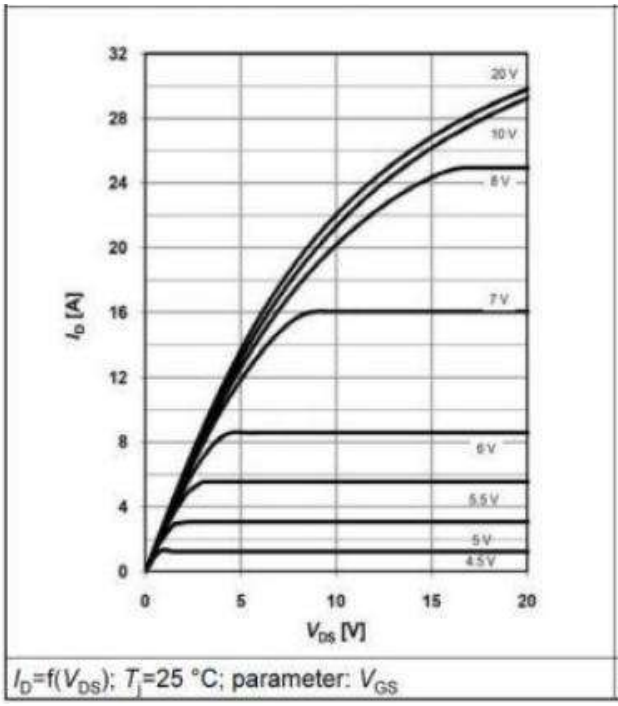
I_D=f(V_{DS}); T_C=25 °C; V_{GS} > 7V; D=0; parameter t_p

Fingure4. Safe operating areaTc=80℃



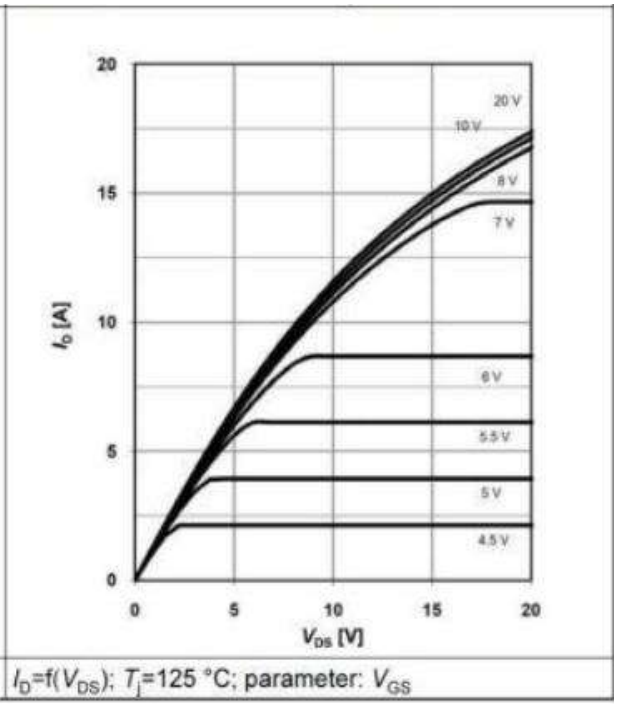
I_D=f(V_{DS}); T_C=80 °C; V_{GS} > 7V; D=0; parameter t_p

