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NCD57001F is a variant of NCD57001 with reduced Soft−Turn−Off time suited to drive large IGBTs or power modules. NCD57001F is a high−current single channel IGBT driver with internal galvanic isolation, designed for high system efficiency and reliability in high power applications. Its features include complementary inputs, open drain FAULT and Ready outputs, active Miller clamp, accurate UVLOs, DESAT protection, and soft turn−off at DESAT. NCD57001F accommodates both 5 V and 3.3 V signals on the input side and wide bias voltage range on the driver side including negative voltage capability. NCD57001F provides >5 kVrms (UL1577 rating) galvanic isolation and >1200 V_{iorm} (working voltage) capabilities. NCD57001F is available in the wide−body SOIC−16 package with guaranteed 8 mm creepage distance between input and output to fulfill reinforced safety insulation requirements.

Features

- High Current Output (+4/−6 A) at IGBT Miller Plateau Voltages
- Low Output Impedance for Enhanced IGBT Driving
- Short Propagation Delays with Accurate Matching
- Active Miller Clamp to Prevent Spurious Gate Turn−on
- DESAT Protection with Programmable Delay
- Typ 550 ns Soft Turn Off during IGBT Short Circuit
- IGBT Gate Clamping during Short Circuit
- IGBT Gate Active Pull Down
- Tight UVLO Thresholds for Bias Flexibility
- Wide Bias Voltage Range including Negative VEE2
- 3.3 V to 5 V Input Supply Voltage
- 5000 V Galvanic Isolation (to meet UL1577 requirements)
- 1200 V Working Voltage (per VDE0884−10 requirements)
- High transient immunity
- High electromagnetic immunity
- This Device is Pb−Free, Halogen Free/BFR Free and is RoHS Compliant

Typical Applications

- Automotive Power Supplies
- HEV/EV Powertrain
- BSG Inverter
- PTC Heater

SOIC−16 WB
CASE 751G−03

MARKING DIAGRAM

XXXXXXXXX	= Specific Device Code
A	= Assembly Location
WL	= Wafer Lot
YY	= Year
WW	= Work Week

PIN CONNECTIONS

ORDERING INFORMATION

See detailed ordering and shipping information on page 10 of this data sheet.

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NCD57001F

Table 1. PIN FUNCTION DESCRIPTION

Pin Name	No.	I/O	Description
V_{EE2A}	1	Power	Output side negative power supply. A good quality bypassing capacitor is required from these pins to GND2 and should be placed close to the pins for best results. Connect it to GND2 for unipolar supply application.
V_{EE2}	8		
DESAT	2	I/O	Input for detecting the desaturation of IGBT due to a short circuit condition. An internal constant current source $I_{DESAT-CHG}$ charging an external capacitor connected to this pin allows a programmable blanking delay every ON cycle before DESAT fault is processed, thus preventing false triggering. When the DESAT voltage goes up and reaches $V_{DESAT-THR}$, the output is driven low.

SAFETY AND INSULATION RATINGS

Symbol	Parameter		Value	Unit
	Installation Classifications per DIN VDE 0110/1.89 Table 1 Rated Mains Voltage	< 150 V_{RMS}	I − IV	
		< 300 V_{RMS}	I − IV	
		< 450 V_{RMS}	I − IV	
		< 600 V_{RMS}	I − IV	
		< 1000 V_{RMS}	I − III	
CTI	Comparative Tracking Index (DIN IEC 112/VDE 0303 Part 1)		600	
	Climatic Classification		−	
	Polution Degree (DIN VDE 0110/1.89)		−	
V_{PR}	Input−to−Output Test Voltage, Method b, V_{IORM} x 1.875 = V_{PR}, 100% Production Test with tm = 1 s, Partial Discharge < 5 pC		2250	V_{pk}
	Input−to−Output Test Voltage, Method a, V_{IORM} x 1.6 = V_{PR}, Type and Sample Test with tm = 10 s, Partial Discharge < 5 pC		−	V_{pk}
V_{IORM}	Maximum Repetitive Peak Voltage		1200	V_{pk}
V_{IOWM}	Maximum Working Insulation Voltage		870	V_{RMS}
V_{IOTM}	Highest Allowable Over Voltage		8400	V_{pk}
E_{CR}	External Creepage		8.0	mm
E_{CL}	External Clearance		8.0	mm
DTI	Insulation Thickness		17.3	um
T_{Case}	Safety Limit Values – Maximum Values in Failure; Case Temperature		150	°C
$P_{S,INPUT}$	Safety Limit Values – Maximum Values in Failure; Input Power		36	mW
$P_{S,OUTPUT}$	Safety Limit Values – Maximum Values in Failure; Output Power		1364	mW
R_{IO}	Insulation Resistance at TS, V_{IO} = 500 V		10^9	Ω

Table 2. ABSOLUTE MAXIMUM RATINGS (Note 1) Over operating free−air temperature range unless otherwise noted

Parameter	Symbol	Minimum	Maximum	Unit
Supply voltage, input side	V_{DD1}			

Table 4. OPERATING RANGES (Note 6)

Parameter	Symbol	Min	Max	Unit
Supply voltage, input side	V_{DD1}−GND1	UVLO1	5.5	V

Table 5. ELECTRICAL CHARACTERISTICS (V_{DD1} = 5 V, V_{DD2} = 15 V, V_{EE2} = −8 V.) (continued)
For typical values T_A = 25°C, for min/max values, T_A is the operating ambient temperature range that applies, unless otherwise noted.

