

3. Specifications

3.1 Absolute Maximum Ratings

Caution: Do not operate at or near the maximum ratings listed for extended periods of time. Exposure to such conditions can adversely impact product reliability and result in failures not covered by warranty.

Parameter	Minimum	Maximum	Unit
CSIP, CSIN, DCIN, ADP, ASGATE	-0.3	+36	V
DCIN - VDD	-0.3	+31	V
PHASE1	GND - 0.3	+36	V
PHASE1	GND - 2 (<20ns)	+36	V
BOOT1, UGATE1	GND - 0.3	VDDP+36	V
PHASE2	GND - 0.3	36	V
PHASE2	GND - 2 (<20ns)	36	V
BOOT2, UGATE2	GND - 0.3	VDDP+36	V
LGATE1, LGATE2	GND - 0.3	+6.5	V
LGATE1, LGATE2	GND - 2 (<20ns)	+6.5	V
VBAT, VSYS, CSOP, CSON, BGATE	-0.3	+36	V
VDD, VDDP	-0.3	+6.5	V
COMP	-0.3	+6.5	V
AMON/BMON, PSYS	-0.3	+6.5	V
OTGEN, BATGONE	-0.3	+6.5	V
ACIN, PROCHOT#, OTGPG, ACOK	-0.3	+6.5	V
SCL, SDA	-0.3	+6.5	V
BOOT1 - PHASE1, BOOT2 - PHASE2	-0.3	+6.5	V
CSIP - CSIN, CSOP - CSON	-0.3	+0.3	V
OTGPG, PROCHOT#, ACOK	-	2	mA
Junction Temperature Range (T _J)	-10	+125	°C
Storage Temperature Range (T _S)	-65	+175	°C
Human Body Model (Tested per JS-001-2023)	-	2	kV
Charged Device Model (Tested per JS-002-2022)	-	750	V
Latch-Up (Tested per JESD78E; Class 2, Level A)	-	100	mA

3.2 Recommended Operating Conditions

Parameter		Minimum	Maximum	Unit
Ambient Temperature	RAA489118ARGNP	-10	+100	°C
	RAA489118A3GNP	-40	+100	°C
Junction Temperature	RAA489118ARGNP	-10	+125	°C
	RAA489118A3GNP	-40	+125	°C
Adapter Voltage		+4	+30	V

3.3 Thermal Specifications

Parameter	Package	Symbol	Conditions	Typical Value	Unit
Thermal Resistance	32 Ld TQFN Package	$\theta_{JA}^{[1]}$	Junction to ambient.	38	°C/W
		$\theta_{JC}^{[2]}$	Junction to case.	2.5	°C/W

- θ_{JA} is measured in free air with the component mounted on a high-effective thermal conductivity test board with direct attach features. See [TB379](#).
- For θ_{JC} , the case temperature location is the center of the exposed metal pad on the package underside.

3.4 Electrical Specifications

Operating conditions: ADP = CSIP = CSIN = 5V and 28V, VSYS = VBAT = CSOP = CSON = 8V and 29.4, unless otherwise noted.
Boldface limits apply across the junction temperature range, -40°C to +125°C unless otherwise specified.

Parameter	Symbol	Test Conditions	Min ^[1]	Typ	Max ^[1]	Unit
UVLO/ACOK						
VADP UVLO Rising	VADP_UVLO_r	-	3.05	3.4	3.7	V
VADP UVLO Hysteresis ^[2]	VADP_UVLO_h	-	-	600	-	mV
VBAT UVLO Rising	VBAT_UVLO_r	-	2.30	2.45	2.65	V
VBAT UVLO Hysteresis	VBAT_UVLO_h	-	-	400	-	mV
VBAT 4P5V Rising	VBAT_4P5_r	-	4.25	4.50	4.90	V
VBAT 4P5V Hysteresis	VBAT_4P5_h	-	-	400	-	mV
VDD 2P7 POR Falling, SMBus and BGATE/BMON Active Threshold	VDD_2P7_f	-	2.5	2.7	2.9	V
VDD 2P7 POR Hysteresis ^[2]	VDD_2P7_h	-	-	150	-	mV
VDD 3P8 POR Rising, Modulator and Gate Driver Active	VDD_3P8_r	-	3.6	3.8	3.9	V
VDD 3P8 POR Hysteresis	VDD_3P8_h	-	-	140	-	mV
ACIN Rising	ACIN_r	-	0.58	0.6	0.615	V
ACIN Hysteresis	ACIN_h	-	-	50	-	mV
Linear Regulator						
VDD Output Voltage	VDD	6V < V _{DCIN} < 30V	4.5	5.0	5.5	V
VDD Dropout Voltage	VDD_dp	<35mA, V _{DCIN} = 4V	-	-	200	mV
VDD Overcurrent Threshold	VDD_OC	ARGNP Junction Temperature: -10 to +125°C	85	115	145	mA
		A3GNP Junction Temperature: -40 to +125°C	85	115	155	

