

SCT2334U

SCT2334U

REVISION HISTORY

1 2 7 (3DJH QXP EHUXIRUSUHYMRXV UHYLMRQV/P D GIWHUURP SDJH QXP EHUX/LQVHFXUJHQ/YHUMRQ
5HYLMRQ &XWRP HU6DP SGN

DEVICE ORDER INFORMATION

ORDERABLE DEVICE	PACKAGING TYPE	STANDARD PACK QTY	PACKAGE MARKING	PINS	PACKAGE DESCRIPTION	MSL
6&7 877 5	7DSH 5HHO		8		) &627	7%

ABSOLUTE MAXIMUM RATINGS

2 YHURSHUDWJ I UH DLWP SHUDMUH XQBWRWHUZH QRMG

) %		, QYHUV LQSWVR VH WDV FRQGFVQFH HUIRUDP SQUHU 7KH WVS RI H WUDQHHGEDFN UHMLVRUGYGHUIURP VH RXSWVR * 1 VHV VH RXSWVRUHU 7KH GHYFH UH XDWV) %YRUHU VR VH LQMUQDUH HUHGFH YDOH RI 9 WSEDO
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RECOMMENDED OPERATING CONDITIONS

2 YHURSHUDWU IUH DLUMP SHUDMUH WDUH XQWVRWHUZ LVH QRNG

PARAMETER	DEFINITION	MIN	MAX	UNIT
9 ₁	, QSWVRUHU WDUH			9
9 ₂₈₇	2 XSWVRUHU WDUH			9
7-	2 SHUDWU MKFVRQWP SHUDMUH			&

ESD RATINGS

PARAMETER	DEFINITION	MIN	MAX	UNIT
9 ₍₆₎	+ XP DQ%RG 0 RGHO+ %0 SHU 16, -((& -6 VSHFIEDMRQ DQSLQV			N9
	& KDQJHG GHYFH 0 RGHO& 0 SHU 16, -((& -6 VSHFIEDMRQ DQSLQV			N9

- (1) -((& GFXP HQW(3 WDWVWDW 9 + %0 DQZ VVDHP DQDFMUQJ ZLV D WQGDUG(6 FRQVRSURFWV
 (2) -((& GFXP HQW(3 WDWVWDW 9 & 0 DQZ VVDHP DQDFMUQJ ZLV D WQGDUG(6 FRQVRSURFWV

THERMAL INFORMATION

PARAMETER	THERMAL METRIC	FCSOT583	UNIT
5 -	- XCFVRQVR DP EHQVWHUP DQJMLVQFH		& :
-7	- XCFVRQVR VRS FKUDFWUL DMRQ SDUP HNU		
-%	- XCFVRQVR ERDUG FKUDFWUL DMRQ SDUP HNU		
5 - & VRS	- XCFVRQVR FDMH WHUP DQJMLVQFH		
5 - %	- XCFVRQVR ERDUG WHUP DQJMLVQFH		
5 - B(90	- XCFVRQVR DP EHQVWHUP DQJMLVQFH (90		
-7B(90	- XCFVRQVR VRS FKUDFWUL DMRQ SDUP HNU (90		

6&7 SURYGHV 5 - DQG 5 -& QXP EHV/RQ DV UH HUHGFH VR HMP DW MKFVRQWP SHUDMUH VR VH GHYFHV 5 - DQG 5 -& DUH QRWD FKUDFWULMIF RI SDFNDJH LVHO EXVR P DQ RMHUV WNP GHYHFKUDFWULMIFV VFK DV VH GHMJQDQG D RXVR VH SUQNG FLFXW ERDUG 3&% RQZ KFK VH 6&7 8 LV P RXQNG DQGH WUDQHQYURCP HQWDFWU 7KH 3&% ERDUG LV D KDWMLQ WDWV VROHUHG VR VH QDGVR VH 6&7 8 & KDQJQ VH GHMJQRURFQJ XUDVRQ VH 3&% ERDUG FKUDFWULMIF VH HIEHF RI VH KDWMLQ DQGH WHUH RUH WDFWDC5 - DQG 5 -&
 0 HDVXHG RQ- (6 0 HU3&% 7KH YDOHV JLYHQ LQ WDWV DQGH DUH RQ YDQGRURFQ SDUVRQZ LV RMHUSDFNDJH V DQGH DQGRW EH XVHGIRUG-MJQ SXLSRVH 7KH VH YDOHV ZHUH FDQXQNG LQ DFFRUGFH ZLV - (6 DQGH V P XQNG RQ D VSHFIEHG- ((& ERDUG 7KH GR QRW VSHUHQVH SHURUP DQGH REVHQGH LQ DQDFWDCSS DMRQ
 0 HDVXHG RQ 6&7 WQGDUG(90 6&7 8 HPR %RDUG 2 XNUO HU R DQGLQHUO HU R FRSSHUMLQGHV P P
 P P 0 HU3&%