Fingure5. Output characteristics Tj=25℃



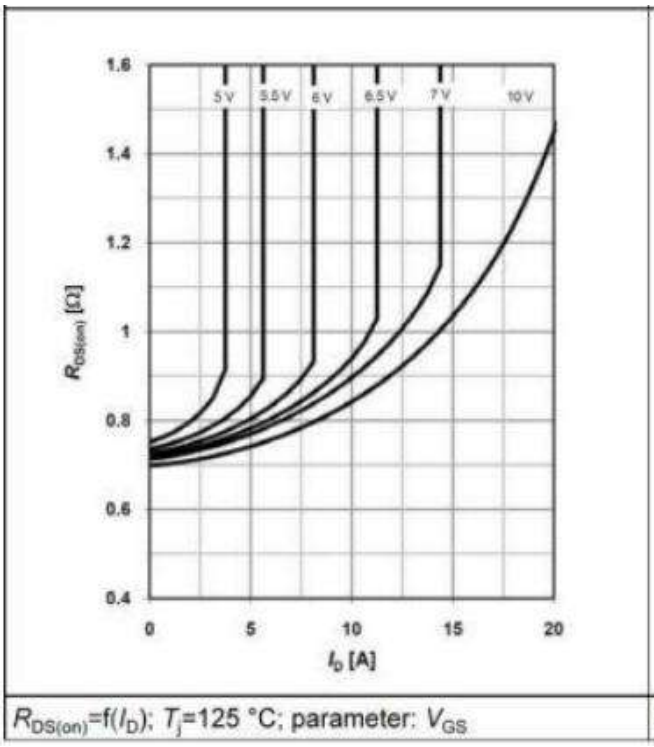
I_D=f(V_{DS}); T_j=25 °C; parameter: V_{GS}

Fingure6. Output characteristics Tj=125℃



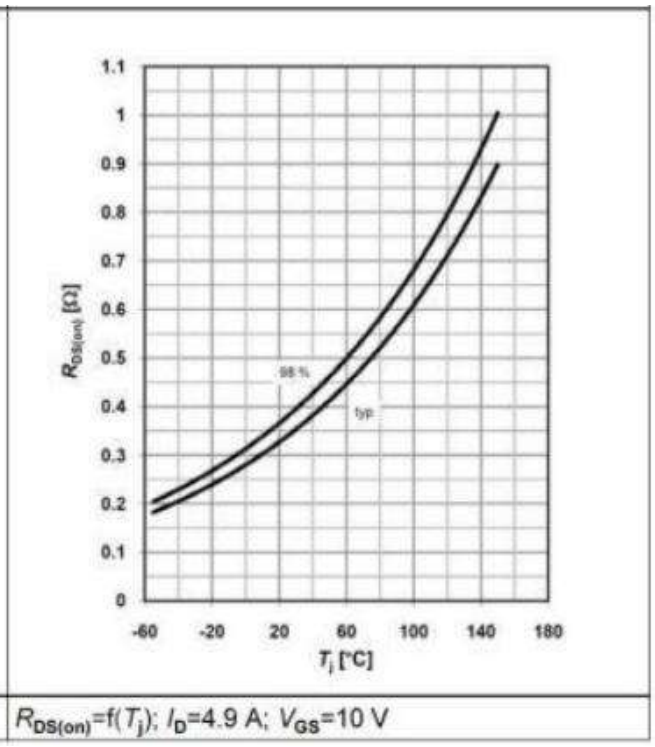
I_D=f(V_{DS}); T_j=125 °C; parameter: V_{GS}

Fingure7. Type drain-source on state resistance



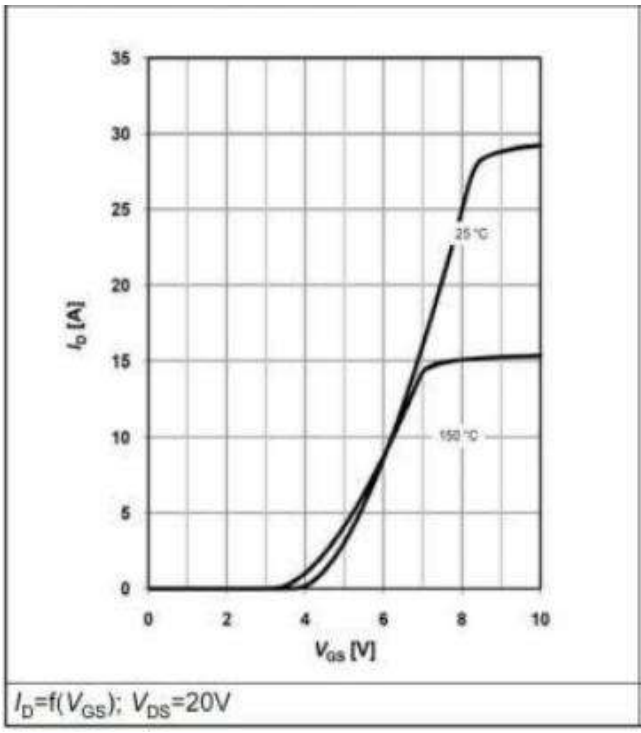
$R_{DS(on)}=f(I_D)$; T_j=125 °C; parameter: V_{GS}

