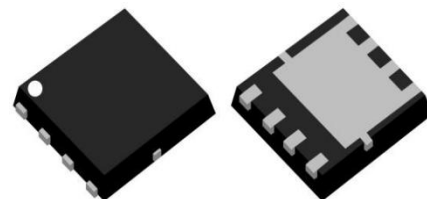
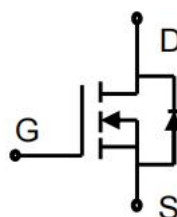


N-Channel Enhancement Mode Power MOSFET 40V/54A

Parameter	Value	Unit
V_{DS}	40	V
$R_{DS(on)}$	5.7	m Ω
I_D	54	A



PDFN3.3x3.3

FEATURES

- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

APPLICATIONS

- Power Tools
- Load Switch
- DC-DC Converter

ABSOLUTE MAXIMUM RATINGS($T_c=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	54	A
Drain Current-Continuous ($T_C=100^{\circ}\text{C}$)	I_D	34	A
Pulsed Drain Current (Note 1)	I_{DM}	216	A
Maximum Power Dissipation	P_D	36.7	W
Single Pulsed Avalanche Energy ($L=0.5\text{mH}$)	E_{AS}	56	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^{\circ}\text{C}$

THERMAL CHARACTERISTIC

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.4	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	60.4	$^{\circ}\text{C/W}$

ELECTRICAL CHARACTERISTICS($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu\text{A}$	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.1	1.6	2.1	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	5.7	7	m Ω

		V _{GS} =4.5V,I _D =15A	-	8	10	mΩ
Forward Transconductance	g _{FS}	V _{DS} =10V,I _D =20A	-	45	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{iSS}	V _{DS} =20V,V _{GS} =0V, F=1.0MHz	-	850	-	pF
Output Capacitance	C _{oss}		-	254	-	pF
Reverse Transfer Capacitance (Note 4)	C _{rSS}		-	8	-	pF
Gate Resistance	R _g	F=1.0MHz	-	3.2	-	Ω
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =20V,I _D =20A,R _L =1Ω, V _{GS} =10V,R _G =10Ω	-	7	-	nS
Turn-on Rise Time	t _r		-	52.5	-	nS
Turn-Off Delay Time	t _{d(off)}		-	44.5	-	nS
Turn-Off Fall Time	t _f		-	93.5	-	nS
Total Gate Charge	Q _g	V _{DS} =20V,I _D =20A,V _{GS} =10V	-	13.1	-	nC
Gate-Source Charge	Q _{gs}		-	2.2	-	nC
Gate-Drain Charge	Q _{gd}		-	2.6	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V,I _S =20A	-	-	1.2	V
Diode Forward Current (Note 2)	I _S		-	-	54	A
Body Diode Reverse Recovery Time	t _{rr}	I _F =40A,dI/dt=100A/μs	-	24.5	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	14	-	nC

Notes:

- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2.Surface Mounted on FR4 Board, t ≤ 10 sec.
- 3.Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- 4.Guaranteed by design, not subject to product.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

