



TND511MD ExPD(Excellent Power Device)

3-phase Motor Drive Application

Features

- 3-phase high side driver.
- Monolithic structure.
- Allows simplified configuration of driver circuit.
- Withstand voltage of 600V is assured.
- Fully compatible input to LSTTL/CMOS.
- High-speed switching.
- Output current : 170mA Source, 340mA Sink.

Specifications

Absolute Maximum Ratings at Ta=25°C (All voltage parameters are absolute voltage referenced to GND)

Parameter	Symbol	Conditions	Ratings	Unit
High Side Floating Supply Voltage	V _H		-0.3 to 625	V
High Side Floating Supply Offset Voltage	V _{FG}		V _H -25 to V _H +0.3	V
High Side Output Voltage	V _{OUT}		V _{FG} -0.3 to V _H +0.3	V
Logic Supply Voltage	V _{DD}		-0.3 to 25	V
Logic Input Voltage(U _{IN} , V _{IN} , W _{IN})	V _{IN}		-0.3 to V _{DD} +0.3	V
Allowable Power Dissipation	P _D	Mounted on a ceramic board (250mm ² ×0.8mm)	0.9	W
Junction Temperature	T _J		-55 to +150	°C
Storage Temperature	T _{stg}		-55 to +150	°C

Recommended Operating Conditions at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
High Side Floating Supply Voltage	V _H		V _{FG} +10 to V _{FG} +20	V
High Side Floating Supply Offset Voltage	V _{FG}		0 to 600	V
High Side Output Voltage	V _{OUT}		V _{FG} to V _H	V
Logic Supply Voltage	V _{DD}		+10 to +20	V
Logic Input Voltage(U _{IN} , V _{IN} , W _{IN})	V _{IN}		0 to V _{DD}	V
Ambient Temperature	T _{opr}		-40 to +125	°C

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AC Characteristics at Ta=25°C (VDD=VH-VFG=15V, CL=1000pF)

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Turn-ON Delay Time	t _{on}	V _{FG} =0V		130		ns
Turn-OFF Delay Time	t _{off}	V _{FG} =600V		110		ns
Turn-ON Rise Time	t _r			110		ns
Turn-OFF Fall Time	t _f			40		ns
Turn-ON Delay Matching of U, V and W *	Mt _{on}	t _{onu} -t _{onv} , t _{onv} -t _{onw} , t _{onw} -t _{onu}		30		ns
Turn-OFF Delay Matching of U, V and W *	Mt _{off}	t _{offu} -t _{offv} , t _{offv} -t _{offw} , t _{offw} -t _{offu}		30		ns

* U, V and W are the phases, refer to Block Diagram.

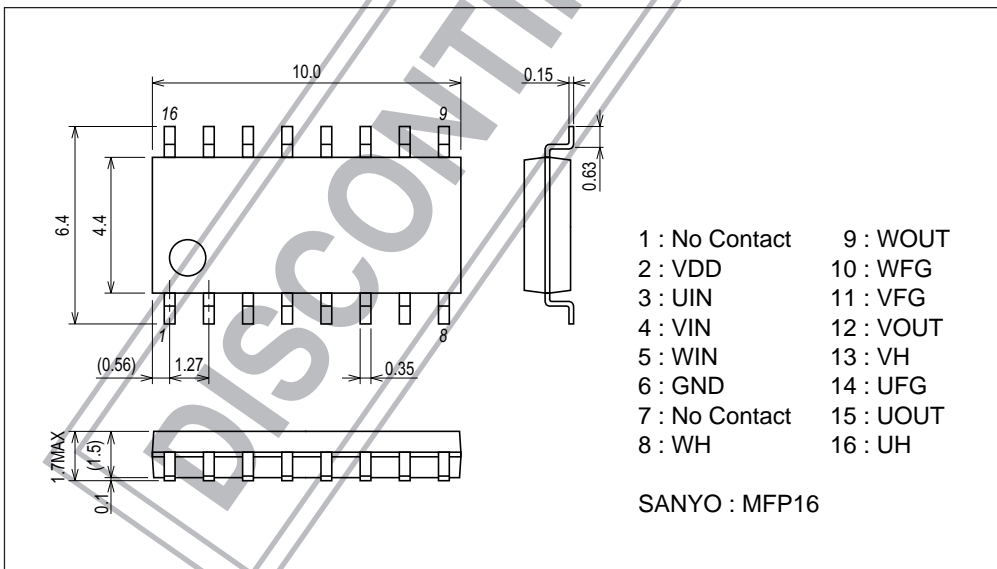
DC Characteristics at Ta=25°C (VDD=VH-VFG=15V)

