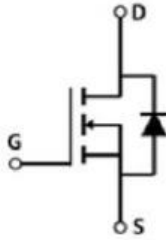


## N-Channel Enhancement Mode Field Effect Transistor



**TO-220**

### Product Summary

- $V_{DS}$  80V
- $I_D$  120A
- $R_{DS(ON)}$  (at  $V_{GS}=10V$ ) < 4.8mohm
- 100% UIS Tested
- 100%  $\nabla V_{DS}$  Tested

### General Description

- Split gate trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$

### Applications

- Battery protection
- Load switch
- Uninterruptible power supply

### ■ Absolute Maximum Ratings ( $T_A=25^\circ C$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		$V_{DS}$	80	V
Gate-source Voltage		$V_{GS}$	$\pm 20$	V
Drain Current	$T_C=25^\circ C$	$I_D$	120	A
	$T_C=100^\circ C$		76	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	480	A
Avalanche energy <sup>B</sup>		$E_{AS}$	702	mJ
Total Power Dissipation <sup>C</sup>	$T_C=25^\circ C$	$P_D$	190	W
	$T_C=100^\circ C$		75.8	
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55~+150	$^\circ C$

### ■ Thermal resistance

Parameter		Symbol	Limit	Units
Thermal Resistance Junction-to-Ambient <sup>D</sup>	$t \leq 10S$	$R_{\theta JA}$	16	$^\circ C/W$
	Steady-State		51.78	
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	0.66	$^\circ C/W$

### ■ Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
YJP120G08A	B1	YJP120G08A	50	/	5000	Tube



# YJP120G08A

## ■ Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	80	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	3.0	4.0	V
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	3.9	4.8	mΩ
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V	-	0.8	1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>		-	-	120	A
Gate resistance	R <sub>G</sub>	f=1MHz, Open drain	-	2	-	Ω
Transconductance	G <sub>fs</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =50A		71.5		S
<b>Dynamic Parameters</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V, f=1MHz	-	5666	-	pF
Output Capacitance	C <sub>OSS</sub>		-	860	-	
Reverse Transfer Capacitance	C <sub>RSS</sub>		-	7.5	-	
<b>Switching Parameters</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =10V, I <sub>D</sub> =50A	-	73	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	25	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	12	-	
Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> =50A, di/dt=100A/us	-	50	-	ns
Reverse Recovery Time	t <sub>rr</sub>		-	44	-	
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω, I <sub>D</sub> =50A	-	27	-	ns
Turn-on Rise Time	t <sub>r</sub>		-	32	-	
Turn-off Delay Time	t <sub>D(off)</sub>		-	54	-	
Turn-off fall Time	t <sub>f</sub>		-	17	-	

