DATASHEET

NPH770215Q

Automotive Dual Channel 15mΩ Smart High-Side Driver

Revision	Date	Description
Rel 1.0	10 October 2023	Preliminary release.

1. Features

- Compliant with AEC-Q100
- Dual channel high side driver with integrated current sense feedback
- Operation voltage range: 4~28V AMR 40V
- On resistance:
  - 14.7mΩ (Typ, T_J = 25°C)
  - 24.7mΩ (Typ, T_J = 150°C)
- DC load current $I_{L(NOM)}$: 5A (Typ)
- Overcurrent limit: 40A (Typ)
- Very low standby current consumption: 0.1μA (Max)
- Support down to 2.85V VCC during cold crank
- 3V/5V CMOS compatible input
- Multiple diagnostics through CS pin
  - High accuracy analog output proportional to loading current
  - Over load and output short to ground alarm
  - Open load diagnostic in OFF state
  - Output short to VCC detection
  - Support CS output enable/disable
- Protections
  - V_{CC} undervoltage shutdown
  - VDS clamp for protection of inductive load
  - Thermal shutdown
  - Overcurrent protection
  - Dynamic overtemperature protection
  - Output latch/hiccup through the $\overline{\text{FaultRST}}$ pin
  - Loss of ground and loss of V_{CC} protection
  - Battery reverse insertion protection
  - ESD protection
- Package: SSOP16PP

2. Applications

- All types of automotive resistive, inductive and capacitive loads
- Power supply protection in ADAS: radar and sensors
- Automotive headlamps

3. Description

NPH770215Q is an automotive dual channel smart high side driver. It features 3V/5V CMOS compatible input control interface and two independent power output channels. It can also provide smart protections and diagnostics. NPH770215Q is extensively used in 12V automotive power supply systems.

NPH770215Q integrates advanced protection functions, including overcurrent protection, dynamic overtemperature protection, and output latch/hiccup function though the $\overline{\text{FaultRST}}$ pin when thermal shutdown or overcurrent event occurs.

NPH770215Q also integrates multiplexed analog output through the CS pin to provide complex diagnostic functions, including accurate analog output proportional to loading current, over load, and output short to ground alarms, output short to V_{CC}, and open load detection in OFF state.

The SEn pin of NPH770215Q provides the function of enable/disable diagnostic functions in OFF state, which can be used to obtain low power consumption if disabled. When multiple NPH770215Q devices are used in one system, the SEn pin can also be used to achieve sampling CS voltage through one single ADC channel of MCU by paralleling CS outputs of multiple NPH770215Q devices, which greatly reduces system cost.

NPH770215Q supports the SSOP16PP package. See **Table 1** for the order information.

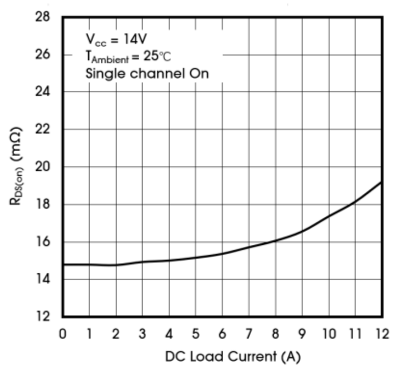

Table 1. Order Information

Order Number	Package	Mark	CH (#)	V_{CC} (V)	Rdson (mΩ)	$I_{standby}$ (Max) (μA)	I_{limit} (A)	Rating	Pkg. Option
NPH770215QASSOP16P	SSOP16PP	H770215Q	2	4-28	14.7	0.1	40	Auto	T/R-3000

4. Pin Configuration and Functions

Figure 1 illustrates the pin configuration.

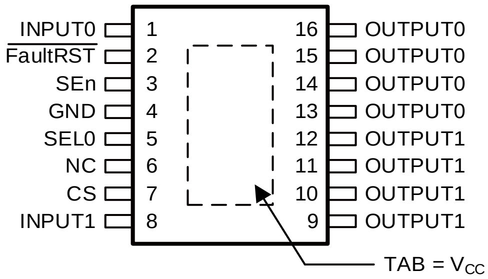

Figure 1. Pin Configuration

Table 2 lists the pin functions.

