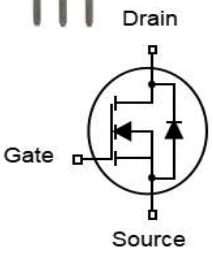
Features

- N-Channel
- Low Gate Charge
- 100% avalanche tested
- Low ON Resistance
- RoHS compliant
- Improved dv/dt Capability
- 100% EAS Tested

V_{DS}	900	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	1.2	Ω
I_D	9	A

TO-220F



Part ID	Package Type	Marking	Packing
ZT9N90F	TO-220F	ZT9N90F	1000pcs/Tape

Absolute Maximum Ratings T_A =25°C, unless otherwise specified

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{GS}	Gate-Source Voltage		±30	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		900	V
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_{DM}	Drain Current-Continuous@ Current-Pulsed (Note 2)	T_C =25°C	36	A
Mounted on Large Heat Sink				
I_D	Drain Current-Continuous (Note 1)	T_C =25°C	9	A
		T_C =100°C	5.6	A
P_D	Total power dissipation	T_C =25°C	25	W
	Derating Factor above 25 °C		0.2	W/ °C
$R_{\theta JC}$	Thermal Resistance-Junction to Case		5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient		69	°C/W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed (Note 3)		486	mJ
dv/dt	Reverse Diode dv/dt (Note 4)		5	V/ns

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Electrical Characteristics @ T_j=25°C (unless otherwise stated)						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	900	--	--	V
BV_{DSS}/TJ	Breakdown voltage temperature coefficient	I_D=250μA, referenced to25℃	--	0.82	--	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=900V,V_{GS}=0V	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±30V,V_{DS}=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	3.0	4.0	5.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=4.5A	--	1.2	1.5	Ω
Gfs	Forward Transconductance	V_{GS}=10V, I_D=4.5A	--	7.2	--	S
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
Ciss	Input Capacitance	V_{DS}=25V,V_{GS}=0V, f=1MHz	--	2050	--	pF
Coss	OutputCapacitance		--	144	--	pF
Crss	ReverseTransferCapacitance		--	11	--	pF
Rg	Gate Resistance	V_{DS} =0V Scan F mode	--	2.3	--	Ω
Qg	Total Gate Charge	V_{DS}=720V,I_D=9A, V_{GS}=10V	--	42.1	--	nC
Qgs	Gate-SourceCharge		--	13.1	--	nC
Qgd	Gate-DrainCharge		--	18.6	--	nC
Switching Characteristics (Note 2)						
Td(on)	Turn-on Delay Time	V_{DS}=450V, I_D =9A, R_G=25Ω, V_{GS}=10V	--	49	--	ns
Tr	Turn-on Rise Time		--	64	--	ns
Td(off)	Turn-Off Delay Time		--	85	--	ns
Tf	Turn-Off Fall Time		--	33	--	ns
Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_S=9A,V_{GS}=0V	--	--	1.3	V
Trr	Reverse Recovery Time	T_j=25℃,I_S =9A, V_{GS} =0V di/dt=100A/μs	--	656	--	ns
Qrr	Reverse Recovery Charge		--	9.2	--	uC
Irrm	Peak Reverse Recovery Current		--	28	--	A

Notes
1. Drain current is limited by maximum junction temperature.
2. Repetitive rating : pulse width limited by junction temperature.
3. L = 12mH, I_{AS} = 9A, V_{DD} = 50V, R_G=25Ω, Starting at T_J = 25°C
4. I_{SD} ≤ I_D, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Starting at T_J =25°C

