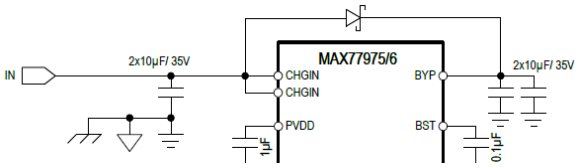
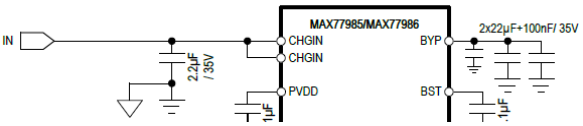
Migration Guide from MAX77975/MAX77976 to MAX77985/MAX77986

General Description

The MAX77985/MAX77986 is a high-performance high-input 3.5/5.5A fast charger with a Smart Power Selector™.

The MAX77985/MAX77986 is the next generation of the MAX77975/MAX77976. Hence, we encourage customers to migrate the solution from MAX77975 to MAX77985 and from MAX77976 to MAX77986.

Change List

<table>
<tr><th>No.</th><th>MAX77975/MAX77976</th><th>MAX77985/MAX77986</th></tr>
<tr><td>1.</td><td>MAX77975/MAX77976 needs an external protection to support a 15V hot plug.
 
</td><td>MAX77985/MAX77986 supports a 15V hot plug without an external protection.
 
</td></tr>
<tr><td>2.</td><td>The B2SOVRC feature is not available.
CHG_CNFG_05 (0x1B)
Charger configuration 5
<table>
<tr><th>BIT</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td>Field</td><td>Reserved</td><td>Reserved</td><td>Reserved</td><td>RECYCLE_EN</td><td colspan="4">Reserved[3:0]</td></tr>
<tr><td>Reset</td><td>0b0</td><td>0b0</td><td>0b0</td><td>0b0</td><td colspan="4">0x6</td></tr>
<tr><td>Access Type</td><td>Write, Read</td><td>Write, Read</td><td>Write, Read</td><td>Write, Read</td><td colspan="4">Write, Read</td></tr>
</table>
<table>
<tr><th>BITFIELD</th><th>BITS</th><th>DESCRIPTION</th><th>DECODE</th></tr>
<tr><td>Reserved</td><td>7</td><td>Reserved</td><td>Reserved</td></tr>
<tr><td>Reserved</td><td>6</td><td>Reserved</td><td>Reserved</td></tr>
<tr><td>Reserved</td><td>5</td><td>Reserved</td><td>Reserved</td></tr>
<tr><td>RECYCLE_EN</td><td>4</td><td>DISIBS Event Recycle Option</td><td>0b0: In case of DISIBS events, buck is disabled (OFF) and Q_{BATT} FET is opened. System recycles after 150ms (min) only in case a valid charger is present.
0b1: In case of DISIBS events, buck is disabled (OFF) and Q_{BATT} FET is opened. System recycles after 150ms (min).</td></tr>
<tr><td>Reserved</td><td>3:0</td><td>Reserved</td><td>0x0: Recommended
0x6: Default (Not recommended)</td></tr>
</table></td><td>The B2SOVRC feature is available.
CHG_CNFG_05 (0x1B)
Charger configuration 5
<table>
<tr><th>BIT</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td>Field</td><td>B2SOVRC_DTC</td><td>B2SOVRC_ALARM_ONLY</td><td>B2SOVRC_CTRL</td><td>RECYCLE_EN</td><td colspan="4">B2SOVRC[3:0]</td></tr>
<tr><td>Reset</td><td>0b0</td><td>0b0</td><td>0b0</td><td>0b0</td><td colspan="4">0x8</td></tr>
<tr><td>Access Type</td><td>Write, Read</td><td>Write, Read</td><td>Write, Read</td><td>Write, Read</td><td colspan="4">Write, Read</td></tr>
</table>
<table>
<tr><th>BITFIELD</th><th>BITS</th><th>DESCRIPTION</th><th>DECODE</th></tr>
<tr><td>B2SOVRC_DTC</td><td>7</td><td>BATT to SYS Overcurrent Debounce to Q_{BATT} Clear Control</td><td>0x0: 105µs
0x1: 10ms</td></tr>
<tr><td>B2SOVRC_ALARM_ONLY</td><td>6</td><td>B2SOVRC Alarm Only Control</td><td>0x0: Alarm only is disabled: when tripping B2SOVRC, I/T is triggered and Q_{BATT} opens after T_{OCP}.
0x1: Alarm only is enabled: when tripping B2SOVRC, I/T is triggered but Q_{BATT} remains closed even after T_{OCP}.</td></tr>
<tr><td>B2SOVRC_CTRL</td><td>5</td><td>Battery Mode B2SOVRC Monitoring Control</td><td>0x0: Automatic mode
0x1: Continuous mode</td></tr>
<tr><td>RECYCLE_EN</td><td>4</td><td>B2S OCP or DISIBS Event Recycle Option</td><td>0b0: In the case of B2S OCP or DISIBS events, the buck is disabled (OFF) and Q_{BATT} FET is opened. System recycles after 150ms (min) only if a valid charger is present.
0b1: In the case of B2S OCP or DISIBS events, buck is disabled (OFF) and Q_{BATT} FET is opened. System recycles after 150ms (min).</td></tr>
<tr><td>B2SOVRC</td><td>3:0</td><td>BATT to SYS Overcurrent Threshold (A)</td><td>0x0: Disabled
0x1: 3.0
0x2: 3.5
0x3: 4.0
0x4: 4.5
0x5: 5.0
0x6: 5.5
0x7: 6.0
0x8: 6.5
0x9: 7.0
0xA: 7.5
0xB: 8.0
0xC: 8.5
0xD: 9.0
0xE: 9.5
0xF: 10.0</td></tr>
</table></td></tr>
</table>