Table 2. Pin Functions

Position	Name	Type	Description
1	INPUT0	Input	Voltage controlled input pin with hysteresis, compatible with 3V and 5V CMOS outputs. It controls output switch state.
2	$\overline{\text{FaultRST}}$	Input	Active low compatible with 3V and 5V CMOS outputs pin; it unlatches the output in case of fault; If kept low, sets the outputs in auto-restart mode.
3	Sen	Input	Active high compatible with 3V and 5V CMOS outputs pin; it enables the CS diagnostic pin.
4	GND	Ground	Ground connection. Must be reverse battery protected by an external diode / resistor network.
5	SEL0	Input	Active high compatible with 3V and 5V CMOS outputs pin; they address the CS multiplexer.
6	NC	---	Not connect for this pin.
7	CS	Output	Analog current sense output pin. It delivers a current proportional to the load current.
8	INPUT1	Input	Voltage controlled input pin with hysteresis, compatible with 3V and 5V CMOS outputs. It controls output switch state.
9-12	OUTPUT1	Output	Power outputs. All the pins must be connected together.
13-16	OUTPUT0	Output	Power outputs. All the pins must be connected together.
---	V_{CC}	Power	Battery connection

5. Specifications

5.1 Absolute Maximum Ratings

Table 3 lists the absolute maximum ratings of the NPH770215Q.

Table 3. Absolute Maximum Ratings

Parameter	Description	Min	Max	Units
Voltage	DC supply voltage, V_{CC}		38	V
	Reverse DC supply voltage, $-V_{CC}$		0.3	V
	Maximum transient supply voltage (ISO 16750-2:2010 Test B clamped to 40V; R_L = 4Ω), V_{CCPK}		40	V
	Maximum jump start voltage for single pulse short circuit protection, V_{CCJS}		28	V
Current	DC reverse ground pin current, $-I_{GND}$		200	mA
	OUTPUT DC output current, I_{OUT}		Internally limited	A
	Reverse DC output current, $-I_{OUT}$		TBD	A
	INPUT DC input current, I_{IN}	–1	10	mA
	SEn DC input current, I_{Sen}	–1	10	mA
	SEL0 DC input current, I_{SEL}	–1	10	mA
	$\overline{\text{FaultRST}}$ DC input current, I_{FR}	–1	1.5	mA
	CS pin DC output current (V_{GND} = V_{CC} and V_{SENSE} < 0V), I_{SENSE}		10	mA
	CS pin DC output current in reverse (V_{CC} < 0V), I_{SENSE}		–20	mA
	Maximum switching energy (single pulse) (T_{DEMAG} = 0.4ms; T_{JSTART} = 150°C), E_{MAX}		TBD	mJ
Temperature	Junction, T_J	–40	150	°C
	Storage, T_{stg}	–55	150	°C

Note: Stresses beyond those listed under **Table 3** may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under **Table 5**. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

5.2 ESD Ratings

Table 4 lists the ESD ratings of the NPH770215Q.

Table 4. ESD Ratings

Parameter	Symbol	Description	Value	Units
Electrostatic Discharge	$V_{(ESD)}$	Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001[1]	±2000	V
		Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001[1], V_{CC}, output 0, and output 1	±8000	
		Charged-device model (CDM), per JEDEC specification JESD22-C101[2]	±1000	

Note 1: The JEDEC document JEP155 indicates that 500V HBM allows safe manufacturing with a standard ESD control process.

Note 2: The JEDEC document JEP157 indicates that 250V CDM allows safe manufacturing with a standard ESD control process.

5.3 Recommended Operating Conditions

Table 5 lists the recommended operating conditions for the NPH770215Q.

Table 5. Recommended Operating Conditions

Parameter	Description	Symbol	Min	Nom	Max	Units
Power Supply						
Power Supply			4		28	V
Digital Inputs						
Digital Input Voltage		V_{DIG}	0		5.5	V
Temperature Range						
Operating Ambient Temperature		T_A	–40		125	°C

5.4 Thermal Information

Table 6 lists the thermal information for the NPH770215Q.