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ELECTRICAL CHARACTERISTICS

9,1 9 7- &a & WSEFDOYDOH LV/VWVG XQGHU &

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT
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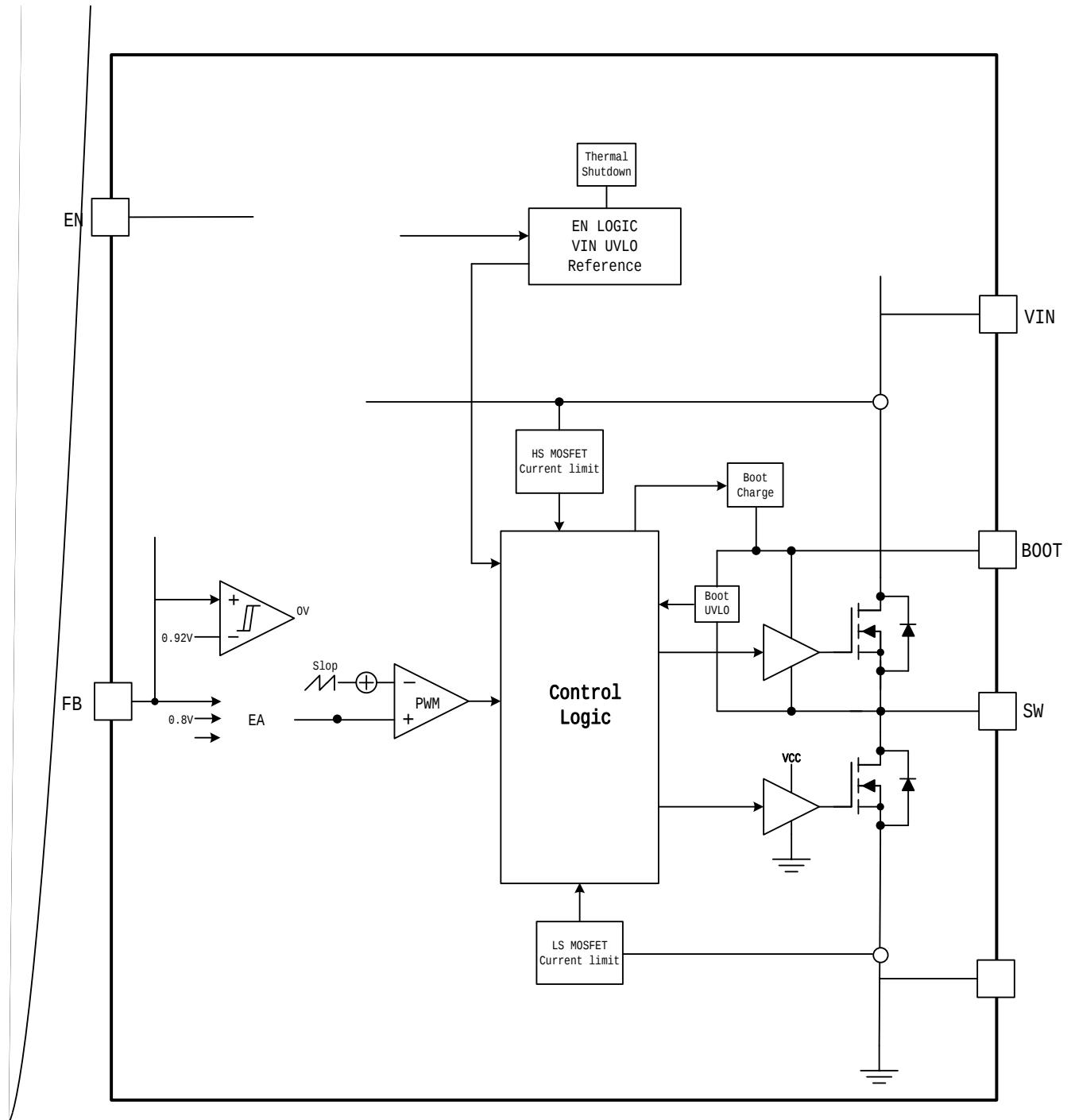
Power Supply

9,1 2 SHUDUJ LQXVROUH 9

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT
V _{B0} ,1	0 I _Q P _{XP} V _Z V _{IK} I _{HT} X _{HCF} I _{Q860} P _{RGH}					N+
V _{B0} ,1	0 I _Q P _{XP} R _Q V _{PH}					QV
V _{B0} ,1	0 I _Q P _{XP} R _I V _{PH}					QV
V _{B0}	0 D R _Q V _{PH}					XV
Power Good						
9 3* B89	3 R _Z H _U J _R G _I O _J X _G H _U Y _R O _J H _U H _U S _S I _Q V _U H _K R _G	POWER GOOD (% of FB voltage)				
		POWER BAD (% of FB voltage)				
9 3* B29	3 R _Z H _U J _R G _I O _J R _Y H _U Y _R O _J H _U H _U S _S I _Q V _U H _K R _G	POWER BAD (% of FB voltage)				
		POWER GOOD (% of FB voltage)				

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FUNCTIONAL BLOCK DIAGRAM



) L J X U H) X C F M R O D O / B F N I D J U D P

OPERATION

Overview

7KH6&7 8 LV D 9 9 LQSW RXSXW(0 , I U H G G O V Q F K U R Q R X V E X F N F R Q Y H U N U Z L W E X L W Q P 5 G V R Q K U J K V G H D G G P 5 G V R Q Q Z V G H S R Z H U 0 2 6) (7 V , V I P S O P H Q W F R Q M D Q M U H T X H Q F S H D N F X U H Q P R G H F R Q M R O V R U H J X O W R X S X W Y R O U H S U R Y L Q J H F H Q W O H D G G B D G W D Q M H Q M H V S R Q M D G G V I P S O L Q V H H W U D O I U H T X H Q F F R P S H Q D M R Q G H M J Q