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Logic "1" Input Voltage	V _{IH}	V _{DD} =10 to 20V	3.0			V
Logic "0" Input Voltage	V _{IL}	V _{DD} =10 to 20V			0.8	V
High-level Output Voltage, V _{BIAS} -V _O	V _{OH}	V _{IN} =V _{IH} , I _O =0A			0.1	V
Low-level Output Voltage, V _O	V _{OL}	V _{IN} =V _{IL} , I _O =0A			0.1	V
Offset Supply Leakage Current	I _{LK}	V _H =V _{FG} =600V			10	μA
Quiescent V _H Supply Current	I _{QH}	V _{IN} =0V or V _{DD}		50	100	μA
Quiescent V _{DD} Supply Current	I _{QDD}	V _{IN} =0V or V _{DD}		140	230	μA
Logic "1" Input Bias Current	I _{IN+}	V _{IN} =V _{DD}		20	55	μA
Logic "0" Input Bias Current	I _{IN-}	V _{IN} =0V			1	μA
V _H Supply Undervoltage Positive Going Threshold	V _{HUV+}		7.6	8.9	9.9	V
V _H Supply Undervoltage Negative Going Threshold	V _{HUV-}		6.7	8.1	9.5	V
V _{DD} Supply Undervoltage Positive Going Threshold	V _{DDUV+}		7.6	8.9	9.9	V
V _{DD} Supply Undervoltage Negative Going Threshold	V _{DDUV-}		6.7	8.1	9.5	V
Output High Short Circuit Pulsed Current	I _{O+}	V _{OUT} =0V, V _{IN} =15V, PW≤10μs	170	200		mA
Output Low Short Circuit Pulsed Current	I _{O-}	V _{OUT} =15V, V _{IN} =0V, PW≤10μs	340	400		mA

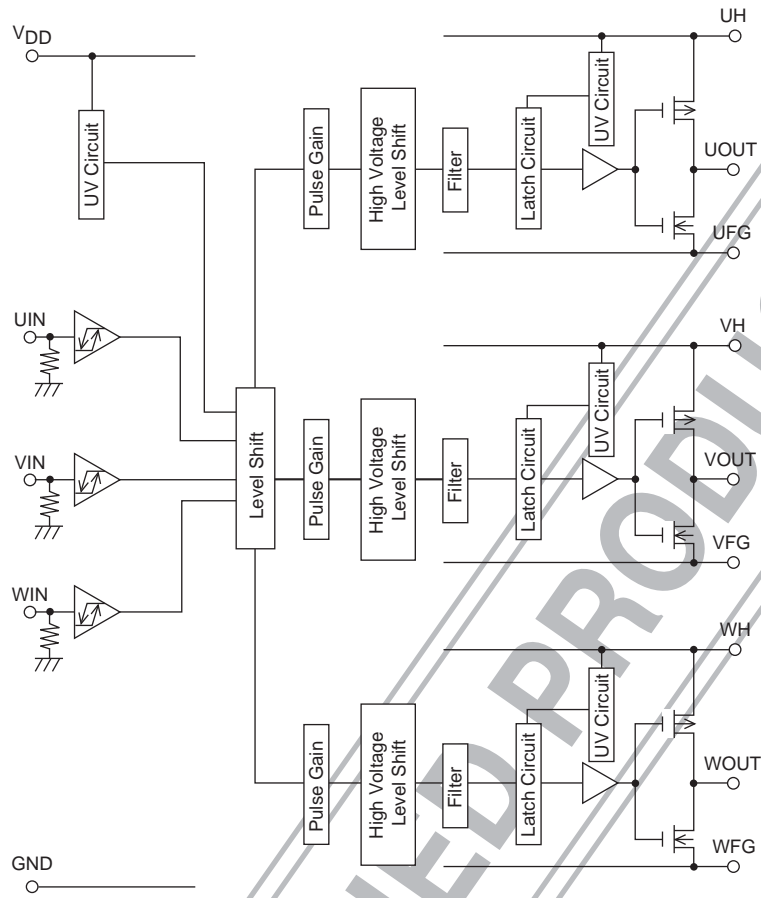
Package Dimensions

unit : mm (typ)

7050A-002

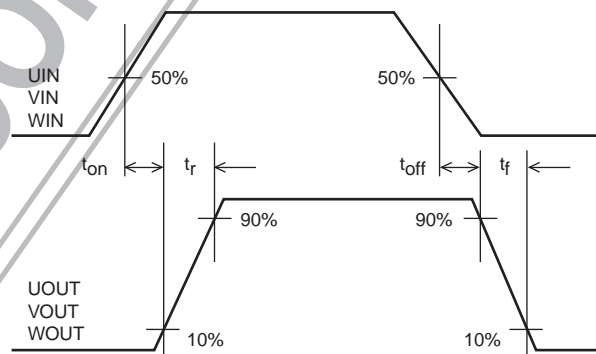


Block Diagram



IT10899

Switching Time Waveform Definition



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*Attention to input signals of short pulse width

The input signals whose pulse width is $0.5\mu\text{s}$ or shorter must not enter TND511MD. When such a signal enters, the following correspondences are necessary.

Please be sure to connect to the input terminal (UIN, VIN and WIN) an external filter circuit composed of a resistor and a capacitor whose equivalent Time Constant is above $R=1\text{k}\Omega / C=2200\text{pF}$. It is for the purpose of cutting these unwanted input signals. Because when such a signal enters the input terminal, the output (UOUT, VOUT and WOUT) sometimes does not return to "LOW" but always keep at "HIGH".

