

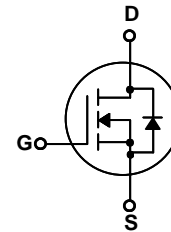
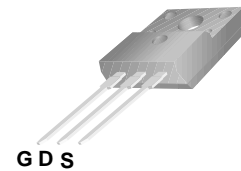


## WGF10N80

### 800V N-Channel MOSFET

#### Features

- Low Intrinsic Capacitances
- Excellent Switching Characteristics
- Extended Safe Operating Area
- Unrivalled Gate Charge :Qg= 44nC (Typ.)
- BVDS=800V, ID=10A
- R<sub>DS(on)</sub> : 1.0 Ω (Max) @VG=10V
- 100% Avalanche Tested



TO-220F

G-Gate, D-Drain, S-Source

#### Absolute Maximum Ratings *T<sub>c</sub>=25°C unless other wise noted*

Symbol	Parameter	WGF10N80	Units
V <sub>DSS</sub>	Drain-Source Voltage	800	V
I <sub>D</sub>	Drain Current -continuous (T <sub>c</sub> =25°C)	10*	A
	-continuous (T <sub>c</sub> =100°C)	6.32*	A
V <sub>GS</sub>	Gate-Source Voltage	±30	V
E <sub>AS</sub>	Single Pulsed Avanche Energy (Note1)	920	mJ
I <sub>AR</sub>	Avalanche Current (Note2)	10	A
P <sub>D</sub>	Power Dissipation (T <sub>c</sub> =25°C)	240	W
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range	-55 ~ +150	°C
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	°C

#### Thermal Characteristics

Symbol	Parameter	Typ.	Max	Units
R <sub>θJC</sub>	Thermal Resistance, Junction to Case	--	0.52	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient	--	40	°C/W

\*Drain current limited by maximum junction temperature.

<b>Electrical Characteristics</b> $T_c=25^\circ\text{C}$ unless other wise noted						
Symbol	Parameter	Test Condition	Min.	Typ.	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=250\ \mu\text{A}$ , $V_{GS}=0$	800	--	--	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D=250\ \mu\text{A}$ , Reference to $25^\circ\text{C}$	--	0.98	--	$V/^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=800\text{V}$ , $V_{GS}=0\text{V}$	--	--	10	$\mu\text{A}$
		$V_{DS}=640\text{V}$ , $T_c=125^\circ\text{C}$			100	$\mu\text{A}$
$I_{GSSF}$	Gate-body leakage Current, Forward	$V_{GS}=+30\text{V}$ , $V_{DS}=0\text{V}$	--	--	100	nA
$I_{GSSR}$	Gate-body leakage Current, Reverse	$V_{GS}=-30\text{V}$ , $V_{DS}=0\text{V}$	--	--	-100	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$I_D=250\ \mu\text{A}$ , $V_{DS}=V_{GS}$	3.0	--	5.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$I_D=5\text{A}$ , $V_{GS}=10\text{V}$	--	0.9	1.0	$\Omega$
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=25\text{V}$ , $V_{GS}=0$ , $f=1.0\text{MHz}$	--	2150	2800	pF
$C_{oss}$	Output Capacitance		--	180	230	pF
$C_{rss}$	Reverse Transfer Capacitance		--	15	20	pF
<b>Switching Characteristics</b>						
$T_d(on)$	Turn-On Delay Time	$V_{DD}=400\text{V}$ , $I_D=10\text{A}$ $R_G=25\ \Omega$ (Note 3,4)	--	50	110	nS
$T_r$	Turn-On Rise Time		--	130	270	nS
$T_d(off)$	Turn-Off Delay Time		--	90	190	nS
$T_f$	Turn-Off Fall Time		--	80	170	nS
$Q_g$	Total Gate Charge	$V_{DS}=640\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=10\text{A}$ (Note 3,4)	--	45	58	nC
$Q_{gs}$	Gate-Source Charge		--	13.5	--	nC
$Q_{gd}$	Gate-Drain Charge			17	--	nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain-Source Diode Forward Current		--	--	10	A
$I_{SM}$	Maximum Pulsed Drain-Source Diode Forward Current		--	--	40	A
$V_{SD}$	Drain-Source Diode Forward Voltage	$I_D=10\text{A}$	--	--	1.4	V
$t_{rr}$	Reverse Recovery Time	$I_S=10\text{A}$ , $V_{GS}=0\text{V}$	--	730	--	nS
$Q_{rr}$	Reverse Recovery Charge	$di_f/dt=100\text{A}/\mu\text{s}$ (Note3)	--	10.9	--	$\mu\text{C}$
*Notes	1, $L=25.0\text{mH}$ , $I_{AS}=10\text{A}$ , $V_{DD}=50\text{V}$ , $R_G=25\ \Omega$ , Starting $T_J=25^\circ\text{C}$ 2, Repetitive Rating : Pulse width limited by maximum junction temperature 3, Pulse Test : Pulse Width $\leq 300\ \mu\text{s}$ , Duty Cycle $\leq 2\%$ 4, Essentially Independent of Operating Temperature					