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Parameter	Symbol	Test Conditions	Min ^[1]	Typ	Max ^[1]	Unit
Battery Current	I _{BAT1}	Battery only, BGATE OFF, PSYS OFF, GPC OFF, BMON OFF, V _{BAT} = 29.4V, DCIN current comes from battery, I _{BAT} = I _{VBAT} + I _{CSOP} + I _{CSON} + I _{DCIN} + I _{VSYS}	-	24	50	μA
	I _{BAT2}	Battery only, BGATE ON, PSYS OFF, GPC OFF, BMON ON, V _{BAT} = 29.4V, DCIN current comes from battery, I _{BAT} = I _{VBAT} + I _{CSOP} + I _{CSON} + I _{DCIN} + I _{VSYS}	-	74	-	
	I _{BAT3}	Battery only, BGATE on, PSYS ON, BMON OFF, V _{BAT} = 29.4V, DCIN current comes from battery, I _{BAT} = I _{VBAT} + I _{CSOP} + I _{CSON} + I _{DCIN} + I _{VSYS}	-	925	1155	
Adapter Current Regulation, R _{s1} = 10mΩ						
Adapter Current Accuracy	-	CSIP - CSIN = 50mV	-	5	-	A
			-2.2	-	2.2	%
		CSIP - CSIN = 40mV	-	4	-	A
			-2.5	-	2.5	%
		CSIP - CSIN = 30mV	-	3	-	A
			-3.5	-	3.5	%
		CSIP - CSIN = 25mV	-	2.5	-	A
			-4.2	-	4.2	%
		CSIP - CSIN = 20mV	-	2	-	A
			-5.0	-	5.0	%
		CSIP - CSIN = 15mV	-	1.5	-	A
			-6.9	-	6.9	%
		CSIP - CSIN = 10mV	-	1	-	A
			-10	-	10	%
CSIP - CSIN = 5mV	-	0.5	-	A		
	-20	-	20	%		
CSIP - CSIN = 2.5mV	-	0.25	-	A		
	-40	-	40	%		
Adapter Current PROCHOT# Threshold R _{s1} = 10mΩ	I _{ADP_HOT_TH10}	ACProchot = 0x0B00H (5.632A)	-	5.632	-	A
			-1.5	-	1.5	%
		ACProchot = 0x0500H (2.56A)	-	2.56	-	A
			-2.5	-	2.5	%
		ACProchot = 0x0400H (2.048A)	-	2.048	-	A
			-4	-	4	%
ACProchot = 0x0200H (1.024A)	-	1.024	-	A		
	-6	-	6	%		

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Boldface limits apply across the junction temperature range, -40°C to +125°C unless otherwise specified. (Cont.)

