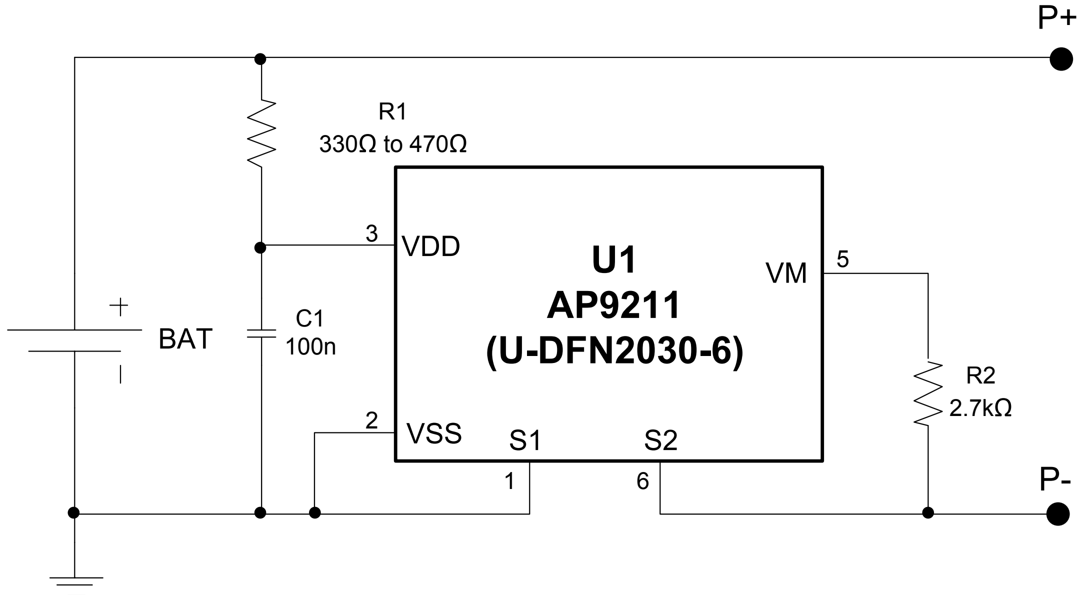
Typical Applications Circuit (Note 4)



Note: 4. R1 and C1 are used to stabilize the supply voltage of the AP9211. The recommended range of R1 value is 330Ω to 470Ω and C1 value is 10nF to 1000nF, typical value is 100nF. R2 should be connected between P- to V_M sense terminal to monitor the status of charger and the charge/discharge current. The R2 should be between 300Ω and 4kΩ, typical value is 2.7kΩ. R1 and R2 are also used as current limit resistors if the battery or charger is connected reversely. Polarity reversing may cause the power consumption of R1 and R2 to go over their power dissipation rating, therefore, R1 and R2 values should be selected appropriately for the actual application. If R2 is more than 4kΩ resistor, charge may not be off due to the voltage drop on R2.

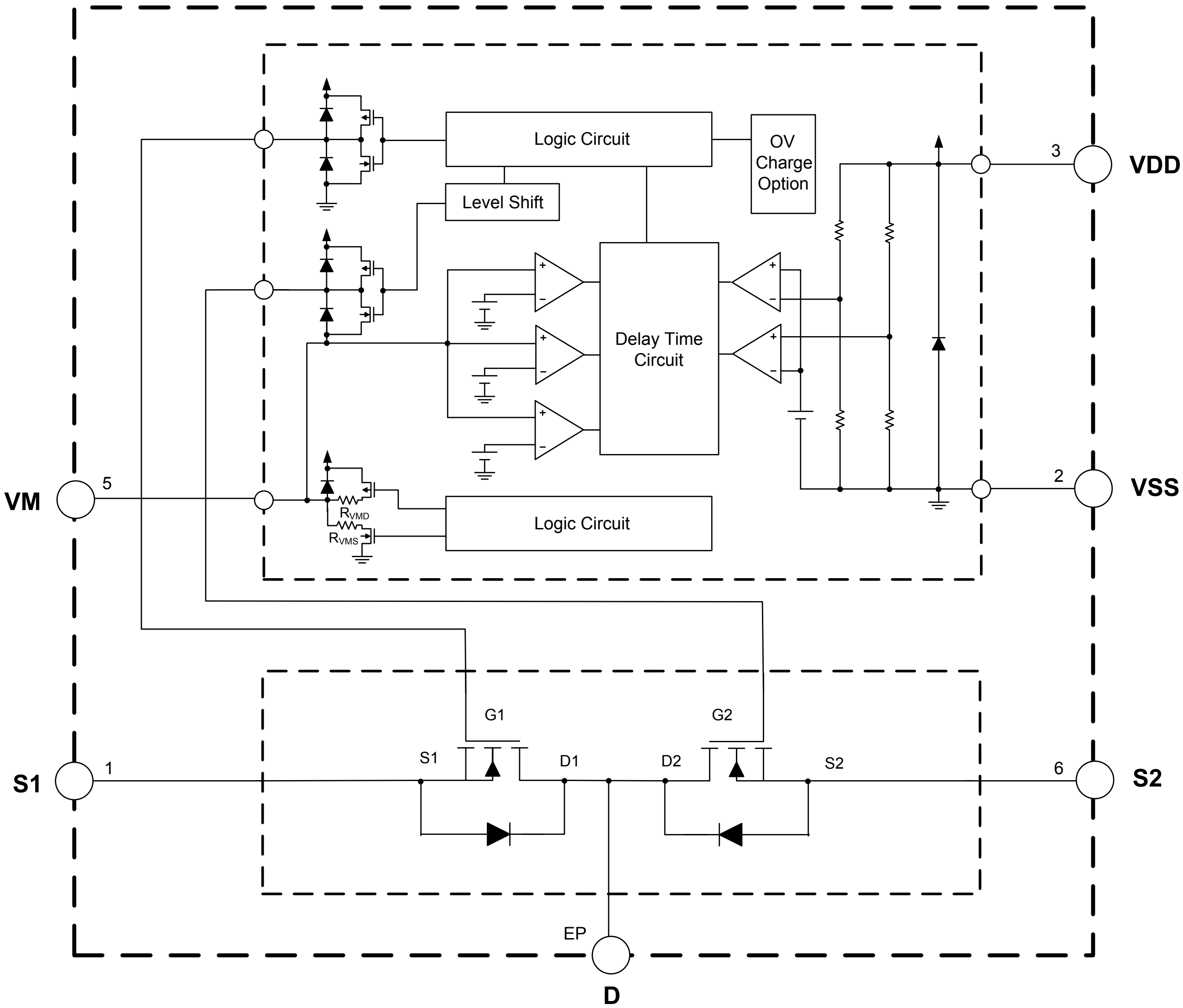
For power down mode, when first connecting AP9211 system board to the battery, it is necessary to use charger or to short P- to the battery negative polarity. Once the AP9211 is activated, the charger or connection can be removed, otherwise the battery cannot discharge current through system board.