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

B. T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, V<sub>GS</sub>=10V, L=2mH I<sub>as</sub>=26.5A.

C. P<sub>d</sub> is based on max. junction temperature, using junction-case thermal resistance.

D. The value of R<sub>θJA</sub> is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub> =25° C.



## ■ Typical Performance Characteristics

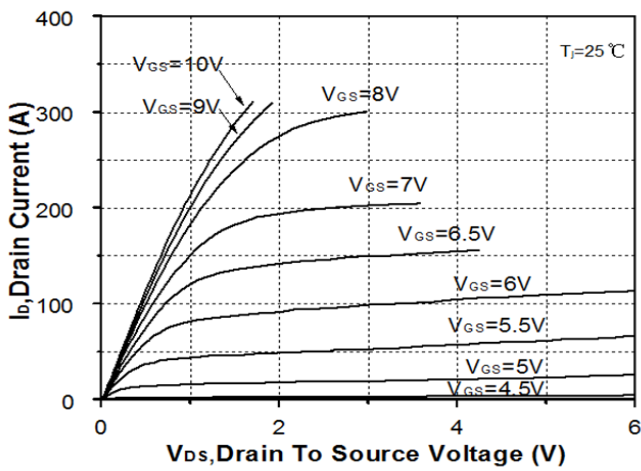


