

MAX17691A/MAX17691B

4.2V—60V No-Opto Isolated Flyback Converter with Integrated FET

General Description

Benefits and Features

(9PAE K -9AFA=J >9EADQ G> AKGD9L=< HGO=J <=NA;=K =F9;D;=K PL=JF9D GEHGF=FLK 9F< /GL9D GKL ;GGD=J KE9DD=J 9F< KAEHD=J HGO=J KMHHDQ KGDMLAGFBAF@=9L=K L@= *HLG;GMHD=J 9F< .:=;GF<9JQ .A<= (3 AK 9 @A?@ =>>A;A=F;Q)G *HLG AFL=?J9L=< JJGJ EHDA>A=J F(*.!/ >DQ;9;C ;GFN=JL=J L@9L MK=K >AP=< >J=IM=F;Q U OH LG .H9;=.9NAF?K H=9C ;MJJ=FL EG<= ;GFLJGD /@= <=NA;= K=FK=K L@= AKGD9L=<GO - .*) \$FL=?J9L=< F(*.!/ GMLHML NGDL9?=<AJ=;LDQ >JGE L@= HJAE9JQ KA<=>DQ;9;C F9D9D 'GGH GEH=FK9LAGF (3 >GJE <MJAF? K=;GF<9JQ KA<= J=;LA>A=J ;GF<M;LAGF)G UK=MADL \$F .G>L .L9JL GF<9JQ KA<= =JJGJ 9EHDA>A=J 9F< GHLG;GMHD=J 9J J=IMJ;=K +GO=J AKKAH9LAGF LG HJGNA<= 9F 9;MJ9L= AKGD9L=< J=?MD9L=< GMLHML NGDL9?=>A;A=F;Q K9NAF? MH LG G> + KH9;= FGJE9DDQ J=IMAJ=< >GJ 9J =DAN=JK MH LG 2 *MLHML +GO=J LJ9<ALAGF9D >DQ;9;C ;GFN=JL=J U !J=IM=F;Q !GD< 9;C F9:D=K F@9F;=< 'A?@L /@= (3 >=9LMJ=K 9 DGO - .*) 1 Ej 'G9< >>A;A=F;Q AFL=?J9L=< F(*.!/ HJAE9JQ KOAL;@ 9F< AK =KA?F=< LGU Z .@ML<GOF MJJ=FL GH=J9L= GN=J 9 OA<= KMHHDQ J9F?=>JGE 1 LG 1 /@=MHHGJLK &=Q .QKL=E '=N=D =KA?F -=IMAJ=E=FLK KOAL;@AF? >J=IM=F;Q G> L@= <=NA;= AK HJG?J9EE9:D= >JGE=IM=F;Q AL@=JAF? .MHHGJLK 'GO (\$.HJ=9< C#R LG C#R F)01* >=9LMJ= 9DDGOK L@= MK=J .H;LJME *H=J9LAGF LG LMJF *) !! L@= HGO=J ;GFN=JL=J HJ=;AK=DQ 9L L@= <T .OAL;@AF? !J=IM=F;Q .QF;@JGFAR9LAGF LG PL=JF9D KAJ=< AFHML NGDL9?=\$FHML GN=JNGDL9?=\$HJGL;LAGF 9F;C AEHD=E=FL=< MKAF? L@= *1\$ HAF (3 GFDQ .G>L U GEHDA9FL OAL@ \$.+ D9KK (\$ -=IMAJ=E=FLK KL9JL DAEALK AFJMK@ ;MJJ=FL 9L KL9JLMH /@= (3 h *H=J9L=K -=DA9:DQ AF <N=JK= FNAJGFE=FLK KMHHGJLK =PL=JF9D ;DG;C KQF;@JGFAR9LAGF LG 9NGA<DGO=>J= DA9:DQ AF <N=JK= FNAJGFE=FLK IM=F;Q b:=9LKc GF L@= AFHML :MK AF KQKL=EK OAL@ EMDLHML U *MLHML AG<= !GJO9J< 1GDL9?=/=EH=J9LMJ= ;GFN=JL=JK /@= <=NA;= 9DKG @9K HJG?J9EE9:D= >J=IM=F;Q GEH=FK9LAGF <AL@=JAF? >GJ DGO (\$ KHJ=9< KH=;LJME GH=J9LAGF U #A;;MH MJJ=FL 'AEAL +JGL=;LAGF U +JG?J9EE9:D=)01* /@J=K@GD< /@= (3 9DDGOK L=EH=J9LMJ= ;GEH=FK9LAGF >GJ U \$FHML *N=JNGDL9?=\$1\$ +JGL=;LAGF (3 N9JA9LAGFK AF L@= GMLHML J=;LA>A=J <AG<= >GJO9J< *N=JL=EH=J9LMJ= +JGL=;LAGF <JGH /@= (3 AK AFL=JF9DDQ ;GEH=FK9L=< >GJ DGGH U #A?@\$F<MKLJA9D T LG T E:A=FL *H=J9LAF? KL9:ADALQ O@AD= L@= (3 G>=>=JK =PL=JF9D DGGH ;GE/=EH=J9LMJ= -9F?= T LG T %MF;LAGF H=FK9LAGF >D=PA:ADALQ /@= (3 @9K JG:MKL @A; /=EH=J9LMJ= -9F?=> ;MH HJGL=;LAGF 9F< L@=JE9D HJGL=;LAGF K;@=E=K 9F< AK ;9N9AD9:D= AF 9 KH9;= K9NAF? HAF EE P EE /!) U #A?@\$F<MKLJA9D T LG T E:A=FL *H=J9LAF? H9;C9?=\$ OAL@ 9 L=EH=J9LMJ= J9F?=>JGE T LG T