# Typical Characteristics

Figure 1. On-Region Characteristics

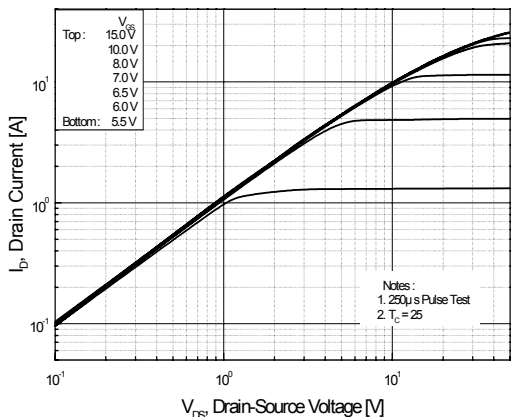


Figure 2. Transfer Characteristics

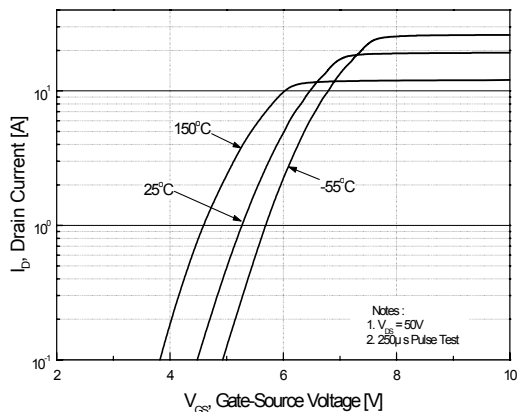


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

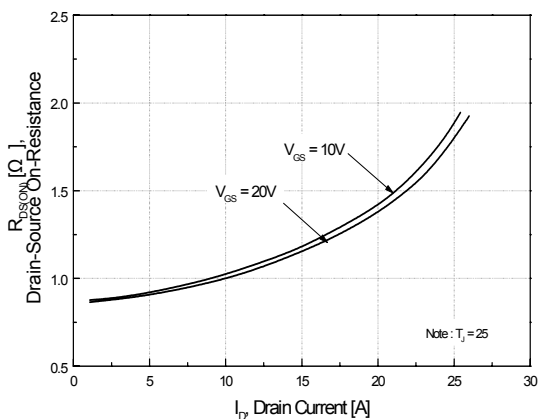


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

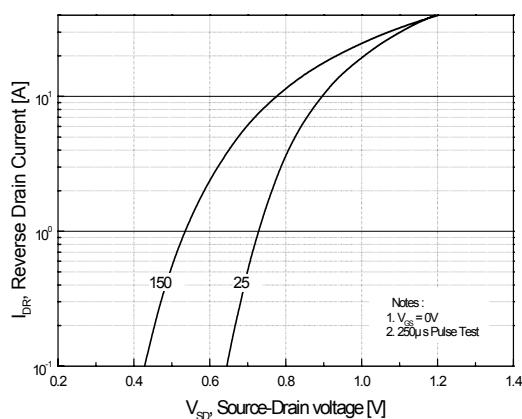


Figure 5. Capacitance Characteristics