Fingure8. Typ. drain-source on state resistance



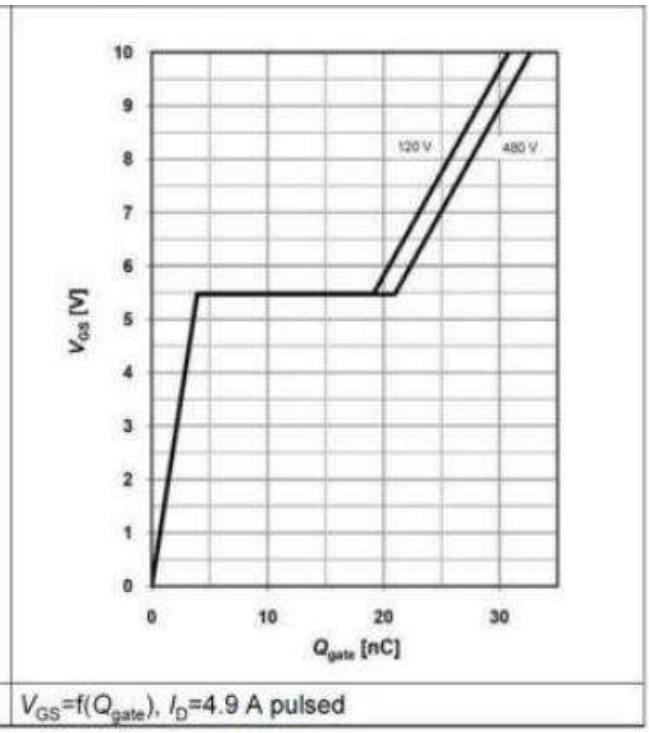
$R_{DS(on)}=f(T_j)$; I_D=4.9 A; V_{GS}=10 V