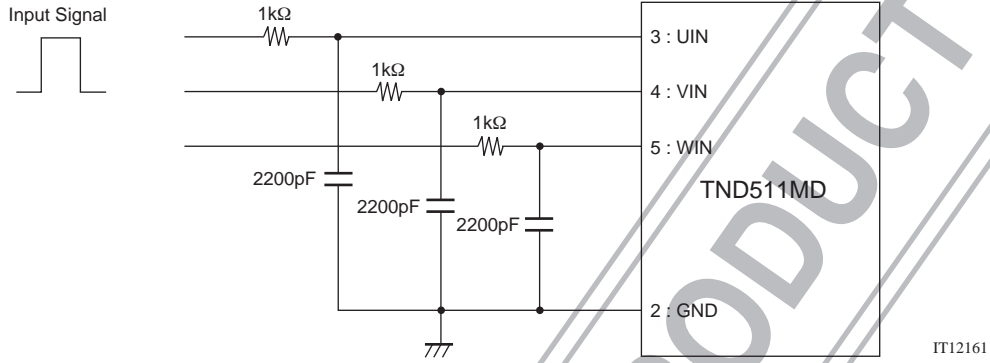
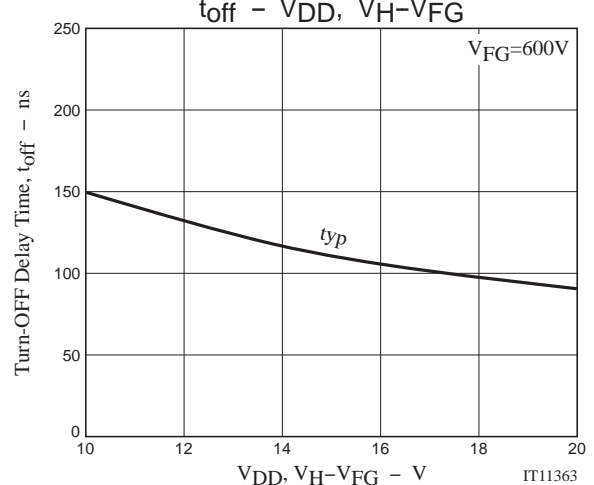
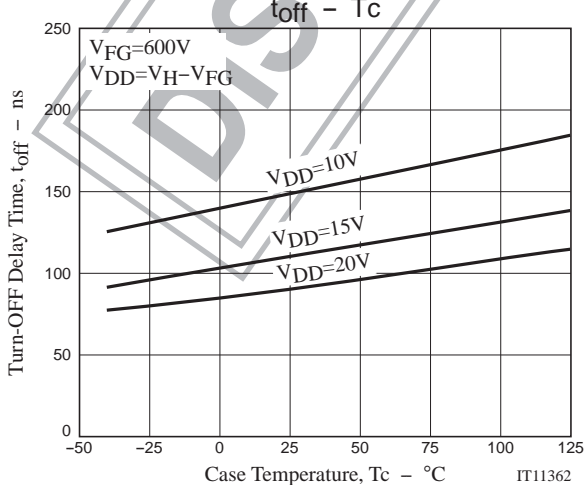
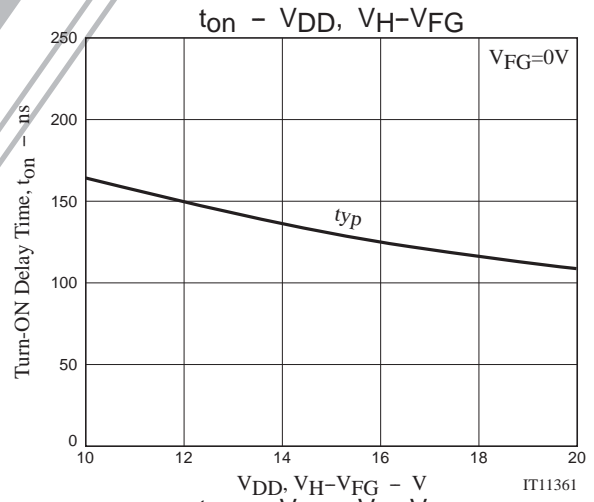
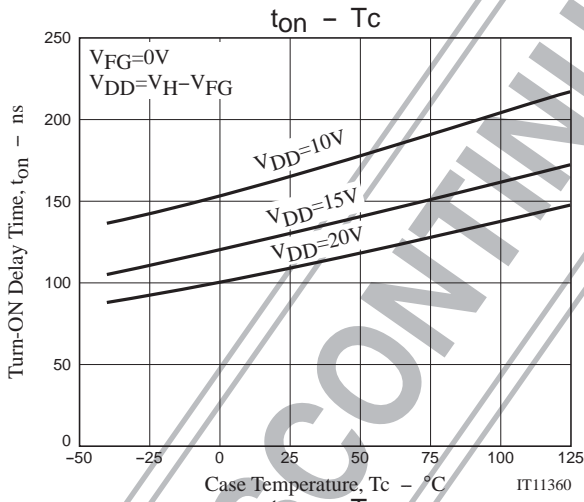
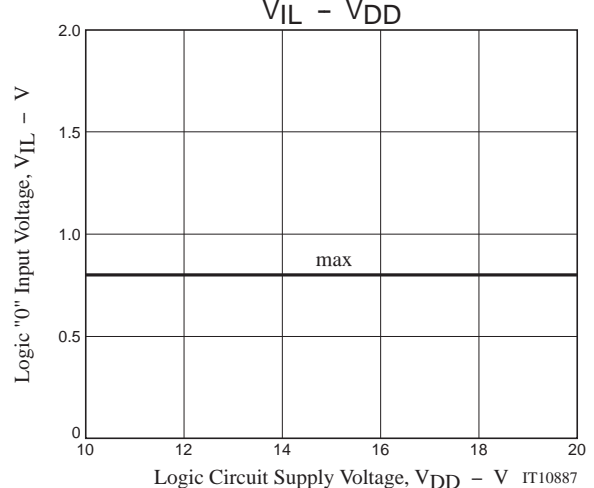
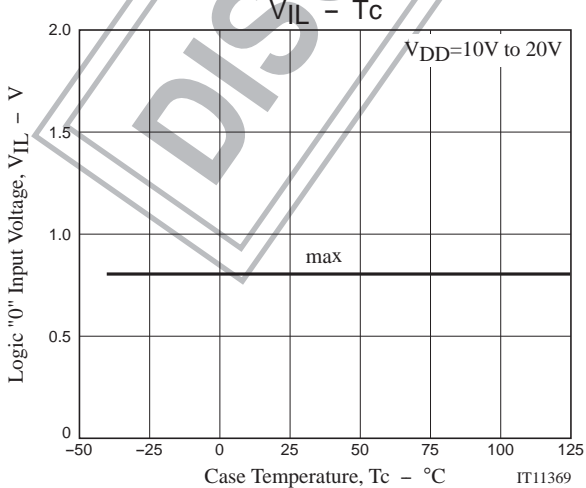