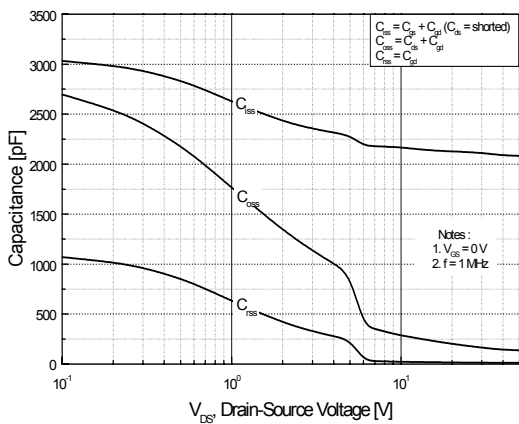
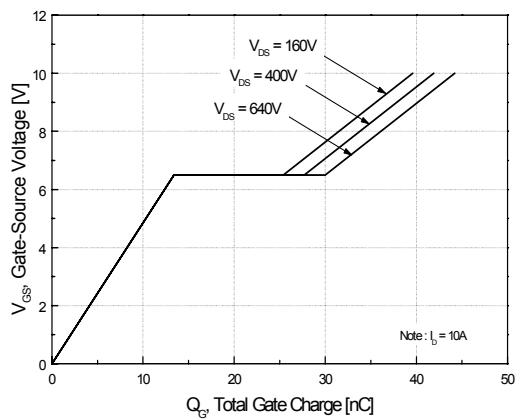
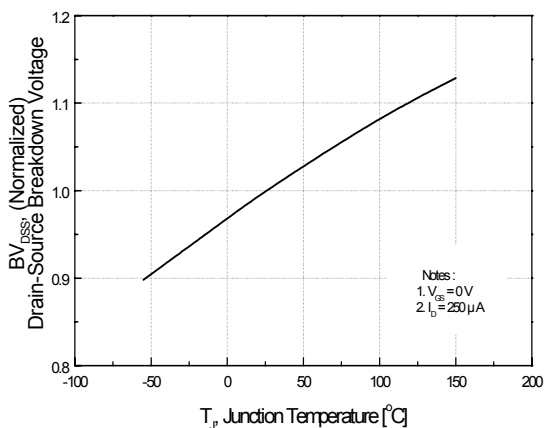


Figure 6. Gate Charge Characteristics

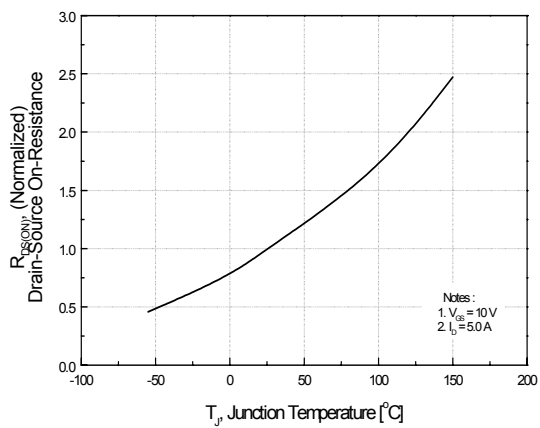


# Typical Characteristics (Continued)

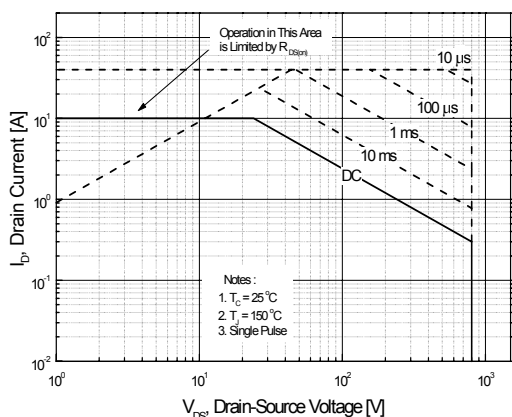
**Figure 7. Breakdown Voltage Variation vs. Temperature**



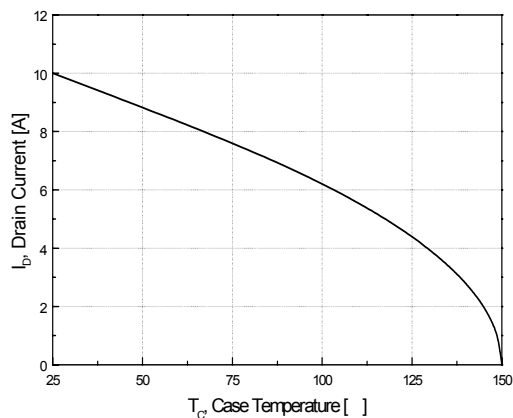
**Figure 8. On-Resistance Variation vs. Temperature**



