

MCZ5216ST

LLC Current Resonant Mode Controller

Feature

- Robust 600V direct gate driver
- HV Startup function
- X-cap Discharge
- Vcc(max)=35V
- Active Stand-by function
- Burst mode function
- Soft Starting function
- Operating frequency 500kHz is available
- Over current protection(OCP1)
- Over current protection for peak load(OCP2)
- Correction of OLP(OCP2) level based on the input voltage
- Capacitive mode protection
- Two-step timer latch function
- Latching protection with external signal is possible
- Vc1 OVP(Latching protection) is possible
- Low input voltage protection(Vsen)
- Thermal Shutdown
- Halogen free
- Pb free
- RoHS:Yes

Outline

House Name: SOP18



1.絶対最大定格

Absolute Maximum Ratings

1-1.入出力定格

Input Output Ratings

特に指定なき場合はTj=25°C

Tj=25°C unless otherwise specified

項目 Item	記号 Symbol	規格値 Value	単位 Unit
Vin入力電圧 Vin input voltage	Vin	-0.3 ~ 600	V
フローティングドライバ電圧 High side floating supply voltage	VB	-0.3 ~ 600	V
制御部電源電圧 Vc1 input voltage	Vc1	-0.3 ~ 35	V
ハイサイドドライバ電源電圧 VB input voltage	VB-VS	-0.3 ~ 16	V
ローサイドドライバ電源電圧 Vc2 input voltage	Vc2	-0.3 ~ 16	V
Vsen端子電圧 Vsen input voltage	Vvsen	-0.3 ~ 10	V
ASTBY端子電圧 ASTBY input voltage	Vastby	-0.3 ~ 6(*1)	V
BURST端子電流 BURST input current	Iburst	-1 ~ 10	mA
SST端子電流 SST input current	Isst	-1 ~ 10	mA
LS端子電流 LS input current	Ils	-1 ~ 10	mA
CSO端子電圧 CSO input voltage	Vcso	-0.3 ~ 6	V
CS端子電圧 CS input voltage	Vcs	-3 (t < 100us) ~ 6(*1)	V

*1 外部電圧印加の場合。ICからの出力電圧については不問とする。

In case of external supply voltage. Output voltage from IC is no object.

1-2.熱定格

Thermal Ratings

項目 Item	記号 Symbol	規格値 Value	単位 Unit
許容損失 Total power dissipation	Pt	2.5 (*2)	W
接合部温度 Junction temperature	Tj	150	°C
保存温度 Storage temperature	Tstg	-40 ~ 150	°C
熱抵抗 Thermal Resistance	θ_{ja}	50 (*2)	°C/W

*2 4-layer Board

ガラエポ基板 : 114.3mm × 76.2mm, 厚さ : 1.6mm、内面銅箔サイズ : 74.2mm × 74.2mm, 厚さ : 35μm

Glass-Epoxy Board : 114.3mm × 76.2mm, Thickness : 1.6mm, Inside copper foil : 74.2mm × 74.2mm, Thickness : 35μm

2.推奨動作条件

Recommended operation conditions

項目 Item	記号 Symbol	規格値 Value	単位 Unit
Vin入力電圧 Vin input voltage	Vin	50 ~ 480	V
フローティングドライバ電圧 High side floating supply voltage	VB	-0.3 ~ 480	V
制御部電源電圧 Vc1 input voltage	Vc1	-0.3 ~ 28	V
ハイサイドドライバ電源電圧 VB input voltage	VB-VS	-0.3 ~ Vc2-Vf (*3)	V
ローサイドドライバ電源電圧 Vc2 input voltage	Vc2	-0.3 ~ Vc2 (*4)	V
接合部温度 Junction temperature	Tj	-20 ~ 120	°C

*3 Vf : ブートストラップ用ダイオードのVf

Vf is forward voltage of Boot strap diode.

*4 電氣的特性(3ページ)のVc2規格値を参照

Please refer to Drain-kick section Vc2 of 3 pages of this specification.

注意

Notes

推奨動作条件の範囲を超えて使用すると、信頼性に影響を及ぼす場合があります。

It might influence reliability when using it exceeding the range of recommended operating conditions.

本ICを御使用の際は絶対最大定格を越えないようにしてください。絶対最大定格を超えた場合、ICが破壊する可能性があります。破壊した場合、その破壊モード(オープンモード、ショートモード)は特定できませんので、ヒューズなど物理的な安全対策を施すようお願いします。

Do not use this IC beyond its absolute maximum ratings to prevent the IC from potential damage. Since the kind of destructive mode cannot be identified (open mode, short mode), take safety measures such as fusing.

3.電気的特性

Electrical characteristics

3-1.電気的特性(1/8)

Electrical characteristics (1/8)

特に指定なき場合は $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$
 $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$ unless otherwise specified

< Starter部 >

項目 Item	記号 Symbol	条件 Condition	規格値 Ratings			単位 Unit
			MIN	TYP	MAX	
不足電圧保護回路 Under voltage protection						
Vc2動作開始電圧1 (AC入力検出モード) Vc2 startup threshold voltage 1 (AC Input)	Vc2(st)1	LS>Vls(acon)	11.4	12.2	13.0	V
Vc2動作開始電圧2 (DC入力検出モード) Vc2 startup threshold voltage 2 (DC Input)	Vc2(st)2	LS<Vls(acon)	9.3	10.0	10.7	V
Vc2動作停止電圧 Vc2 shutdown threshold voltage	Vc2(sp)		6.8	7.5	8.2	V
Vc2動作開始/停止電圧差1 Vc2 st/sp hysteresis voltage 1	Vc2(st/sp)hys1	Vc2(st)1-Vc2(sp)	3.7	4.7	5.7	V
Vc2動作開始/停止電圧差2 Vc2 st/sp hysteresis voltage 2	Vc2(st/sp)hys2	Vc2(st)2-Vc2(sp)	1.8	2.5	3.2	V
高電圧起動回路機能 HV startup section						
ドレインキック供給電流1 Drain-kick supply current 1	Idk(on)1	Vin=100V Vc2=1.0V	2.0	2.8	3.6	mA
ドレインキック供給電流2 Drain-kick supply current 2	Idk(on)2	Vin=100V Vc2=4.0V	27	33	40	mA
ドレインキック供給電流1、2切替Vc2電圧 Exchange voltage of Drain-kick current	Vc2(dkon12)	Vin=100V Idk(on)1→Idk(on)2	2.0	2.5	3.0	V
ドレインキックOFF時消費電流 Vin current of DK-off	Ivin(dkoff)	Vin=100V,Vc1=16V, Vsen>Vsen(xdischg)	5	20	40	uA
ドレインキックON時Vc2電圧 Vc2 voltage of DK-on	Vc2(dkon)	Vin=100V Vc1=0V	13.0	13.6	14.2	V
ドレインキックOFF時Vc2電圧1 Vc2 voltage of DK-off1	Vc2(dkoff)1	Vc1=16V,Vsen=6V, BURST<Vbst(H/L)	12.6	13.3	14.0	V
ドレインキックOFF時Vc2電圧2 Vc2 voltage of DK-off2	Vc2(dkoff)2	Vc1=16V,Vsen=6V, BURST>Vbst(H/L)	11.8	12.5	13.2	V
ドレインキック停止Vc1電圧 Vc1 voltage of DK-off	Vc1(dkoff)	Vin=100V	11.2	12.6	14.0	V
ドレインキック再起動Vc1電圧 Vc1 voltage of DK-on	Vc1(dkon)	Vin=100V	7.0	8.0	9.0	V
Xコンデンサ放電電流 X-cap discharge current	Ivin(xdischg)	Vin=100V,Vsen=0V LS>Vls(acon)	0.7	0.9	1.1	mA