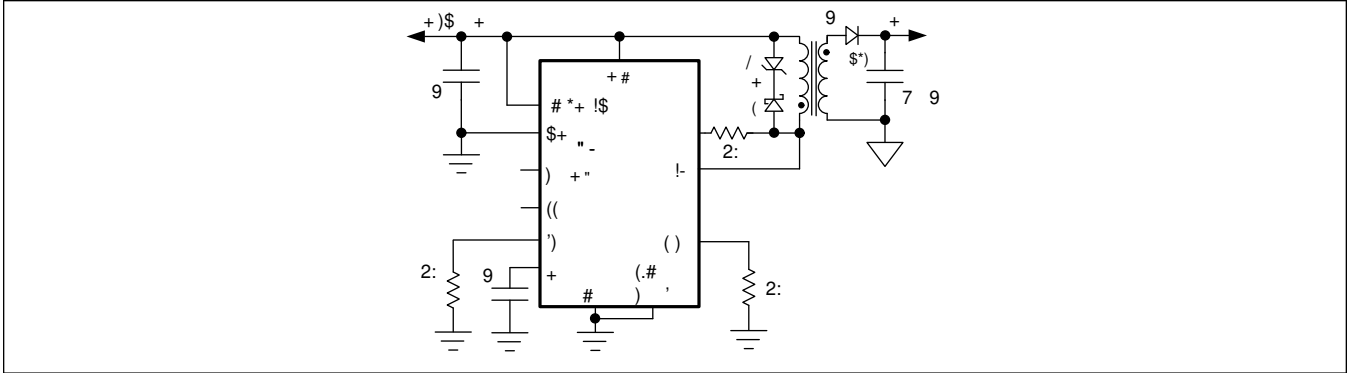
[Ordering Information](#) appears at end of data sheet.

Applications

- h \$KGD9L=< +GO=J .MHHDA=K
- h + ' \$ * (G<MD=K
- h \$ " / "9L= JAN= .MHHDA=K
- h \$F<MKLJA9D 9F< /=D=;GE HHDA;9LAGFK



Typical Application Circuit



(3 (3

1' 1)G *HLG \$KGD9L=<<
!DQ;9;C GFN=JL=J OAL@ \$FL=?J9L=<< !/

Absolute Maximum Ratings

1\$))01* LG ")	1 LG 1	GFLAFMGMK +GO=J AKKAH9LAGF .AF?D= '9Q=J G9J< /
'3 LG ")	1 LG 1	=J9L= E2 \ 9:GN= \ E2
1\$) LG !	1 LG 1	GFLAFMGMK +GO=J AKKAH9LAGF (MDLAD9Q=J G9J< /
1 LG ")	1 LG 1	<=J9L= E2 \ 9:GN= \ E2
*1\$ (3	1 LG 1	*H=J9LAF? /=EH=J9LMJ= -9F?=)GL= T LG T
*(+ (3	1 LG 1	%MF;LAGF /=EH=J9LMJ= T
-.4) \$/# - .. ./ 9F< / 1	(LG ") 1 LG 1	.LGJ9?=/EH=J9LMJ= -9F?= T LG T
'3-(. MJJ=FL		.GD<=JAF? /=EH=J9LMJ= J=>DGO T