Fingure9. Typ. transfer characteristics



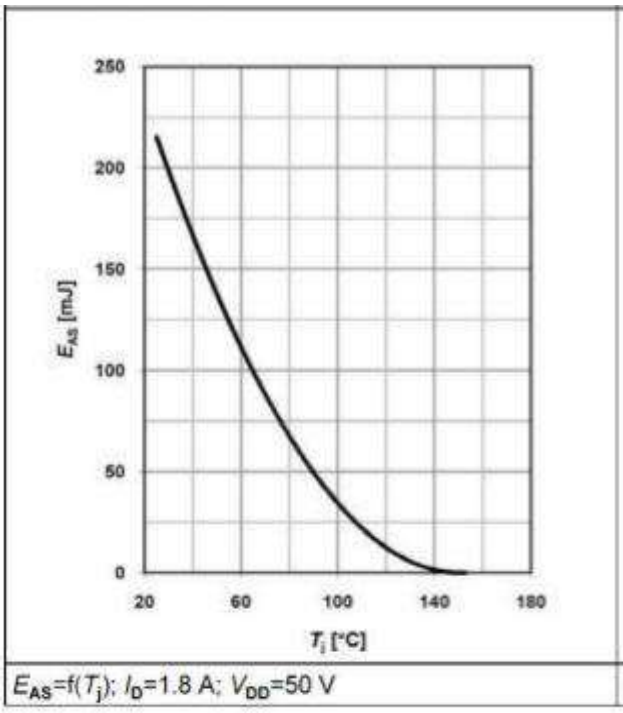
$I_D=f(V_{GS})$; V_{DS}=20V

Fingure10. Gate charge



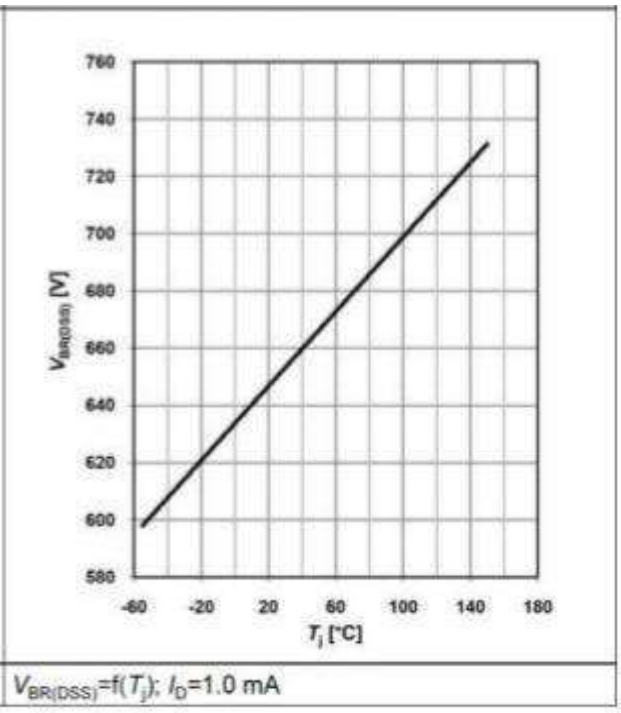
$V_{GS}=f(Q_{gate})$, I_D=4.9 A pulsed

Fingure11. Avalanche energy



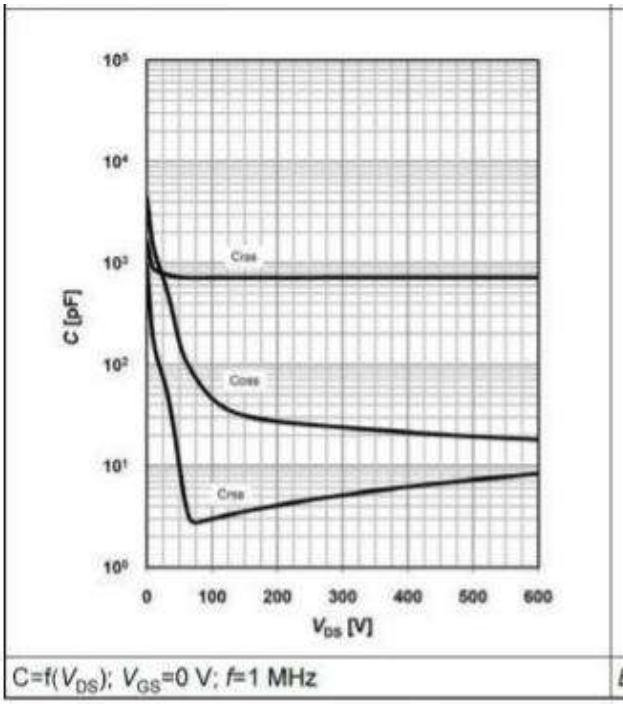
E_{AS}=f(T_j); I_D=1.8 A; V_{DD}=50 V

Fingure12. Drain-source breakdown voltage



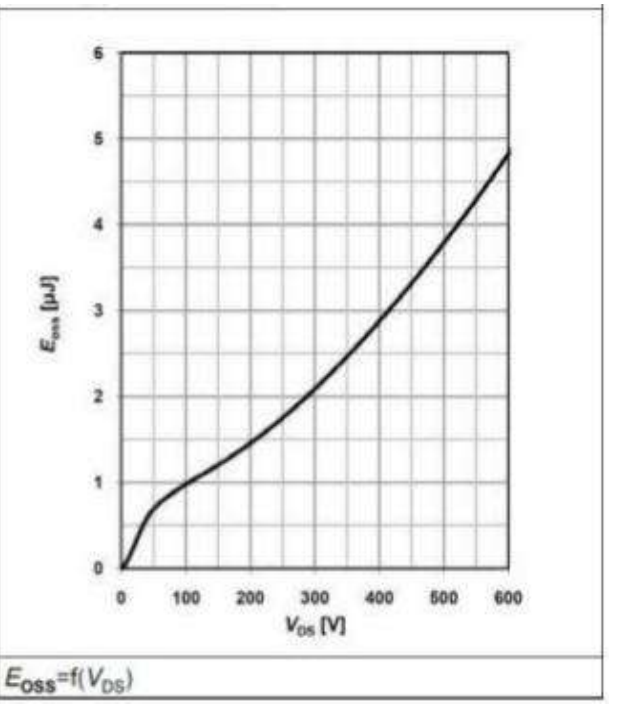
$V_{BR(DSS)}$=f(T_j); I_D=1.0 mA

Fingure13. Typ. capacitances



C=f(V_{DS}); V_{GS}=0 V; f=1 MHz

Fingure14. Coss stored energy



E_{OSS}=f(V_{DS})