Parameter	Symbol	Test Conditions	Min ^[1]	Typ	Max ^[1]	Unit
System Voltage Regulation						
Maximum System Voltage Accuracy	-	MaxSystemVoltage for 8.4V and 12.6V	-1.0	-	1.0	%
		MaxSystemVoltage for 16.8V and 21V	-0.75	-	0.75	
		MaxSystemVoltage for 25.2V and 29.4V	-0.5	-	0.5	
Minimum System Voltage Accuracy	-	VDAC = 5V to 25V	-3	-	3	%
Input Voltage Regulation Accuracy	-	Input Voltage Register = 4.096V	3.92	-	4.18	V
Charge Current Regulation, R _{s2} = 5mΩ (Limits apply across temperature range of 0°C to +85°C)						
Charge Current Accuracy	-	V _{CSOP} - V _{CSON} = 30mV	-	6	-	A
			-3.5	-	3.5	%
		V _{CSOP} - V _{CSON} = 25mV	-	5	-	A
			-3.85	-	3.85	%
		V _{CSOP} - V _{CSON} = 20mV	-	4	-	A
			-4	-	4	%
		V _{CSOP} - V _{CSON} = 15mV	-	3	-	A
			-5.2	-	5.2	%
		V _{CSOP} - V _{CSON} = 10mV	-	2	-	A
			-6	-	6	%
		V _{CSOP} - V _{CSON} = 5mV	-	1	-	A
			-12	-	12	%
		V _{CSOP} - V _{CSON} = 2.5mV	-	0.5	-	A
			-22.2	-	22.2	%
		V _{CSOP} - V _{CSON} = 1.28mV	-	0.256	-	A
			-42	-	42	%
BGATE Clamp						
VSYS - VBGATE ON	-	Charging enabled	7.45	8.30	9.05	V
VSYS - VBGATE OFF	-	Charging disabled	-	0	-	V
ASGATE Clamp						
VADP - VASGATE ON	-		-	10	-	V
VADP - VASGATE OFF	-		-	0	-	V
Trickle Charging Current Regulation, R _{s2} = 5mΩ (Limits apply across temperature range of 0°C to +85°C)						
Trickle Charge Current Accuracy	-	Trickle, 1024mA	938	1024	1109	mA
		Trickle, 512mA	410	512	614	
		Trickle, 256mA	180	256	360	
		Trickle, 128mA	55	128	192	
Fast Charge to Trickle Charge Threshold	-	V _{SYN} - V _{BGATE}	4.5	5.05	5.6	V

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Parameter	Symbol	Test Conditions	Min ^[1]	Typ	Max ^[1]	Unit
Trickle Charge to Fast Charge Threshold Hysteresis	-	$V_{SYS} - V_{BGATE}$	50	130	290	mV
Fast Charge to Trickle Charge BGATE Threshold ^[2]	-	$V_{SYS} > 7V, V_{FB} \gg V_{REF}$	-	1.15	-	V
Trickle Charge to Fast Charge BGATE Threshold Hysteresis ^[2]	-	$V_{SYS} > 7V, V_{FB} \gg V_{REF}$	-	50	-	mV
Ideal Diode Mode						
Entering Ideal Diode Mode VSYS Voltage Threshold	-	BGATE off, VSYS falling $V_{BAT} - V_{CSON}$	100	150	200	mV
Exiting Ideal Diode Mode Battery Discharging Current Threshold	-	$R_{s2} = 5m\Omega$	190	380	550	mA
Exiting Ideal Diode Mode Battery Charging Current Threshold	-	$R_{s2} = 5m\Omega$	150	250	350	mA
BGATE Source	-	$V_{SYS} - V_{BGATE} = 2V$, charging disabled	4	5	10	mA
BGATE Sink	-	$V_{BGATE} - V_{GND} = 2V$, charging enabled	20	30	40	μA
BGATE Sink	-	$V_{BGATE} - V_{GND} = 2V$, in Ideal Diode mode	-	9	-	mA
AMON/BMON						
Input Current Sense Amplifier, $R_{s1} = 10m\Omega$						
CSIP/CSIN Input Voltage Range ^[2]	-	-	4	-	30	V
Forward AMON Gain	-	-	-	18.01	-	V/V
Forward AMON Accuracy $V_{AMON} = 18.01 \times (V_{CSIP} - V_{CSIN})$	-	$V_{CSIP} - V_{CSIN} = 50mV$ (5A), $V_{CSIP} = 5V, 28V$	-2.8	-	2.8	%
		$V_{CSIP} - V_{CSIN} = 10mV$ (1A), $V_{CSIP} = 5V, 28V$	-10	-	10	
		$V_{CSIP} - V_{CSIN} = 5mV$ (0.5A), $V_{CSIP} = 5V, 28V$	-16.8	-	16.8	
		$V_{CSIP} - V_{CSIN} = 1mV$ (0.1A), $V_{CSIP} = 5V, 28V$	-78.8	-	78.8	
Reverse AMON Gain	-	-	-	17.9	-	V/V
Reverse AMON Accuracy $V_{AMON} = 17.9 \times (V_{CSIP} - V_{CSIN})$	-	$V_{CSIN} - V_{CSIP} = 40mV$ (4A), $V_{CSIP} = 5V, 28V$	-4.5	-	4.5	%
		$V_{CSIN} - V_{CSIP} = 10mV$ (1A), $V_{CSIP} = 5V, 28V$	-12.6	-	13.5	
		$V_{CSIN} - V_{CSIP} = 5mV$ (0.5A), $V_{CSIP} = 5V, 28V$	-25.5	-	25.5	
		$V_{CSIN} - V_{CSIP} = 2.56mV$ (0.256A), $V_{CSIP} = 5V, 28V$	-48.5	-	48.5	