Typical Characteristics T_J = 25ºC, unless otherwise noted

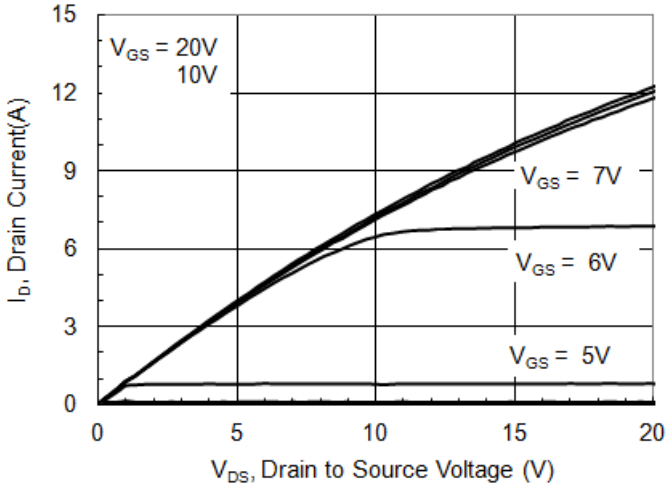


Fig1. Output characteristics

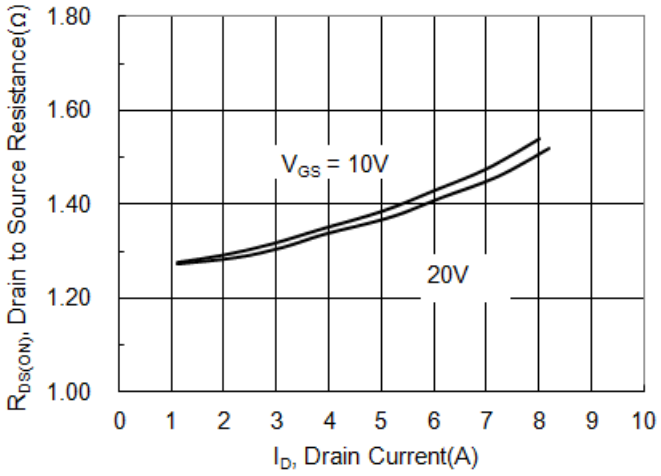


Fig4. Drain-source on-state resistance

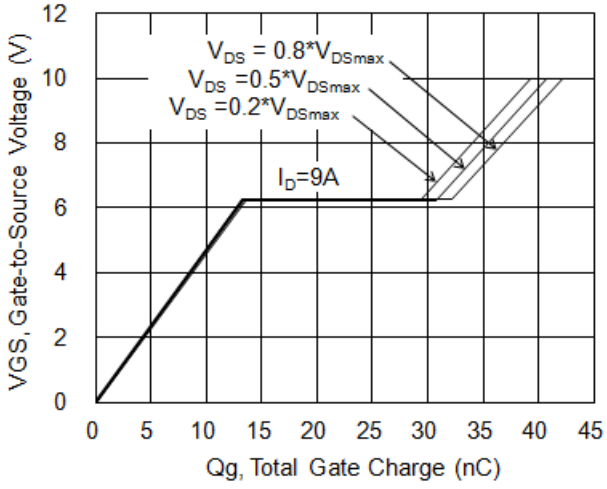


Fig2. Gate charge characteristics

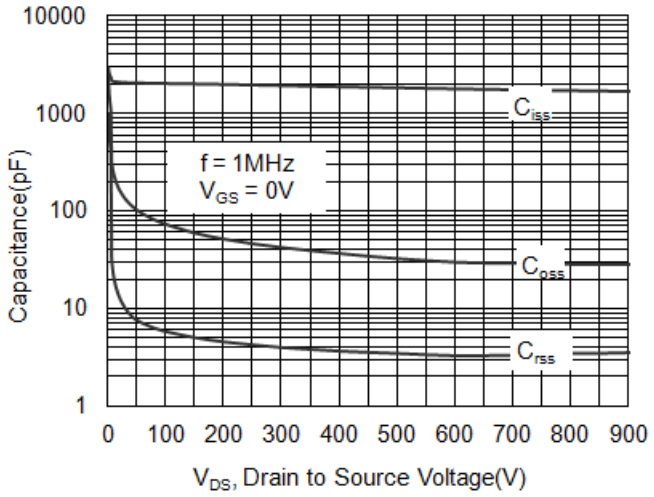