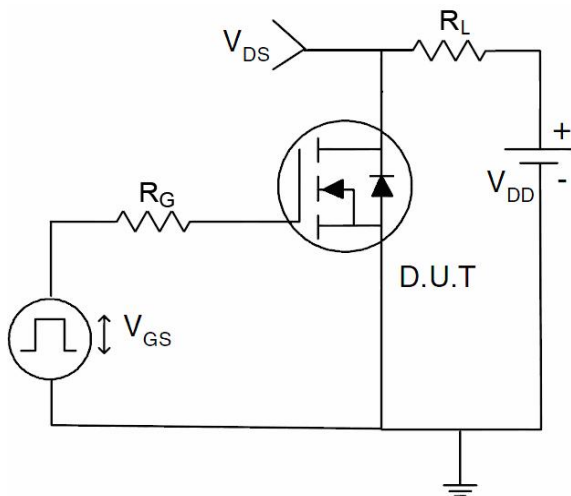


Figure 1 Switching Test Circuit

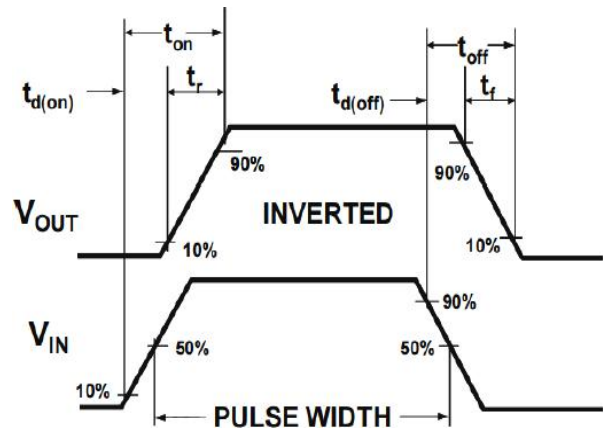


Figure 2 Switching Waveform

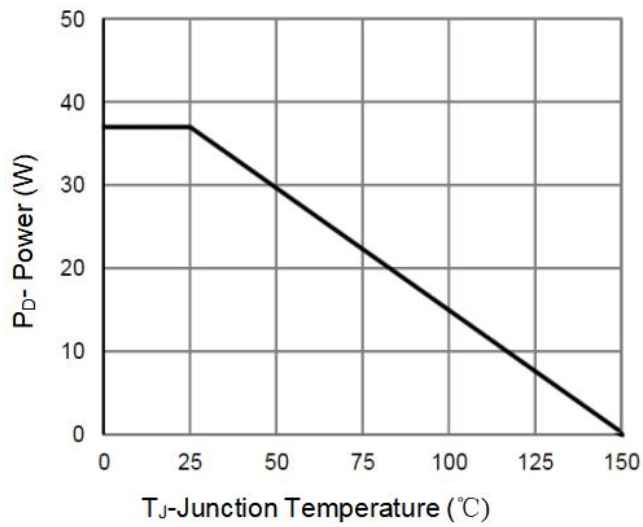


Figure 3 Power De-rating

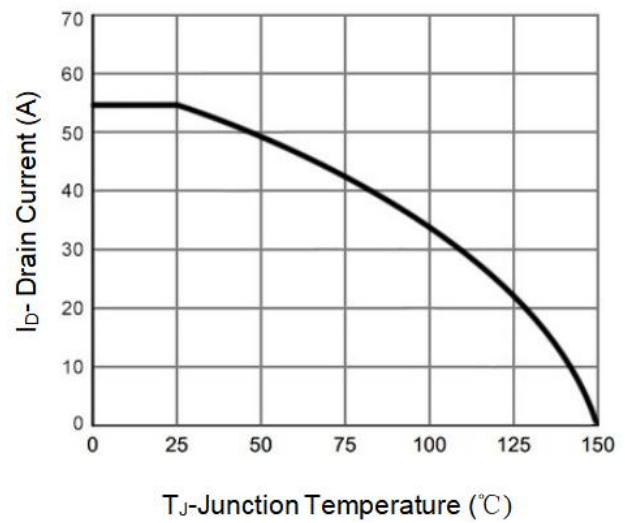


Figure 4 Drain Current

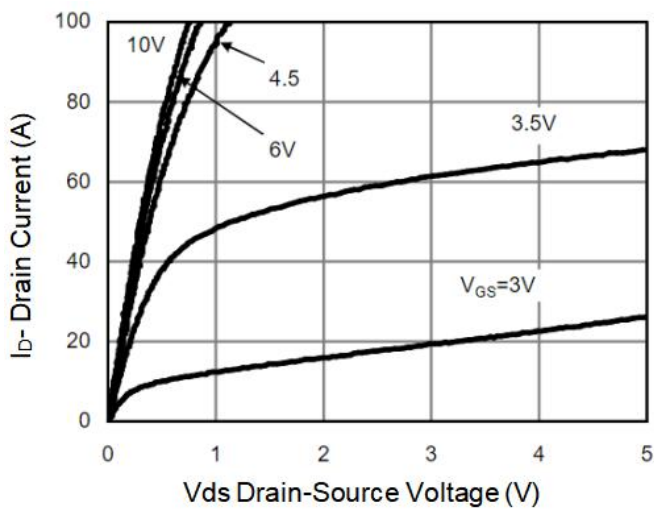


Figure 5 Output Characteristics

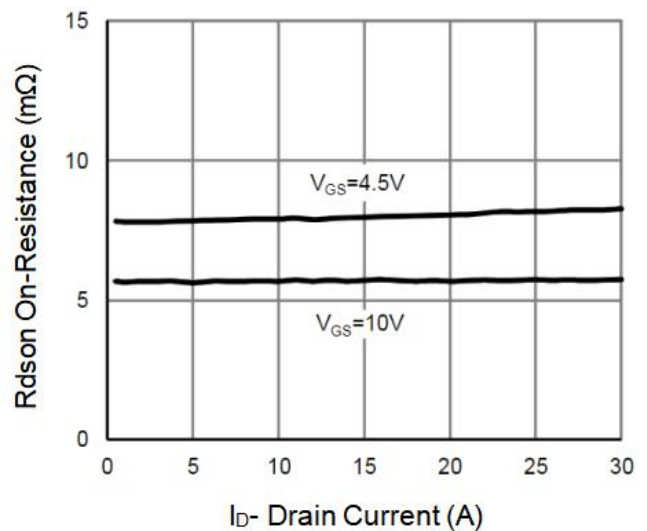


Figure 6 $R_{DS(on)}$ vs Drain Current

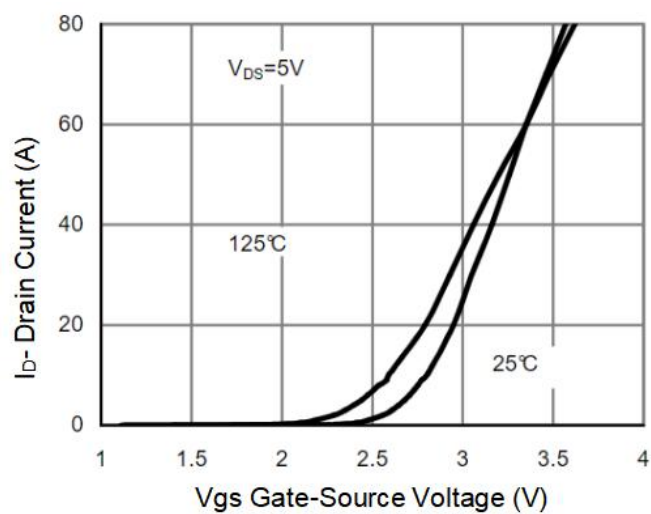


Figure 7 Transfer Characteristics

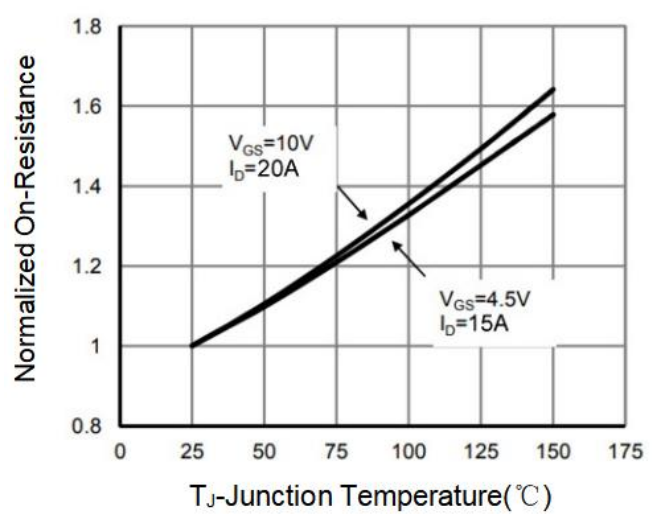


Figure 8 $R_{DS(on)}$ vs Junction Temperature