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
LOGIC INPUT AND OUTPUT						
IN+, IN−, $\overline{RST}$ Low Input Voltage		V				

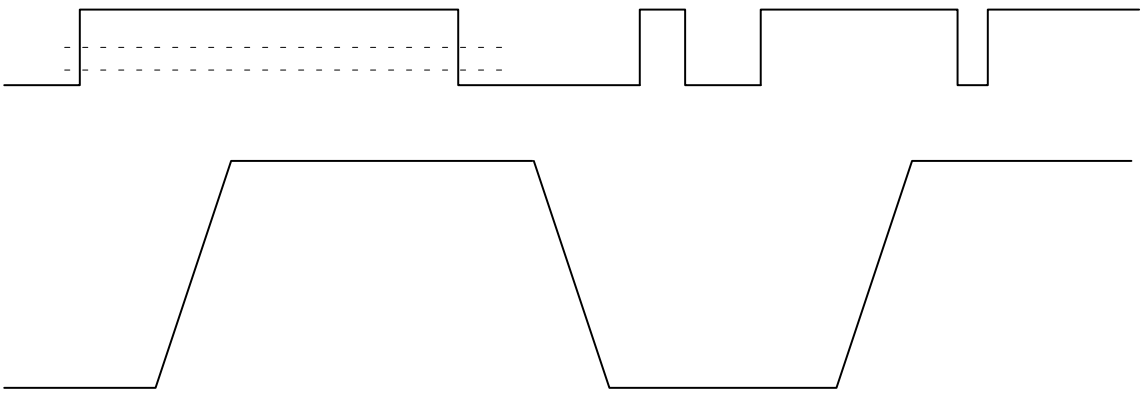

Figure 3. Simplified Block Diagram

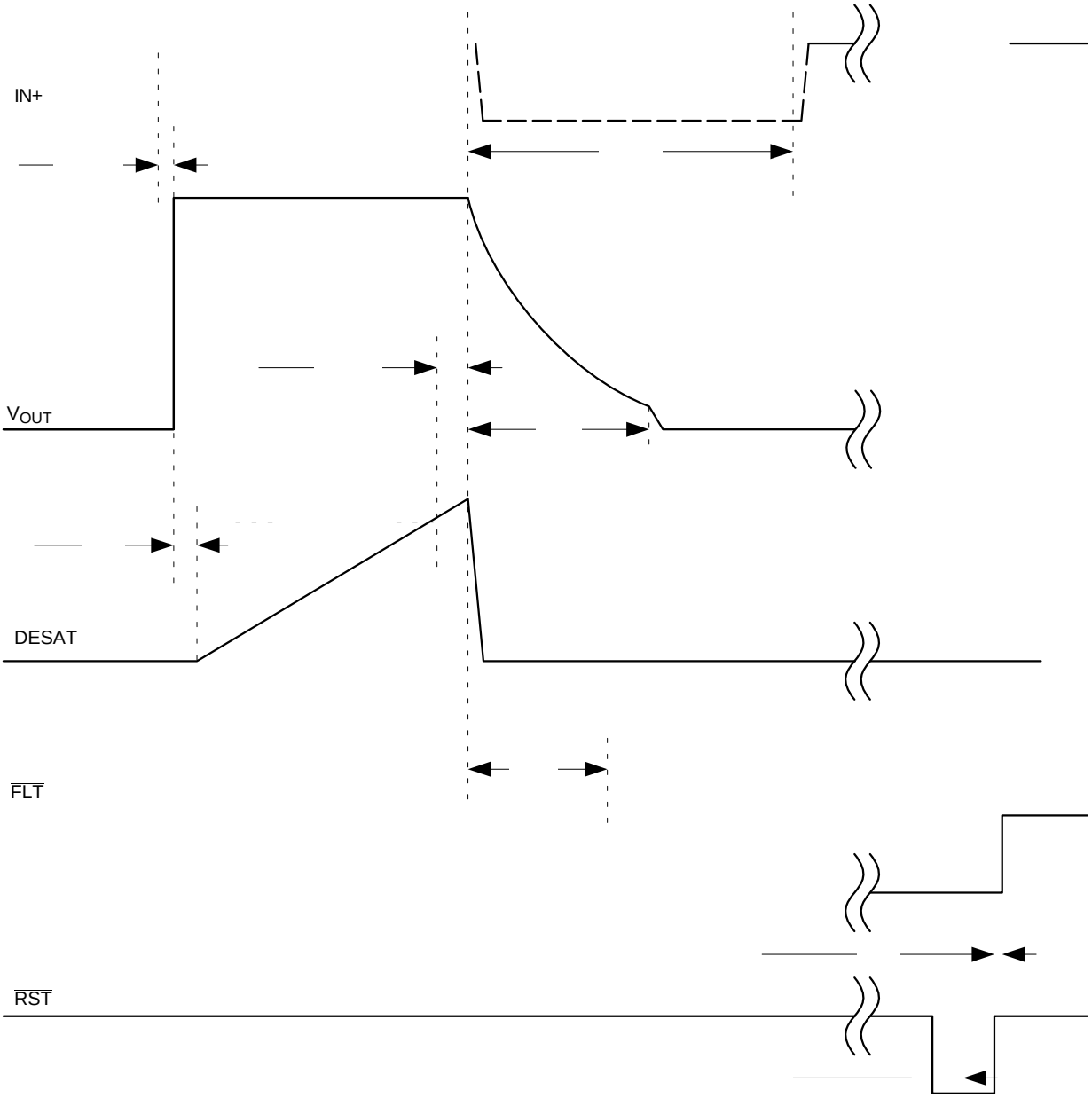

Figure 5. UVLO Waveform

SOIC

−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

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