Figure1. Output Characteristics

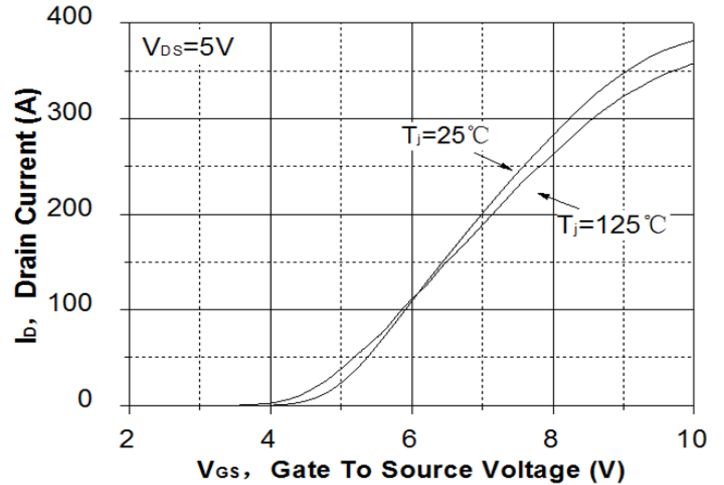


Figure2. Transfer Characteristics

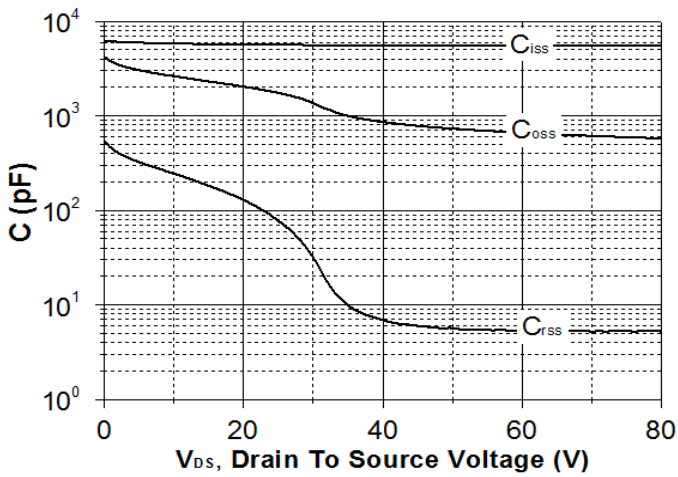


Figure3. Capacitance Characteristics

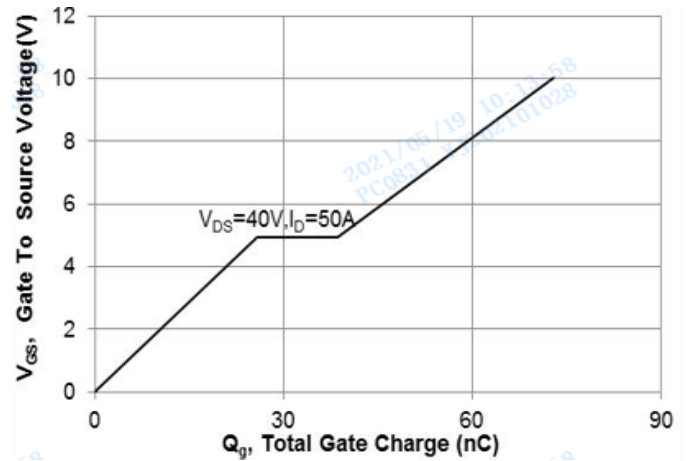


Figure4. Gate Charge

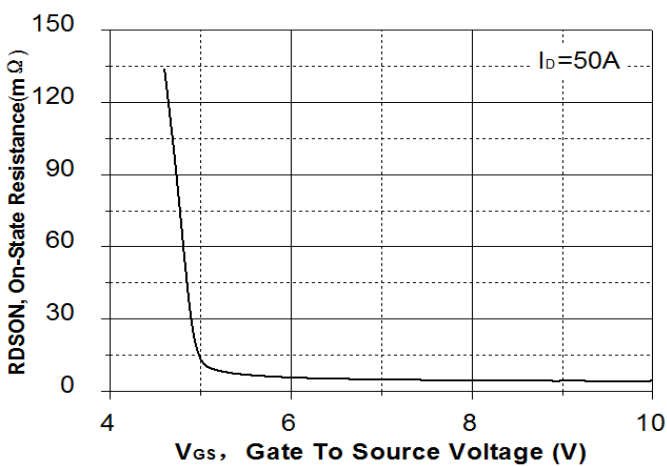


Figure5. On-Resistance vs. Gate to Source Voltage

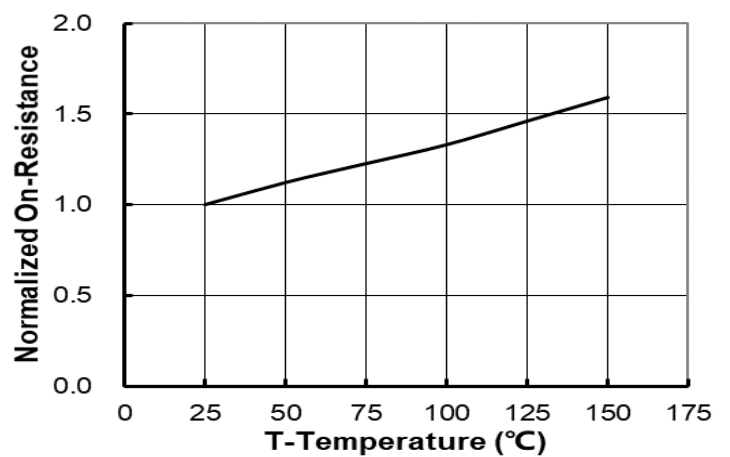


Figure6. Normalized On-Resistance



# YJP120G08A

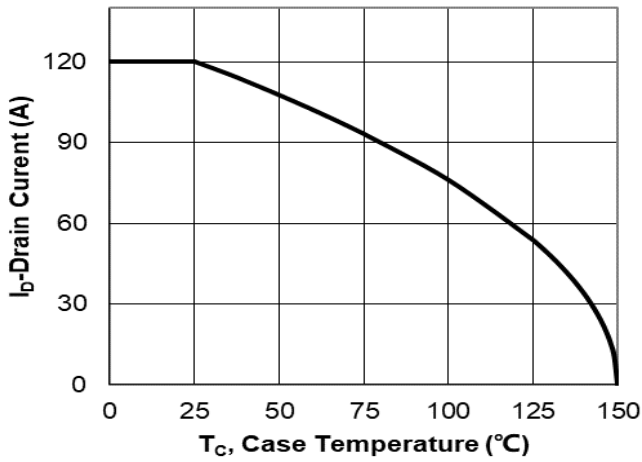