Fig 5. Capacitance Characteristics

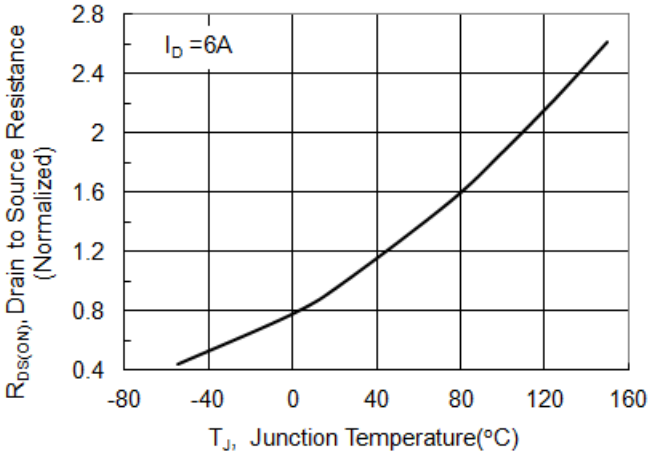


Fig 3. $R_{DS(ON)}$ vs junction temperature

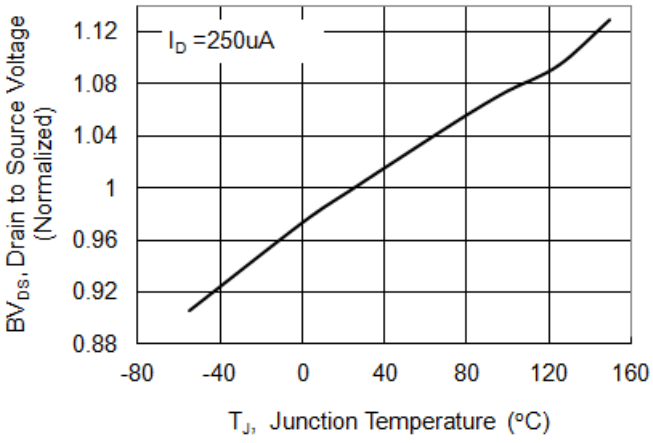


Fig 6. BV_{DSS} vs junction temperature

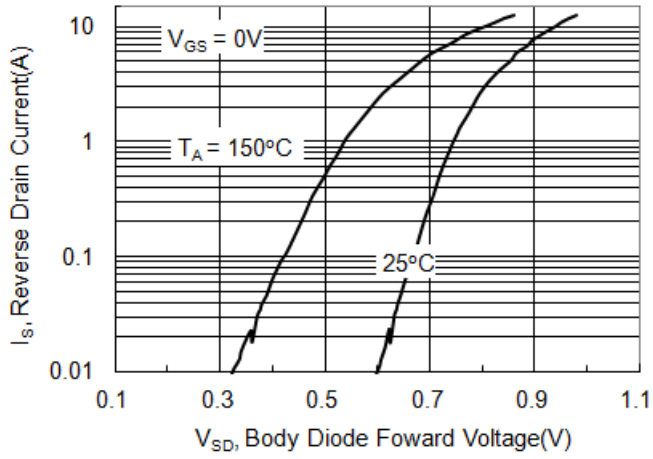


Fig 7. Forward characteristics of reverse diode