The values selected should follow the recommended typical range mentioned above. It has not been confirmed whether the operation is normal or not in circuits other than the above example of connection. In addition, the example of connection shown above and the typical value do not exactly guarantee proper operation. Please perform the actual application to set the suitable value through your complete evaluation.

Pin Descriptions

Pin Number	Pin Name	Function
1	S1	Source pin of discharging MOSFET, connecting this pin to battery negative pole.
2	VSS	Negative power supply pin
3	VDD	Positive power supply pin, connecting this pin to battery positive pole through R1
4	NC	Not connected, leave this pin floating
5	VM	Charger negative input pin, short this pin to S2 pin through R2
6	S2	Source pin of charging MOSFET, connecting this pin to charge negative input.
EP	D	Thermal PAD is common drain of charge and discharge MOSFET, so in PCB layout, prefer to use large copper area to cover this pad for better thermal dissipation, then leave it open.

Functional Block Diagram



Absolute Maximum Ratings (Notes 4 & 5)

Symbol	Parameter	Rating	Unit
V_{DS}	Supply Voltage (Between VDD and VSS)	-0.3 to 12	V
V_{DM}	Charge Input Voltage (Between VDD and VM for Protection Chip)	-0.3 to 24	V
V_{DSS}	MOSFET Drain-to-Source Voltage	24	V
V_{GSS}	MOSFET Gate-to-Source Voltage	±12	V
I_D	Continuous Drain Current, V_{GS} = 4.5V, T_A = +25°C	9.0	A
	Continuous Drain Current, V_{GS} = 4.5V, T_A = +70°C	7.1	A
P_D	Power Dissipation	1000	mW
T_J	Maximum Junction Temperature	+150	°C
T_{STG}	Storage Temperature Range	-65 to +150	°C
—	ESD (Machine Model)	300	V
—	ESD (Human Body Model)	3000	V

Notes: 4. Stresses beyond those listed under *Absolute Maximum Ratings* can cause permanent damage to the device. These are stress ratings only and functional operation of the device at these conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
5. Ratings apply to ambient temperature at +25°C. The JEDEC High-K board design used to derive this data was a 2 inch x 2 inch multilayer board with 2oz internal power and ground planes and 2oz copper traces on the top and bottom of the board.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{DS}	Supply Voltage (Between VDD and VSS)	1.5	5.5	V
V_{DM}	Charge Input Voltage (Between VDD and VM)	-0.3	5.5	V
T_A	Operating Ambient Temperature	-40	+85	°C