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One Analog Way, Wilmington, MA 01887 U.S.A. | Tel: 781.329.4700 |

Migration Guide from MAX77975/MAX77976 to MAX77985/MAX77986

Change List (continued)

<table>
<tr><th>No.</th><th>MAX77975/MAX77976</th><th>MAX77985/MAX77986</th></tr>
<tr><td>3.</td><td>MINSYS = 3.60V (fixed).</td><td>MAX77985A/MAX77986A MINSYS is 3.4V, 3.5V, 3.6V, and 3.7V.
MAX77985B/MAX77986B MINSYS is 3.0V, 3.1V, 3.5V, and 3.6V.</td></tr>
<tr><td>4.</td><td>CHG_CV_PRM (Charge Termination Voltage) is 4.15V to 4.46V (default 4.2V with 10mV steps).
Battery Chemistry = Li-ion, Li-Polymer</td><td>MAX77985A/MAX77986A CHG_CV_PRM (Charge Termination Voltage) is 4.15V to 4.5375V (default 4.2V with 12.5mV steps).
Battery Chemistry = Li-ion, Li-Polymer

MAX77985B/MAX77986B CHG_CV_PRM (Charge Termination Voltage) is 3.50V to 4.275V (default 3.60V with 25mV steps).
Battery Chemistry = LiFePO$_4$</td></tr>
<tr><td>5.</td><td>QBEXT (Pin 30)—External Battery FET Control Output.</td><td>QBEXT/PGOOD (Pin 30)—Configurable as External Battery FET Control Output or PGOOD as unplug detection of 9V and 15V sources.</td></tr>
<tr><td>6.</td><td>N/A</td><td>Spread Spectrum Modulation to reduce EMI.
SS_ENV [Bit7:6] in the register CHG_CNFG_00.</td></tr>
<tr><td>7.</td><td>Buck Inductor Current Limit, I_{HSILIM}.
I_{HSILIM} for MAX77976 is 9.5A (typ)
I_{HSILIM} for MAX77975 is 7A (typ)</td><td>Buck Inductor Current Limit, I_{HSILIM}.
I_{HSILIM} for MAX77986 is 11.1A (typ)
I_{HSILIM} for MAX77985 is 8.3A (typ)</td></tr>
<tr><td>8.</td><td>CHGIN Input Current Limit Setting Range, $I_{INLIMIT}$.
$I_{INLIMIT}$ = 0.1A to 3.2A.</td><td>CHGIN Input Current Limit Setting Range, $I_{INLIMIT}$.
$I_{INLIMIT}$ for MAX77986 = 0.1A to 5.5A
$I_{INLIMIT}$ for MAX77985 = 0.1A to 3.5A</td></tr>
<tr><td>9.</td><td>N/A</td><td>Higher V_{SYS} buck mode (Mode 0x6)</td></tr>
<tr><td>10.</td><td>Unplug TA during charging when $V_{BATT} > V_{TERM}$ is not detected.</td><td>The bug is fixed.</td></tr>
<tr><td>11.</td><td>SYSUVLO/OVLO/TDIE may turn off permanently after the LPM register is cleared.</td><td>The bug is fixed.</td></tr>
<tr><td>12.</td><td>I_{CHGIN}, $V_{CHGIN\_UVLO\_ACC}$, and $V_{CHGIN2SYS\_TH}$.
Electrical Characteristics
