



# THE DATASHEET OF UMC5NQ-7



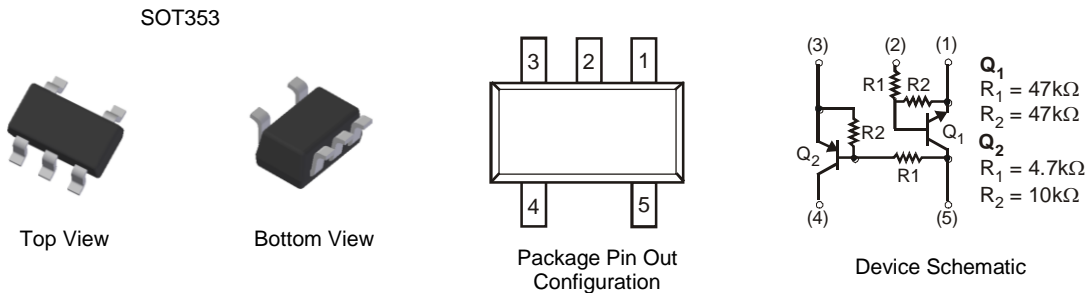
**DUAL COMPLEMENTARY PRE-BIASED TRANSISTORS**

**Features**

- Ultra-Small Surface Mount Package
- Surface Mount Package Suited for Automated Assembly
- Simplifies Circuit Design and Reduces Board Space
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

**Mechanical Data**

- Case: SOT353
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208
- Weight: 0.006 grams (Approximate)

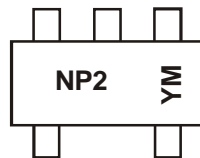


**Ordering Information** (Notes 4 & 5)

Part Number	Compliance	Marking	Reel Size (inch)	Tape Width (mm)	Quantity per Reel
UMC5NQ-7	Automotive	NP2	7	8	3,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated’s definitions of Halogen- and Antimony-free, “Green” and Lead-free.
  3. Halogen- and Antimony-free “Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**



NP2 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: E = 2017)  
 M = Month (ex: 9 = September)

Date Code Key

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	E	F	G	H	I	J	K	L	M

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

**Absolute Maximum Ratings, Pre-Biased NPN Transistor, Q<sub>1</sub>** (@T<sub>A</sub> = +25°C unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	50	V
Input Voltage	V <sub>IN</sub>	-10 to +40	V
Output Current	I <sub>O</sub>	30	mA
Collector Current	I <sub>C(MAX)</sub>	100	mA

**Absolute Maximum Ratings, Pre-Biased PNP Transistor, Q<sub>2</sub>** (@T<sub>A</sub> = +25°C unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	-50	V
Input Voltage	V <sub>IN</sub>	-20 to +7	V
Output Current	I <sub>O</sub>	-100	mA
Collector Current	I <sub>C(MAX)</sub>	-100	mA

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	290	mW
Thermal Resistance, Junction to Ambient Air (Note 6)	R <sub>θJA</sub>	430	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Note: 6. Device mounted on FR-4 PCB; pad layout as shown on Diodes Incorporated suggested pad layout document, which can be found on our website at <http://www.diodes.com/package-outlines.html>.

**Electrical Characteristics, Pre-Biased NPN Transistor, Q<sub>1</sub>** (@T<sub>A</sub> = +25°C unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	(Note 7) V <sub>I(OFF)</sub>	0.5	—	—	V	V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA
	(Note 8) V <sub>I(ON)</sub>	—	—	3	V	V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA
Output Voltage	V <sub>O(ON)</sub>	—	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5 mA
Input Current	I <sub>I</sub>	—	—	0.18	mA	V <sub>I</sub> = 5V
Output Current	I <sub>O(OFF)</sub>	—	—	0.5	μA	V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V
DC Current Gain	G <sub>I</sub>	68	—	—	—	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
Gain-Bandwidth Product (Note 9)	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = -5mA, f = 100MHz
Input Resistance	R <sub>1</sub>	32.9	47	61.1	kΩ	—
Resistance Ratio	R <sub>2</sub> /R <sub>1</sub>	0.8	1	1.2	—	—