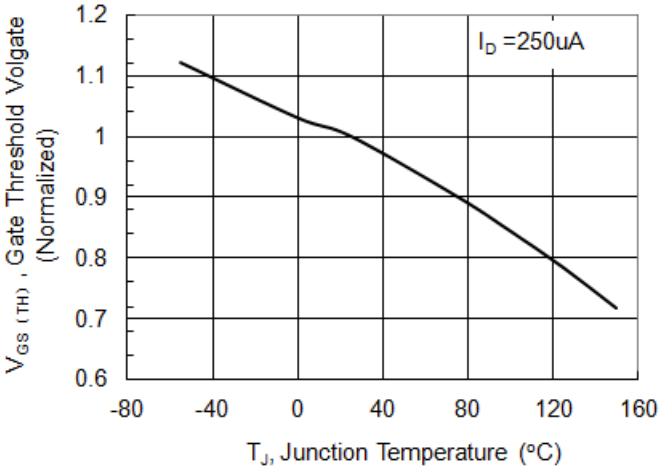


Fig 9. $V_{GS(TH)}$ vs junction temperature

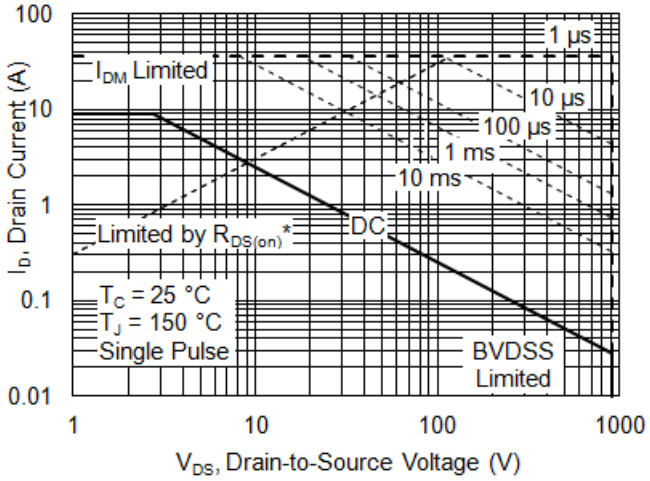


Fig 8 . Safe operating area (TO-220F)

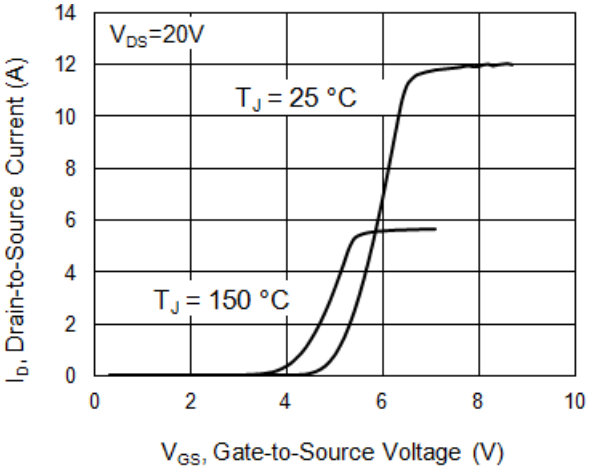


Fig 10. Transfer characteristics

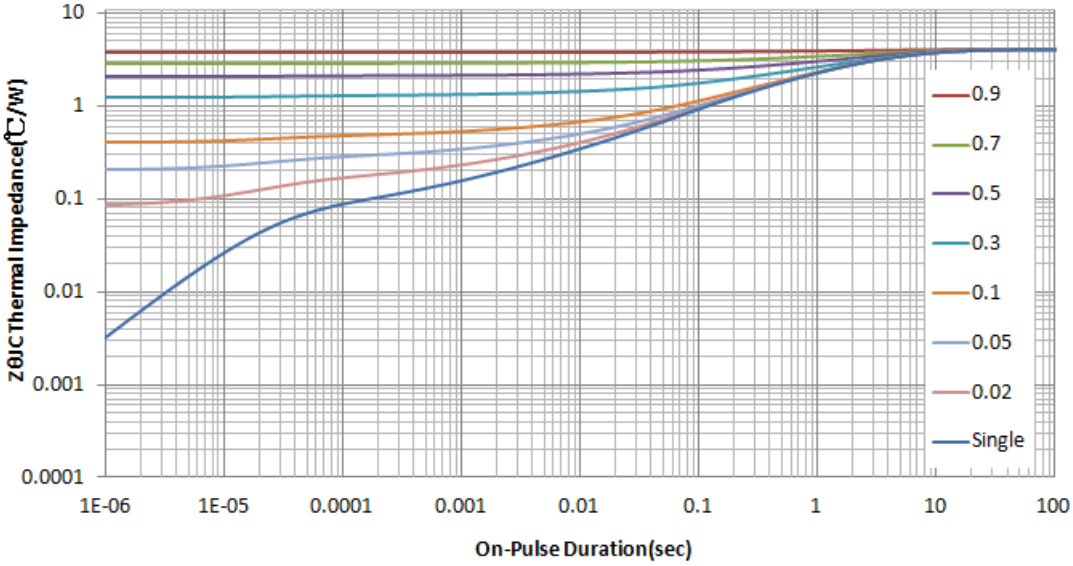


Fig 11 . Transient thermal impedance(TO-220F)