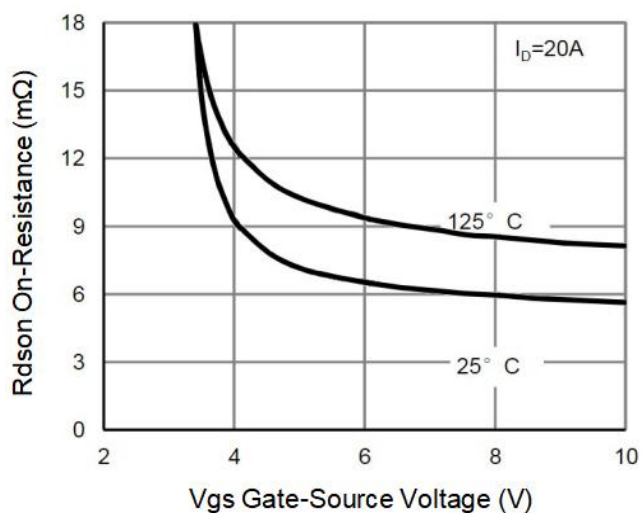


Figure 9 Rdson vs Vgs

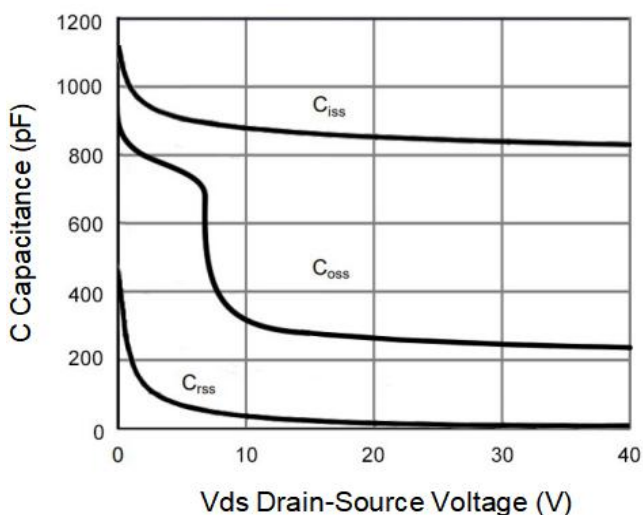


Figure 10 Capacitance vs Vds

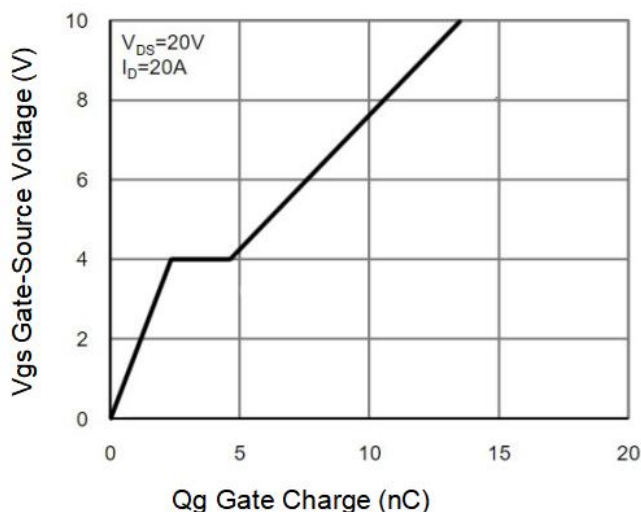


Figure 11 Gate Charge

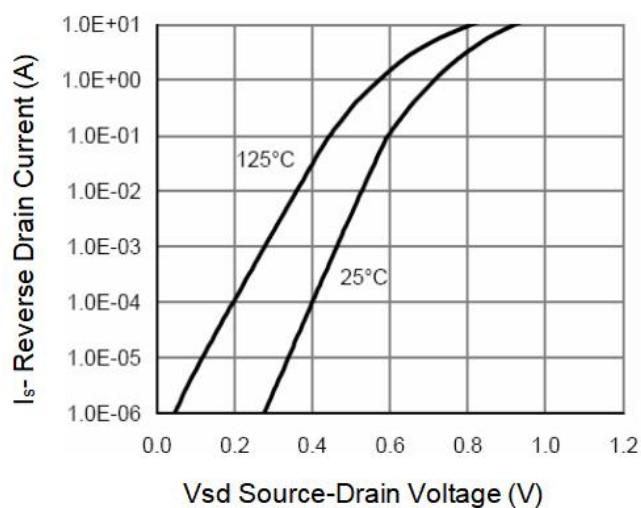


Figure 12 Source- Drain Diode Forward

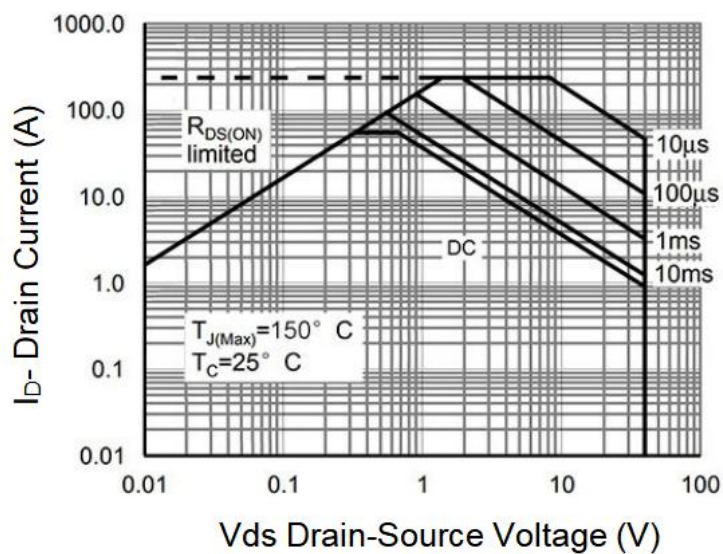


Figure 13 Safe Operation Area

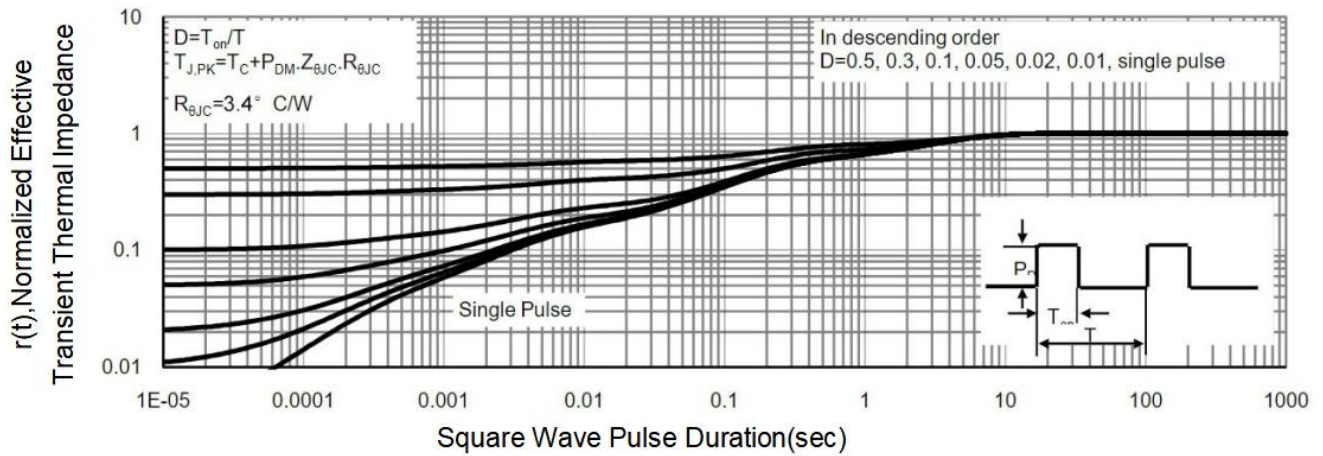
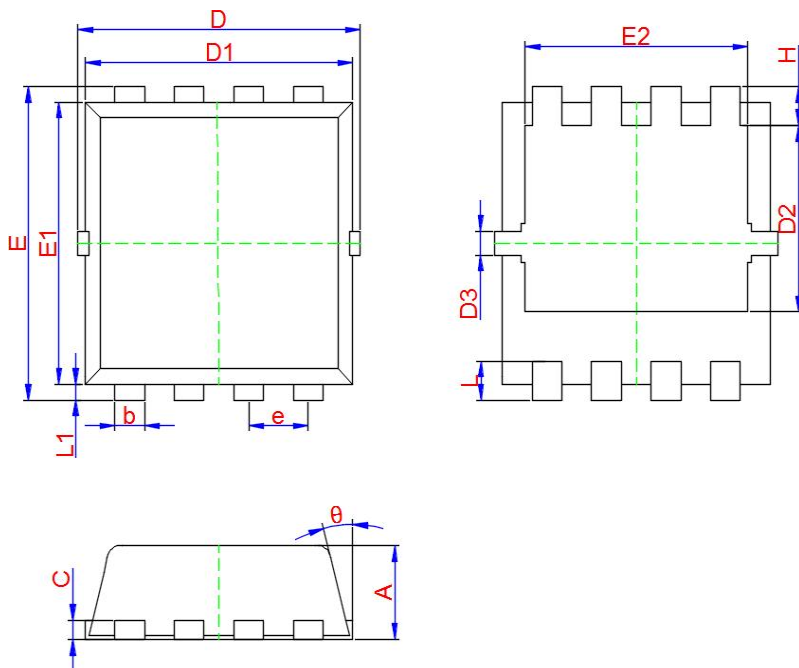


Figure 14 Normalized Maximum Transient Thermal Impedance

PACKAGE OUTLINE



Symbol	Dimensions in mm		
	Min.	Typ.	Max.
A	0.650	0.770	0.900
b	0.250	0.300	0.350