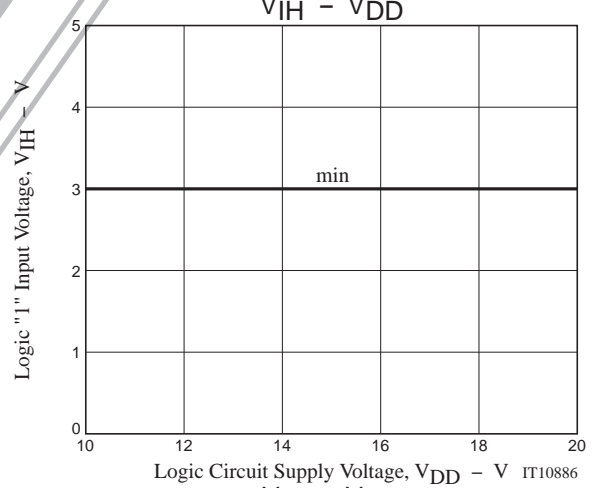
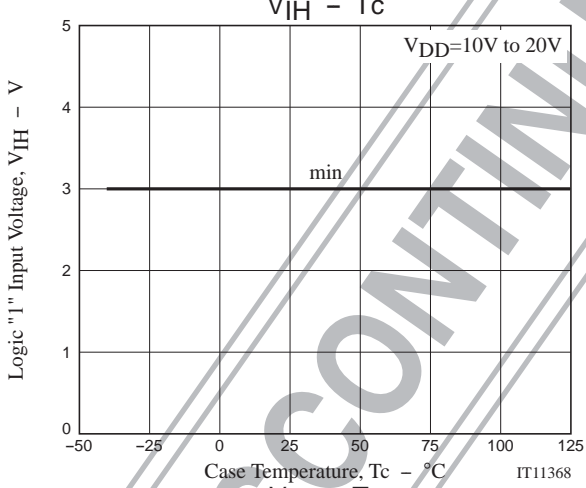
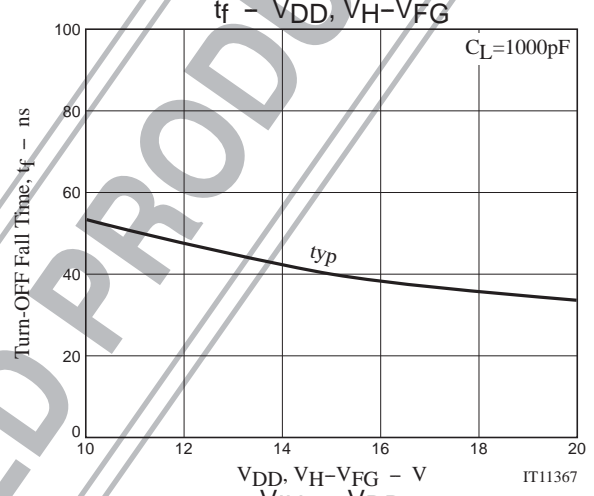
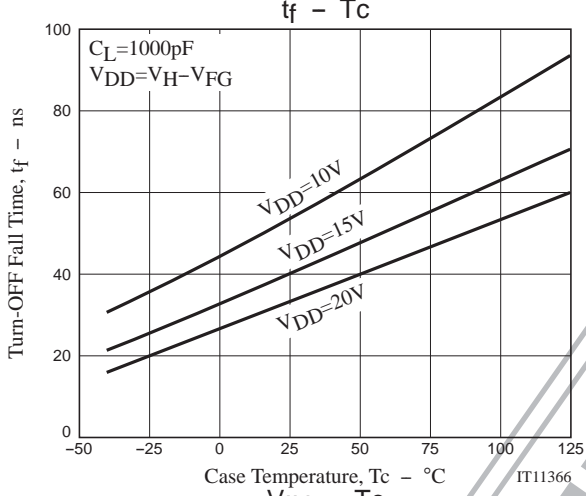
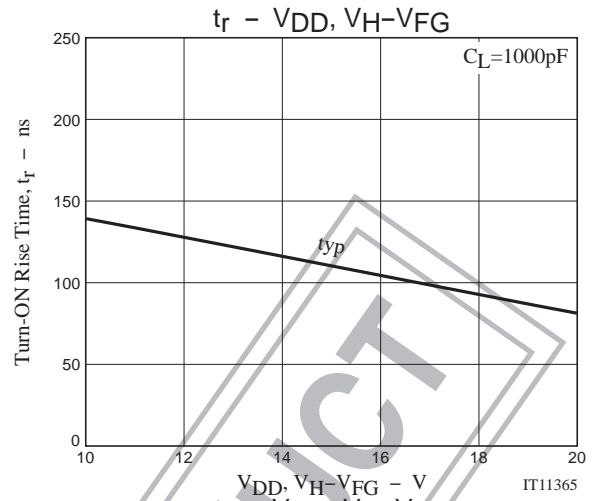
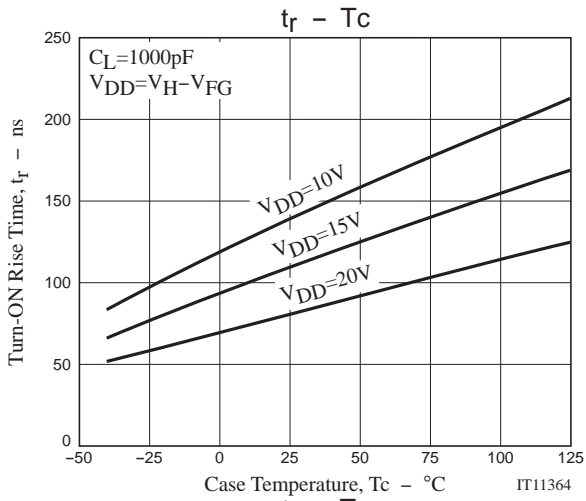