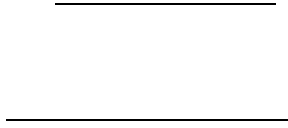
7KH VZ L W K L Q I U H T X H Q F L V D G M D E G I U R P N + V R 0 + W U R X J K U H M V R U V R S V P L H H U M H U V H S R Z H U H I I E I H Q F R U V H H W U D O F R P S R Q H Q V L L H V 7 K H 6 & 7 2 3 3 4 8 I H D M U H V P V V R W M D U W P H V R D Y R L G O U H L Q U V K F X U H Q W 7 K H G M E H D O R V X S S R U W P R Q R O M E W D U X S Z L W S U H E I D V H G R X S X V F R Q G V R Q

7KH (1 S L Q Z L W D S U H F L M R Q W U H V K R G W D W F D Q E H X V H G V R D G M W M H L Q S X W Y R O U H G F N R X W M U H V K R O V Z L W V R H W U D O U H M V R U V R P H H W D F F X U D W K U J K H U 8 9 / 2 V W M P U H T X U H P H Q V

6 & 7 8 D F K I H Y H V U D Q R P V S U H D G V S H F W P P R G X O M R Q H S D Q M R Q F H Q M U H G R Q V H V M W Z L W K L Q I U H T X H Q F 7 K H S X S R V H R V S U H D G V S H F W P L V V R H O P L Q W S H D N H P L M R Q V D W S H F I I E I U H T X H Q F I H V E V S U H D G Q W M H H P L M R Q V D F U R W D Z I G H U D Q H R I U H T X H Q F I H V U D W H U W D Q D S D U V Z L W I L H G I U H T X H Q F R S H U D M R Q

The SCE g 8 I X O S U R M F V R Q I H D M U H V L C F O C H W H L Q S X W X G H U Y R O U H G F N R X W M H R X S X V R Y H U Y R O U H S U R M F V R Q R Y H U F X U H Q V S U R M F V R Q Z L W F F O I E F F O I F X U H Q M P W Q D G G K I E F X S P R G H R X S X W K D U G V K R U M S U R M F V R Q D G G W H U P D O K X X R Z Q S U R M F V R Q

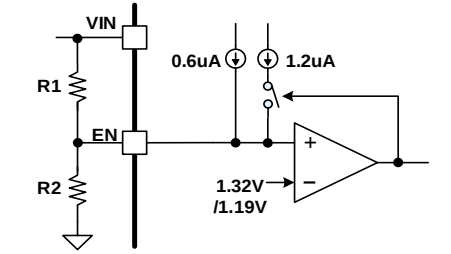
Peak C v 2 ! nclude Ñ Ñ sprc u hMhard



: KHUH

9_{UMH} LVUMQJ WUHKRGR 9LQ89/2

9_{IDQ} LVIDQJ WUHKRGR 9LQ89/2



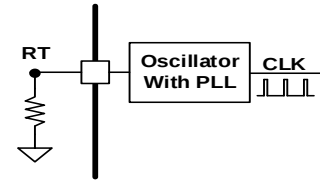
)LXUH 6 VWP 89/2 E HQDEG YLGH

Output Voltage

7KH 6&7 8 UHJXONVWHI QMDOH HUHCFHYROJ HDW 9 ZLW VRODQFH RYHUMH RSHUDQJ WLP SHUDXUH
DQG YROUH UDQJH 7KH RXSXWYROJH LV VHWE D UHMLRU GYLGHU IRP WH RXSXWQRGH R WH) % SLQ ,WLV
UHFRP PHQG HG R XH VRODQFH RUEH WUHMWRU 8 VH (TXDNRQ R FDQXON UHMLDQFH R UHMLRU GYLGHU
7R

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,QUHVLWUWHWU IUTXHCF PRGH D UHVLWUSOFHGEHWHHQ57 SLQVR WH JURXGG VHW WH VZLVAKLQ IUTXHCF RYHUDZIGHUDQJHIURP N+ VR 0+ : KHQ57 LVGDVQJ WHIUTXHCF LV N+ DQGZKHQ57 LVFRQHFVWG VR WH JURXGG WHIUTXHCF LV 0+ 8VH(TXDVRQ RUWH SDVQJ) L XUH VR GHVUP LQH WH UHVLWDFH IRUD VZLVAKLQ IUTXHCF QHGHG



ZKHUH) VZ LVVZLVAKLQ FGFNIUTXHCF

) L XUH 6HWHQJ) UTXHCF DQG &GFN6 QFKURQL DMRQ

Frequency Spread Spectrum

7R UHGXFH (0 , WH 6&7 8 LP SDP HQW) UTXHCF 6 SUHDG 6 SHFWP) 66 7KH SXLSRVH RI VSUHDG VSHFWP LV VR HOP LQDW SHDN HP LMRQV DWSHFIE IUTXHCFIHV E VSUHDGQJ WHWH HP LMRQV DFURW D ZIGHUDQJH RI IUTXHCFIHV UHWHUWDQ DSDUVZLV ILHG IUTXHCF IXCFMRQ ,Q PRWW VMP V FRQDQJQJ WH 6&7 8 QZ IUTXHCF FRQGFVGHHP LMRQV IURP WHILWVHZ KDUP RQFVR WH VZLVAKLQ IUTXHCF FDQEHDMO ILOUHG 7KH) 66 FILFXLVVHV SVHXGR UQGRP IUTXHCF KRSSLQJ VR YDU WH VZLVAKLQ IUTXHCF ZLVMDQ VSHFIE UDQJH 7KHWHUHQJ VSDQJL RI WH VZLVAKLQ IUTXHCF 7KH VSUHDG VSHFWP LV RQO DYDDEH ZKHWH FGFN RI WH 6&7 8 GHYEHV LV IUH UXQJQJ DWHILU QMDUQ IUTXHCF Q RI WH IRQZLQ FRQVLRQ RYHUHGHV VSUHDG VSHFWP VMDQJ LVRI