3-1.電気的特性(2/8)

Electrical characteristics (2/8)

特に指定なき場合は $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$
 $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$ unless otherwise specified

< Starter部 >

項目 Item	記号 Symbol	条件 Condition	規格値 Ratings			単位 Unit
			MIN	TYP	MAX	
消費電流 consumption current						
待機時Vin消費電流 Vin current of stand-by	Idk(stb)	Vin=100V Vc1=0V, Vsen=0V	0.7	0.9	1.1	mA
待機時Vc1消費電流(バースト停止) Vc1 current of stand-by 2 (burst stop)	Ivc1(stb)	Vc1=16V, Vsen=6V BURST>Vbst(H)	0.8	1.0	1.2	mA
動作時消費電流 Operating current	Ivc1(on)	Vc1=16V Vsen=6V	11	14	17	mA
バースト機能 Burst section						
BURST端子SST放電電圧 BURST voltage of output off	Vbst(H)		1.8	2.0	2.2	V
BURST端子SST充電電圧 BURST voltage of output on	Vbst(L)		1.3	1.5	1.7	V
BURST端子出力停止/起動電圧差 Output off/on hysteresis voltage	Vbst(H/L)hys	Vbst(H)-Vbst(L)	0.3	0.5	0.7	V
BURST端子放電電流1 BURST discharge current 1	Ibst(dis)1	ASTBY<Vastby(bston/off) BURST=1.0V	250	400	550	uA
BURST端子放電電流2(バーストモード) BURST discharge current 2 (burst mode)	Ibst(dis)2	ASTBY>Vastby(bston/off) BURST=1.0V	-5	0	5	uA
過熱保護 Thermal shutdown protection						
動作停止温度 Operating stop temperature	TSD		140 *5	-	-	℃
動作停止/復帰温度幅 Hysteresis temperature	ΔTSD		-	40 *5	-	℃
ラッチ保護 Stop latch section						
ラッチ解除電圧 Latch reset voltage of Vc2	Vc2(latch reset)		6.0	7.0	8.0	V
Vc2動作停止/ラッチ解除電圧差 Vc2(sp)/Vc2(latch reset) hysteresis	Vc2(sp)/ Vc2(latch reset)	Vc2(sp)- Vc2(latch reset)	0.1	0.5	1.0	V
Vc1過電圧保護電圧 Over voltage protection of Vc1	Vc1(ovp latch)		31.0	33.0	34.7	V

*5 設計保証
Design assurance.

3-1.電気的特性(3/8)

Electrical characteristics (3/8)

<LLC部>

特に指定なき場合は $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$
 $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$ unless otherwise specified

項目 Item	記号 Symbol	条件 Condition	規格値 Ratings			単位 Unit
			MIN	TYP	MAX	
入力監視機能 Input monitoring section						
LS/Vsen変換比 LS/Vsen ratio	LS/Vsen		1.05	1.20	1.35	－
入力電圧監視しきい値1 (SS-Reset) Input threshold voltage 1	Vsen1	LS>Vls(acon) ASTBY<Vas(on/off)	0.85	1.00	1.15	V
入力電圧監視しきい値2 (SS-Reset) Input threshold voltage 2	Vsen2	LS>Vls(acon) ASTBY<Vas(on/off)	0.75	0.90	1.05	V
入力電圧監視しきい値1/2電圧差 Input 3/4 hysteresis voltage	Vsen(1-2)hys	Vsen1-Vsen2	0.05	0.10	0.20	V
入力電圧監視しきい値3 (SS-Reset) Input threshold voltage 3	Vsen3	LS>Vls(acon) ASTBY>Vas(on/off)	0.85	1.00	1.15	V
入力電圧監視しきい値4 (SS-Reset) Input threshold voltage 4	Vsen4	LS>Vls(acon) or ASTBY>Vas(on/off)	0.75	0.90	1.05	V
入力電圧監視しきい値3/4電圧差 Input 3/4 hysteresis voltage	Vsen(3-4)hys	Vsen3-Vsen4	0.05	0.10	0.20	V
入力電圧監視しきい値5 (SS-Reset) Input threshold voltage 5	Vsen5	LS<Vls(acon) ASTBY<Vas(on/off)	3.3	3.5	3.7	V
入力電圧監視しきい値6 (SS-Reset) Input threshold voltage 6	Vsen6	LS<Vls(acon) ASTBY<Vas(on/off)	3.0	3.2	3.4	V
入力電圧監視しきい値5/6電圧差 Input 5/6 hysteresis voltage	Vsen(5-6)hys	Vsen5-Vsen6	0.1	0.3	0.5	V
入力電圧監視しきい値7 (SS-Reset) Input threshold voltage 7	Vsen7	LS<Vls(acon) ASTBY>Vas(on/off)	0.85	1.00	1.15	V
入力電圧監視しきい値8 (SS-Reset) Input threshold voltage 8	Vsen8	LS<Vls(acon) ASTBY>Vas(on/off)	0.75	0.90	1.05	V
入力電圧監視しきい値7/8電圧差 Input 3/4 hysteresis voltage	Vsen(7-8)hys	Vsen7-Vsen8	0.05	0.10	0.20	V
Vsen端子停止時BURST放電電流 BURST discharge current at Vsen-OFF	Ibst(vsendis)	Vsen=0V, BURST=1V	2.0	3.5	5.0	mA
Vsen端子停止時Vc1放電電流 Vc1 discharge current at Vsen-OFF	Ivc1(vsendis)	Vsen=0V	2.0	3.0	4.0	mA
AC-OFF後SST放電遅延時間 SST discharge delay time after AC-OFF	Tsst(dischg)	LS>Vls(acon)	90	140	190	ms