Table 6. Thermal Information

Parameter	Symbol	SSOP16PP	Units
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	28.7	°C/W
Junction-to-Board Thermal Resistance	$R_{\theta JB}$	13.4	°C/W
Junction-to-Top Characterization Parameter	Ψ_{JT}	3.0	°C/W
Junction-to-Board Characterization Parameter	Ψ_{JB}	9.3	°C/W
Junction-to-Case (Top) Thermal Resistance	$R_{\theta JC (top)}$	21.3	°C/W

5.5 Electrical Characteristics

Table 7 lists the electrical characteristics of the NPH770215Q. 7V < V_{CC} < 28V; –40°C < T_J < 150°C, unless otherwise specified. All typical values refer to V_{CC} = 13V; T_J = 25°C, unless otherwise specified.

Table 7. Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
During Cranking						
Minimum Cranking Supply Voltage (V_{CC} Decreasing)	$V_{USD\_Cranking}$				2.85	V
Power						
Operating Supply Voltage	V_{CC}		4	13	28	V
Undervoltage Shutdown	V_{USD}				2.85	V
Undervoltage Shutdown Reset	$V_{USDReset}$				5	V
Undervoltage Shutdown Hysteresis	$V_{USDhyst}$			1.25		V
On-State Resistance(1)	R_{ON}	I_{OUT} = 3A; T_J = 25°C		14.4		mΩ
		I_{OUT} = 3A; T_J = 150°C			28.0	
		I_{OUT} = 3A; V_{CC} = 7V; T_J = 25°C(2)			18.0	
Nominal Load Current Per Channel (2 channel active)	$I_{L(NOM)}$	T_J < 150°C(3)		5		A
Supply Current in Standby at V_{CC} = 13V(4)	I_{STBY}	V_{CC} = 13V; V_{IN} = V_{OUT} = V_{FR} = V_{SEn} = 0V; V_{SEL0} = 0V; T_J = 25°C		0.01	0.1	µA
		V_{CC} = 13V; V_{IN} = V_{OUT} = V_{FR} = V_{SEn} = 0V; V_{SEL0} = 0V; T_J = 85°C(5)			TBD	
		V_{CC} = 13V; V_{IN} = V_{OUT} = V_{FR} = V_{SEn} = 0V; V_{SEL0} = 0V; T_J = 125°C			3	
Standby Mode Blanking Time	t_{D_STBY}	V_{CC} = 13V; V_{IN} = V_{OUT} = V_{FR} = V_{SEL0} = 0V; V_{SEn} = 5V to 0V	510	650	760	µs
Supply Current	$I_{S(ON)}$	V_{CC} = 13V; V_{SEn} = V_{FR} = V_{SEL0} = 0V; V_{IN0} = 5V; V_{IN1} = 5V; I_{OUT0} = 0A; I_{OUT1} = 0A		3.7	5.0	mA
Control Stage Current Consumption in ON State. All Channels Active.	$I_{GND(ON)}$	V_{CC} = 13V; V_{SEn} = 5V; V_{FR} = V_{SEL0} = 0V; V_{IN0} = 5V; V_{IN1} = 5V; I_{OUT0} = 3A; I_{OUT1} = 3A			6.0	mA
Off-State Output Current at V_{CC} = 13V(4)	$I_{L(off)}$	V_{IN} = V_{OUT} = 0V; SEn = 0; V_{CC} = 13V; T_J = 25°C		0.15	0.5	µA
		V_{IN} = V_{OUT} = 0V; SEn = 0; V_{CC} = 13V; T_J = 125°C			3	
Output - V_{CC} Diode Voltage at T_J = 150°C	V_F	I_{OUT} = –3A; T_J = 150°C		TBD		V
Switching (V_{CC} = 13V; –40°C < T_J < 150°C, Unless Otherwise Specified)						
Turn-On Delay Time at T_J = 25°C(6)	$t_{d(on)}$	R_L = 4.3Ω	35	65	95	µs
Turn-Off Delay Time at T_J = 25°C(6)	$t_{d(off)}$		20	60	100	
Turn-On Voltage Slope at T_J = 25°C(6)	$(dV_{OUT}/dt)_{on}$	R_L = 4.3Ω	0.06	0.20	0.4	V/µs
Turn-Off Voltage Slope at T_J = 25°C(6)	$(dV_{OUT}/dt)_{off}$		0.15	0.38	0.6	
Switching Energy Losses at Turn-On 1(t_{won})	W_{ON}	R_L = 4.3Ω	---	0.5	0.9(7)	mJ
Switching Energy Losses at Turn-Off (t_{woff})	W_{OFF}	R_L = 4.3Ω	---	0.25	0.5(7)	mJ