7KH FGFNLV UHGXFHGXUQJ / 2 IXCFMRQ

7KH FGFNLV UHGXFHGDVQJ KWBQJLQ860

7KH FGFNLV UHGXFHGXUQJ P LQXP RQVPH IXCFMRQ

Bootstrap Voltage Regulator and BOOT UVLO

QH WHUCCERRWDS FDSDFVUJHWHHQ%2 27 SLQDQG6: SLQSRZHU WHI GDVQJ JDW GJHUVH KJ K VGH SRZHU 0 26) (7 7KH ERRWDS FDSDFVUJHWHHQ LV FQDWHG IURP DQ LQJUDNG YRDUH UH XDVUZ KHQ KJ K VGH SRZHU 0 26) (7 LVRI DQG QZ VGH SRZHU 0 26) (7 LV RQ ERRVGRGH LV LQJUDNG RQ WH 6&7 8 GHQ YRDU 7 7KH

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NRQVRQWP SHUWUHDQEHZ & WHGMEH UHWDWZLNQUDORWWDVSKDVH

APPLICATION INFORMATION

Typical Application

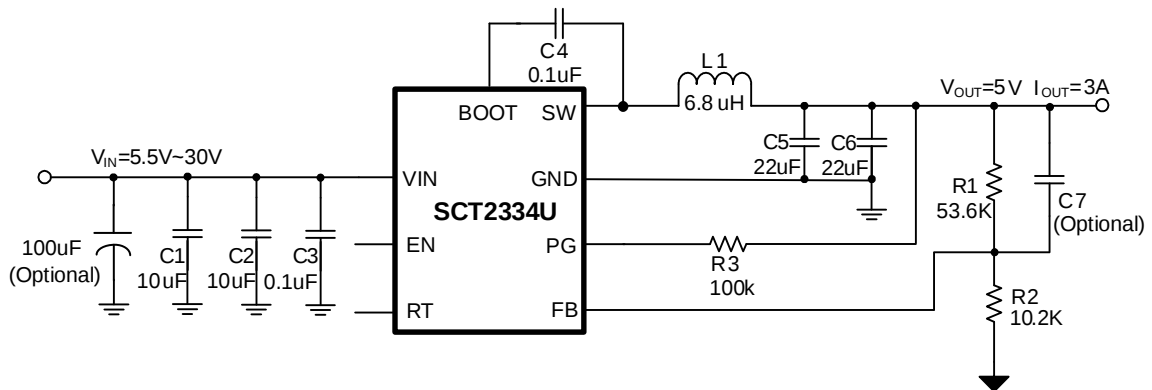


Figure 11. SCT2334U Design Example, 5V Output

Design Parameters

Design Parameters	Example Value
Input Voltage (VIN)	9.1V
Output Voltage (VOUT)	9V
Output Current (IOUT)	9A
Inductor (L1)	6.8uH
Capacitor (C1)	10uF
Capacitor (C2)	10uF
Capacitor (C3)	0.1uF
Capacitor (C4)	0.1uF
Capacitor (C5)	22uF
Capacitor (C6)	22uF
Capacitor (C7)	Optional
Resistor (R1)	53.6K
Resistor (R2)	10.2K
Resistor (R3)	100k

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Output Voltage

7KH RXSWROUH LV VHE DQH WUDQVSRUWV RUGYLGHU
5 DQG 5 LQ WSEDO DSSOLFDV VFKHP DMF
5HFRPH HQHG5 UHVMHQFH LV N 8VH(TXDNRQ
WFDXOW 5

) , !

V _{OUT}	R ₁	R ₂
9	.	N
9	.	N
9	.	N

ZKHU

9₅() LV WHHHHGDFN UHHHQFH YROUH WSEDO
9

Switching Frequency

+LJKHUVZ LFKLQ IUTXHGFHV VSSRUWP DQUSURLEVR RXSWWGXFWU DGRXSWFDSDFLUV UHVXOW LQ EZHU
YROUH DQG FXUHQVUSSEV +RZHYHU WH KJKHU VZ LFKLQ IUTXHGF FDXHV H WD VZ LFKLQ QW ZKFK
GRZ QJUDGV FROHUV RYHDO SRZHU H IEFH DQG WHUP DOSHURUP DQFH , QWLV GHMJQ D P RGHUW VZ LFKLQ
IUTXHGF R N+ LV VHQFNGV RDKLHYH ERW VP DQVORQVL H DQG KJKH IEFH RSHUVRQ

Inducto

resultin

7KH VRODQFXUHQVGRZLQJ WURXJK WH LQGXFRULV WH LQGXFRULSSO FXUHQVSOV WH RXSXVFXUHQV KHQ VHOVWQJ
DQ LQGXFRUL FKRRVH LW UDNG FXUHQVHVSFDQ WH VDMVRQFXUHQVQJHUVWQJ LW SHDN RSHUDVRQFXUHQVQGG
506 FXUHQVQDOR GRWEH H FHGHG 7KHUHUH WH SHDN VZLWKLQJ FXUHQVRI LQGXFRUL ,/3(. DQG ,/506 FDQ EH
FDGXONGDVQLQ TXDVRQ DQG TXDVRQ