Figure7. Drain current

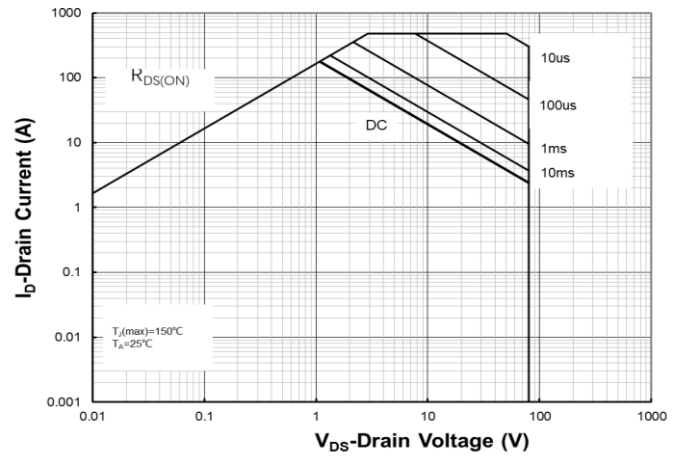


Figure8.Safe Operation Area

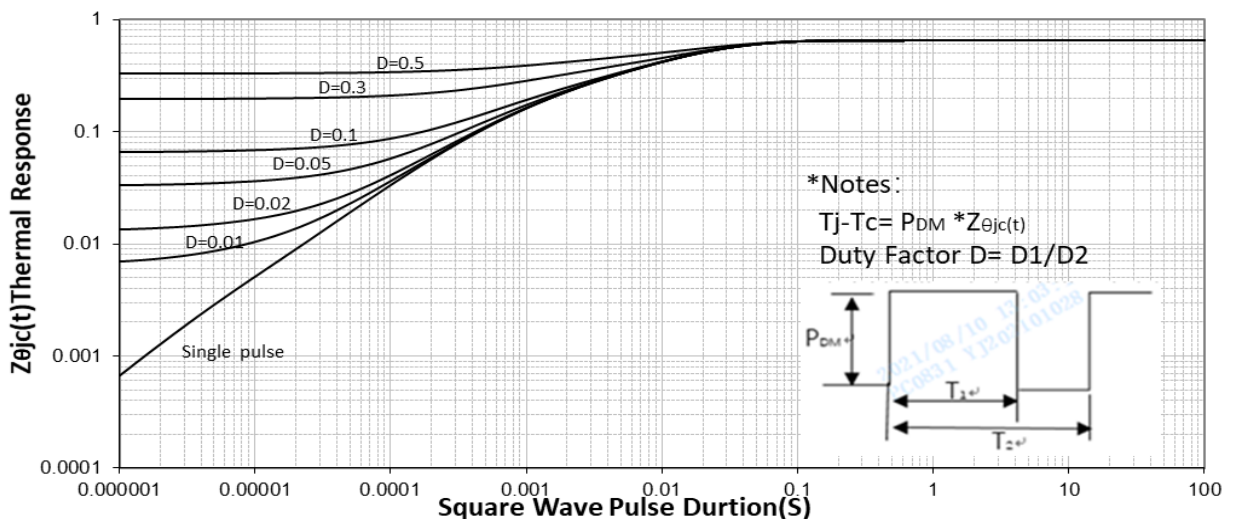
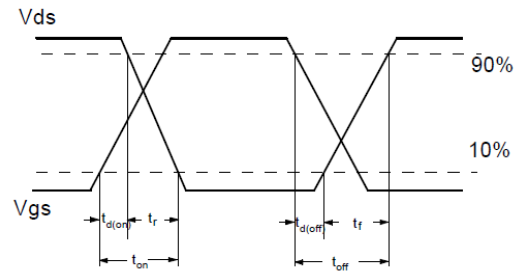
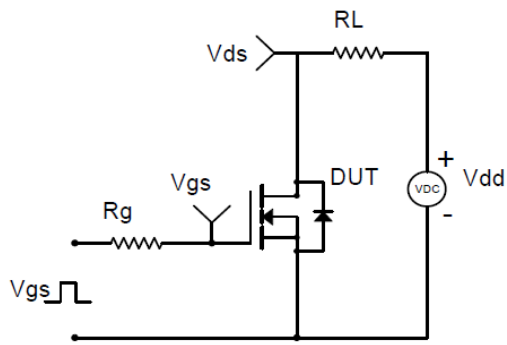
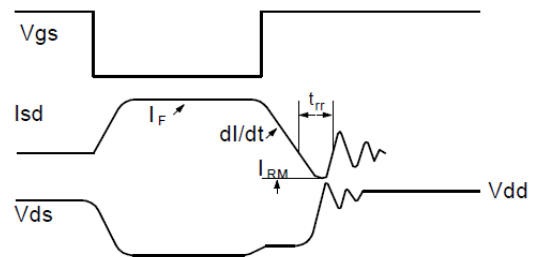
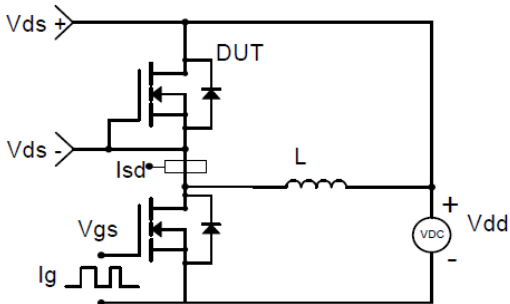


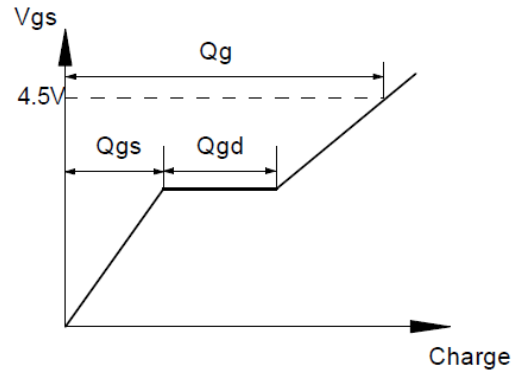
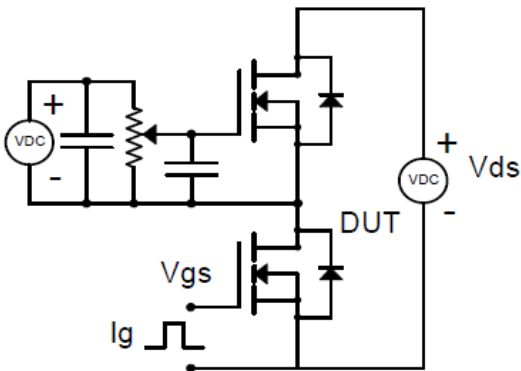
Figure9.Normalized Maximum Transient thermal impedance