Electrical Characteristics (T_A = +25°C, V_{DD} = 3.5V, V_{SS} = 0V, R1 = 220Ω, R2 = 1.0kΩ, C1 = 100nF, unless otherwise specified.)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_{CU}	Overcharge Detection Voltage	—	V_{CU} - 0.025	V_{CU}	V_{CU} + 0.025	V
V_{CL}	Overcharge Release Voltage	$V_{CL} \neq V_{CU}$	V_{CL} - 0.050	V_{CL}	V_{CL} + 0.050	V
		$V_{CL} = V_{CU}$	V_{CL} - 0.025	V_{CL}	V_{CL} + 0.025	V
V_{DL}	Overdischarge Detection Voltage	—	V_{DL} - 0.035	V_{DL}	V_{DL} + 0.035	V
V_{DU}	Overdischarge Release Voltage	$V_{DU} \neq V_{DL}$	V_{DU} - 0.100	V_{DU}	V_{DU} + 0.100	V
		$V_{DU} = V_{DL}$	V_{DU} - 0.035	V_{DU}	V_{DU} + 0.035	V
V_{DOC}	Discharge Overcurrent Detection Voltage	—	V_{DOC} -0.015	V_{DOC}	V_{DOC} +0.015	V
V_{SHORT}	Load Short-Circuiting Detection Voltage	—	V_{SHORT} -0.10	V_{SHORT}	V_{SHORT} +0.10	V
V_{COC}	Charge Overcurrent Detection Voltage	—	V_{COC} -0.015	V_{COC}	V_{COC} +0.015	V
I_{CC} (Power Down Function)						
I_{CC}	Current Consumption During Operation	V_{DD} = 3.5V, V_M = 0V	—	3.0	4.5	μA
I_{PDN}	Current Consumption During Power Down Mode	V_{DD} = 1.8V, VM Pin Floating	—	—	0.1	μA
I_{CC} (Auto-Wake Up Function)						
I_{CC}	Current Consumption During Operation	V_{DD} = 3.5V, V_M = 0V	—	3	4.5	μA
I_{AUTO}	Current Consumption During Auto-Wake Mode	V_{DD} = 1.8V, VM Pin Floating	—	3.5	5.5	μA
R_{VMD}	Resistance Between VM Pin and VDD Pin	V_{DD}=1.8V V_M=0V	150	300	500	kΩ
R_{VMS}	Resistance Between VM Pin and VDD Pin	V_{DD}=3.5V V_M=1.0V	10	30	50	kΩ
V_{0CHA}	0V Battery Charge Starting Charge Voltage	0V battery charging "available"	1.2	—	—	V
V_{0INH}	0V Battery Charge Inhibition Battery Voltage	0V battery charging "unavailable"	—	—	0.45	V
V_{OVCHG}	Overvoltage Charge Detection Voltage	V_{DD}=3.5V	6.0	8.0	10.0	V
V_{OVCHGR}	Overvoltage Charge Release Voltage	V_{DD}=3.5V	5.3	7.3	9.3	V
t_{CU}	Overcharge Detection Delay Time	—	t_{CU} * 0.8	t_{CU}	t_{CU} * 1.2	ms
t_{CUR}	Overcharge Release Delay Time	—	t_{CUR} * 0.8	t_{CUR}	t_{CUR} * 1.2	ms
t_{DL}	Overdischarge Detection Delay Time	—	t_{DL} * 0.8	t_{DL}	t_{DL} * 1.2	ms
t_{DLR}	Overdischarge Release Delay Time	—	t_{DLR} * 0.8	t_{DLR}	t_{DLR} * 1.2	ms
t_{DOC}	Discharge Overcurrent Detection Delay Time	—	t_{DOC} * 0.8	t_{DOC}	t_{DOC} * 1.2	ms
t_{DOCR}	Discharge Overcurrent Release Delay Time	—	t_{DOCR} * 0.8	t_{DOCR}	t_{DOCR} * 1.2	ms
t_{SHORT}	Load Short Detection Delay Time	—	t_{SHORT} * 0.8	t_{SHORT}	t_{SHORT} * 1.2	μs
t_{COC}	Charge Overcurrent Detection Delay Time	—	t_{COC} * 0.8	t_{COC}	t_{COC} * 1.2	ms
t_{COCR}	Charge Overcurrent Release Delay Time	—	t_{COCR} * 0.8	t_{COCR}	t_{COCR} * 1.2	ms

Electrical Characteristics (Cont.)

(T_A = -40°C to +85°C, V_{DD} = 3.5V, V_{SS} = 0V, R1 = 220Ω, R2 = 1.0kΩ, C1 = 100nF, unless otherwise specified.)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_{CU}	Overcharge Detection Voltage	—	V_{CU} - 0.060	V_{CU}	V_{CU} + 0.040	V
V_{CL}	Overcharge Release Voltage	$V_{CL} \neq V_{CU}$	V_{CL} - 0.080	V_{CL}	V_{CL} + 0.065	V
		$V_{CL} = V_{CU}$	V_{CL} - 0.060	V_{CL}	V_{CL} + 0.040	V
V_{DL}	Overdischarge Detection Voltage	—	V_{DL} - 0.080	V_{DL}	V_{DL} + 0.080	V
V_{DU}	Overdischarge Release Voltage	$V_{DU} \neq V_{DL}$	V_{DU} - 0.150	V_{DU}	V_{DU} + 0.190	V
		$V_{DU} = V_{DL}$	V_{DU} - 0.080	V_{DU}	V_{DU} + 0.080	V
V_{DOC}	Discharge Overcurrent Detection Voltage	—	V_{DOC} -0.021	V_{DOC}	V_{DOC} +0.024	V
V_{SHORT}	Load Short-Circuiting Detection Voltage	—	V_{SHORT} -0.34	V_{SHORT}	V_{SHORT} +0.34	V
V_{COC}	Charge Overcurrent Detection Voltage	—	V_{COC} -0.040	V_{COC}	V_{COC} +0.040	V
I_{CC} (Power Down Function)						
I_{CC}	Current Consumption During Operation	V_{DD} = 3.5V, V_M = 0V	—	3.0	7.0	μA
I_{PDN}	Current Consumption During Power Down Mode	V_{DD} = 1.8V, VM Pin Floating	—	—	1.0	μA
I_{CC} (Auto-Wake Up Function)						
I_{CC}	Current Consumption During Operation	V_{DD} = 3.5V, V_M = 0V	—	3	4.5	μA
I_{AUTO}	Current Consumption During Auto-Wake Mode	V_{DD} = 1.8V, VM Pin Floating	—	6	8	μA
R_{VMD}	Resistance between VM Pin and VDD Pin	V_{DD}=1.8V V_M=0V	100	300	650	kΩ
R_{VMS}	Resistance between VM Pin and VDD Pin	V_{DD}=3.5V V_M=1.0V	5	30	65	kΩ
V_{0CHA}	0V Battery Charge Starting Charge Voltage	0V battery charging "available"	1.2	—	—	V
V_{0INH}	0V Battery Charge Inhibition Battery Voltage	0V battery charging "unavailable"	—	—	0.3	V
V_{OVCHG}	Overvoltage Charge Detection Voltage	V_{DD}=3.5V	5.5	8.0	10.5	V
V_{OVCHGR}	Overvoltage Charge Release Voltage	V_{DD}=3.5V	5.0	7.3	9.5	V
t_{CU}	Overcharge Detection Delay Time	—	t_{CU} * 0.6	t_{CU}	t_{CU} * 1.4	ms
t_{CUR}	Overcharge Release Delay Time	—	t_{CUR} * 0.6	t_{CUR}	t_{CUR} * 1.4	ms
t_{DL}	Overdischarge Detection Delay Time	—	t_{DL} * 0.6	t_{DL}	t_{DL} * 1.4	ms
t_{DLR}	Overdischarge Release Delay Time	—	t_{DLR} * 0.6	t_{DLR}	t_{DLR} * 1.4	ms
t_{DOC}	Discharge Overcurrent Detection Delay Time	—	t_{DOC} * 0.6	t_{DOC}	t_{DOC} * 1.4	ms
t_{DOCR}	Discharge Overcurrent Release Delay Time	—	t_{DOCR} * 0.6	t_{DOCR}	t_{DOCR} * 1.4	ms
t_{SHORT}	Load Short Detection Delay Time	—	t_{SHORT} * 0.6	t_{SHORT}	t_{SHORT} * 1.4	μs
t_{COC}	Charge Overcurrent Detection Delay Time	—	t_{COC} * 0.6	t_{COC}	t_{COC} * 1.4	ms
t_{COCR}	Charge Overcurrent Release Delay Time	—	t_{COCR} * 0.6	t_{COCR}	t_{COCR} * 1.4	ms