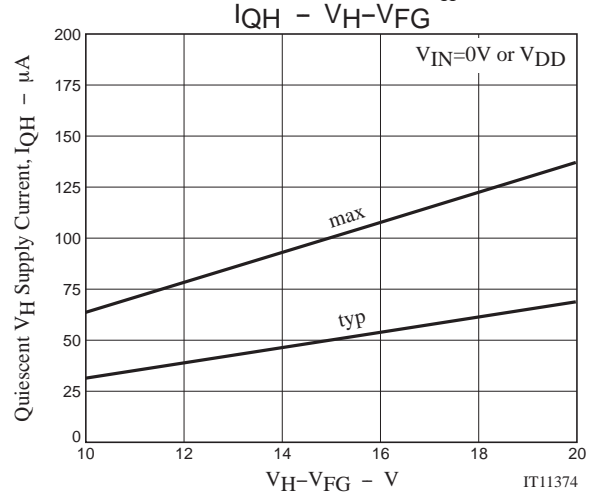
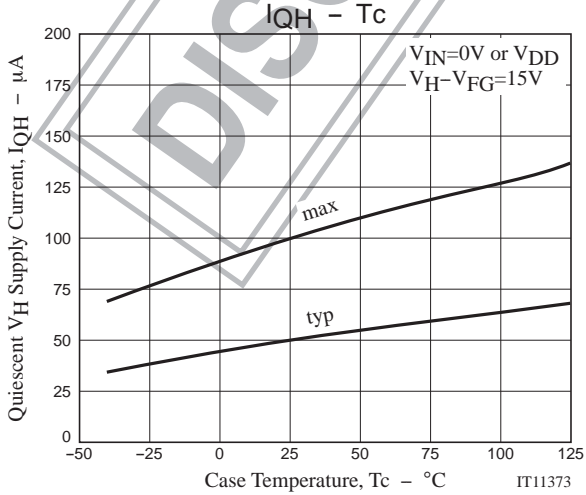
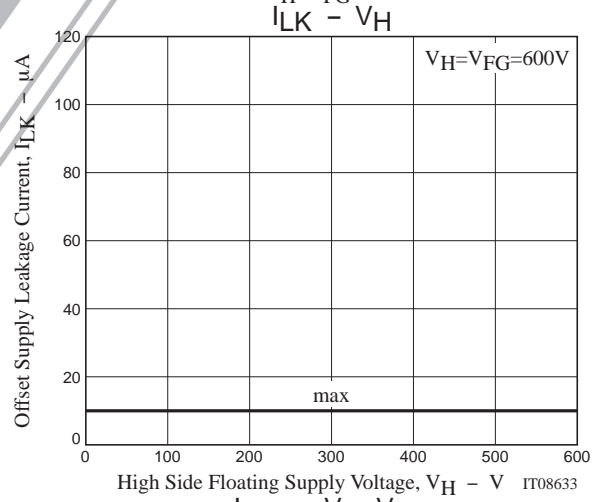
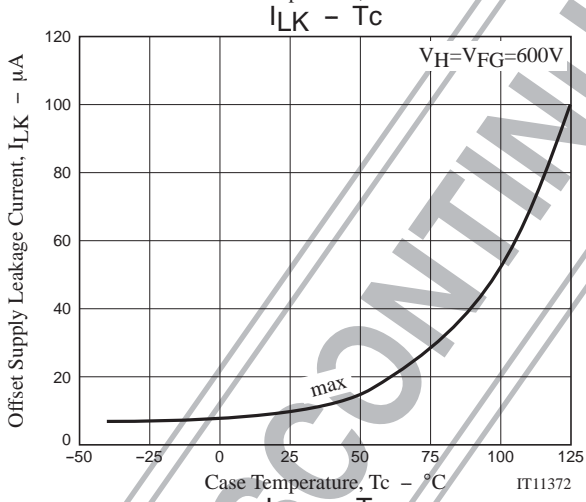