3-1.電気的特性(4/8)

Electrical characteristics (4/8)

特に指定なき場合は $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$

$V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$ unless otherwise specified

<LLC部>

項目 Item	記号 Symbol	条件 Condition	規格値 Ratings			単位 Unit
			MIN	TYP	MAX	
SST機能 SST section						
SST端子しきい値 Input threshold voltage	V _{SST}		1.3	1.5	1.7	V
SST充電電流1 SST charge current 1	Isst(chg)1	SST=0V	−110	−90	−70	uA
SST充電電流2 SST charge current 2	Isst(chg)2	SST=1.0V	−40	−30	−20	uA
SST充電電流3 SST charge current 3	Isst(chg)3	SST=0V ASTBY>Vas(bston/off)	−110	−90	−70	uA
SST放電電流 SST discharge current	Isst(dischg)	SST=1.0V Vsen=0V	2.0	4.0	6.0	mA
SST端子開放電圧 SST open voltage	Vsst(open)		1.9	2.1	2.3	V
LLC動作開始SST電圧 SST voltage of LLC start	Vsst(st)		0.5	0.6	0.7	V
LLC動作停止SST電圧 SST voltage of LLC stop	Vsst(sp)		0.4	0.5	0.6	V
LLC動作開始/停止SST電圧差 SST hysteresis voltage of LLC st/sp	Vsst(st/sp)hys	Vsst(st)−Vsst(sp)	0.04	0.10	0.20	V
SSTラッチ停止電圧 SST latch stop voltage	Vsst(latch)		4.3	4.5	4.7	V
バースト間欠動作時SST保持電圧 SST voltage to burst operation	Vsst(bst)	BURST>Vbst(H/L)	0.4	0.5	0.6	V
SS起動時FB端子放電電流 1 FB discharge current1 of SS offset	Ifb(ssst)1	SST=Vsst(st) ASTBY>Vas(bston/off) Vsen=1V	0.4	0.7	1.0	mA
SS起動時FB端子放電電流 2 FB discharge current2 of SS offset	Ifb(ssst)2	SST=Vsst(st) ASTBY>Vas(bston/off) Vsen=5V	1.2	1.6	2.0	mA
SS起動時FB端子放電電流 3 FB discharge current3 of SS offset	Ifb(ssst)3	SST=Vsst(st) ASTBY<Vas(off) Vsen=5V	1.2	1.6	2.0	mA
LS機能 LS section						
AC入力監視モードON_LS電圧 (LS ON) LS threshold voltage of AC monitoring mode	Vls(acon)		0.75	1.00	1.25	V
CSO端子 Hi電圧 Hi voltage of CSO	Vcso(H)	SST>Vsst	2.3	2.5	2.7	V
CSO端子 充電電流 CSO charge current	Icso(chg)	SST>Vsst Vcso=0V	−1.3	−1.0	−0.7	mA
CSO端子 Low電圧 Low voltage of CSO	Vcso(L)	SST<Vsst	−0.3	0	0.5	V
CSO端子 放電電流 CSO discharge current	Icso(dischg)	SST<Vsst Vcso=2.5V	0.7	1.0	1.3	mA

3-1.電気的特性(5/8)

Electrical characteristics (5/8)

<LLC部>

特に指定なき場合は $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$
 $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$ unless otherwise specified

項目 Item	記号 Symbol	条件 Condition	規格値 Ratings			単位 Unit
			MIN	TYP	MAX	
タイマ機能 Timer section						
Timerしきい値1 Timer threshold voltage 1	Vtimer(set)		3.2	3.5	3.8	V
Timerしきい値2 Timer threshold voltage 2	Vtimer(reset)		0.15	0.30	0.45	V
Timer充電電流1 Timer charge current 1	Itimer(chg)1	CS > Vocp1(±)	−50	−40	−30	uA
Timer充電電流2 Timer charge current 2	Itimer(chg)2	Vocp2(±) <CS< Vocp1(±) Vcso(ocp2)<CSO<Vcso(tmr)	−2.4	−1.7	−1.0	uA
Timer充電電流3 Timer charge current 3	Itimer(chg)3	Vocp2(±) <CS< Vocp1(±) CSO>Vcso(tmr)	−50	−40	−30	uA
Timer放電電流(Refresh) Timer discharge current (Refresh)	Itimer(refresh)		40	80	120	uA
Timer放電電流(間欠) Timer discharge current (Intermittent)	Itimer(dischg)		3.0	6.0	9.0	uA
発振器機能 Oscillator section						
周波数設定精度 Output frequency	f(0)	Ct=1500pF,Rt=9.3kΩ*6	90	100	110	kHz
ソフトスタート周波数 Soft start frequency	fss	Ct=1500pF,Rt=9.3kΩ*6 SST=Vss(st)	280	340	400	kHz
FB充電電流 FB charge current	Ifb(chg)	FB=4.0V	−13.0	−11.0	−9.0	mA
FB充電停止電圧 FB charge stop voltage	Vfb(top)		4.75	5.00	5.25	V
FB充電開始電圧1 FB charge start voltage 1	Vfb(bottom)1		3.50	3.75	4.00	V
FB充電開始電圧2 FB charge start voltage 2	Vfb(bottom)2	Tss(3) *7	2.75	3.00	3.25	V
FB充電開始電圧3 FB charge start voltage 3	Vfb(bottom)3	ASTBY>Vas(on)	2.55	2.8	3.05	V
FBマスク電圧 FB musk threshold voltage	Vfb(msk)		4.55	4.80	5.05	V
Tss拡大比 Tss expansion ratio	Tss(3) *7	SST=Vss(st)	−	1.7	−	−

*6 C_t : FB端子に接続する外付けコンデンサ

C_t is external capacitor connected to FB terminal .