Electrical Characteristics (Cont.) (Notes 7 & 8)

(T_A = +25°C, V_{DD} = 3.5V, V_{SS} = 0V, R1 = 220Ω, R2 = 1.0kΩ, C1 = 100nF, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 20V, V_{GS}=0	—	—	1.0	µA
$R_{SS(ON)1}$	Static Source-Source On-Resistance 1	V_{DD} = 4.0V I_D = 1.0A	20	27	30	mΩ
$R_{SS(ON)2}$	Static Source-Source On-Resistance 2	V_{DD} = 3.9V I_D = 1.0A	21	27	31	mΩ
$R_{SS(ON)3}$	Static Source-Source On-Resistance 3	V_{DD} = 3.0V I_D = 1.0A	21	28	33	mΩ
V_{SD}	Diode Forward Voltage	V_{GS} = 0V (Note 6) I_S = 1A	—	0.75	1.0	V

Notes: 6. In case of Gate-Source voltage of charging MOSFET is 0V. In case of Gate-Source voltage of discharging MOSFET is 0V.
7. These specifications are guaranteed by design - will not be tested in production.

Application Information

Operation Mode

1. Normal Status

The AP9211 monitors the battery voltage between the VDD pin and VSS pin as well as the voltage difference between the VM pin and VSS pin to control battery charging and discharging. When the battery voltage is between overdischarge detection voltage (V_{DL}) and overcharge detection voltage (V_{CU}) as well as when the VM pin voltage is between the charge overcurrent detection voltage (V_{COC}) and discharge overcurrent detection voltage (V_{DOC}), the AP9211 turns on discharging and charging MOSFET. In these conditions, the battery can charge and discharge freely. Also, R_{VMD} does not connect to VDD pin, and R_{VMS} does not connect to VSS pin in this status.

2. Overcharge Status

If the battery voltage is more than V_{CU} during charging status for the overcharge detection delay time (t_{CU}) or longer, the AP9211 turns off the charging MOSFET to stop charging. R_{VMD} and R_{VMS} are not connected in overcharge status.

When VM pin voltage is lower than V_{DOC} and battery voltage falls below V_{CL}, the AP9211 releases from overcharge status. When VM pin voltage is equal or more than V_{DOC} and battery voltage falls below V_{CU}, the AP9211 releases from overcharge status.

3. Overdischarge Status

If the battery voltage is less than V_{DL} during discharging status for the overdischarge detection delay time (t_{DL}) or longer, the AP9211 turns off the discharging MOSFET to stop discharging. In overdischarge status, R_{VMD} is connected to V_{DD} and VM pin voltage is pulled up to V_{DD} by $R_{VMD,}$ but R_{VMS} is not connected. For power-down mode version, the AP9211 recovers normal status from overdischarge status only by charging the battery through the charger.

When VM pin voltage to VSS pin voltage is less than typical -0.7V, and the battery voltage rises over V_{DL}, the AP9211 releases from overdischarge status. If V_M pin voltage to V_{SS} pin voltage is higher than typical -0.7V, the AP9211 releases from overdischarge status until the battery voltage rises over V_{DU}.

For auto-wakeup version AP9211SA, the device recovers to normal status from overdischarge status if either of these two conditions are satisfied:

If charger is connected:	The AP9211SA overdischarge status is released in the same way as described above in AP9211S Overdischarge Status section.
If no charger is connected:	1) The battery voltage reaches the overdischarge release voltage (V_{DU}) or higher.
	2) Maintains continuous time more than overdischarge release delay time t_{DLR}.

4. Discharge Overcurrent and Short-Current Status

When battery is in discharge overcurrent status, if the voltage of the VM pin to VSS pin is equal or more than V_{DOC} to V_{SHORT} and detection lasts for the discharge overcurrent detection delay time (t_{DOC}) or longer, the AP9211 turns off the discharging MOSFET to stop discharging.

When the battery is in short-current status, if the voltage of the VM pin to VSS pin is equal to or more than $V_{SHORT,}$ and the detection lasts for the short current detection delay time or longer, the AP9211 turns off the discharge MOSFET to stop discharging.

In discharge overcurrent or short-current status, R_{VMS} is connected to $V_{SS,}$ but R_{VMD} is not connected. The voltage of VM pin is almost equal to V_{DD} as long as the load is connected. When the load is disconnected, the voltage of VM pin becomes almost equal to V_{SS} (due to R_{VMS} being connected) and then the AP9211 releases from discharge overcurrent or short current status.

5. Charge Overcurrent Status

When the battery is in charge current status, if the voltage of the VM pin to VSS pin is equal to or less than V_{COC}, and the detection continues for the charge overcurrent detection delay time (t_{COC}) or longer, the AP9211 turns off the charging MOSFET to stop charging.