Test Circuits and Waveforms

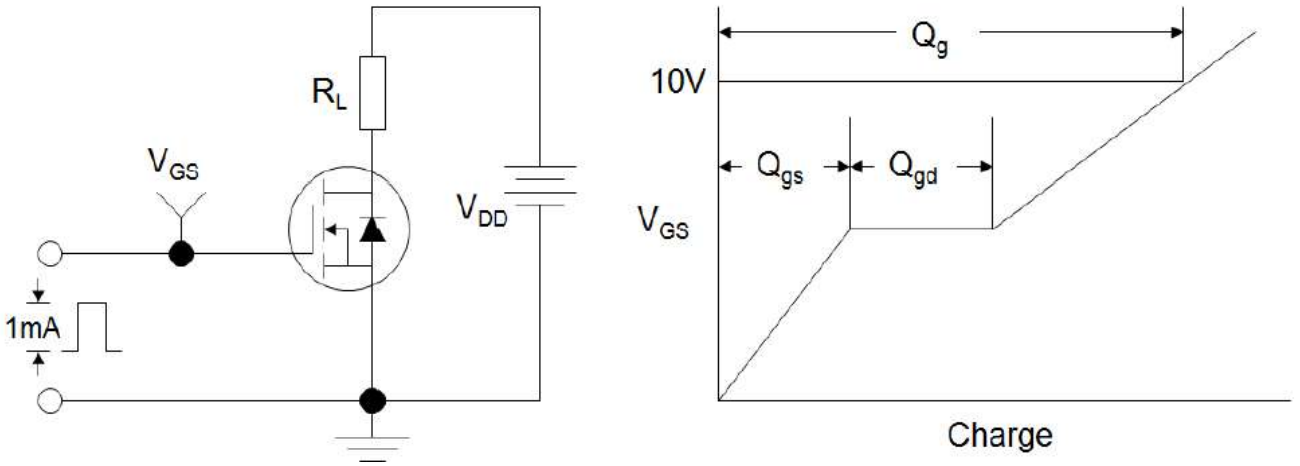


Figure A.
Gate Charge Test Circuit and Waveform

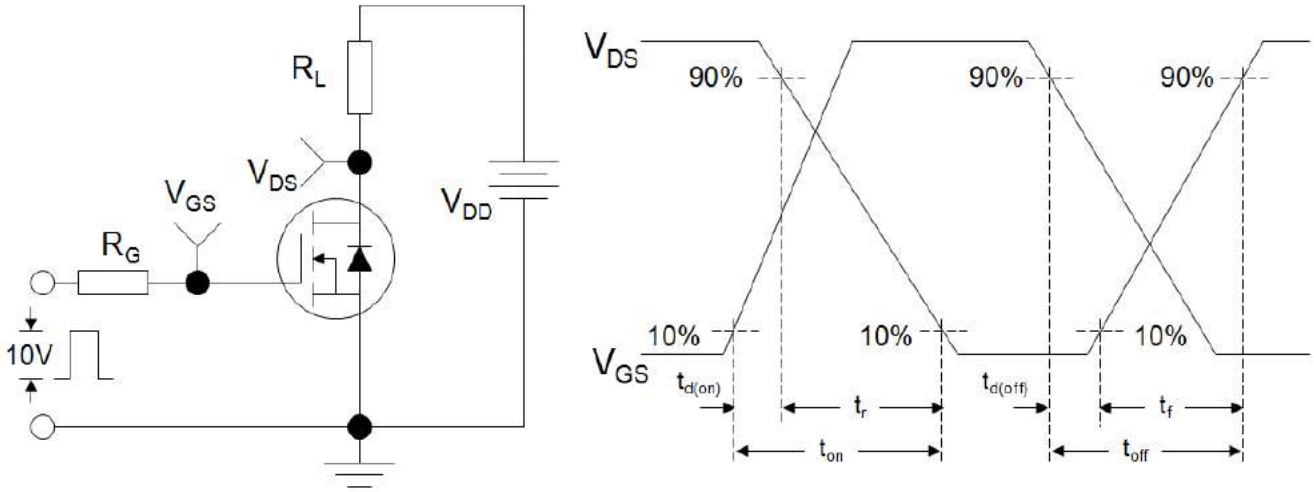


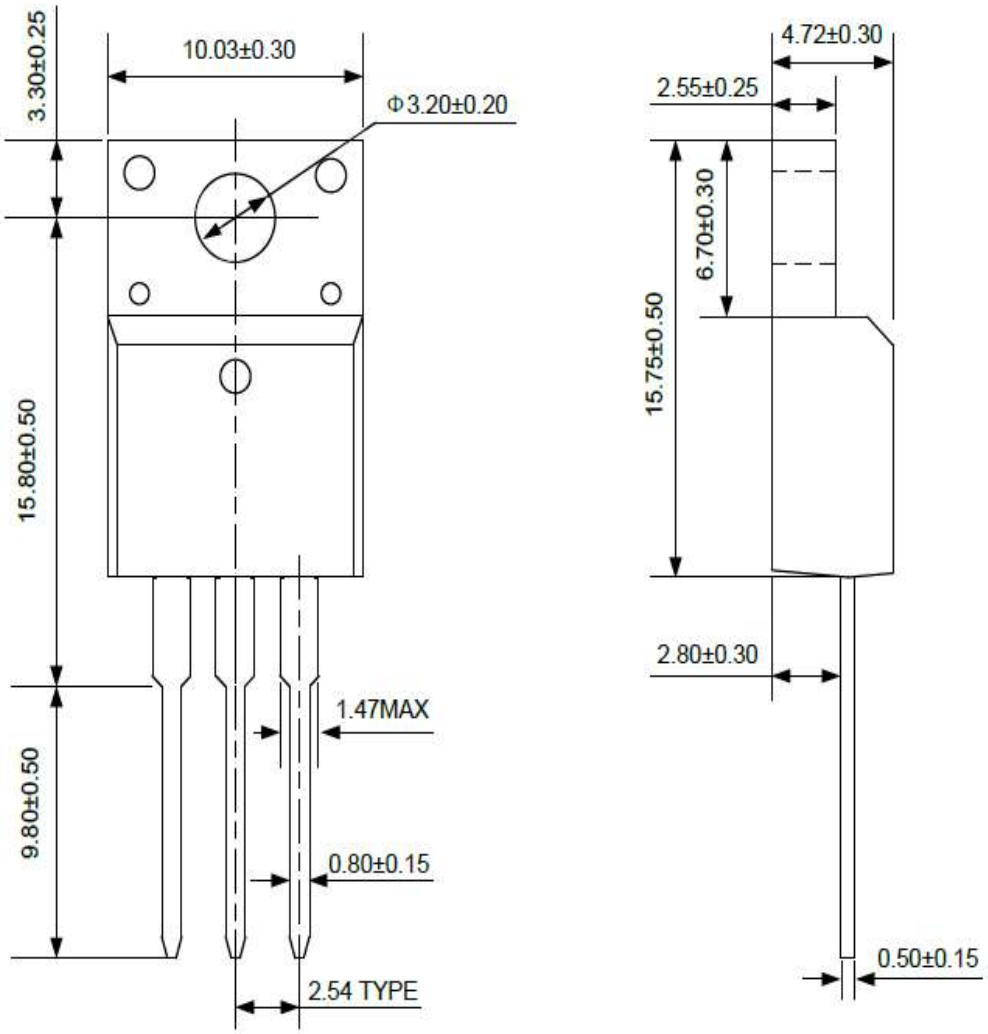
Figure B.
Resistive Switching Test Circuit and Waveform

Test Circuits and Waveforms

Figure C.Unclamped Inductive Switching Test Circuit and Waveform

Package outline drawing

Unit:mm



TO-220F

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