R_t : FB端子に接続する外付け抵抗

R_t is external resistor connected to FB terminal .

*7 $T_{ss(3)}$: 発振器1発目と3発目のVGLのON幅比(設計保証)

$T_{ss(3)}$ is on-time ratio of VGL depend on 1st and 3rd time in saw-tooth wave. (design assurance)

3-1.電気的特性(6/8)

Electrical characteristics (6/8)

<LLC部>

特に指定なき場合は $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$
 $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$ unless otherwise specified

項目 Item	記号 Symbol	条件 Condition	規格値 Ratings			単位 Unit
			MIN	TYP	MAX	
過電流保護機能 Over current protection						
OCP1(+)検出電圧 OCP1(+) threshold voltage	Vocp1(+)		0.450	0.500	0.550	V
OCP1(-)検出電圧 OCP1(-) threshold voltage	Vocp1(-)		-0.550	-0.500	-0.450	V
OCP2(+)検出電圧 1 OCP2(+) threshold voltage	Vocp2(+) ₁		0.300	0.350	0.400	V
OCP2(+)検出電圧 2 OCP2(+) threshold voltage	Vocp2(+) ₂	Vsen=5V ASTBY<Vas(off)	0.200	0.250	0.300	V
OCP2(-)検出電圧 OCP2(-) threshold voltage	Vocp2(-)		-0.400	-0.350	-0.300	V
CS端子電流 CS bias current	Ics	CS=0V	-120	-100	-80	uA
CSO端子プレチャージ電圧 CSO pre-charge voltage	Vcso(pre)	CS=0V	2.3	2.5	2.7	V
OCP2動作開始CSO端子電圧 CSO voltage to OCP2-ON	Vcso(ocp2)	Vocp2(±) <CS< Vocp1(±)	2.4	2.6	2.8	V
CSO端子検出電圧差 Difference of CSO voltage	Vcso	Vcso(ocp2)-Vcso(pre)	0.04	0.10	0.20	V
Timer充電切替CSO端子検出電圧 CSO voltage to timer current switching	Vcso(tmr)		3.4	3.6	3.8	V
OCP2動作時CSO端子充電電流 CSO charge current to OCP2 operation	Icso(ocp2)	CSO>Vcso(ocp2)	-30	-20	-10	uA
CSO端子放電電流 CSO discharge current	Icso(dis)	CSO=2.8V	5	10	15	uA
AC-OFF後CSO放電遅延時間 CSO discharge delay time after AC-OFF	Tcso(dischg)	LS ON	20	35	60	ms
di/dt保護機能 di/dt protection						
didt(+)検出電圧 1 didt(+) threshold voltage	Vdidt(+)		0.030	0.060	0.090	V
didt(-)検出電圧 1 didt(-) threshold voltage	Vdidt(-)		-0.090	-0.060	-0.030	V

3-1.電気的特性(7/8)

Electrical characteristics (7/8)

<LLC部>

特に指定なき場合は $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$
 $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$ unless otherwise specified

項目 Item	記号 Symbol	条件 Condition	規格値 Ratings			単位 Unit
			MIN	TYP	MAX	
AS機能 Active stand-by section						
ASモード開始電圧 AS-mode start voltage	Vas(on)		3.0	3.2	3.4	V
ASモード停止電圧 AS-mode stop voltage	Vas(off)		2.0	2.2	2.4	V
ASTBY端子開放電圧 ASTBY open voltage	Vastby(open)		4.5	5.0	5.5	V
ASTBY端子充電電流1 ASTBY charge current 1	Iastby(chg)1	ASTBY=0V	−3.5	−2.5	−1.5	uA
ASTBY端子充電電流2 ASTBY charge current 2	Iastby(chg)2	ASTBY>Vastby(bston) ASTBY<Vastby(open)	−8.0	−5.0	−2.0	uA
ASTBY端子放電電流 ASTBY discharge current	Iastby(dischg)	ASTBY>Vastby(open)	2.5	4.5	6.5	uA
バーストモード開始ASTBY端子電圧 Burst-mode on voltage	Vastby(bston)		3.7	4.0	4.3	V
バーストモード解除ASTBY端子電圧 Burst-mode off voltage	Vastby(bstoff)		3.6	3.9	4.2	V
バーストモード開始/解除電圧差 Burst-mode on/off hysteresis voltage	Vastby(on/off)hys		0.05	0.10	0.20	V
ASリニア動作開始電圧 AS-linear start voltage	Vas(linon)		2.7	3.0	3.3	V
ASリニア動作解除電圧 AS-linear stop voltage	Vas(linoff)		2.0	2.2	2.4	V
ASリニア動作時FB放電電流 1 FB discharge current 1 of AS linear	Ifb(aslin)1	LS=0V,Vsen=5V ASTBY=2.7V	250	350	450	uA
ASリニア動作時FB放電電流 2 FB discharge current 2 of AS linear	Ifb(aslin)2	LS=0V,Vsen=4V ASTBY=2.7V	80	170	260	uA
ASリニア動作時FB放電電流 3 FB discharge current 3 of AS linear	Ifb(aslin)3	LS=0V,Vsen=3.4V ASTBY=2.7V	5	50	100	uA
ASリニア動作時FB放電電流 4 FB discharge current 4 of AS linear	Ifb(aslin)4	LS>Vls(acon),Vsen=6V ASTBY=2.7V	70	170	270	uA

3-1.電気的特性(8/8)

Electrical characteristics (8/8)

特に指定なき場合は $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$
 $V_{in}=100V, V_{c1}=16V, f(0)=100kHz, T_j=25^{\circ}C$ unless otherwise specified