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Differential Pulse Skew (t_{PHL} – t_{PLH})(6)	t_{SKEW}	R_L = 4.3Ω	−110	−25	55	µs
Logic Inputs (7V < V_{CC} < 28V; –40°C < T_J < 150°C)						
INPUT0/1 Characteristics						
Input Low Level Voltage	V_{IL}				0.9	V
Low Level Input Current	I_{IL}	V_{IN} = 0.9V	0.8			µA
Input High Level Voltage	V_{IH}		2.1			V
High Level Input Current	I_{IH}	V_{IN} = 2.1V			10	µA
Input Hysteresis Voltage	$V_{I(hyst)}$		0.15			V
$\overline{\text{FaultRST}}$ Characteristics						
Input Low Level Voltage	V_{FRL}				0.9	V
Low Level Input Current	I_{FRL}	V_{IN} = 0.9V	0.8			µA
Input High Level Voltage	V_{FRH}		2.1			V
High Level Input Current	I_{FRH}	V_{IN} = 2.1V			10	µA
Input Hysteresis Voltage	$V_{FR(hyst)}$		0.15			V
SEL0 Characteristics (7V < V_{CC} < 18V)						
Input Low Level Voltage	V_{SELL}				0.9	V
Low Level Input Current	I_{SELL}	V_{IN} = 0.9V	0.8			µA
Input High Level Voltage	V_{SELH}		2.1			V
High Level Input Current	I_{SELH}	V_{IN} = 2.1V			10	µA
Input Hysteresis Voltage	$V_{SEL(hyst)}$		0.15			V
SEn Characteristics (7V < V_{CC} < 18V)						
Input Low Level Voltage	V_{SEnL}				0.9	V
Low Level Input Current	I_{SEnL}	V_{IN} = 0.9V	0.8			µA
Input High Level Voltage	V_{SEnH}		2.1			V
High Level Input Current	I_{SEnH}	V_{IN} = 2.1V			10	µA
Input Hysteresis Voltage	$V_{SEn(hyst)}$		0.15			V
Protections (7V < V_{CC} < 18V; –40°C < T_J < 150°C)						
DC Short-Circuit Current	I_{LIMH}	V_{CC} = 13V; T_A = 25°C	30	40	50	A
		V_{CC} = 13V; T_A = 150°C	25	35	45	
		4V < V_{CC} < 18V(7)			53	
Short-Circuit Current During Thermal Cycling	I_{LIML}	V_{CC} = 13V; T_R < T_J < T_{TSD}		25		
Shutdown Temperature	T_{TSD}		155	175	195	°C
Reset Temperature(7)	T_R			T_{TSD} – 10		
Thermal Reset of Fault Diagnostic Indication	T_{RS}	V_{FR} = 0V; V_{SEn} = 5V		135		
Thermal Hysteresis (T_{TSD} – T_R)(7)	T_{HYST}			10		
Dynamic Temperature	ΔT_{J_SD}	T_J = –40°C; V_{CC} = 13V		60		°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Fault Reset Time for Output Unlatch(7)	t_{LATCH_RST}	V_{FR} = 5V to 0V within 2ms after fault occurs; V_{SEn} = 5V; V_{IN} = 5V; V_{SEL0} = 0V		2		ms
		V_{FR} = 5V to 0V longer than 2ms after fault occurs; V_{SEn} = 5V; V_{IN} = 5V; V_{SEL0} = 0V		50		us