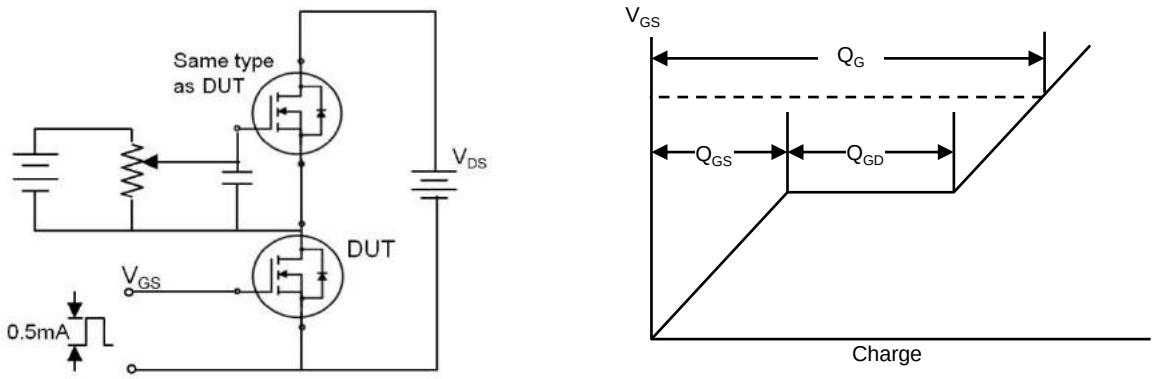


Figure A：Gate charge test circuit & waveform

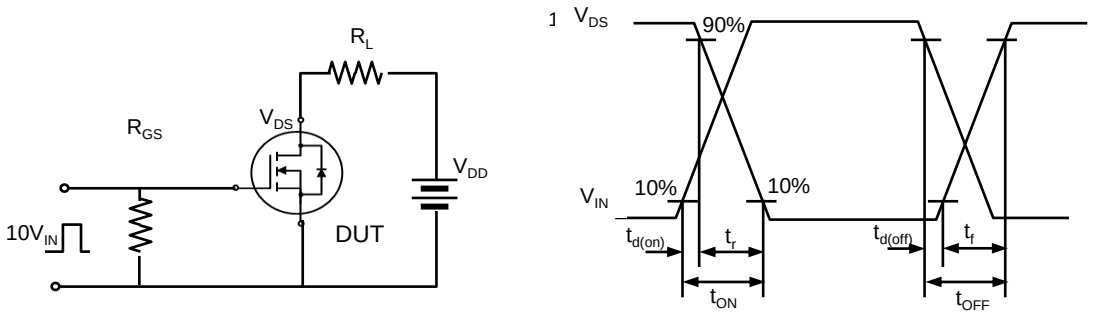


Figure B：Switching time test circuit & waveform

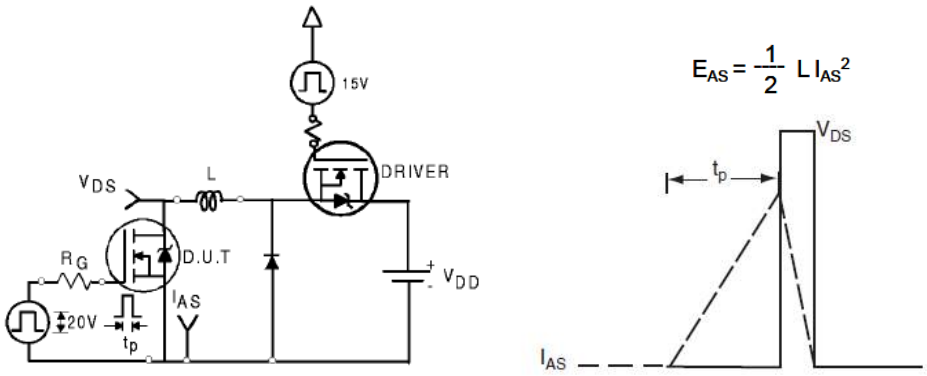


Figure C：Unclamped Inductive switching test circuit & waveform