Application Information (Cont.)

6. 0V Battery Charging Function (Option)

This function is available as an option and can be factory set internally. AP9211 has this function built in. 0V charging function permits charger to recharge the battery whose voltage is 0V due to self-discharge. If 0V charging function is not present, the device prevents the charger to recharge the battery whose voltage is 0V due to self-discharge. If a device without 0V charging function is required, contact Diodes sales team.

7. Overvoltage Charger Detection Circuit

This function is used to monitor the charger voltage between the VDD pin and VM pin, and when this voltage exceeds overvoltage charger detection voltage (8.0V Typ.), the AP9211 turns off charging MOSFET. When this voltage drops below overvoltage charger release voltage (7.3V Typ.), it then turns on charging MOSFET. There are no delay times set for detection and release.

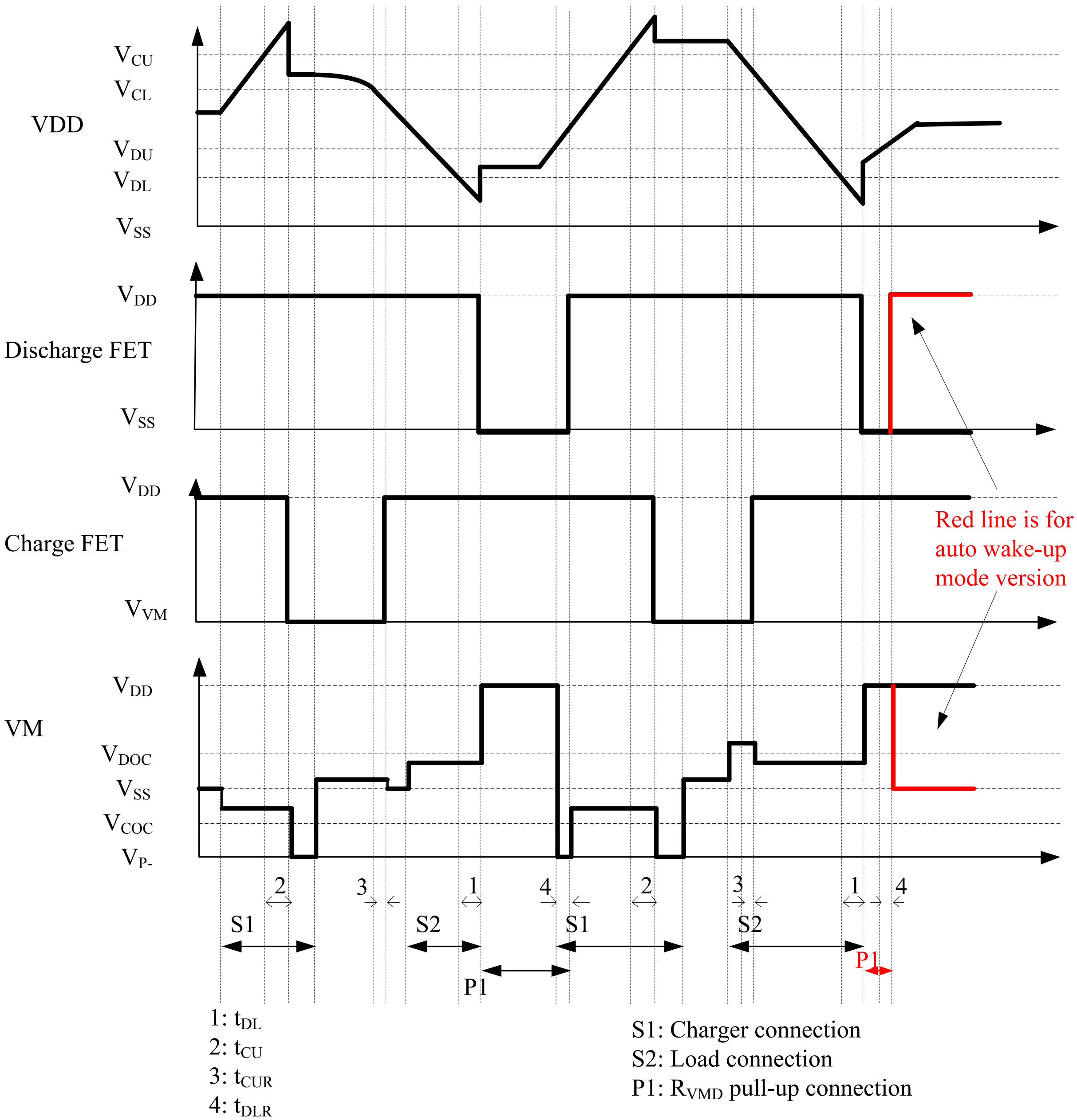
8. Power-Down Mode or Auto-Wakeup Function Option

In a device with power-down function, during power-down mode, the device enters the overdischarge status. The IC enters sleep mode and the current consumption becomes very low, typically 0.1µA. To release from power-down status to the normal status, charger connection is required.

In device with auto-wakeup mode, the IC remains active in the overdischarge state. The IC is released into the normal state by the operation that increases the battery voltage more than overdischarge release voltage.