(V_{SYS} = 3.8V, V_{BATT} = 3.8V, V_{VIO} = 1.8V, V_{CHGIN} = 5V, unless otherwise specified. Limits are production tested at T_A = +25°C. Limits over the operating temperature range and relevant supply voltage range are guaranteed by design and characterization.)
<table>
<tr><th>PARAMETER</th><th>SYMBOL</th><th>CONDITIONS</th><th>MIN</th><th>TYP</th><th>MAX</th><th>UNITS</th></tr>
<tr><td colspan="7">GENERAL ELECTRICAL CHARACTERISTICS</td></tr>
<tr><td rowspan="3">CHGIN Quiescent Current</td><td rowspan="3">I_{CHGIN}</td><td>V_{CHGIN} = 5.0V, SUSPEND pin digital high or MODE = 0, DEEP_SUSP_DIS = 1</td><td></td><td>0.19</td><td>0.38</td><td>mA</td></tr>
<tr><td>V_{CHGIN} = 5.0V, SUSPEND pin digital high or MODE = 0, DEEP_SUSP_DIS = 0</td><td></td><td>85</td><td></td><td>µA</td></tr>
<tr><td>V_{CHGIN} = 5.0V, V_{BATT} = 4.2V, MODE = 5, DONE state (V_{SYS} = 4.35V), I_{SYS} = 0A</td><td></td><td>2.35</td><td></td><td>mA</td></tr>
<tr><td>CHGIN Undervoltage Threshold Accuracy</td><td>$V_{CHGIN\_UVLO\_ACC}$</td><td>V_{CHGIN} rising, 4.7V setting</td><td>4.6</td><td>4.7</td><td>4.8</td><td>V</td></tr>
<tr><td>CHGIN to SYS Undervoltage Threshold Rising</td><td>$V_{CHGIN2SYS\_TH}$</td><td>V_{CHGIN} - V_{SYS}, rising</td><td>0.12</td><td>0.20</td><td>0.28</td><td>V</td></tr>
</table>
</td><td>Tight tolerance of I_{CHGIN}, $V_{CHGIN\_UVLO\_ACC}$, and $V_{CHGIN2SYS\_TH}$.
Electrical Characteristics
(V_{SYS} = 3.8V, V_{BATT} = 3.8V, V_{VIO} = 1.8V, V_{CHGIN} = 5V, unless otherwise specified. Limits are production tested at T_A = +25°C. Limits over the operating temperature range and relevant supply voltage range are guaranteed by design and characterization.)
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<tr><th>PARAMETER</th><th>SYMBOL</th><th>CONDITIONS</th><th>MIN</th><th>TYP</th><th>MAX</th><th>UNITS</th></tr>
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<tr><td rowspan="3">CHGIN Quiescent Current</td><td rowspan="3">I_{CHGIN}</td><td>V_{CHGIN} = 5.0V, SUSPEND pin digital high or MODE = 0, DEEP_SUSP_DIS = 1</td><td></td><td>0.19</td><td>0.32</td><td>mA</td></tr>
<tr><td>V_{CHGIN} = 5.0V, SUSPEND pin digital high or MODE = 0, DEEP_SUSP_DIS = 0</td><td></td><td>85</td><td></td><td>µA</td></tr>
<tr><td>V_{CHGIN} = 5.0V, V_{BATT} = 4.2V, MODE = 5, DONE state (V_{SYS} = 4.35V), I_{SYS} = 0A</td><td></td><td>2.35</td><td></td><td>mA</td></tr>