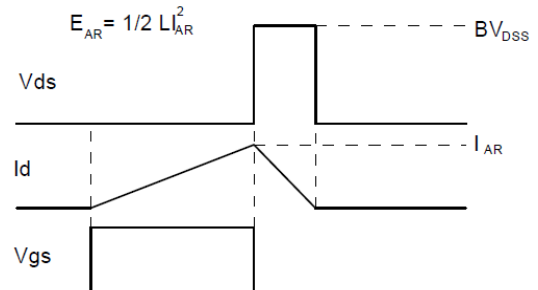
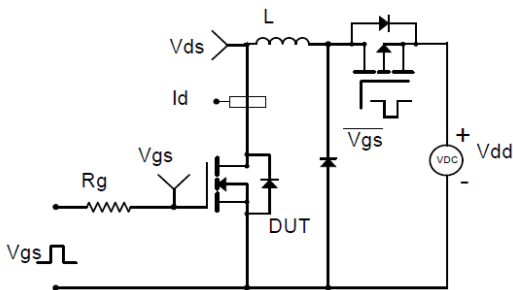
**Resistive Switching Test Circuit & Waveforms**



**Diode Recovery Test Circuit & Waveforms**



**Gate Charge Test Circuit & Waveform**

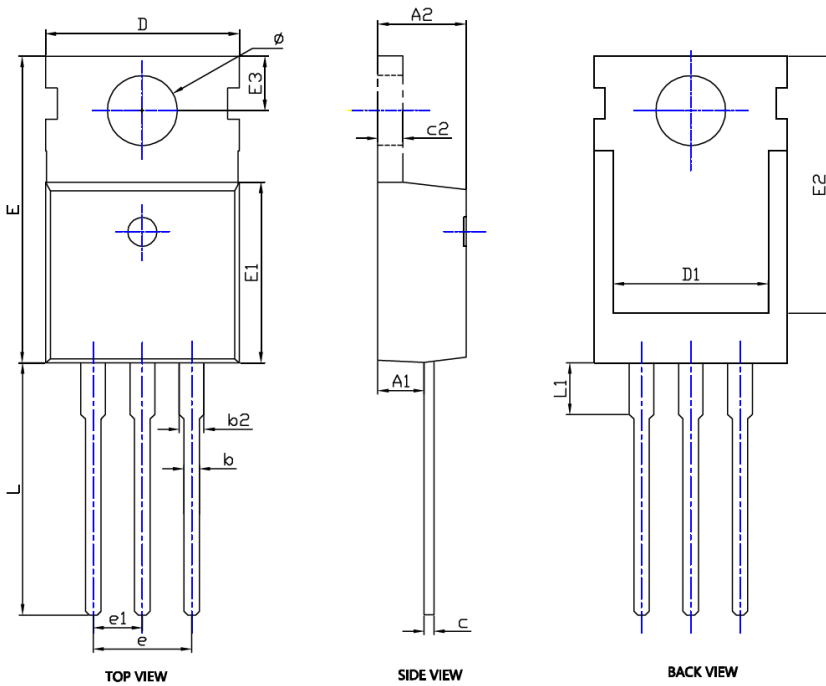


**Unclamped Inductive Switching (UIS) Test Circuit & Waveforms**



# YJP120G08A

## ■ TO-220AB-D Package information



SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A1	0.091	0.098	2.300	2.500
A2	0.175	0.183	4.450	4.650
b	0.030	0.033	0.750	0.850
b2	0.048	0.052	1.220	1.320
c	0.018	0.022	0.450	0.550
c2	0.050	0.052	1.270	1.330
D	0.386	0.402	9.800	10.200
D1	0.303	0.327	7.700	8.300
E	0.614	0.630	15.600	16.000
E1	0.360	0.372	9.150	9.450
E2	0.510	0.533	12.950	13.550
E3	0.110BSC		2.800BSC	
e	0.200BSC		5.080BSC	
e1	0.100BSC		2.540BSC	
L	0.506	0.518	12.850	13.150
L1	0.093	0.117	2.360	2.960
∅	0.138	0.146	3.500	3.700

**NOTE:**  
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.  
2. TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.



# YJP120G08A

---

## Disclaimer

The information presented in this document is for reference only. Yangzhou Yangjie Electronic Technology Co., Ltd. reserves the right to make changes without notice for the specification of the products displayed herein to improve reliability, function or design or otherwise.

The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Yangjie or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

This publication supersedes & replaces all information previously supplied. For additional information, please visit our website <http://www.21yangjie.com> , or consult your nearest Yangjie's sales office for further assistance.