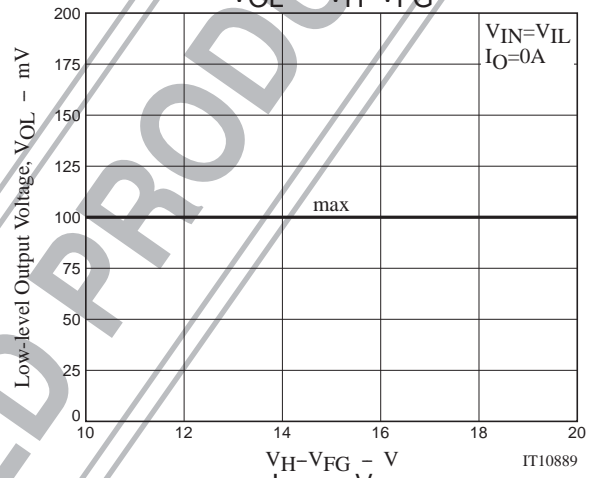
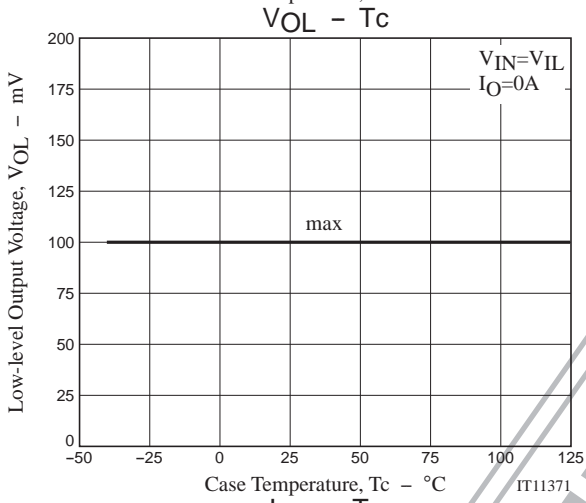
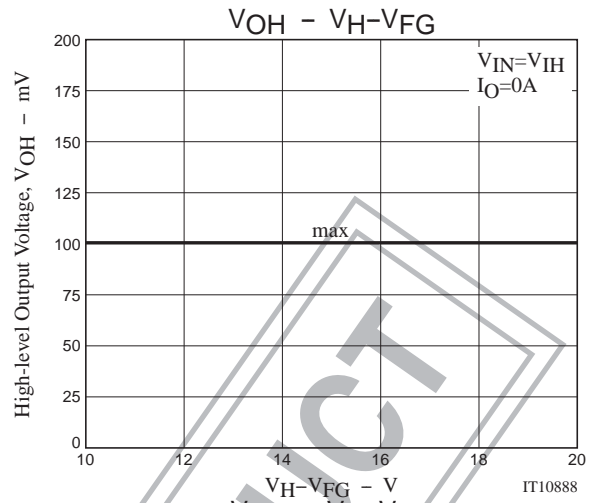
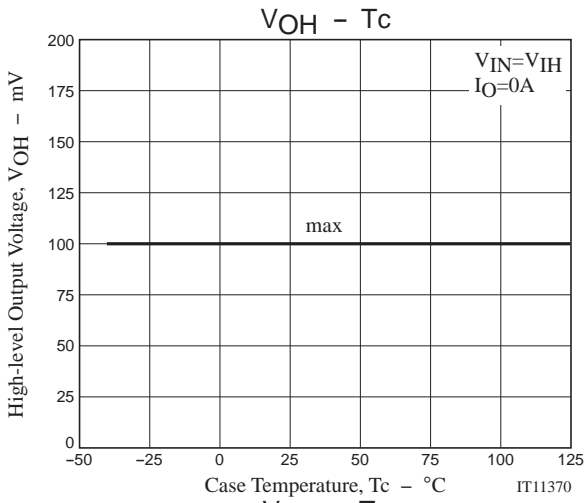
Figure: External CR Filter Circuit