: KHUH

,/3(. LV WH LQGXFRULSHDNFXUHQV
,287 LV WH & QDGFUHQV
,/33 LV WH LQGXFRULSHDN R SHDNFXUHQV
,/506 LV WH LQGXFRUL506 FXUHQV

,QRYHURDGLQ RU QDGLQVROQVROQ WH LQGXFRULSHDNFXUHQVFDQLQFUDVH XS V WH VZLWKLQJ FXUHQVQ LVRI
WH GHYEHZKIEK LVWSFDQ 7KH P RWFRQHUHVH DSSURDFK LVRI FKRRVH DQ LQGXFRULZLW D VDMVRQFXUHQV
UDWJ JUDVUWQJ %FDXVH RI WH PD LP XP ,/3(. QDNGE GHYEH WH PD LP XP RXSXVFXUHQVQDWH
6&7 8 FDQGHQDOR GHSHQVROQ WH LQGXFRULFXUHQVSSO 7KV WH PD LP XP GHUHG RXSXVFXUHQVQDOR
DIHFW WH VHOVVRQRI LQGXFRULFH 7KH VP DQ LQGXFRULHVXQV LQ QJHULQGXFRULFXUHQVSSO QDGLQ V D QZHU
PD LP XP RXSXVFXUHQV

Input Capacitor Selection

7KH LQGXVFXUHQVRI WH VNSGRZQ & & FRQHUHVH LVFRQVROXV WHUHUH LVWHTXUHV DFDSDVURV VSSO WH
& FXUHQVRI WH VNSGRZQ & & FRQHUHVH KLEP DQDGLQJ WH & LQGXVROUH 8VH FDSDFURVZLW QZ (65
IRUEHWHUHUHURUP DQFH &HUP IF FDSDFURVZLW 5RU 5 GHQVIEVDUH XVDO VXJHVWGEFDXVH RI WHUHQZ
(65 DQVP DQMP SHUDVUHFRHIFHQV DQGLVW VROQJ O HFRP P HQGHV V XH DQVHURV HUYDOH FDSDFURV HJ
X) ZLW VP DQSDNDJH VLH VRI LQVUWKLQHTXHQ VZLWKLQJ QRVH 3QFH WH VP DQVH FDSDFURVDV
FRVH V 9,1 DQG * 1 SLQDVSRMEQ

7KH YROUH UDWJ RI WH LQGXVFDSDVURV XWEH JUDVUWQJ WH PD LP XP LQGXVROUH QG WH FDSDFURV XW
DOR KDYH D USSO FXUHQVUDWJ JUDVUWQJ WH PD LP XP LQGXVFXUHQVSSO 7KH 506 FXUHQVQ WH LQGXV
FDSDVURVFDQEHFDGXONGXWQJ (TXDVRQ

7KH ZRUWFDVHFRQVROQRFFXUVDV,1 9287 ZKHUH

) RUVP SDIEDVRQ FKRRVH DQ LQGXVFDSDVURVZLW DQ 506 FXUHQVUDWJ JUDVUWQJ KDOR WH PD LP XP QDQ
FXUHQV

: KHQ VHOVWQJ FHUP IF FDSDFURV LVQHGV VRI FRQGHUWH HIFVWH YDOH RI D FDSDFURVGHFUDVQJ DV WH &
EIDV YROUHDFURV D FDSDFURVQFUDVQJ

7KH LQGXVFDSDVQFH YDOH GHUHV LQHV WH LQGXVSSO YROUH RI WH UHVXQV 7KH LQGXVROUH USSO FDQEH
FDGXONGXWQJ (TXDVRQ DQ WH PD LP XP LQGXVROUH USSO RFFXUVDV GXWF FQ

) RU VLV H DP SBI VZR) 5 FHUP IE FDSDFLUV UDNG IRU 9 LQ SDUDODUH XVHG QG D) IRUKJK IHTXHF IONUQ FDSDFLUV SDFHG DV FGVH DV SRWED V V H GHYEH SLQ

,I RXZDQV P DNH V H 860 ZRUN PRUH VDEI XQGHU GURS RXWKJK GXWF FQ I VLV UFRP P HQGHG V DGG D OUH HGFWRQ FDSDFLUV V H LQSV V VDELO H V H LQSVYRDUH

Bootstrap Capacitor Selection

) FHUP IE FDSDFLUP XWEH FRQFHNG EHV H H Q %2 2 7 SLQ DQG 6: SLQ IRU SURSHURSHUDMRQ FHUP IE FDSDFLUV LK 5 RUEH VUJUDGH GHGFWE LV UFRP P HQGHG 7 KH FDSDFLUV KRXC KDYH D 9 RUKJKHU YRDUH UDVQ

Output Capacitor Selection

7 KH V HGFVRQ RXSV FDSDFLUV LQIH FVRXSVYRDUH USSBI LQ VNDG VDV DQG G D G V D Q M H Q VSHURP DQFH

7 KH RXSV USSBI LV HWHQD FRP SRVHGR VZR SDUW 2 QH LV FDXVGE V H LQGFVRUF XUHQV USSBI JRLQ VURXJK V H (TXLDQ Q 6 HUH V 5 H M V D Q F H (6 5 R V H RXSV FDSDFLUV DQG V H R V H U V FDXVGE V H LQGFVRUF XUHQV USSBI FKDUJLQ DQG GLVKDUJLQ V H RXSV FDSDFLUV 7R DFKIYH VP DORXSVYRDUH USSBI FKRRVH D QZ (6 5 RXSV FDSDFLUV QH FHUP IE FDSDFLUV) RU FHUP IE FDSDFLUV V H FDSDFLQFH GRP LQNV V H RXSV USSBI) RU VP SLEDVRQ V H RXSVYRDUH USSBI FDQEH HVP DWGE (TXDVRQ GHMUG