Note 1: %MF;LAGF L=EH=J9LMJ= ?J=9L=J L@9F T <=?J9<=K GH=J9LAF? DA>=LAE=K

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Package Information

12 TDFN

+9;C9?= G<=	/
*MLDAF=)ME:=J	_____
'9F< +9LL=JF)ME:=J	_____
THERMAL RESISTANCE, SINGLE-LAYER BOARD	
%MF;LAGF LG E:A=F ₁ I	T 2
%MF;LAGF LG 9K= /@=JE9D -=KAKL9F;= I	T 2
THERMAL RESISTANCE, FOUR-LAYER BOARD	
%MF;LAGF LG E:A=F ₁ I	T 2
%MF;LAGF LG 9K= /@=JE9D -=KAKL9F;= I	T 2

!GJ L@= D9L=KL H9;C9?= GMLDAF= AF>GJE9LAGF 9F< D9F< H9LL=JFK <GHLJAFILK@9C@HGom/packages>
)GL= L@9L 9 b c b c GJ b c AF L@= H9;C9?= ;G<= AF<A;9L=K -G#. KL9LMK GFDQ +9;C9?= <J9OAF?K E9Q K@GO 9 <A>=>J
 KM>>AP ;@9J9;L=J :ML L@= <J9OAF? H=JL9AFK LG L@= H9;C9?= J=?9J<D=KK G> -G#. KL9LMK
 +9;C9?= L@=JE9D J=KAKL9F;=K O=J= G:L9AF=< MKAF? L@= E=L@G< <=K;JA:=< AF % KH=;A>A;9LAGF % . MKAF? 9
 >GMJ D9Q=J :G9J< !GJ <=L9AD=< AF>GJE9LAGF GF H9;C9?= L@=JE9D ;GFKA<=J9LAGFKindeg=dlc.com/
[thermal-tutorial](#)

(3 (3

1' 1)G *HLG \$KGD9L=<<
!DQ:9;C GFN=JL=J OAL@ \$FL=?J9L=< !/

Electrical Characteristics

1 \$) 1 ! 1)01** 1 1 *1\$ 1 (3 *(+ *+) (3 1 m! LG ") 1 ") 1 / 1 (1.4) \$/#- 1 -/ '3 .. *+) - ./ Cj / T LG T MFD=KK GL@=JOAK= FGL=<< /QHA;9D N9DM=K 9J= 9L / T DD NGDL9?=K 9J= J=>=J=F;<< LG ") MFD=KK GL@=JOAK= FGL=<<)GL=

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT						
\$FHML 1GDL9?=-9F?=-	1 \$)					1
\$FHML .MHHDQ @ML<GOF MJJ=FL	\$)8.#)) 01* ")				m
\$FHML .MHHDQ MJJ=FL	\$))G 'G9<				E
EN/UVLO						
) 01* /@J=K@GD<	1)-	1) -AKAF?				1
	1)!	1) !9DDAF?				
/JM= .@ML<GOF) 01* /@J=K@GD<	1)#)					1
) 01* \$FHML '=9C9?=- MJJ=FL	\$)'&"	1) 1 / / % \				F
VCC						
1 --?MD9LAGF 1GDL9?=- 1		1 \$) 1 m X \$ 1 X E				1
		1 X 1 \$) X 1 \$ 1 m				
1 MJJ=FL 'AEAL	\$) 8(3	1 \$) 1 1 1 1				E
1 JGHGML	1 *	1 \$) 1 \$ 1 E				E1
1 01*	1 1 01-	-AKAF?				1
	1 1 01!	!9DDAF?				
OVI (MAX17691A)						
*1\$ /@J=K@GD<	1 *1\$8-	*1\$ -AKAF?				1
	1 *1\$8!	*1\$!9DDAF?				
*1\$ -=KHGFK= /AE=		1 *1\$ KL=H >JGE 1 LG 1 E1 *N=J<JAN=				mK
*1\$ \$FHML '=9C9?=- MJJ=FL	\$)1\$	1 *1\$ 1 / / % \				F
RT						
.OAL:@AF? !J=IM=F;Q -9F?=-	>2-/					C#R
.OAL:@AF? !J=IM=F;Q ;;MJ9;Q		>2-/ C#R LG C#R				
=>9MDL .OAL:@AF? !J=IM=F;Q		-/ *+)				C#R
SYNC/DITHER						
.QF:@JGFAR9LAGF 'G?A; #A?@ \$FHML	1 \$#					1
.QF:@JGFAR9LAGF 'G?A; 'GO \$FHML	1 \$'					1
.QF:@JGFAR9LAGF +MDK= 2A<L@						FK