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Parameter	Symbol	Test Conditions	Min ^[1]	Typ	Max ^[1]	Unit
AMON Minimum Output Voltage	-	V _{CSIP} - V _{CSIN} = 0V	-	-	30	mV
Discharge Current Sense Amplifier, R _{s2} = 5mΩ						
BMON Gain (Battery Discharging)	-	-	-	17.97	-	V/V
BMON Accuracy V _{BMON} = 17.97×(V _{CSON} - V _{CSOP})	-	V _{CSON} - V _{CSOP} = 50mV (10A), V _{CSON} = 8V, 29.4V	-3.5	-	3.1	%
		V _{CSON} - V _{CSOP} = 10mV (2A), V _{CSON} = 8V, 29.4V	-11.5	-	6	
		V _{CSON} - V _{CSOP} = 5mV (1A), V _{CSON} = 8V, 29.4V	-23	-	14	
		V _{CSON} - V _{CSOP} = 3mV (0.6A), V _{CSON} = 8V, 29.4V	-39	-	22.1	
Charge Current Sense Amplifier, R _{s2} = 5mΩ (Limits apply across the temperature range of 0°C to +85°C)						
BMON Gain (Battery Charging)	-	-	-	36.07	-	V/V
BMON Accuracy V _{BMON} = 36.07 x (V _{CSOP} - V _{CSON})	-	V _{CSOP} - V _{CSON} = 30mV (6A), V _{CSON} = 8V, 29.4V	-5	-	5	%
		V _{CSOP} - V _{CSON} = 20mV (4A), V _{CSON} = 8V, 29.4V	-5.9	-	5.9	
		V _{CSOP} - V _{CSON} = 5mV (1A), V _{CSON} = 8V, 29.4V	-13.9	-	13.9	
		V _{CSOP} - V _{CSON} = 2.5mV (0.5A), V _{CSON} = 8V, 29.4V	-24.6	-	24.6	
		V _{CSOP} - V _{CSON} = 1.28mV (0.256A), V _{CSON} = 8V, 29.4V	-45	-	45	
BMON Minimum Output Voltage	-	V _{CSOP} - V _{CSON} = 0V	-	-	31	mV
Discharging Current PROCHOT# Threshold, R _{s2} = 5mΩ	I _{DIS_HOT_TH}	DCProchot# = 2.048A	1.77	2.08	2.39	A
Discharging Current PROCHOT# Threshold, Battery Only, R _{s2} = 5mΩ	I _{DIS_HOT_TH}	DCProchot# = 12A	10.6	12.9	15.2	A
		DCProchot# = 6A	5.2	6.5	8	A
AMON/BMON Source Resistance ^[2]	-	-	-	-	5	Ω
AMON/BMON Sink Resistance ^[2]	-	-	-	-	5	Ω
BATGONE and OTGEN						
High-Level Input Voltage	-	-	0.9	-	-	V
Low-Level Input Voltage	-	-	-	-	0.4	V
Pull-Down Current	-	BATGONE and OTGEN = 5V	-	5	-	μA