Turn-Off Output Voltage Clamp	V_{DEMAG}	I_{OUT} = 100mA; T_J = –40°C	V_{CC} – 46			V
		I_{OUT} = 100mA; T_J = 25°C to 150°C	V_{CC} – 46	V_{CC} – 45	V_{CC} – 38	V
Current Sense (7V < V_{CC} < 18V; –40°C < T_J < 150°C)						
Current Sense Clamp Voltage	V_{SENSE_CL}	V_{SEn} = 0V; I_{SENSE} = 1mA	−10.0	−9.3		V
		V_{SEn} = 0V; I_{SENSE} = –1mA		5.1		
Current Sense Characteristics						
I_{OUT}/I_{SENSE}	K_0	I_{OUT} = 0.1A; V_{SENSE} = 0.5V; V_{SEn} = 5V; T_A = 25C	2750	2900	3050	
Current Sense Ratio Drift(5)(8)	dK_0/K_0	I_{OUT} = 0.1A; V_{SENSE} = 0.5V; V_{SEn} = 5V; T_A = -40~150C	−12		12	%
I_{OUT}/I_{SENSE}	K_1	I_{OUT} = 0.25A; V_{SENSE} = 0.5V; V_{SEn} = 5V; T_A = 25C	2800	2920	3050	
Current Sense Ratio Drift(5)(8)	dK_1/K_1	I_{OUT} = 0.25A; V_{SENSE} = 0.5V; V_{SEn} = 5V; T_A = -40~150C	−10		12	%
I_{OUT}/I_{SENSE}	K_2	I_{OUT} = 3A; V_{SENSE} = 4V; V_{SEn} = 5V; T_A = 25C	2880	2950	3000	
Current Sense Ratio Drift(5)(8)	dK_2/K_2	I_{OUT} = 3A; V_{SENSE} = 4V; V_{SEn} = 5V; T_A = -40~150C	−7		11	%
I_{OUT}/I_{SENSE}	K_3	I_{OUT} = 9A; V_{SENSE} = 4V; V_{SEn} = 5V	2880	2950	3000	
Current Sense Ratio Drift(5)(8)	dK_3/K_3	I_{OUT} = 9A; V_{SENSE} = 4V; V_{SEn} = 5V	−7		11	%
CS Current for OL Detection	I_{SENSE_OL}	I_{OUT} = 0.01A; V_{SENSE} = 0.5V; V_{SEn} = 5V		3.8	9.8	µA
Current Sense Leakage Current	I_{SENSE0}	Current sense disabled: V_{SEn} = 0V			0.5	µA
		Current sense disabled: –1V < V_{SENSE} < 4V(5)	−0.5		0.5	µA
		Current sense enabled: V_{SEn} = 5V; Channel ON; I_{OUT} = 0A; Diagnostic selected; V_{IN0} = 5V; V_{IN1} = 5V; V_{SEL0} = 0V; I_{OUT0} = 0A; I_{OUT1} = 3A	0	1.8	5.2	µA
		Current sense enabled: V_{SEn} = 5V; Channel OFF; Diagnostic selected: V_{IN0} = 0V; V_{IN1} = 5V; V_{SEL0} = 0V; I_{OUT1} = 3A			1	µA
CS Saturation Voltage	V_{SENSE_SAT}	V_{CC} = 7V; R_{SENSE} = 2.7kΩ; V_{SEn} = 5V; V_{IN} = 5V; V_{SEL0} = 0V; I_{OUT} = 9A; T_J = –40°C		5.15		V
CS Saturation Current(5)	I_{SENSE_SAT}	V_{CC} = 7V; V_{SENSE} = 4V; V_{IN} = 5V; V_{SEn} = 5V; V_{SEL0} = 0V; IOUT = 12A; T_A = 25°C	3.8			mA
Output Saturation Current(5)	I_{OUT_SAT}	V_{CC} = 7V; V_{SENSE} = 4V; V_{IN} = 5V; V_{SEn} = 5V; V_{SEL0} = 0V; T_A = 25°C	11.5			A
OFF-State Diagnostic						