<ドライバ部>

項目 Item	記号 Symbol	条件 Condition	規格値 Ratings			単位 Unit
			MIN	TYP	MAX	
ハイサイドドライバ機能 High side driver section						
ハイサイドドライバ動作開始電圧 high side driver start voltage	VB-VS(st)		6.5	7.5	8.5	V
ハイサイドドライバ動作停止電圧 high side driver stop voltage	VB-VS(sp)		4.5	5.5	6.5	V
ハイサイドドライバ動作停止電圧 2 high side driver stop voltage 2	Vc2-VB	Vc2(sp)-VB-VS(sp)	1.5	2.5	3.5	V
LLCドライバ LLC driver						
ソース駆動能力 Output source current	Iout(so)	Vc2=VB=12V VGL=VGH=0V	-280	-240	-200	mA
シンク駆動能力 Output sink current	Iout(si)	Vc2=VB=12V VGL=VGH=12V	320	400	500	mA
ONデューティー Output duty cycle	duty	Ct=1500pF,Rt=9.3kΩ*6	40	45	50	%
デッドタイム Dead time	DT	Ct=1500pF,Rt=9.3kΩ*6	250	400	550	ns
上下デッドタイム差 Unbalance of dead time	ΔDT	Ct=1500pF,Rt=9.3kΩ*6	-100	0	100	ns

*6 C_t : FB端子に接続する外付けコンデンサ

C_t is external capacitor connected to FB terminal .

R_t : FB端子に接続する外付け抵抗

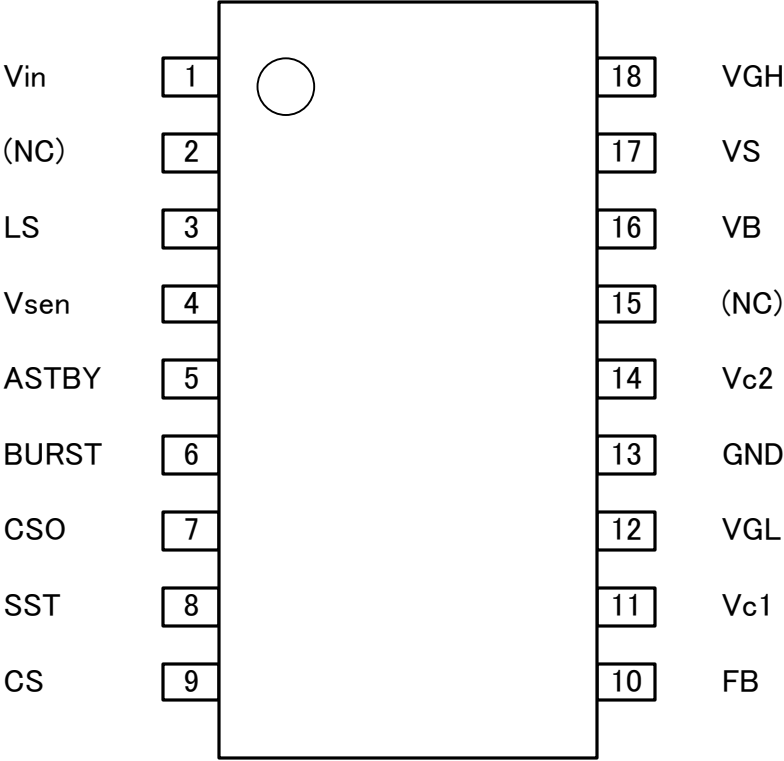
R_t is external resistor connected to FB terminal .

4.端子機能説明 Pin Function

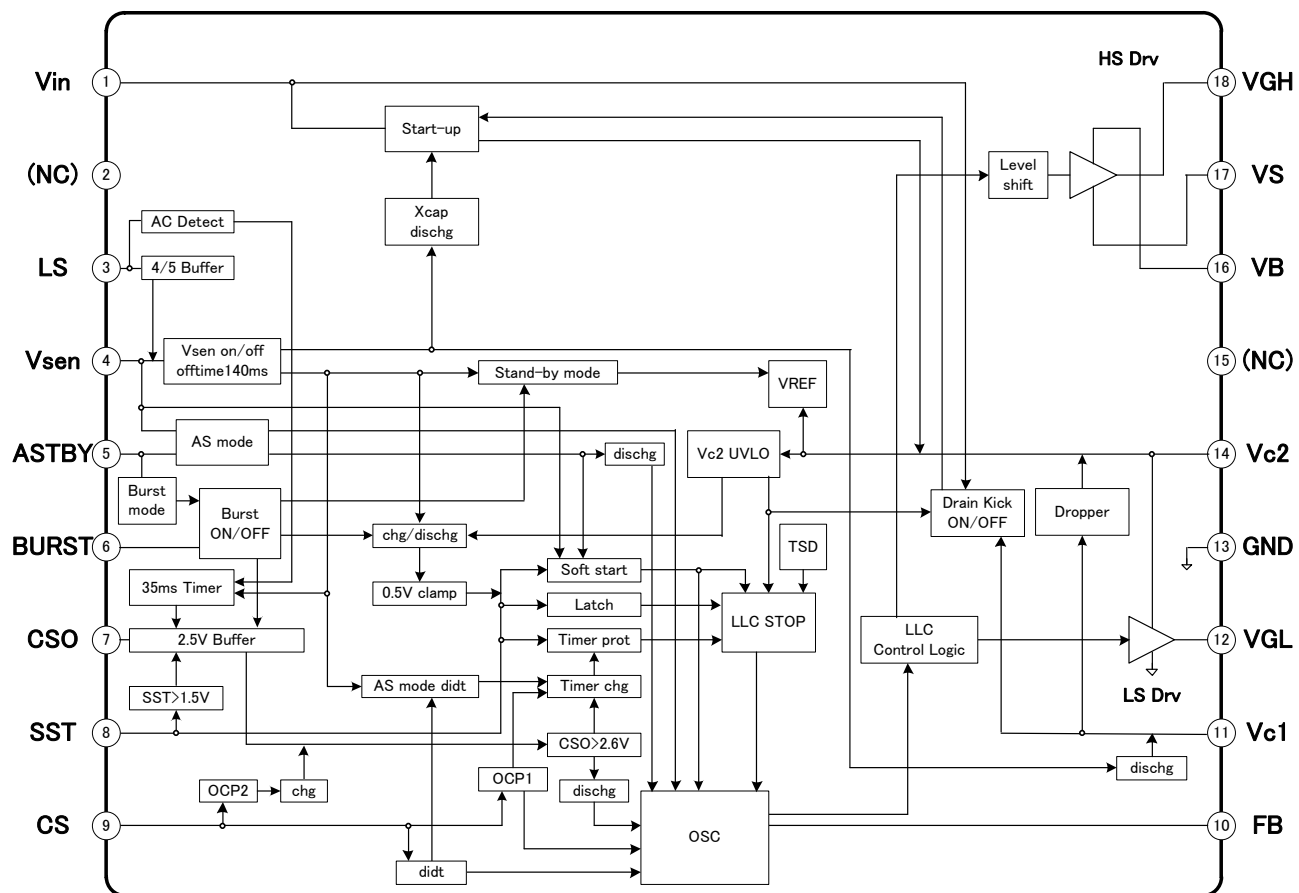
端子番号 PIN No	記号 Symbol	Starter/LLC	機能 Function
1	Vin	Starter	起動回路入力端子、Xコン放電端子 Input of start-up circuit, X-cap discharge
2	(NC)	—	未接続端子 Non connection
3	LS	Starter	AC監視、Vsen電圧供給端子 AC detect, Vsen charge
4	Vsen	Starter/LLC	入力電圧検出端子、低入力保護、SSリセット Low voltage protection, SS-reset
5	ASTBY	Starter/LLC	アクティブスタンバイ切替端子、バーストモード切替端子 Change to active stand-by mode, burst mode
6	BURST	Starter/LLC	バースト動作制御端子 Control to burst operation
7	CSO	LLC	過電流平均化検出応答調整用端子、AC監視出力端子 Detect to adjust response of averaging current, AC detect output
8	SST	LLC	ソフトスタートと異常検出時の間欠動作コンデンサ接続端子 Control to soft-start time and intermittent operation time
9	CS	LLC	過電流検出、過電流平均化検出、di/dt(共振はずれ)検出端子 Detect to over current, averaging current, di/dt-mode
10	FB	LLC	発振器の周波数設定用端子:Dutyや動作周波数の制御 Frequency and duty setting
11	Vc1	Starter/LLC	Vc2電源供給端子 Power supply to Vc2
12	VGL	LLC	ローサイドドライバ出力端子 Output of low side driver
13	GND	common	GND端子 GND
14	Vc2	Starter/LLC	制御回路、ドライバ用電源出力端子 Output voltage of control circuit, driver
15	(NC)	—	未接続端子 Non connection
16	VB	LLC	ハイサイドドライバ電源端子 High side driver supply voltage
17	VS	LLC	ハイサイドドライバ基準電源端子 Reference of high side driver
18	VGH	LLC	ハイサイドドライバ出力端子 Output of high side driver