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Parameter	Symbol	Test Conditions	Min ^[1]	Typ	Max ^[1]	Unit
PROCHOT#						
PROCHOT# Debounce Time	-	Control2 register Bit[10:9] = 11	0.85	1	1.15	ms
		Control2 register Bit[10:9] = 10	425	500	575	μs
PROCHOT# Duration Time	-	Control2 register Bit[8:6] = 000	8.5	10	11.5	ms
		Control2 register Bit[8:6] = 001	17	20	23	
Low VSYS PROCHOT# Trip Threshold	V _{LOW_VSYS_HOT}	Control1 register Bit[1:0] = 00	5.8	6.0	6.2	V
		Control1 register Bit[1:0] = 01	6.1	6.3	6.5	
		Control1 register Bit[1:0] = 10	6.4	6.6	6.8	
		Control1 register Bit[1:0] = 11	6.7	6.9	7.1	
PSYS with NVDC Charger Configuration when CONFIG/PSYS Is Not Tied High ^[2]						
PSYS Output Current R _{s1} = 10mΩ R _{s2} = 5mΩ	I _{PSYS} Control3 Bit[9] = 0 I _{PSYS} = 0.236μA/W × Power + 0μA	V _{CSIP} = 28V, V _{CSIP} - V _{CSIN} = 40mV, V _{BAT} = 12V, 29.4V, V _{CSOP} - V _{CSON} = -10mV	-5	-	5	%
	I _{PSYS} Control3 Bit[9] = 1 I _{PSYS} = 0.118μA/W ×Power	V _{CSIP} = 28V, V _{CSIP} - V _{CSIN} = 80mV, V _{BAT} = 12V, 29.4V, V _{CSOP} - V _{CSON} = -20mV	-5	-	5	
Maximum PSYS Output Voltage	V _{PSYS_MAX}	-	3	-	-	V
Buck-Boost Charger Configuration without BFET when CONFIG/PSYS is Tied High						
Comparator at CONFIG/PSYS ^[2]	-	-	-	VDD-0.7V	-	V
OTG						
OTG Voltage	-	OTGVoltage register = 5.004V	4.9	5.03	5.15	V
OTG Current	-	OTGCurrent register = 512mA, (OTGVoltage = 5.004V, 29.4V)	373	512	675	mA
		OTGCurrent register = 1024mA, (OTGVoltage = 5.004V, 29.4V)	870	1024	1200	
		OTGCurrent register = 1536mA, (OTGVoltage = 5.004V, 29.4V)	1370	1536	1726	
		OTGCurrent register = 3072mA, (OTGVoltage = 5.004V, 29.4V)	2841	3072	3314	
		OTGCurrent register = 4096mA, (OTGVoltage = 5.004V, 29.4V)	3858	4096	4350	
General Purpose Comparator						
General Purpose Comparator Rising Threshold	-	Reference = 1.2V	1.11	1.2	1.32	V
		Reference = 2V	1.93	2	2.1	
General Purpose Comparator Hysteresis	-	Reference = 1.2V	-	45	-	mV
		Reference = 2V	-	45	-	