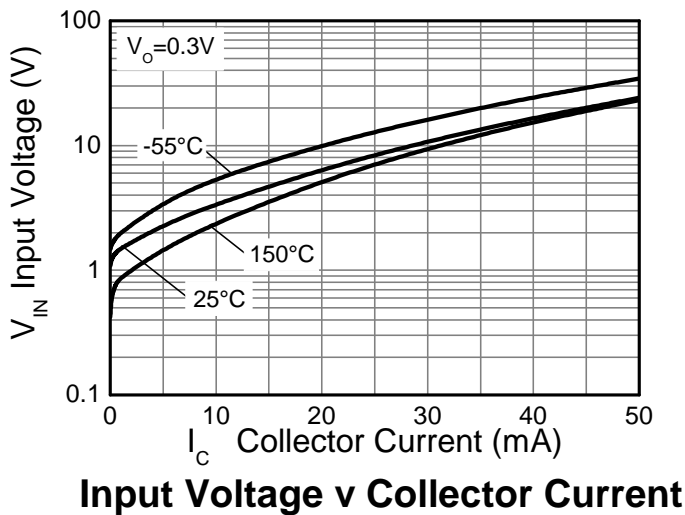
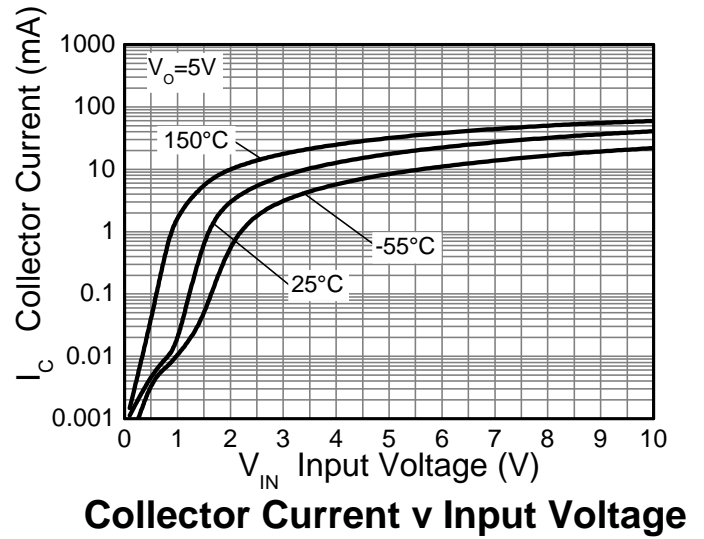
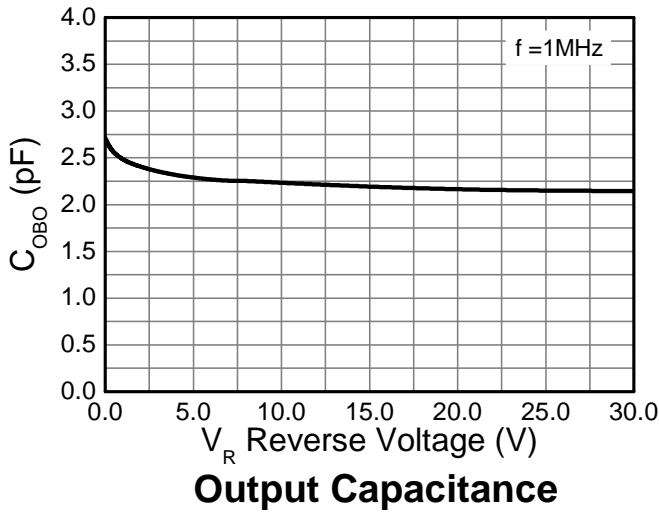
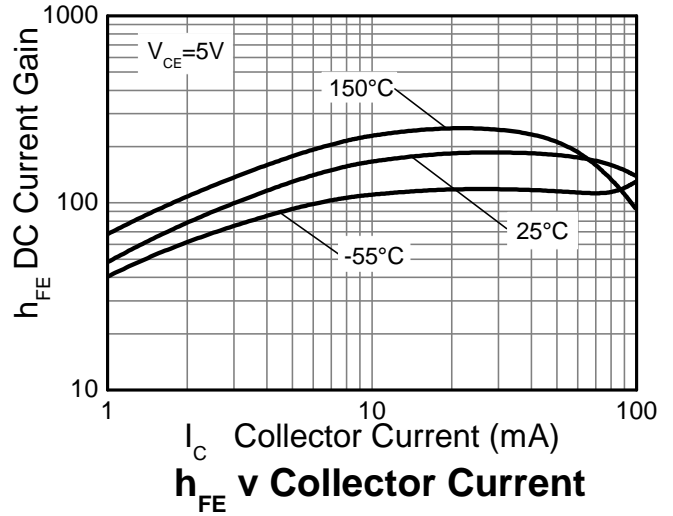
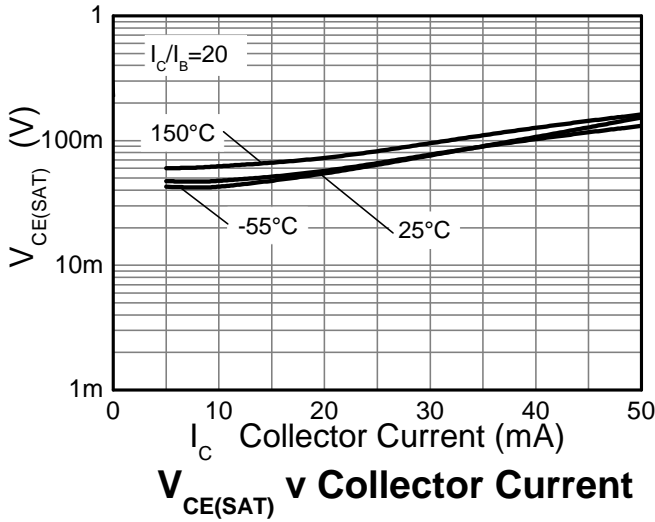
Notes: 7. The device is guaranteed to be in "OFF" state with V<sub>I(OFF)</sub> up to 0.5V.  
 8. The device is guaranteed to be in "ON" state with V<sub>I(ON)</sub> starting from 3V.  
 9. Characteristic of Transistor – for reference only.