5.端子配置
Pin assignment

SOP18pkg



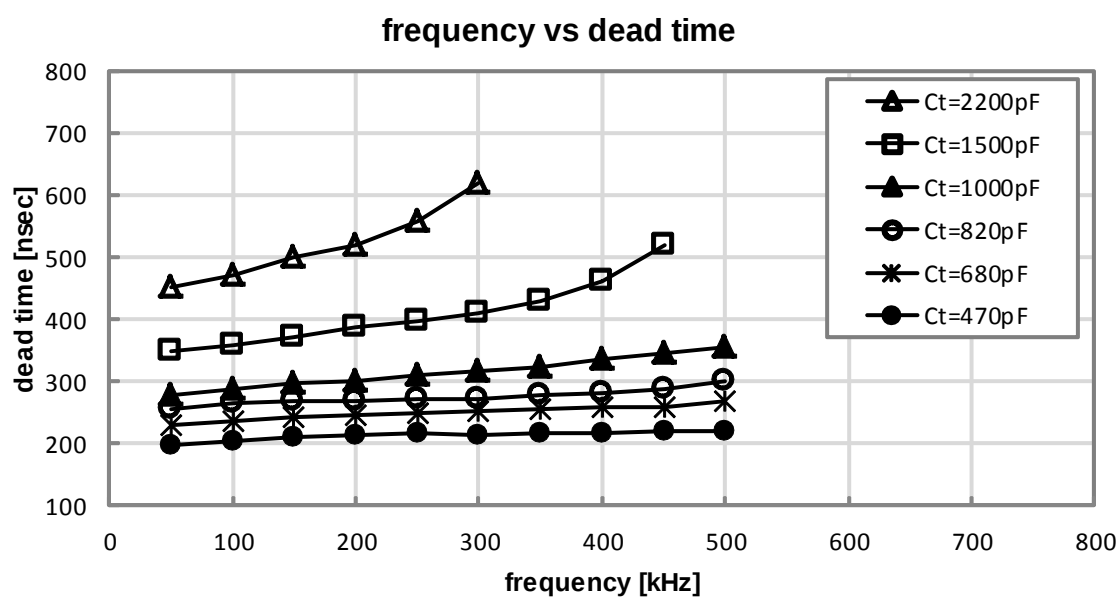
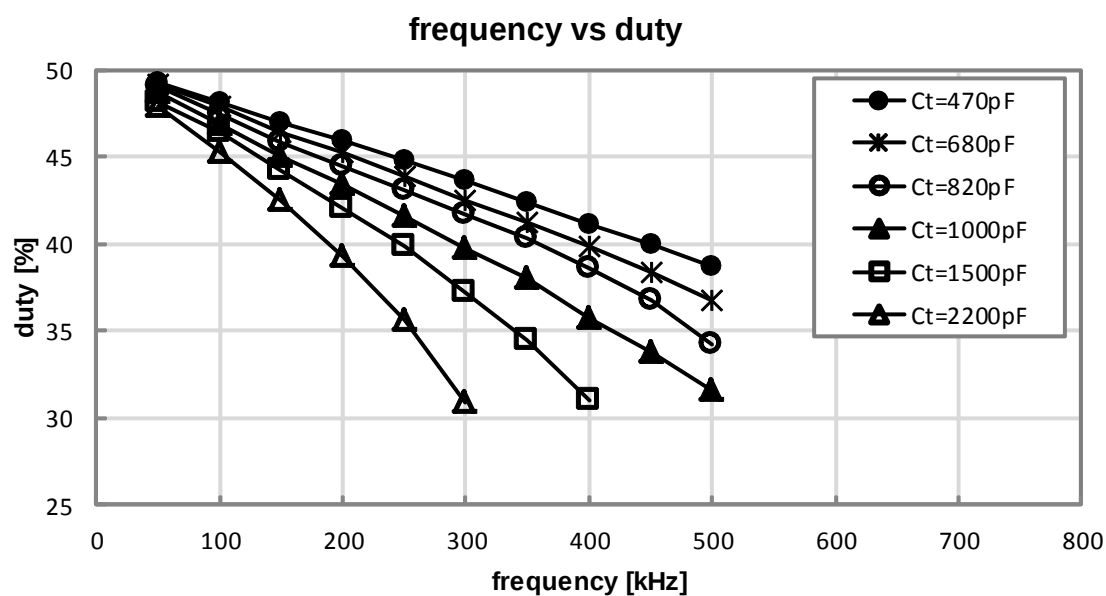
6.ブロック図 Block Diagram