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OFF-State Open-Load Voltage Detection Threshold	V_{OL}	V_{SEn} = 5V; Chx OFF; Chx diagnostic selected; V_{IN0} = 0V; V_{SEL0} = 0V	2	2.9	4	V
OFF-State Output Current During Open Load Detection[9]	$I_{L(off2)}$	V_{IN} = 0V; V_{OUT} = V_{OL}; SEn = 5V; T_J = –40°C to 125°C	50	10	0.5	µA
OFF-State Diagnostic Delay Time from Falling Edge of Input (See **Figure 6)**	t_{DSTKON}	V_{SEn} = 5V; Chx ON to OFF transition; Chx diagnostic selected; e.g. Ch0: V_{IN0} = 5V to 0V; V_{SEL0} = 0V; I_{OUT0} = 0A; V_{OUT} = 4V	200	370	600	µs
Settling Time for Valid OFF-State Open Load Diagnostic Indication from Rising Edge of Sen	$t_{D\_OL\_V}$	V_{IN0} = 0V; V_{IN1} = 0V; V_{FR} = 0V; V_{SEL0} = 0V; V_{OUT} = 4V; V_{SEn} = 0V to 5V		30	60	µs
OFF-State Diagnostic Delay Time from Rising Edge of V_{OUT}	t_{D_VOL}	V_{SEn} = 5V; Chx OFF; Chx diagnostic selected; e.g. Ch0; V_{IN0} = 0V; V_{SEL0} = 0V; V_{OUT} = 0V to 4V		10	30	µs
Fault Diagnostic Feedback (See Table 8)						
Current Sense Output Voltage in Fault Condition	V_{SENSEH}	V_{CC} = 13V; R_{SENSE} = 1kΩ e.g. Ch0 in open load: V_{IN0} = 0V; V_{SEn} = 5V; V_{SEL0} = 0V; I_{OUT0} = 0A; V_{OUT} = 4V	4.7	5.1	5.5	V
Current Sense Output Current in Fault Condition	I_{SENSEH}	V_{CC} = 13V; V_{SENSE} = 5V	5.4	6.5	7.6	mA
Current Sense Timings (Current Sense Mode - See Figure 5)[10]						
Current Sense Settling Time from Rising Edge of Sen	$t_{DSENSE1H}$	V_{IN} = 5V; V_{SEn} = 0V to 5V; R_{SENSE} = 1kΩ; R_L = 4.3Ω		22	60	µs
Current Sense Disable Delay Time from Falling Edge of Sen	$t_{DSENSE1L}$	V_{IN} = 5V; V_{SEn} = 5V to 0V; R_{SENSE} = 1kΩ; R_L = 4.3Ω		12	20	µs
Current Sense Settling Time from Rising Edge of INPUT	$t_{DSENSE2H}$	V_{IN} = 0V to 5V; V_{SEn} = 5V; R_{SENSE} = 1kΩ; R_L = 4.3Ω		160	400	µs
Current Sense Settling Time from Rising Edge of I_{OUT} (Dynamic Response to a Step Change of I_{OUT})	$\Delta t_{DSENSE2H}$	V_{IN} = 5V; V_{SEn} = 5V; R_{SENSE} = 1kΩ; I_{SENSE} = 90% of $I_{SENSEMAX}$; R_L = 4.3Ω			30	µs
Current Sense Turn-Off Delay Time From Falling Edge of INPUT	$t_{DSENSE2L}$	V_{IN} = 5V to 0V; V_{SEn} = 5V; R_{SENSE} = 1kΩ; R_L = 4.3Ω		8	30	µs
Current Sense Timings (Multiplexer Transition Times)[10]						
Current Sense Transition Delay from ChX to ChY	t_{D_XtoY}	V_{IN0} = 5V; V_{IN1} = 5V; V_{SEn} = 5V; V_{SEL0} = 0V to 5V; I_{OUT0} = 0A; I_{OUT1} = 3A; R_{SENSE} = 1kΩ		10	20	µs
Current Sense Transition Delay from Stable Current Sense on ChX to V_{SENSEH} on ChY	$t_{D\_CStoVSENSEH}$	V_{IN0} = 5V; V_{IN1} = 5V; V_{SEn} = 5V; V_{SEL0} = 0V to 5V; I_{OUT0} = 0A; I_{OUT1} = 3A; R_{SENSE} = 1kΩ		TBD	TBD	µs