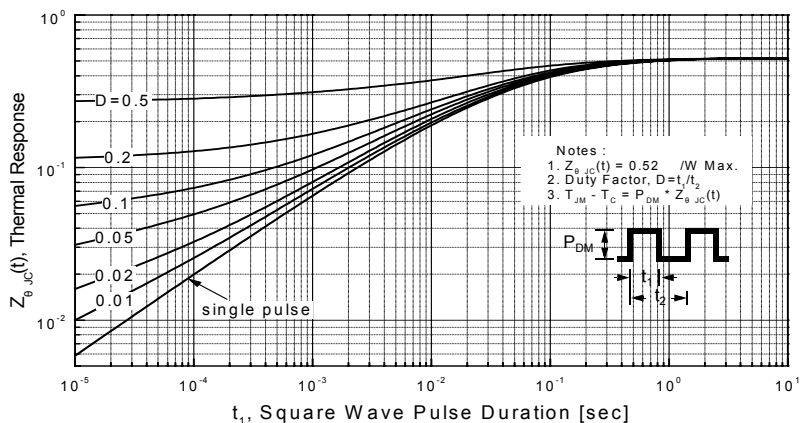
**Figure 9. Maximum Safe Operating Area**



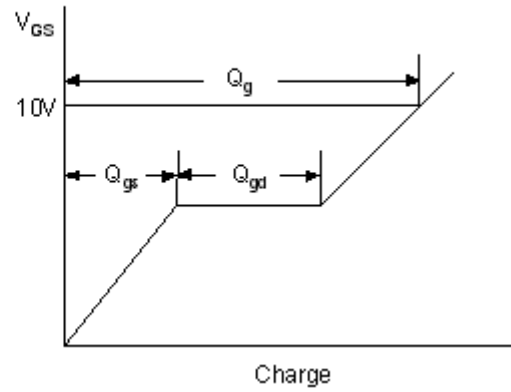
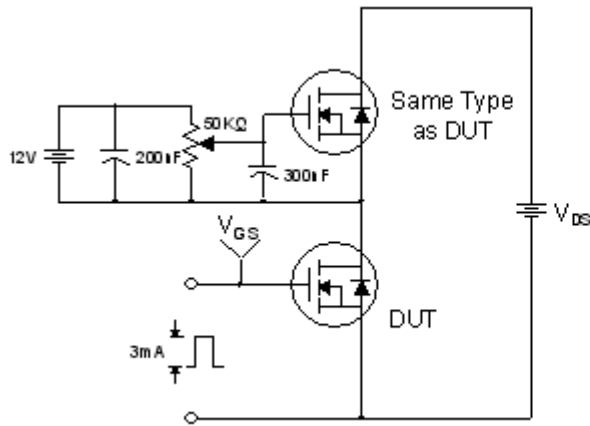
**Figure 10. Maximum Drain Current vs. Case Temperature**



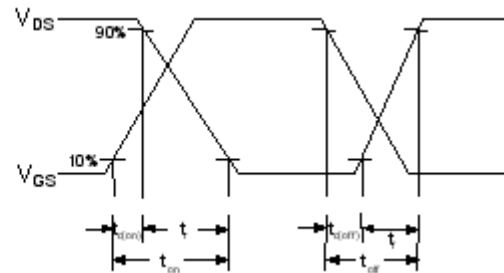
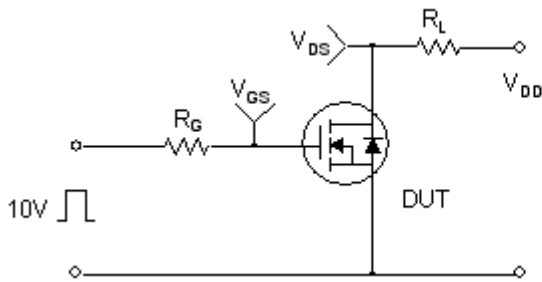
**Figure 11. Transient Thermal Response Curve**