特性図

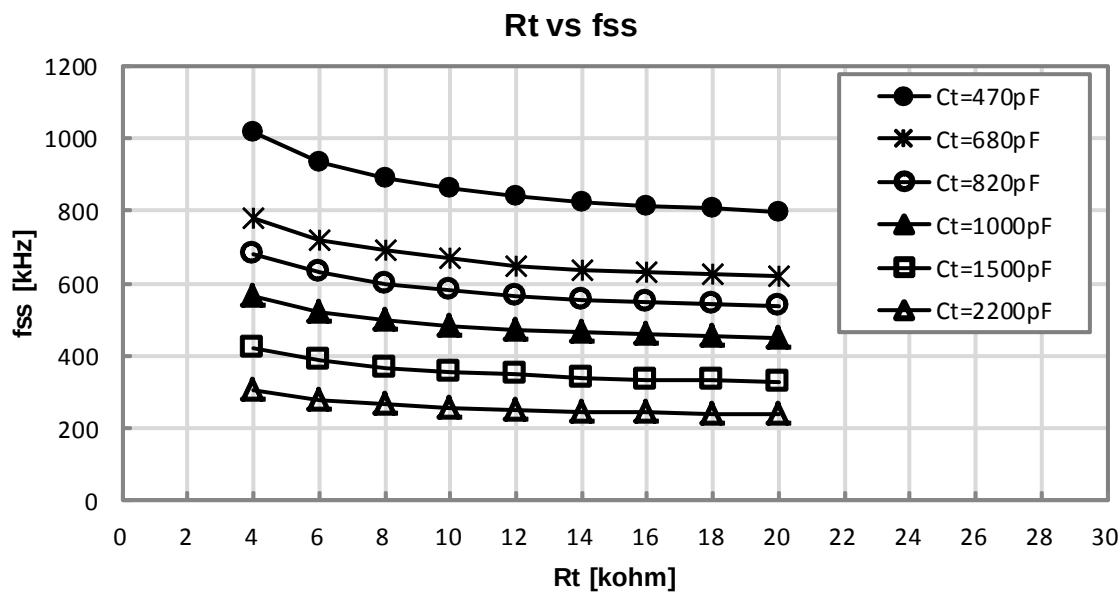
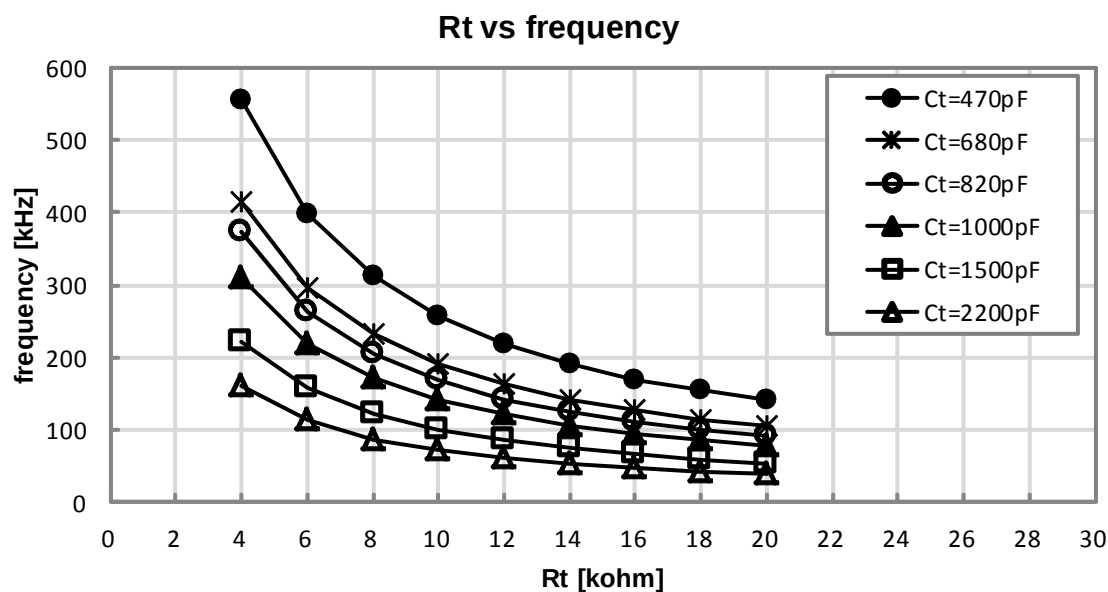
Characteristics Diagrams

特に指定なき場合は $T_j=25^{\circ}\text{C}$
 $T_j=25^{\circ}\text{C}$ unless otherwise specified