c	0.100	0.150	0.250
D	3.150	3.300	3.400
D1	2.950	3.100	3.200
D2	1.600	1.800	1.930
D3	-	0.130	-
E	3.050	3.300	3.450
E1	2.950	3.150	3.200
E2	2.300	2.400	2.550
e	0.650 TYP.		
H	0.330	0.430	0.530
L	0.300	0.400	0.500
L1	0.080	0.130	0.180
θ	-	10°	-

***Important Usage Information and Disclaimer**

The specifications of Zhuhai Hypersemi Co., Ltd. products are not guarantees of product characteristics. They reflect typical performance expected in standard applications, which may vary with specific uses. Users must conduct prior testing for their applications and make necessary adjustments.

Users are responsible for the safety of applications utilizing our products and must implement adequate safety measures to prevent physical injury, fire, or other risks in case of product failure. It is the user's duty to ensure that application designs comply with all applicable laws and standards. Our products must not be used in any applications where a product failure could reasonably result in personal injury, unless specifically authorized in a signed document by Zhuhai Hypersemi Co., Ltd.

No representations or warranties are made regarding the accuracy or completeness of this information, including any claims of non-infringement of third-party intellectual property rights. Zhuhai Hypersemi Co., Ltd. assumes no liability for any applications or uses of its products and does not grant any licenses to its intellectual property rights or those of others. We also make no claims regarding non-infringement of third-party intellectual property rights that may arise from applications.

Due to technical requirements, our products may contain hazardous substances. For details, please contact your nearest sales office. This document replaces all previous information and may be updated. We reserve the right to make changes.