: KHUH

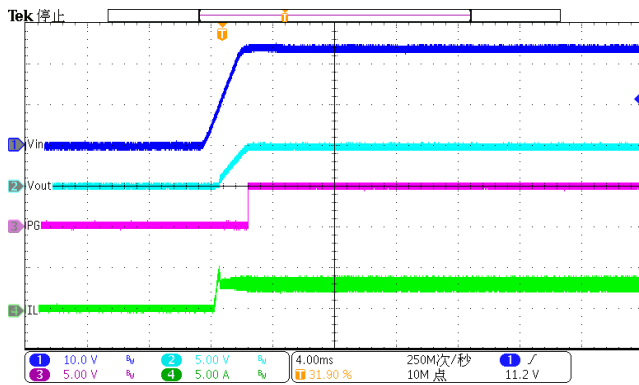
LV V H RXSVYRDUH USSBI
I₆: LV V H VZ LK LQ IHTXHF
/ LV V H LQGFV DQFH R LQGFVRU
&₂₈₇ LV V H RXSV FDSDFLQFH
9₂₈₇ LV V H RXSVYRDUH
9₁ LV V H LQSVYRDUH

XH V FDSDFLUV GHJUDGLQ XQGHU & EIDV V H EIDV YRDUH FDQ VJ QLEDQ UHGXFH FDSDFLQFH & HUP IE FDSDFLUV FDQ GVH P RWR V H L FDSDFLQFH DWUDNG YRDUH 7 KHUH RUH QDYH P DUJLQRQ V H YRDUH UDVQ V HQXUH DGH TXDW H H F V H FDSDFLQFH 7 SIEDO VZR) FHUP IE RXSV FDSDFLUV ZRUNIRUP RWDSSQ FMRQ

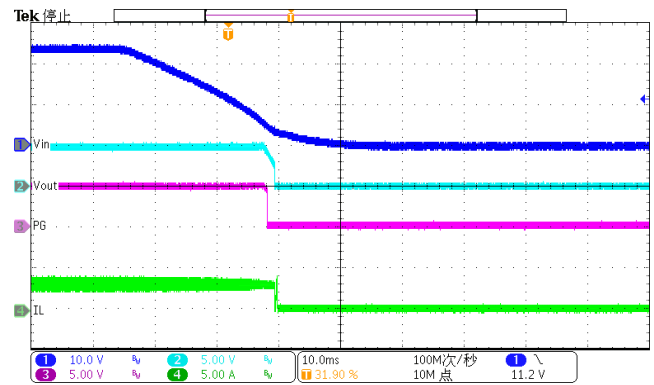
Table 3: Typical External Component Values

Application Waveforms

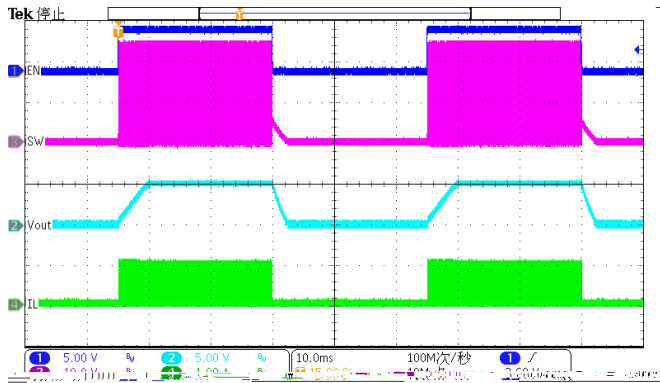
9,1 9 9 2 8 7 9) 6: N XQBW RVH UZ LVH Q RVHG