(3 (3

1' 1)G *HLG \$KGD9L=<
!DQ:9;C GFN=JL=J OAL@ \$FL=?J9L=< !/

Electrical Characteristics (continued)

1 \$) 1 ! 1)01* 1 1 *1\$ 1 (3 *(+ *+) (3 1 m! LG ") 1 ") 1 / 1 (1.4) \$/#- 1 -/ '3 .. *+) - ./ Cj / T LG T MFD=KK GL@=JOAK= FGL=< /QHA;9D N9DM=K 9J= 9L / T DD NGDL9?=K 9J= J=>=J=F;< LG ") MFD=KK GL@=JOAK= FGL=<)GL=

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
AL@=JAF? -9EH @9J?AF? MJJ=FL						m
AL@=JAF? -9EH AK;@9J?AF? MJJ=FL						m
AL@=JAF? -9EH#A?@ /JAH +GAFL						1
AL@=JAF? -9EH"GO /JAH +GAFL						1
SS						
.G>L .L9JL @9J?AF? MJJ=FL	\$.					m
=>9MDL .G>L .L9JL /AE=	L.					EK
LX						
(9PAEME MLQ Q;D=	(3*)GL=				
(AFAEME '3 *F /AE=	L)8(\$)					FK
(AFAEME '3 *>> /AE= /G .9EHD= *MLHML 1GDL9?=-	L!!8(\$)					FK
\$FL=JF9D F(*./ *F -KAKL9F;=	- .*)	\$3 E				Ej
CURRENT LIMIT (I _{LIM})						
+9C MJJ=FL 'AEAL	\$3 + & (3	(3				
-MF9O9Q MJJ=FL 'AEAL	\$3 -0) 2 4	(3				
*N=J;MJJ=FL #A;;MH /AE=GML						4'
(AFAEME +=9C MJJ=FL	\$3 + & (\$)	(3				
SET						
./ -=?MD9LAGF 1GDL9?=-	1./					1
TC/V _{CM}						
/ 1 (+AF A9K 1GDL9?=-	1/ \$.	/ / % G				1
/=EH=J9LMJ= GEH=FK9LAGF G=>>A;A=FL	$\frac{[V]}{[T]}$					E1 G
COMP (MAX17691B)						
JJGJ EHDA>A=J /J9FK;GF<M;L9F;=	"E					m.
*(+ .GMJ;= MJJ=FL	\$(+8.*0-	1 *(+ 1 1 ./ 1				m
*(+ .AFC MJJ=FL	\$(+8.\$)&	1 *(+ 1 1 ./ 1				m

(3 (3

1' 1)G *HLG \$KGD9L=<
!DQ:9;C GFN=JL=J OAL@ \$FL=?J9L=< !/

Electrical Characteristics (continued)

1 \$) 1 ! 1)01** 1 1 *1\$ 1 (3 *(+ *+) (3 1 m! LG ") 1 ") 1 / 1 (1.4) \$/#- 1 -/ '3 .. *+) - ./ Cj / T LG T MFD=KK GL@=JOAK= FGL=< /QHA;9D N9DM=K 9J= 9L / T DD NGDL9?=K 9J= J=>=J=F;=< LG ") MFD=KK GL@=JOAK= FGL=<)GL=

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
THERMAL SHUTDOWN						
/@=JE9D .@ML<GOF /#J=K@GD<	/ .#					\
/@=JE9D .@ML<GOF #QKL=J=KAK						\

Note 2: D=;LJA;9D KH=;A>A;9LAGFK 9J= HJG<M;LAGF L=KL=<H/A>A;9LAGFK GN=J L@= =FLAJ= GH=J9LAF? L=EH=J9LMJ= J9F?= 9J= ?M9J9FL==< :Q <=KA?F 9F< ;@9J9;L=JAR9LAGF

Note 3: (9PAEME <MLQ ;Q;D=(3* AK FGL N9DA< O@=F 9F =PL=JF9D ;DG;C AK 9HHDA=< LG L@=. 4) \$/# - HAF MJAF? =PL=JF9D ;D KQF;@JGFAR9LAGF L@= EAF AEME G>> LAE= GF '3 AK <=;A<=< :Q L@= AFL=JF9D GK;ADD9LGJ >J=IM=F;@= Q@A;@ AK K=L :
[External Clock Synchronization and Switching Frequency Dithering \(SYNC / DITHER\)](#) K=;LAGF >GJ EGJ= <=L9ADK