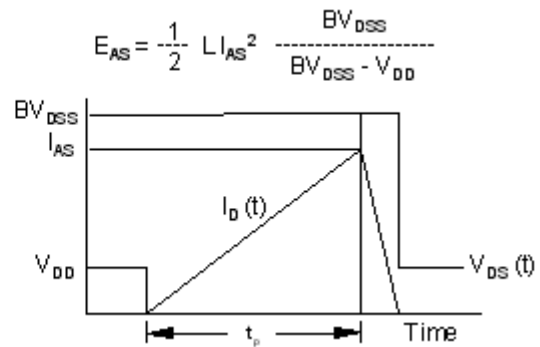
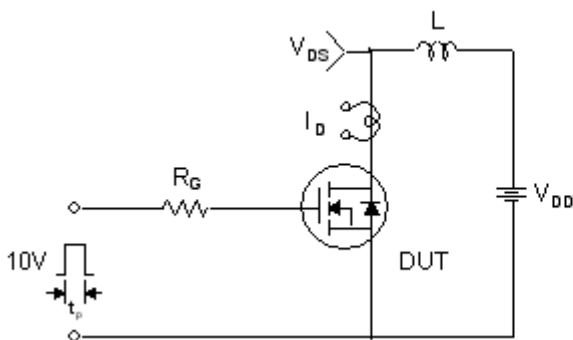
**Gate Charge Test Circuit & Waveform**



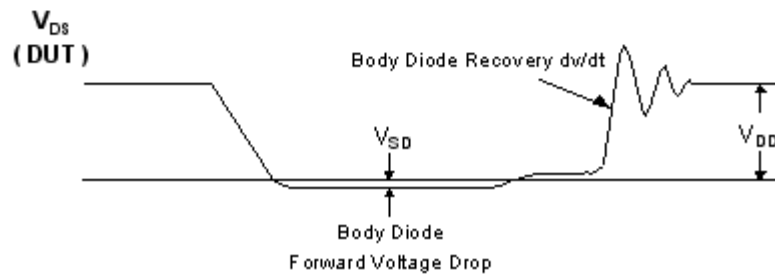
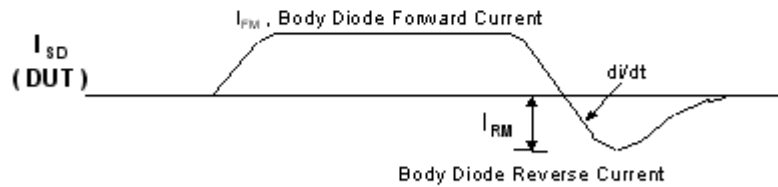
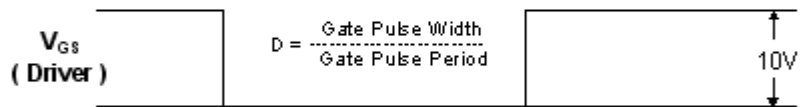
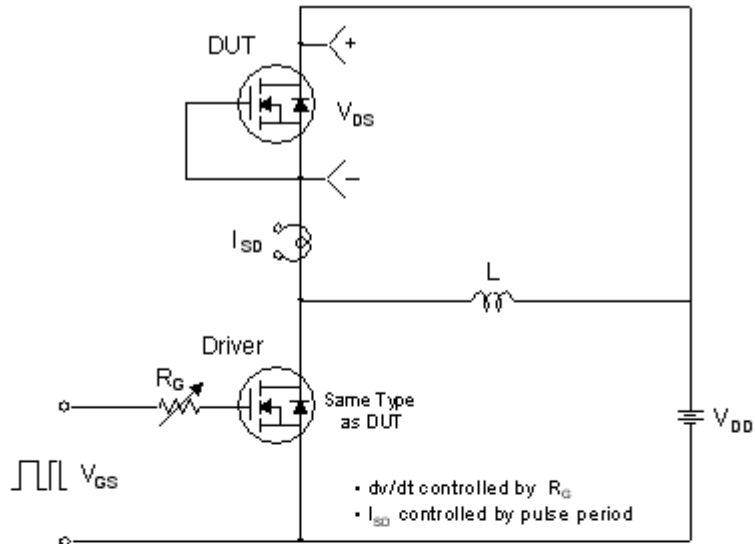
**Resistive Switching Test Circuit & Waveforms**