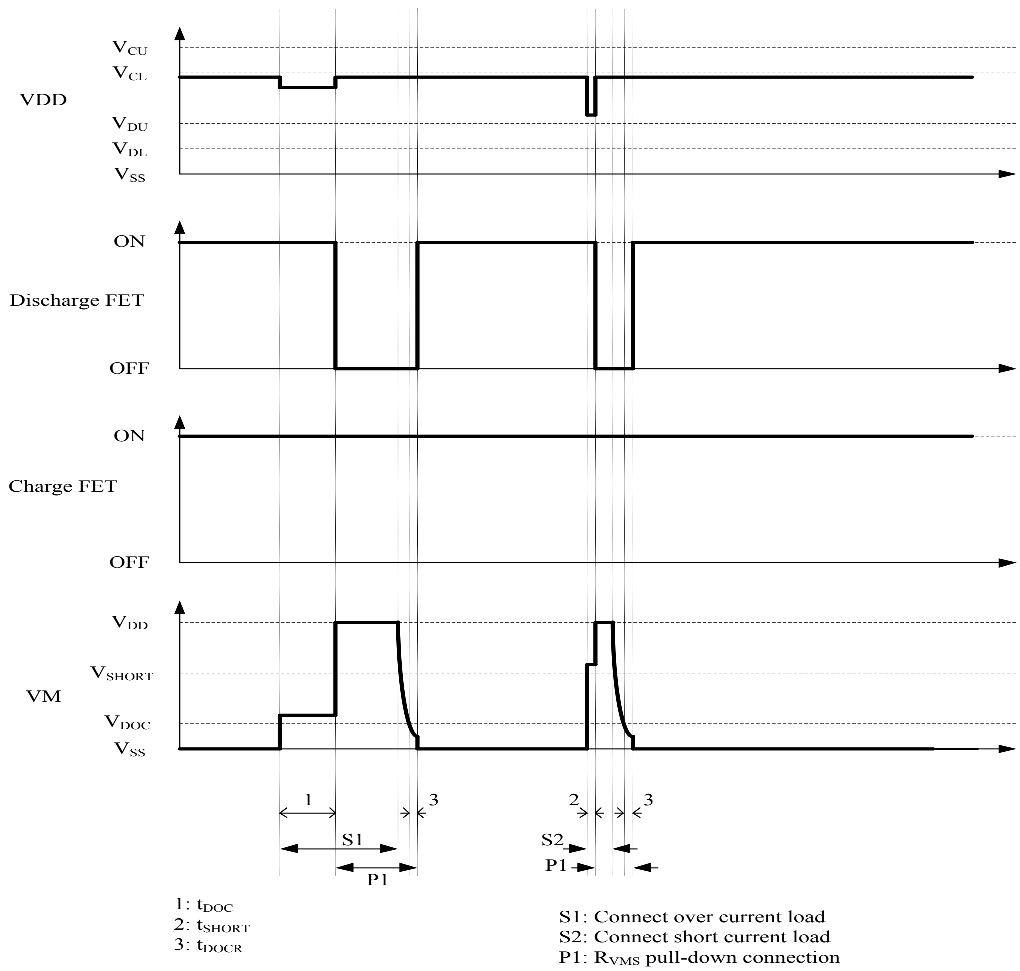
Application Information (Timing Chart)

1. Overcharge and Overdischarge Detection



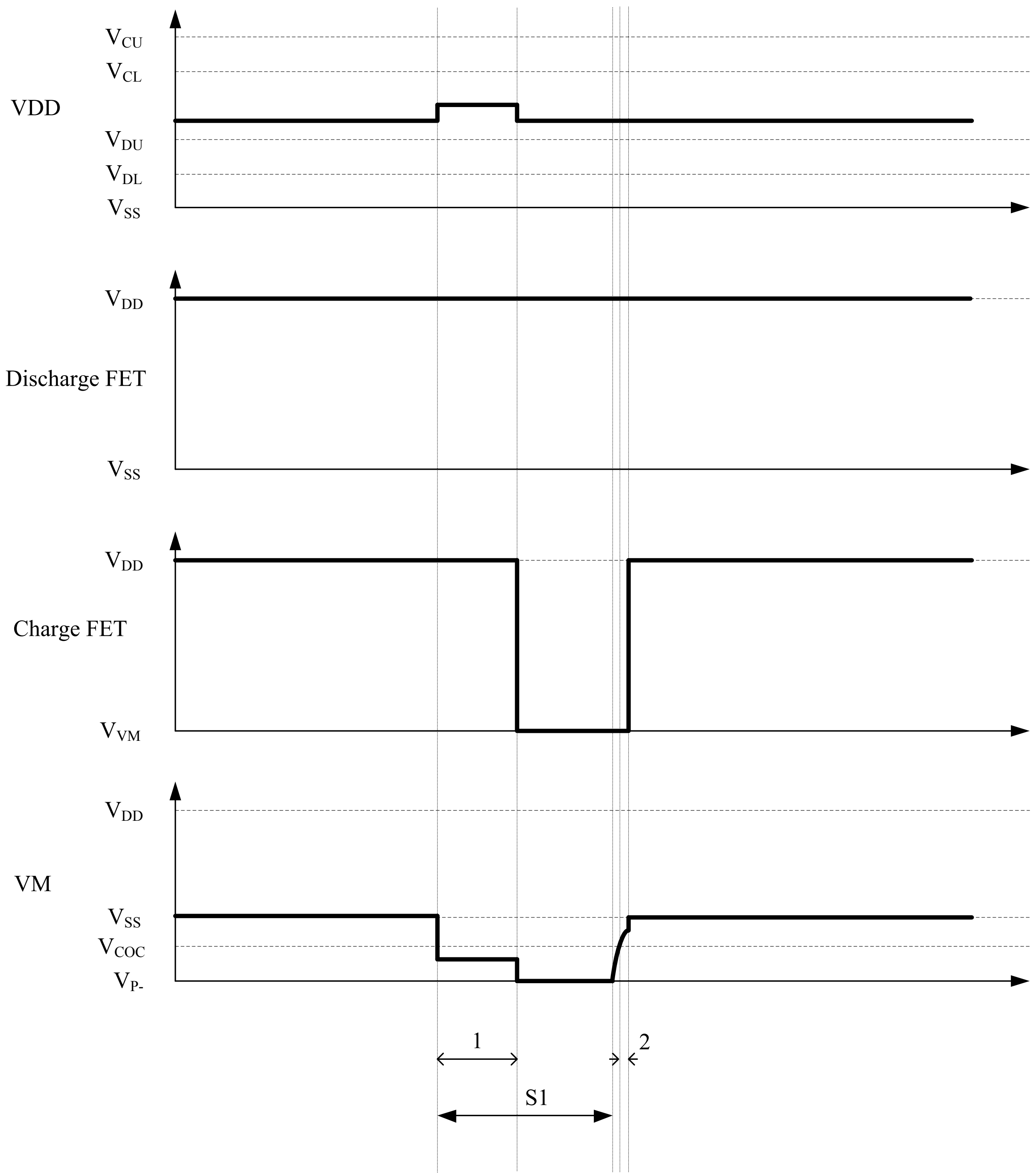
Application Information (Timing Chart) (Cont.)