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Parameter	Symbol	Test Conditions	Min ^[1]	Typ	Max ^[1]	Unit
Protection						
VSYS Absolute Overvoltage Rising Threshold	-	-	32.2	33.6	34.3	V
VSYS Absolute Overvoltage Hysteresis ^[2]	-	-	-	540	-	mV
VSYS Overvoltage Rising Threshold	-	MaxSystemVoltage register value = 8.4V	9.68	10	10.27	V
		MaxSystemVoltage register value = 29.4V	30.6	31	31.6	V
VSYS Overvoltage Hysteresis	-	MaxSystemVoltage register value = 8.4V	550	790	1045	mV
		MaxSystemVoltage register value = 29.4V	600	850	1100	mV
VSYS UV Falling Threshold	-	Control6 register Bit[2:0] = 001	-	3	-	V
		Control6 register Bit[2:0] = 010	-	3.9	-	V
		Control6 register Bit[2:0] = 011	-	4.8	-	V
		Control6 register Bit[2:0] = 100	-	5.7	-	V
		Control6 register Bit[2:0] = 101	-	6.6	-	V
		Control6 register Bit[2:0] = 110	-	7.5	-	V
		Control6 register Bit[2:0] = 111	-	8.4	-	V
VSYS OK Threshold	-	-	0.45	0.6	0.75	V
VSYS OK Source Current	-	-	-	10	-	mA
Over-Temperature Threshold ^[2]	-	-	140	150	160	°C
Adapter Overvoltage Rising Threshold	-	-	32.2	33.3	33.95	V
Adapter Overvoltage Hysteresis	-	-	390	590	760	mV
OTG Undervoltage Falling Threshold	-	OTG voltage = 5.004V	2.85	3.2	3.65	V
OTG Undervoltage Rising Hysteresis ^[2]	-	OTG voltage = 5.004V	-	0.9	-	V
OTG Overvoltage Rising Threshold	-	OTG voltage = 5.004V	6.4	6.8	7.2	V
OTG Overvoltage Falling Hysteresis ^[2]	-	OTG voltage = 5.004V	-	0.9	-	V
Oscillator						
Oscillator Frequency, Digital Core Only	-	-	0.85	1	1.15	MHz
Digital Debounce Time Accuracy ^[2]	-	-	-15	-	15	%
Miscellaneous						
Switching Frequency Accuracy	-	COMP > 1.7V and not in period stretching	-15	-	15	%

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Parameter	Symbol	Test Conditions	Min ^[1]	Typ	Max ^[1]	Unit
Battery Learn Mode Auto-Exit Threshold	-	MinSystemVoltage = 5.376V Control1 register Bit[13] = 1	5.05	5.35	5.7	V
Battery Learn Mode Auto-Exit Hysteresis	-	MinSystemVoltage = 5.376V Control1 register Bit[13] = 1	-	330	-	mV
ADP Discharge Current	-	ADP = 5V to 32V	-	10	-	mA
VSYS Discharge Current	-	VSYS = 5V to 30.8V	-	10	-	mA
SMBus						
SDA/SCL Input Low Voltage	-	-	-	-	0.6	V
SDA/SCL Input High Voltage	-	-	1.3	-	-	V
SDA/SCL Input Bias Current	-	-	-	-	1	μA
SDA, Output Sink Current	-	SDA = 0.4V	4	-	-	mA
SMBus Frequency	f _{SMB}	-	10	-	400	kHz
Gate Driver^[2]						
UGATE1 Pull-Up Resistance	UG1 _{RPU}	100mA source current	-	800	1200	mΩ
UGATE1 Source Current	UG1 _{SRC}	UGATE1 - PHASE1 = 2.5V	1.3	2	-	A
UGATE1 Pull-Down Resistance	UG1 _{RPD}	100mA sink current	-	350	475	mΩ
UGATE1 Sink Current	UG1 _{SNK}	UGATE1 - PHASE1 = 2.5V	1.9	2.8	-	A
LGATE1 Pull-Up Resistance	LG1 _{RPU}	100mA source current	-	800	1200	mΩ
LGATE1 Source Current	LG1 _{SRC}	LGATE1 - GND = 2.5V	1.3	2	-	A
LGATE1 Pull-Down Resistance	LG1 _{RPD}	100mA sink current	-	300	450	mΩ
LGATE1 Sink Current	LG1 _{SNK}	LGATE1 - GND = 2.5V	2.3	3.5	-	A
LGATE2 Pull-Up Resistance	LG2 _{RPU}	100mA source current	-	800	1200	mΩ
LGATE2 Source Current	LG2 _{SRC}	LGATE2 - GND = 2.5V	1.3	2	-	A
LGATE2 Pull-Down Resistance	LG2 _{RPD}	100mA sink current	-	300	450	mΩ
LGATE2 Sink Current	LG2 _{SNK}	LGATE2 - GND = 2.5V	2.3	3.5	-	A
UGATE2 Pull-Up Resistance	UG2 _{RPU}	100mA source current	-	800	1200	mΩ
UGATE2 Source Current	UG2 _{SRC}	UGATE2 - PHASE2 = 2.5V	1.3	2	-	A
UGATE2 Pull-Down Resistance	UG2 _{RPD}	100mA sink current	-	350	475	mΩ
UGATE2 Sink Current	UG2 _{SNK}	UGATE2 - PHASE2 = 2.5V	1.9	2.8	-	A
UGATE1 to LGATE1 Dead Time	t _{UG1LG1DEAD}	-	10	20	40	ns