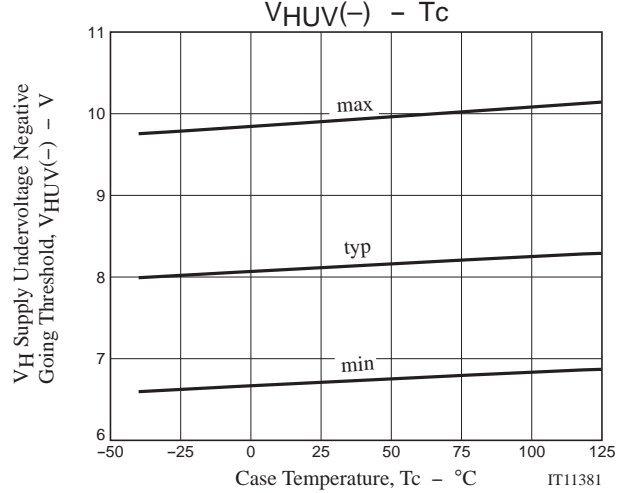
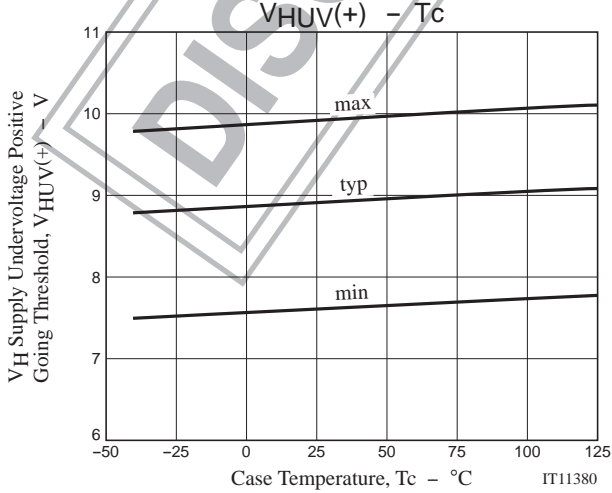
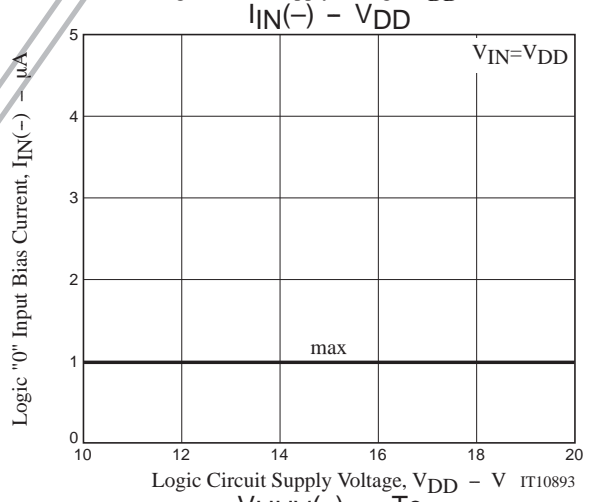
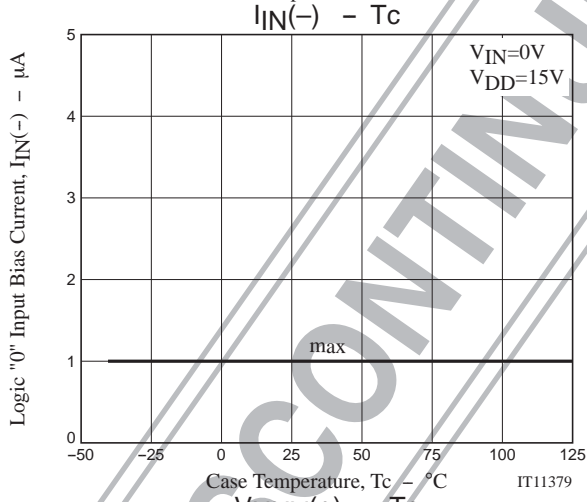
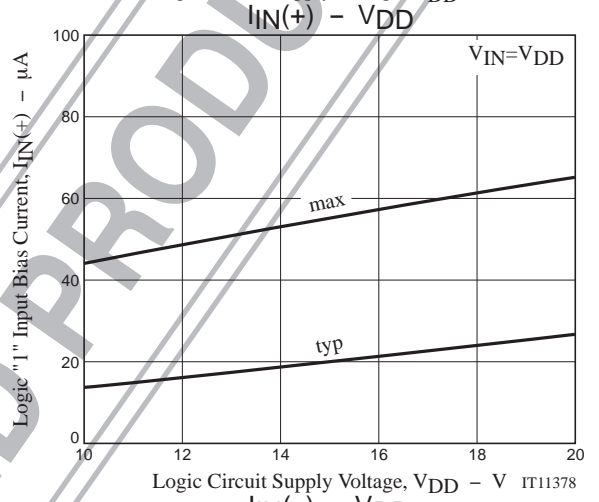
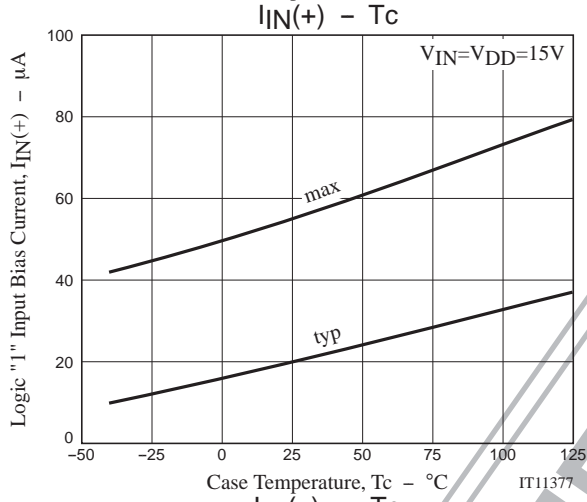
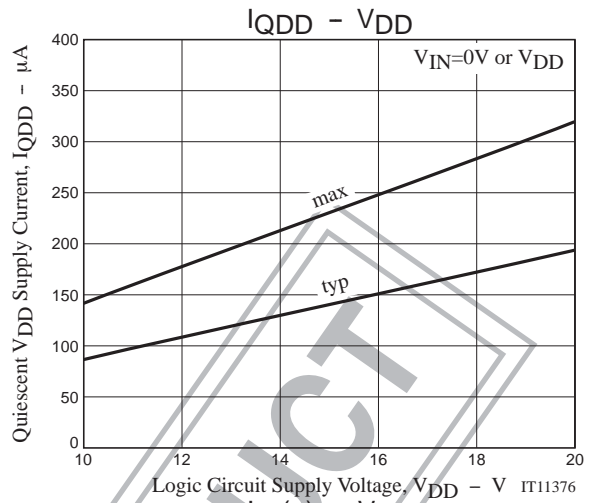