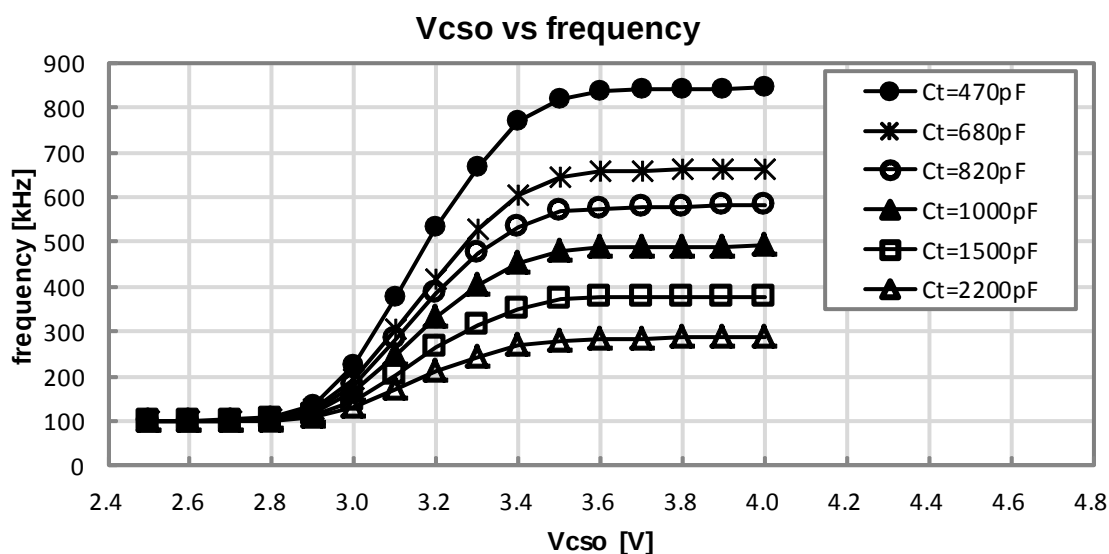
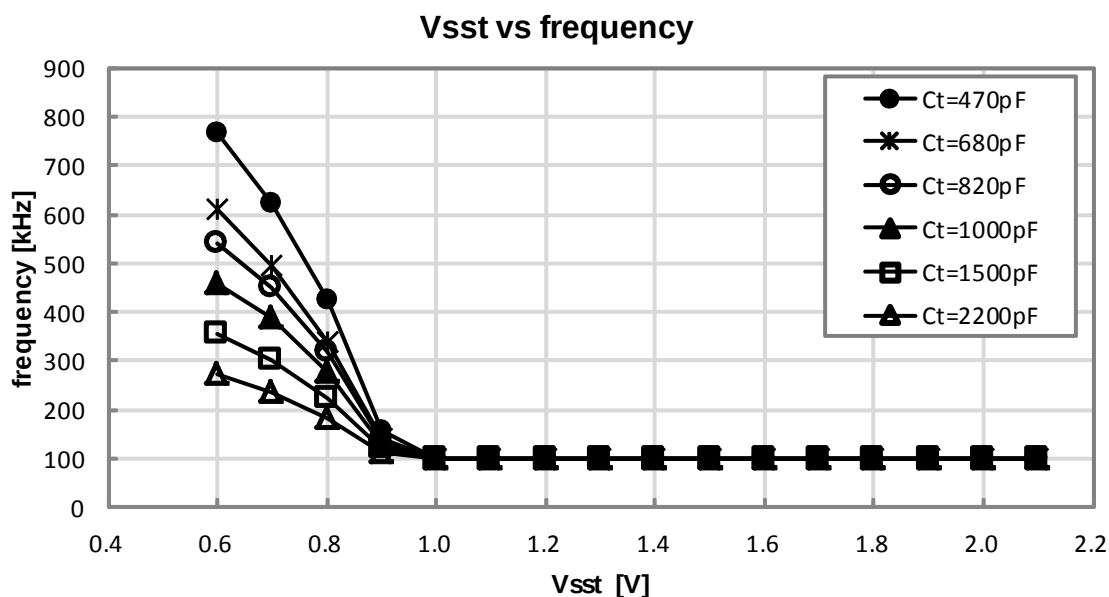
* Ct : FB端子に接続する外付けコンデンサ
 Ct is external capacitor connected to FB terminal .

特に指定なき場合はTj=25°C
Tj=25°C unless otherwise specified



* Ct : FB端子に接続する外付けコンデンサ
Ct is external capacitor connected to FB terminal .
Rt : FB端子に接続する外付け抵抗
Rt is external resistor connected to FB terminal .

特に指定なき場合はTj=25°C
Tj=25°C unless otherwise specified



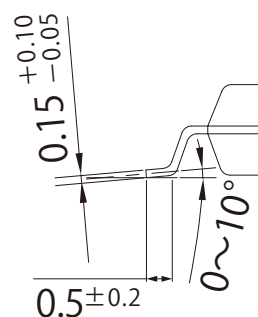
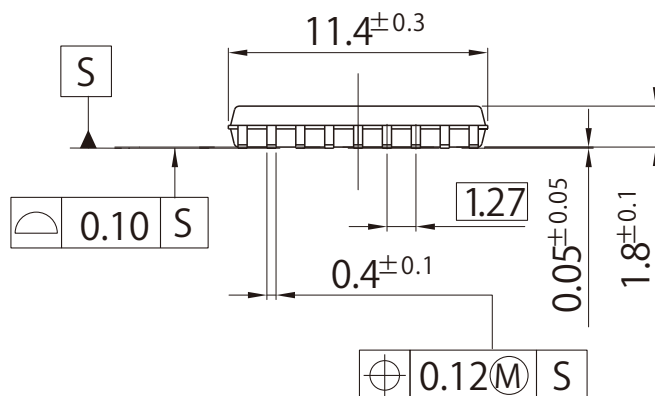
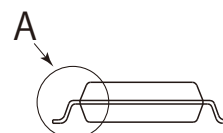
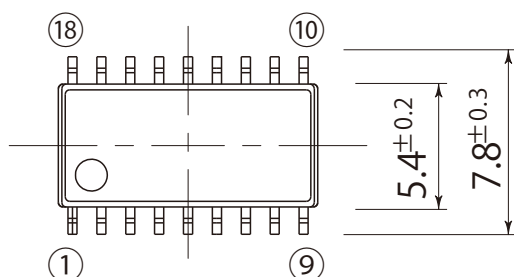
* Ct : FB端子に接続する外付けコンデンサ
Ct is external capacitor connected to FB terminal .

Package Outline-Dimensions

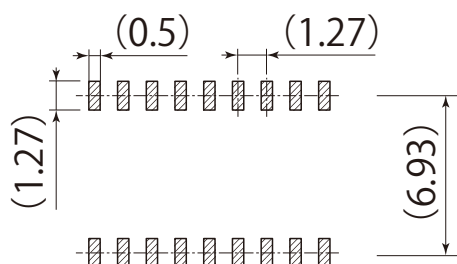
unit : mm
scale: 3/1

L6

JEDEC Code	—
JEITA Code	—
House Name	SOP18



Detail A



Referential Soldering Pad

- 量産時には、適正化を図って下さい
- Optimize soldering pad to the board design and soldering condition.

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