Note 1: For each channel

Note 2: Parameter guaranteed only at V_{CC} = 4V and T_J = 25°C

Note 3: Not subject to production test and specified by design.

Note 4: PowerMOS leakage included

Note 5: Parameter specified by design; not subject to production test.

Note 6: See **Figure 4**.

Note 7: Parameter guaranteed by design and characterization; not subject to production test.

Note 8: All values refer to V_{CC} = 13V; T_J = 25°C, unless otherwise specified.
Note 9: Parameter granted at –40°C < T_J < 125°C
Note 10: Transition delays are measured up to ±10% of final conditions.

TBD

Figure 2. I_{OUT}/I_{SENSE} vs. I_{OUT}

TBD

Figure 3. Current Sense Accuracy vs. I_{OUT}

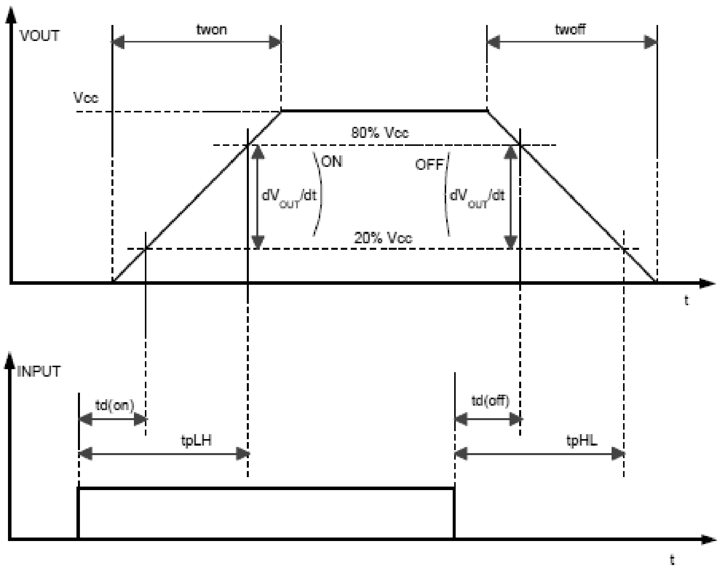

Figure 4. Switching Time and Pulse Skew

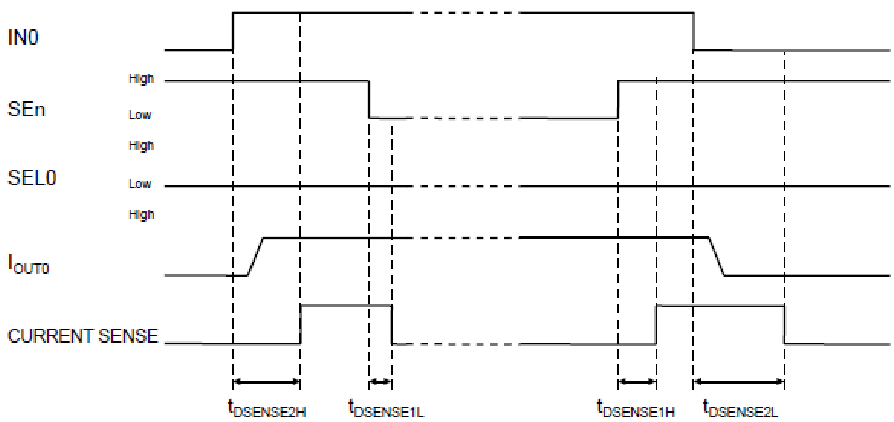

Figure 5. Current Sense Timings (Current Sense Mode)