<tr><td>CHGIN Undervoltage Threshold Accuracy</td><td>$V_{CHGIN\_UVLO\_ACC}$</td><td>V_{CHGIN} rising, 4.7V setting</td><td>4.625</td><td>4.7</td><td>4.775</td><td>V</td></tr>
<tr><td>CHGIN to SYS Undervoltage Threshold Rising</td><td>$V_{CHGIN2SYS\_TH}$</td><td>V_{CHGIN} - V_{SYS}, rising</td><td>0.15</td><td>0.20</td><td>0.25</td><td>V</td></tr>
</table>
</td></tr>
<tr><td>13.</td><td>CHGIN Input Current Limit Accuracy [Min = -12%, Max = 0%]
<table>
<tr><td rowspan="4">CHGIN Input Current Limit Accuracy</td><td rowspan="4">$I_{INLIMIT}$</td><td>Charger enabled, 500mA input current limit setting</td><td>440</td><td>470</td><td>500</td><td rowspan="4">mA</td></tr>
<tr><td>Charger enabled, 1000mA input current limit setting</td><td>880</td><td>940</td><td>1000</td></tr>
<tr><td>Charger enabled, 1800mA input current limit setting</td><td>1584</td><td>1692</td><td>1800</td></tr>
<tr><td>Charger enabled, 3200mA input current limit setting</td><td>2816</td><td>3008</td><td>3200</td></tr>
</table>
</td><td>CHGIN Input Current Limit Accuracy [Min = -10%, Max = 0~+10%]
<table>
<tr><td rowspan="9">CHGIN Input Current Limit Accuracy</td><td rowspan="9">$I_{INLIMIT}$</td><td>Charger enabled, CHGIN = 5V ±5%, input current limit setting ≤ 2.7A, T_A = -5°C to +85°C</td><td>-10</td><td>0</td><td rowspan="9">%</td></tr>
<tr><td>Charger enabled, CHGIN = 5V ±5%, input current limit setting > 2.7A, T_A = -5°C to +85°C</td><td>-10</td><td>+5</td></tr>
<tr><td>Charger enabled, CHGIN = 9V ±5%, input current limit setting ≤ 1.5A, T_A = -5°C to +85°C</td><td>-10</td><td>0</td></tr>
<tr><td>Charger enabled, CHGIN = 9V ±5%, input current limit setting > 1.5A, T_A = -5°C to +85°C</td><td>-10</td><td>+5</td></tr>
<tr><td>Charger enabled, CHGIN = 12V ±5%, input current limit setting ≤ 1A, T_A = -5°C to +85°C</td><td>-10</td><td>+5</td></tr>
<tr><td>Charger enabled, CHGIN = 12V ±5%, input current limit setting > 1A, T_A = -5°C to +85°C</td><td>-10</td><td>+10</td></tr>
<tr><td>Charger enabled, CHGIN = 15V ±5%, input current limit setting ≤ 0.5A, T_A = -5°C to +85°C</td><td>-10</td><td>+5</td></tr>
<tr><td>Charger enabled, CHGIN = 15V ±5%, input current limit setting > 0.5A, T_A = -5°C to +85°C</td><td>-10</td><td>+10</td></tr>
</table>
</td></tr>
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Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	6/23	Initial release	—