2. Discharge Overcurrent Detection



Application Information (Timing Chart) (Cont.)

3. Charge Overcurrent Detection



1: t_{COC}
2: t_{COCR}

S1: Connect over current charger

Ordering Information

AP9211X X - X - X - X

$R_{SS(ON)}$	Power Down Mode	Product Code	Package	Packing
S: Standard	Blank: Yes A: No (Auto-wake-up)	Voltage & Delay Time Combination Code	HAC: U-DFN2030-6 (Type C)	7: Tape & Reel

Part Number	Package Code	Packaging	7" Tape and Reel Quantity
AP9211XX-XX-HAC-7	HAC	U-DFN2030-6 (Type C)	3000/Tape & Reel

Ordering Information (Note 9) (Cont.)

Voltage Combination

Part Number	Overcharge Detection Voltage V_{CU}	Overcharge Release Voltage V_{CL}	Over-discharge Detection Voltage V_{DL}	Over-discharge Release Voltage V_{DU}	Discharge Overcurrent Detection Voltage V_{DOC}	Load Short Detection Voltage V_{SHORT}	Charge Overurrent Detection Voltage V_{COC}	Over Voltage Charger Detection Voltage V_{OVCHG}	Over Voltage Charger Release Voltage V_{OVCHGR}	Power-down Function	Overcharge Protection Mode	0V Battery Charge Function
AP9211XX-AA-HAC-7	4.375V	4.175V	2.500V	2.900V	0.150V	0.700V	-0.150V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AB-HAC-7	4.425V	4.225V	2.500V	2.900V	0.150V	0.700V	-0.150V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AC-HAC-7	4.375V	4.175V	2.500V	2.900V	0.095V	0.700V	-0.095V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AD-HAC-7	4.375V	4.175V	2.500V	2.900V	0.120V	0.700V	-0.120V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AE-HAC-7	4.200V	4.100V	2.500V	3.000V	0.300V	0.550V	-0.100V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AF-HAC-7	4.375V	4.175V	2.500V	2.900V	0.180V	0.700V	-0.180V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AG-HAC-7	4.375V	4.175V	2.500V	2.900V	0.075V	0.700V	-0.075V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AH-HAC-7	4.425V	4.225V	2.500V	2.900V	0.075V	0.700V	-0.075V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AI-HAC-7	4.500V	4.300V	2.400V	2.800V	0.150V	0.700V	-0.075V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AJ-HAC-7	4.375V	4.175 V	2.400V	2.800V	0.125V	0.700V	- 0.125V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AK-HAC-7	4.250V	4.050 V	2.400V	3.000V	0.150V	0.700V	- 0.150V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AL-HAC-7	4.275V	4.175V	2.300V	2.400V	0.180V	0.700V	-0.180V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AM-HAC-7	4.375V	4.175V	2.300V	2.400V	0.180V	0.700V	-0.180V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-AN-HAC-7	4.225V	4.025V	3.200V	3.400V	0.060V	0.450V	-0.060V	8.0V	7.3V	Selectable	Auto Release	Permission
AP9211XX-DD-HAC-7	4.375V	4.175V	2.500V	2.900V	0.120V	0.700V	-0.120V	8.0V	7.3V	Selectable	Auto Release	Prohibition
AP9211XX-DH-HAC-7	4.425V	4.225V	2.500V	2.900V	0.075V	0.700V	-0.075V	8.0V	7.3V	Selectable	Auto Release	Prohibition
AP9211XX-DL-HAC-7	4.275V	4.175V	2.300V	2.400V	0.180V	0.700V	-0.180V	8.0V	7.3V	Selectable	Auto Release	Prohibition
AP9211XX-CR-HAC-7	4.425V	4.225V	2.800V	3.000V	0.130V	0.500V	0.130V	8.0V	7.3V	Selectable	Auto Release	Prohibition
AP9211XX-EA-HAC-7	4.475V	4.275V	2.500V	2.900V	0.150V	0.500V	-0.150V	8.0V	7.3V	Selectable	Auto Release	Permission

Note: 9. If any other voltage combinations are needed, please contact the local sales office.

Ordering Information (Cont.)