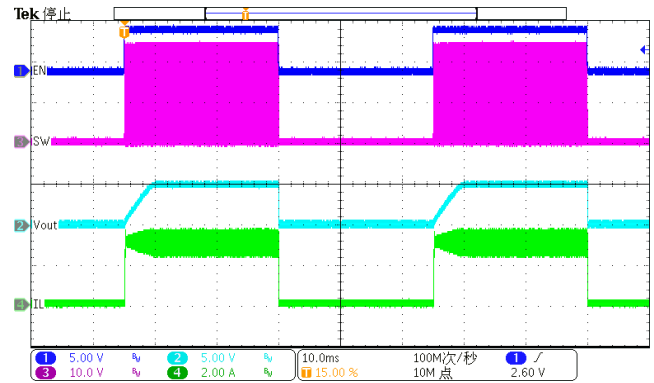
) LJ XUH 3RZ HUXS ,/2



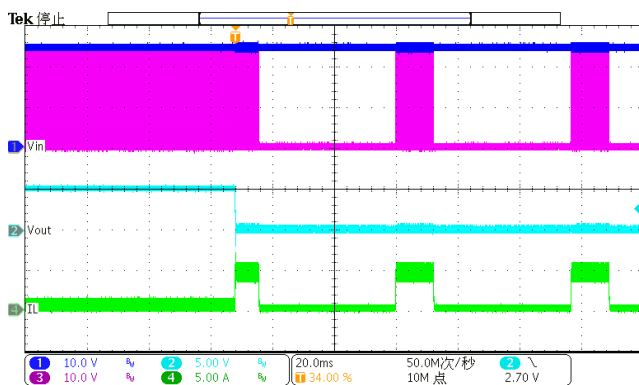
) LJ XUH 3RZ HUGRZ Q ,/2



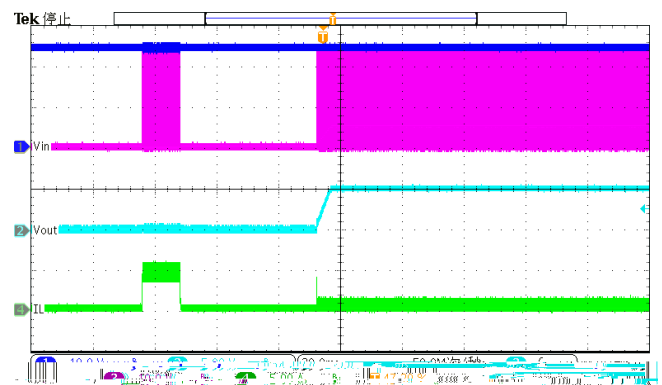
) LJ XUH (1 RVJQ ,/2



) LJ XUH (1 RVJQ ,/2



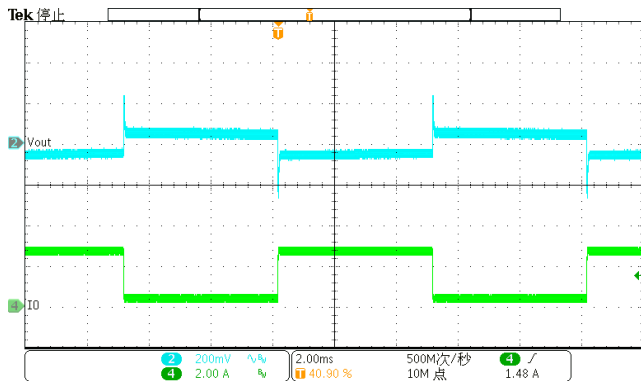
) LJ XUH 2 YHU & XUH QV URNFVRQ VR KDUG VKRUW



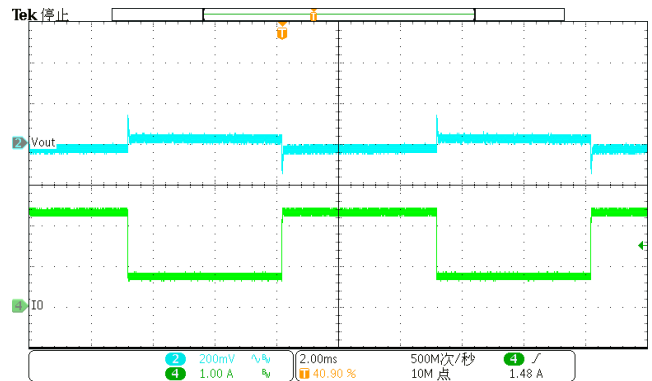
) LJ XUH 2 YHU & XUH QV HGDVH KDUG VKRUW

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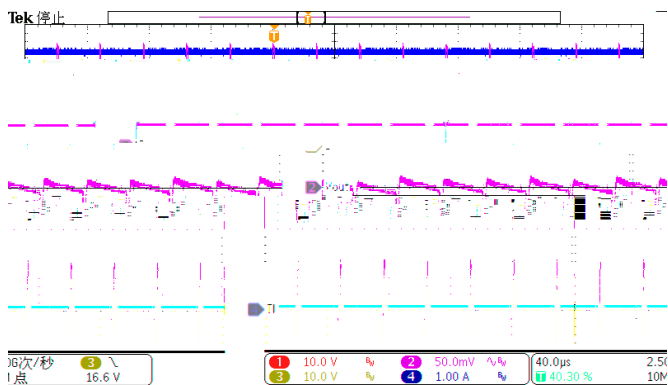
Application Waveforms