**Electrical Characteristics, Pre-Biased PNP Transistor, Q<sub>2</sub>** (@T<sub>A</sub> = +25°C unless otherwise specified.)

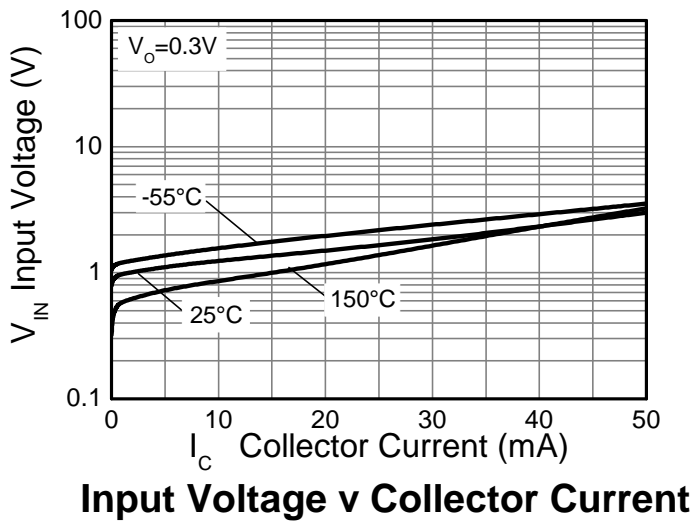
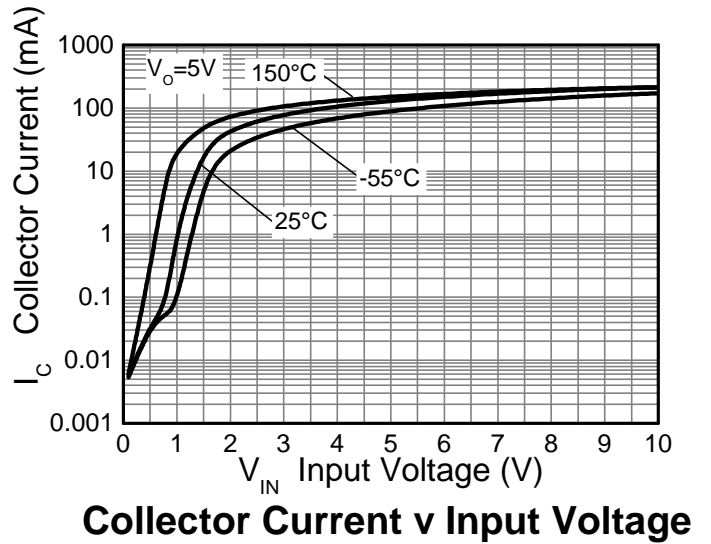
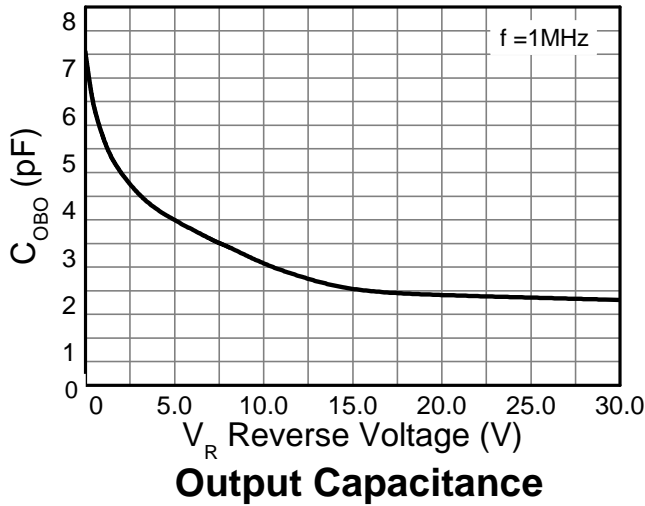
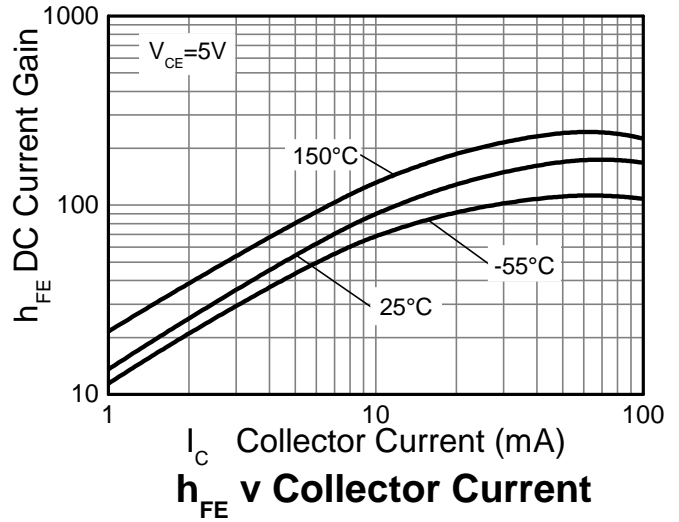
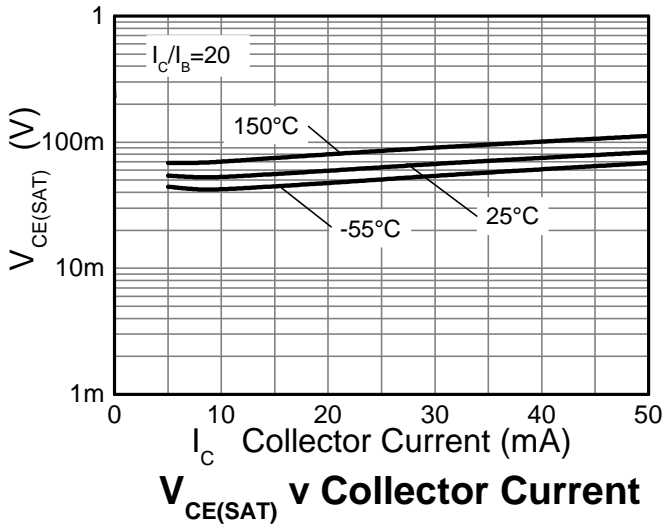
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	(Note 10) V <sub>I(OFF)</sub>	-0.3	—	—	V	V <sub>CC</sub> = -5V, I <sub>O</sub> = -100μA
	(Note 11) V <sub>I(ON)</sub>	—	—	-2.5	V	V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA
Output Voltage	V <sub>O(ON)</sub>	—	-0.1	-0.3	V	I <sub>O</sub> /I <sub>I</sub> = -10mA/-0.5 mA
Input Current	I <sub>I</sub>	—	—	-1.8	mA	V <sub>I</sub> = -5V
Output Current	I <sub>O(OFF)</sub>	—	—	-0.5	μA	V <sub>CC</sub> = -50V, V <sub>I</sub> = 0V
DC Current Gain	G <sub>I</sub>	30	—	—	—	V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA
Gain-Bandwidth Product (Note 9)	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = -10V, I <sub>E</sub> = 5mA, f = 100MHz
Input Resistance	R <sub>1</sub>	3.29	4.7	6.11	kΩ	—
Resistance Ratio	R <sub>2</sub> /R <sub>1</sub>	1.7	2.1	2.6	—	—