AP9211 Delay Time Combination

Part Number	Overcharge Detection Delay Time t_{CU}	Overcharge Release Delay Time t_{CUR}	Overdischarge Detection Delay Time t_{DL}	Overdischarge Release Delay Time t_{DLR}	Discharge Overcurrent Detection Delay Time t_{DOC}	Discharge Overcurrent Release Delay Time t_{DOCR}	Charge Overcurrent Detection Delay Time t_{COC}	Charge Overcurrent Release Delay Time t_{COCR}	Load Short Detection Delay Time t_{SHORT}
AP9211XX-XX-HAC-7	1.0s	2.0ms	115ms	2.0ms	10.0ms	2.0ms	10.0ms	2.0ms	360µs

Marking Information

(Top View)

• XX
Y W X

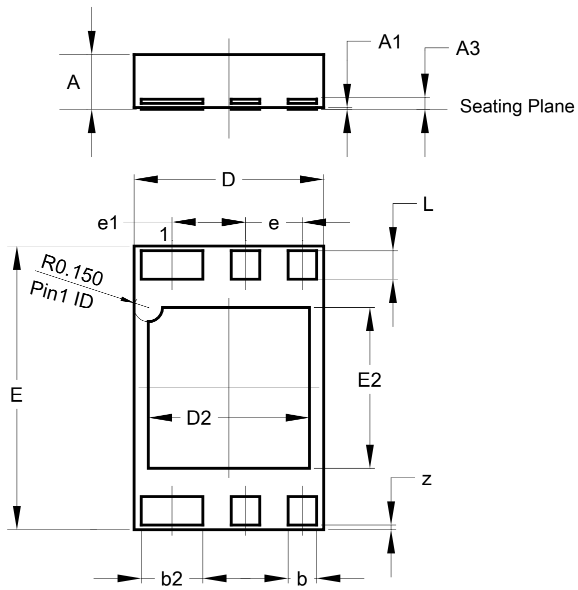
XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Internal Code

Part Number	Package	Identification Code
AP9211S-AA-HAC-7	U-DFN2030-6 (Type C)	P5
AP9211S-AB-HAC-7	U-DFN2030-6 (Type C)	P6
AP9211S-AC-HAC-7	U-DFN2030-6 (Type C)	6B
AP9211S-AD-HAC-7	U-DFN2030-6 (Type C)	6C
AP9211S-AE-HAC-7	U-DFN2030-6 (Type C)	6D
AP9211S-AF-HAC-7	U-DFN2030-6 (Type C)	6E
AP9211S-AG-HAC-7	U-DFN2030-6 (Type C)	6F
AP9211S-AH-HAC-7	U-DFN2030-6 (Type C)	6G
AP9211S-AI-HAC-7	U-DFN2030-6 (Type C)	6H
AP9211S-AJ-HAC-7	U-DFN2030-6 (Type C)	6Y
AP9211S-AK-HAC-7	U-DFN2030-6 (Type C)	6Z
AP9211S-AL-HAC-7	U-DFN2030-6 (Type C)	5T
AP9211S-AM-HAC-7	U-DFN2030-6 (Type C)	5U
AP9211S-AN-HAC-7	U-DFN2030-6 (Type C)	5V
AP9211S-CR-HAC-7	U-DFN2030-6 (Type C)	5W
AP9211S-DD-HAC-7	U-DFN2030-6 (Type C)	5Z
AP9211S-DH-HAC-7	U-DFN2030-6 (Type C)	8A
AP9211S-DL-HAC-7	U-DFN2030-6 (Type C)	8B
AP9211SA-AA-HAC-7	U-DFN2030-6 (Type C)	M3
AP9211SA-AB-HAC-7	U-DFN2030-6 (Type C)	M4
AP9211SA-AC-HAC-7	U-DFN2030-6 (Type C)	M6
AP9211SA-AD-HAC-7	U-DFN2030-6 (Type C)	M7
AP9211SA-AE-HAC-7	U-DFN2030-6 (Type C)	M8
AP9211SA-AF-HAC-7	U-DFN2030-6 (Type C)	N3
AP9211SA-AG-HAC-7	U-DFN2030-6 (Type C)	N4
AP9211SA-AH-HAC-7	U-DFN2030-6 (Type C)	N6
AP9211SA-AI-HAC-7	U-DFN2030-6 (Type C)	N7
AP9211SA-AJ-HAC-7	U-DFN2030-6 (Type C)	N8
AP9211SA-AK-HAC-7	U-DFN2030-6 (Type C)	NE
AP9211SA-AL-HAC-7	U-DFN2030-6 (Type C)	7X
AP9211SA-AM-HAC-7	U-DFN2030-6 (Type C)	P7
AP9211SA-AN-HAC-7	U-DFN2030-6 (Type C)	P8
AP9211SA-CR-HAC-7	U-DFN2030-6 (Type C)	7Y
AP9211SA-DD-HAC-7	U-DFN2030-6 (Type C)	7Z
AP9211SA-DL-HAC-7	U-DFN2030-6 (Type C)	7V

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

U-DFN2030-6 (Type C)

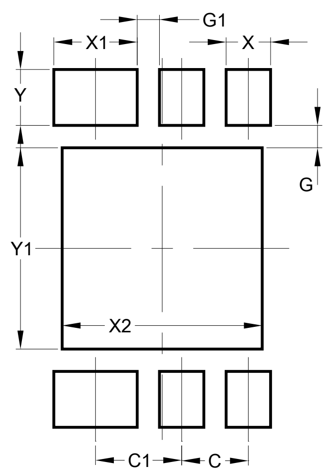


U-DFN2030-6 (Type C)			
Dim	**Min**	**Max**	**Typ**
A	0.50	0.60	--
A1	0.00	0.05	0.02
A3	--	--	0.127
b	0.25	0.35	0.30
b2	0.60	0.70	0.65
D	1.90	2.10	2.00
D2	1.60	1.80	1.70
E	2.90	3.10	3.00
E2	1.60	1.80	1.70
e	--	--	0.60
e1	--	--	0.775
L	0.25	0.35	0.30
z	0.0500 Ref		
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

U-DFN2030-6 (Type C)



Dimensions	Value (in mm)
C	0.600
C1	0.775
G	0.200
G1	0.200
X	0.400
X1	0.750
X2	1.800
Y	0.500
Y1	1.800