Operating conditions: ADP = CSIP = CSIN = 5V and 28V, VSYS = VBAT = CSOP = CSON = 8V and 29.4, unless otherwise noted.
Boldface limits apply across the junction temperature range, -40°C to +125°C unless otherwise specified. (Cont.)

Parameter	Symbol	Test Conditions	Min ^[1]	Typ	Max ^[1]	Unit
LGATE1 to UGATE1 Dead Time	$t_{LG1UG1DEAD}$	-	10	20	40	ns
LGATE2 to UGATE2 Dead Time	$t_{LG2UG2DEAD}$	-	10	20	40	ns
UGATE2 to LGATE2 Dead Time	$t_{UG2LG2DEAD}$	-	10	20	40	ns

- Parameters with MIN and/or MAX limits are 100% tested at +25°C, unless otherwise specified. Temperature limits established by characterization and are not production tested.
- Values or limits established by characterization and are not production tested.

3.5 SMBus Timing Specification

Parameters	Symbol	Test Conditions	Min ^[1]	Typ	Max ^[1]	Unit
SMBus Frequency	F_{SMB}	-	10	-	400	kHz
Bus Free Time	t_{BUF}	-	4.7	-	-	μs
Start Condition Hold Time from SCL	$t_{HD:STA}$	-	4	-	-	μs
Start Condition Set-Up Time from SCL	$t_{SU:STA}$	-	4.7	-	-	μs
Stop Condition Set-Up Time from SCL	$t_{SU:STO}$	-	4	-	-	μs
SDA Hold Time from SCL	$t_{HD:DAT}$	-	300	-	-	ns
SDA Set-Up Time from SCL	$t_{SU:DAT}$	-	250	-	-	ns
SCL Low Period	t_{LOW}	-	4.7	-	-	μs
SCL High Period	t_{HIGH}	-	4	-	-	μs
SMBus Inactivity Timeout	-	Maximum charging period without a SMBus Write to MaxSystemVoltage or ChargeCurrent register	-	175	-	s

- Limits established by characterization and are not production tested.

3.6 Gate Driver Timing Diagrams

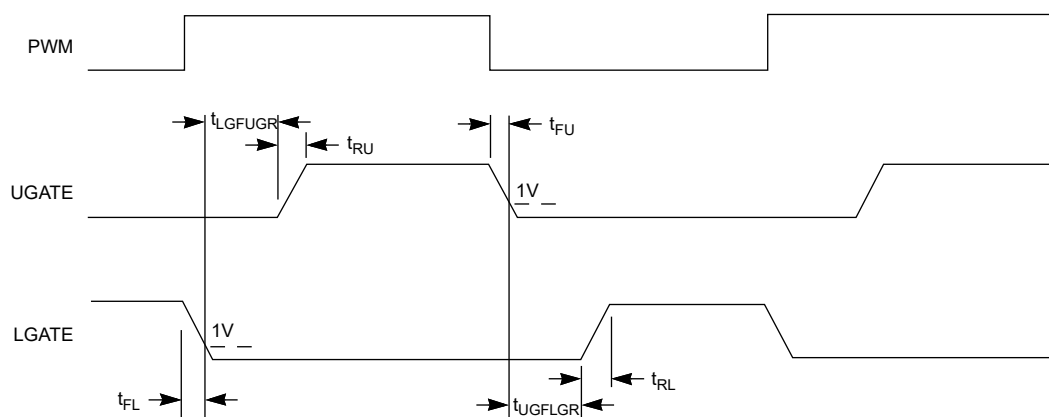


Figure 6. Gate Driver Timing Diagram