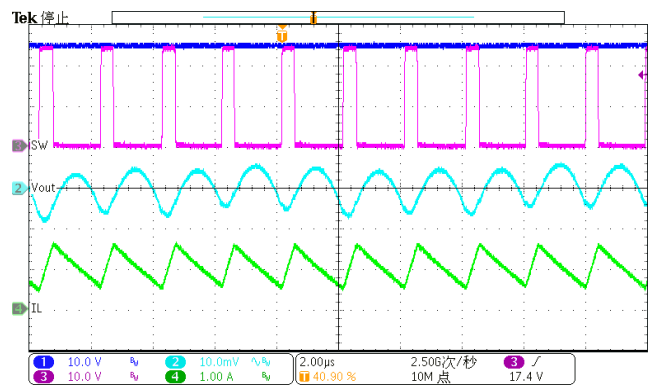
) LJXUH /RDG7UDQM HQW a XV



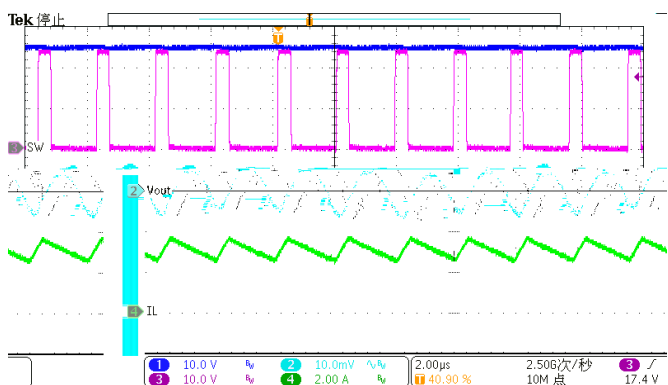
) LJXUH /RDG7UDQM HQW a XV



) LJXUH 2 X5XV6 ISS01 ,/2



) LJXUH 2 X5XV6 ISS01 ,/2



) LJXUH 2 X5XV6 ISS01 ,/2



) LJXUH 7KHUP DO 9,1 9 287

Layout Guideline

3URSHU3&% 0 RXW/D FUM/DORU6&7 8 V WDEG DQG HIEHQ/RSUDMRQ 7KH WDFHV FRQGXFWDJ IDWWZ LFKLQJ FXUHQW RU YROUHV DUH HDV RI LQNUDFVZ LK WND LGXFWQFH DQG SDUDLVF FDSDFWQFH RI JHQHUDW QRLVH DQG GHJUDGH SHURUP DQFH) RUEHWWUHVXOW IROZ WHVH JXGHQHV DVEHQBZ

1. 3RZHU JURXQGLQJ VFHP H LV YHU FUMDOEHFDXVH RI FDUWLQJ SRZHU WHUP DO DQG JORFK ERXQFLQJ QRLVH DWRFIDWNG ZLWK FGFNIUHTXHF 7KH WXP E RI UKG LV RI P DNH JURXQG WDFH QBZHWNP SHQGQFH DQG SRZHUDUH GLWEXNGHYHQO RQ3&% 6 XIEHQO SDFLQJ JURXQGDUH ZLORSVP LH WHUP DODGG QVFDXWQJ RYHUKHDVUDH

2. 3DFH D QBZ (65 FHUP IE FDSDFWUDV FGVH RI 9,1 SLQDGG WH JURXQGDV SRWEG RI UHGXFH SDUDLVF HHHFW

3.) RURSHUDMRQ DWXQDNG QDG WH VRS VGH JURXQGDUH P XWASURYGH DGHXDWI KHDWGLVSDWQJ DUHD 0 DNH VXUH WH VRS VZ LFKLQJ QRS ZLWK SRZHUKDYH QBZ HULP SHQGQFH RI JURXQGLQJ

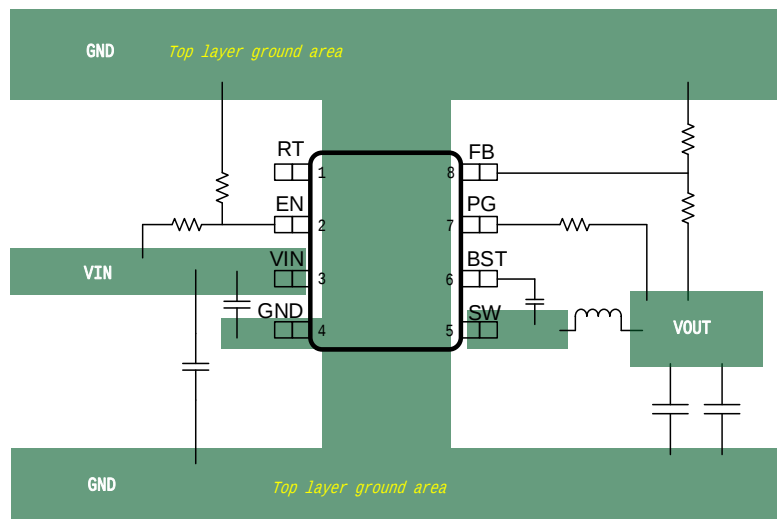
4. 7KH ERWVP 0 HULV D OUIH JURXQG SOGH FRQHFVNG RI WH JURXQG SOGH RQ VRS 0 HUE YDV 7KH SRZHU SDG VKRXG EH FRQHFVNG RI WH ERWVP 3&% JURXQG SOGHV XWQJ P XQSGI YDV GLHFV XQGHWVH , & , VWUFRP P HQGHG P LOGDP HNUGLQKREIV RI WHUP DQDV EXW VP DQIYD RI HUV GW ULN RI VROHU YROPH QW 2 QDSSQFMRQV ZKHUH VROHU YROPH QW WUK WH YDV LV RI FRQHUQ SOJLQJ RUWQWQJ FDQ EH XVHG RI DFKIHYH D UHSHDQEH SURFHV

5. 2 XSWQGXFRU VKRXG EH SDFHG FGVH RI WH 6: SLQ 7KH VZ LFKLQJ DUHD RI WH 3&% FRQGXFRUP LQJ L HG RI SUHYHQWH FHMYH FDSDFWVH FRXSQJ

6. 7KH 57 WHUP LQDQV VHQWVH RI QRLVH RI WH 57 UHMLRU VKRXG EH QFDWNG DV FGVH DV SRWEG RI WH , & DQG URXNG ZLWK P LQJ DQIYV RI WDFH

7. 89/2 DGXWDQ 57 UHMLRUV 66 DQGHGDFNFRP SRQHQW VKRXG FRQHFVNG VP DQIYDQJURXQZ KIEK P XWV UHMLQ RI WH * 1 SLQZ LKRXWQ LQNUDYQJ ZLWK SRZHU JURXQG

8.) RUDFKIHYQJ EHWUWHUP DQSHURUP DQFH DIRXUO HUO RXW/WRQJ O UFRP P HQGHG



) LKUH 3&%/D RXW DP SGI

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TAPE AND REEL INFORMATION