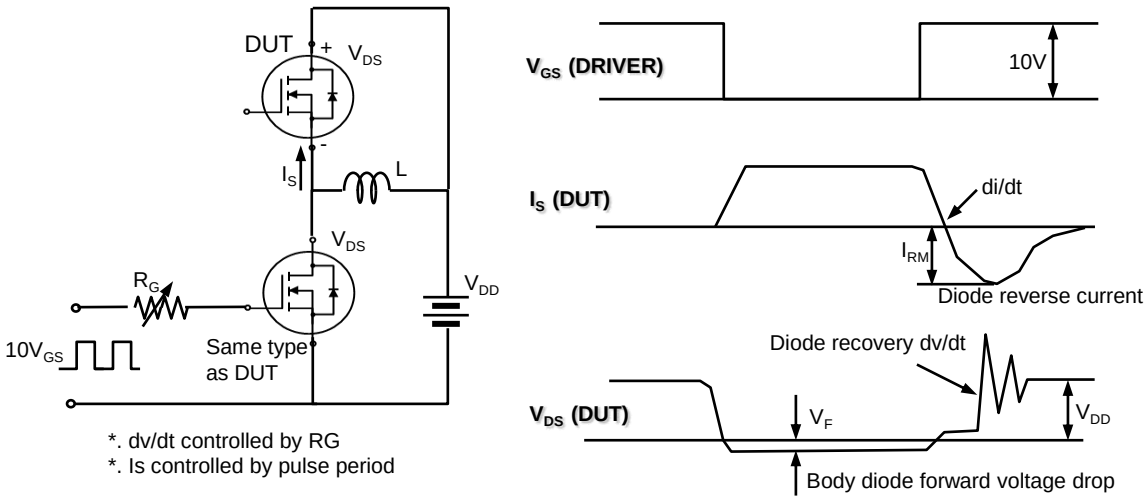
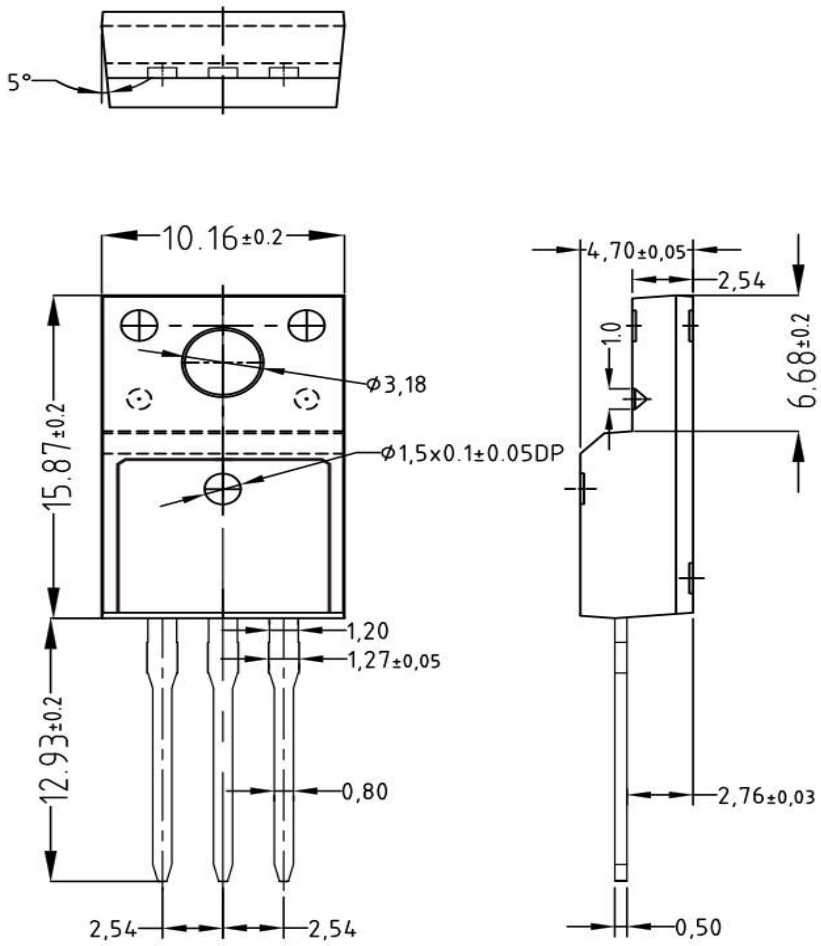


Figure D：Peak diode recovery dv/dt test circuit & waveform

TO-220F Package Information



Customer Service

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