Notes: 10. The device is guaranteed to be in "OFF" state with V<sub>I(OFF)</sub> up to -0.3V.  
 11. The device is guaranteed to be in "ON" state with V<sub>I(ON)</sub> starting from -2.5V.

**Typical Electrical Characteristics – NPN Section** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



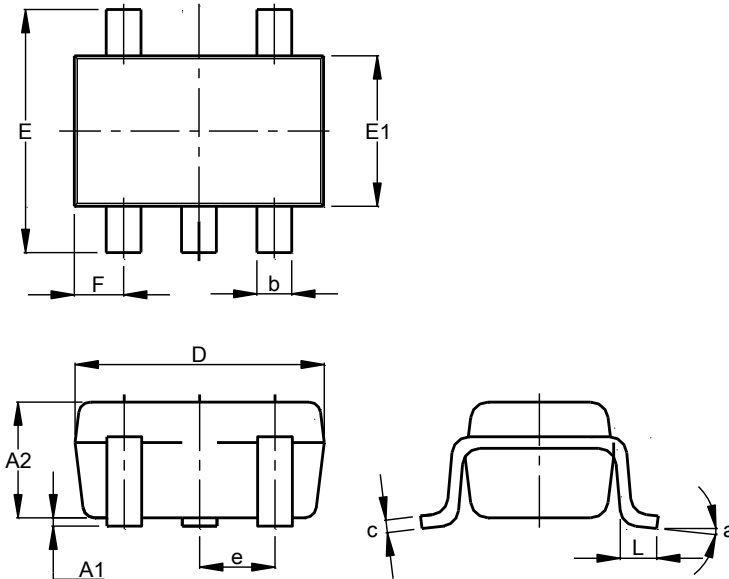
**Typical Electrical Characteristics – PNP Section** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

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

**SOT353**

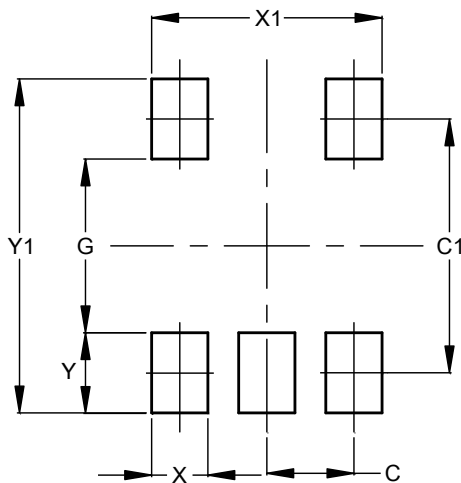


SOT353			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	1.00
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT353**



Dimensions	Value (in mm)
C	0.650
C1	1.900
G	1.300
X	0.420
X1	1.720
Y	0.600
Y1	2.500

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