**Unclamped Inductive Switching Test Circuit & Waveforms**

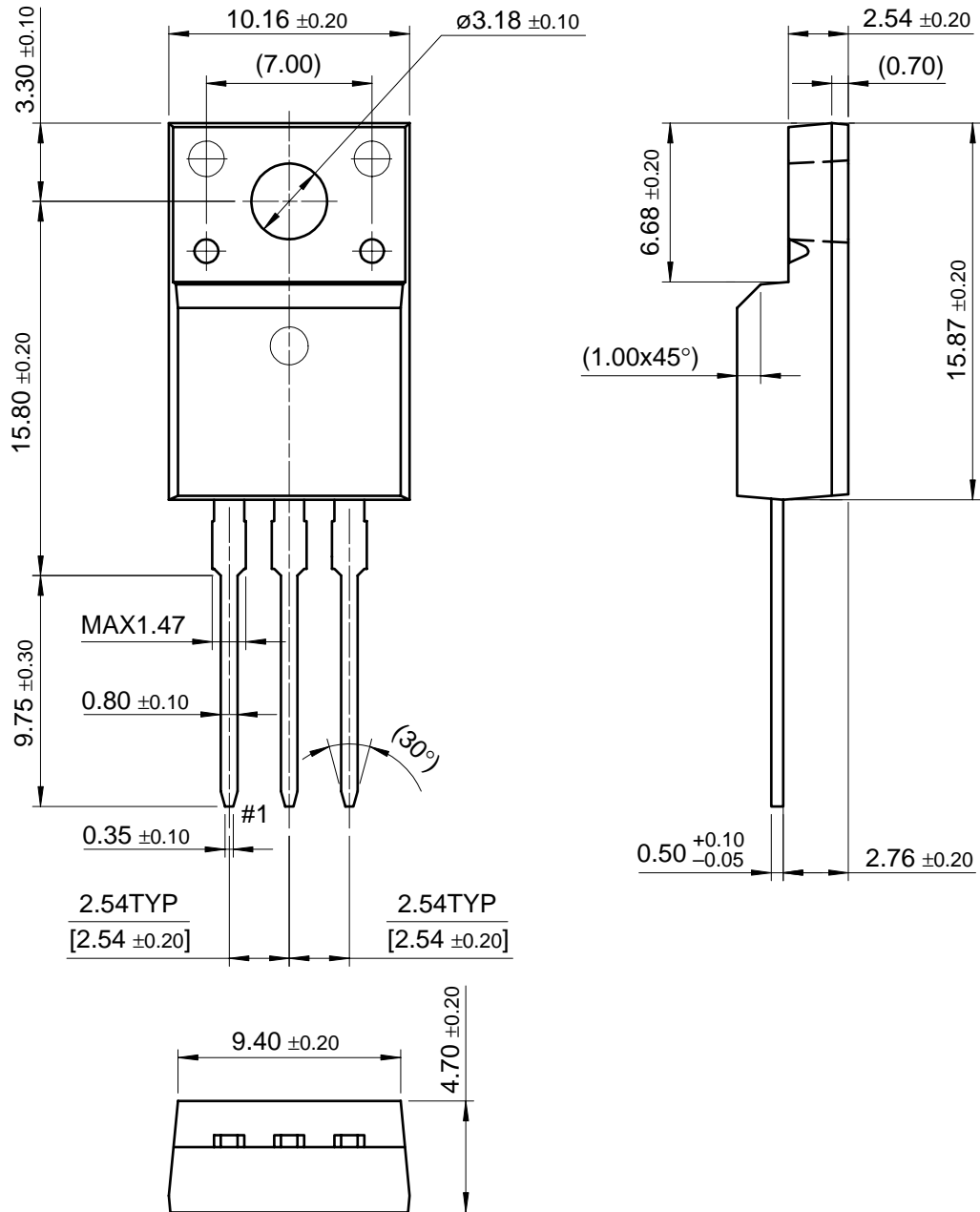


Peak Diode Recovery dv/dt Test Circuit & Waveforms



Package Dimension

TO-220F



Dimensions in Millimeters