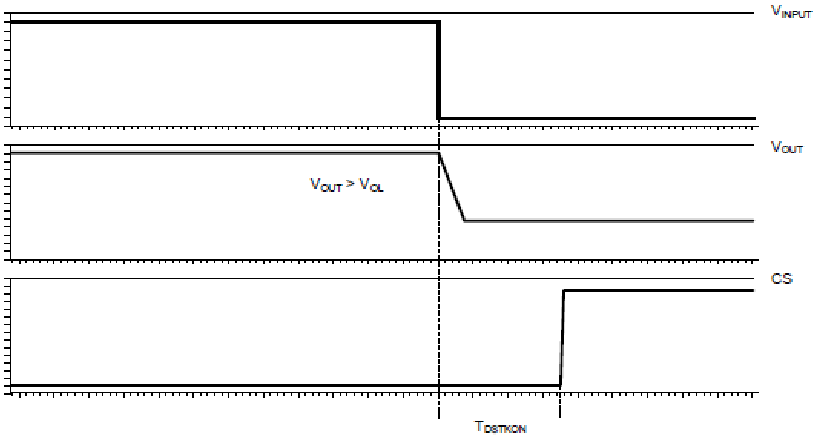

Figure 6. T_{DSTKON}

6. Typical Characteristics

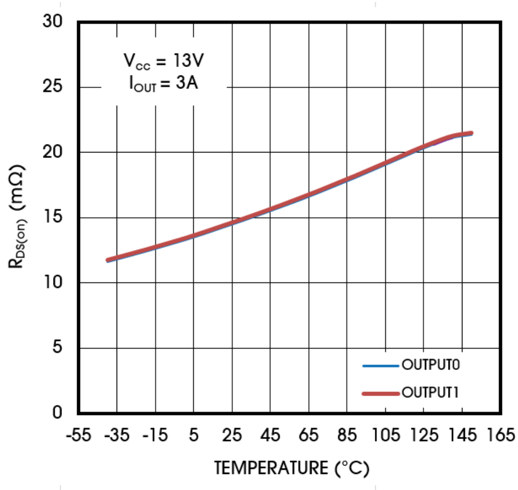

Figure 7. On-State Resistance vs. T_{case}

TBD

Figure 8. On-State Resistance vs. V_{CC}

7. Package Information

The NPH770215Q is available in the SSOP16PP package. **Figure 9** shows the package view.

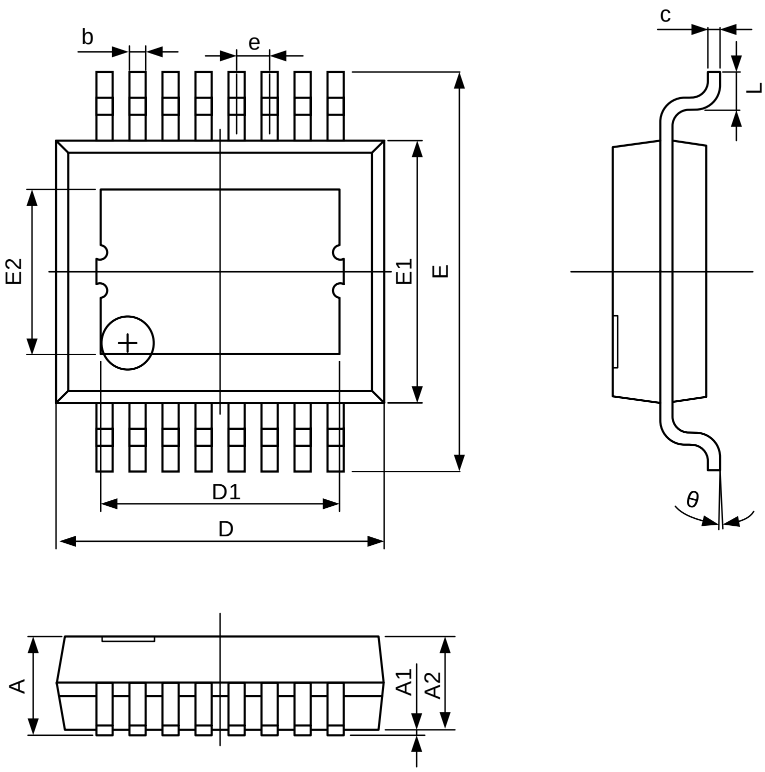

Figure 9. Package View

Table 8 provides detailed information about the dimensions.

Table 8. Dimensions

Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	**Max**	**Min**	**Max**
A	1.350	1.650	0.053	0.065
A1	0.000	0.100	0.000	0.004
A2	1.350	1.550	0.053	0.061
B	0.200	0.300	0.008	0.012
C	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
D1	3.510	3.710	0.138	0.146
E	6.050	6.200	0.238	0.244
E1	3.800	4.000	0.150	0.157
E2	2.400	2.600	0.094	0.102
E	0.500 (BSC)		0.020 (BSC)	
L	0.400	0.900	0.016	0.035
Θ	0	8	0	8

8. Tape And Reel Information

TBD