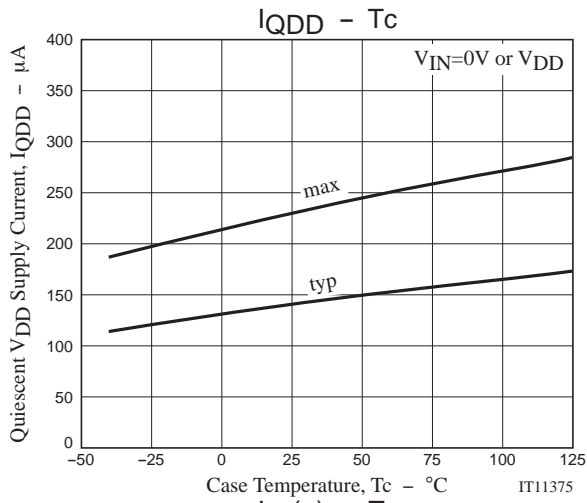
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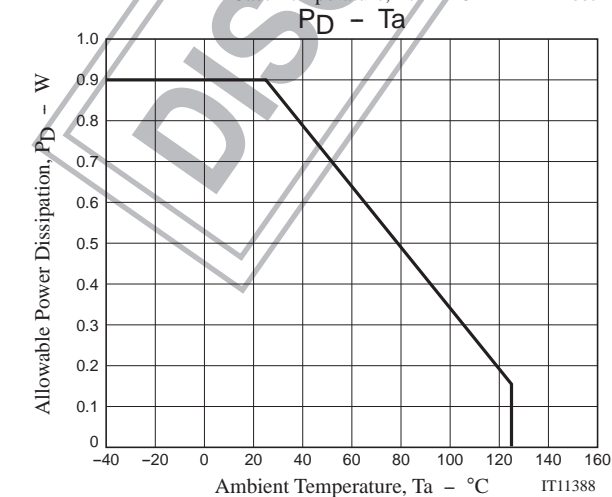
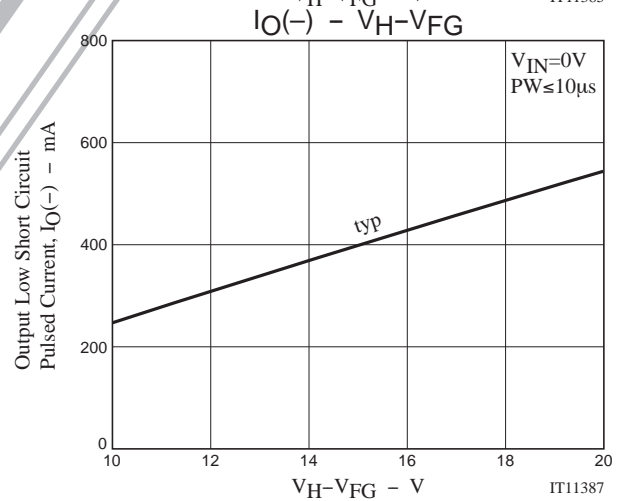
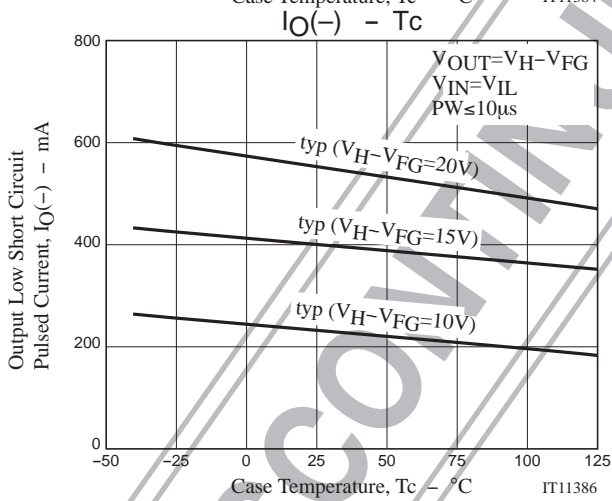
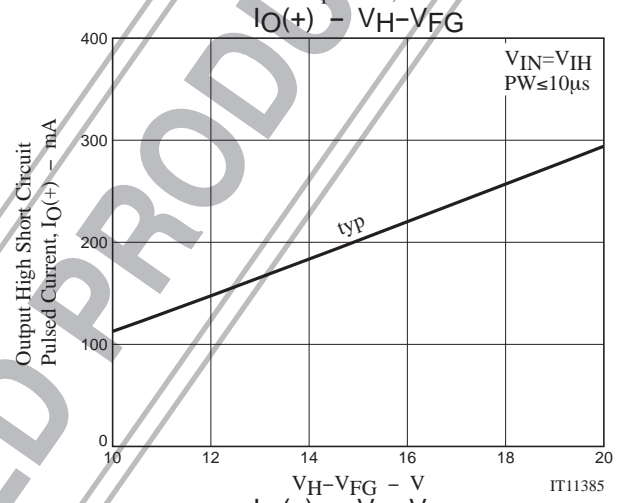
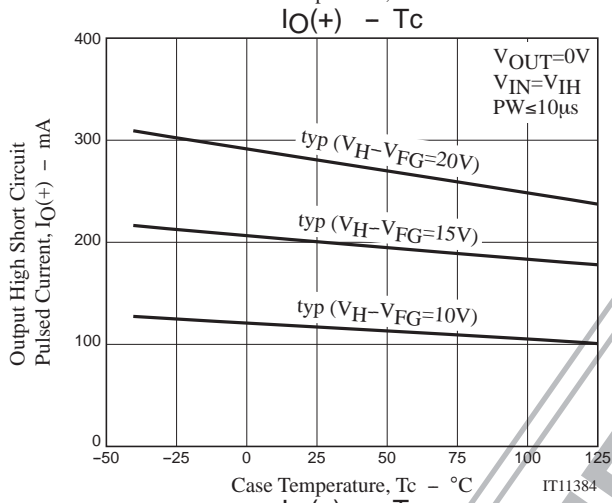
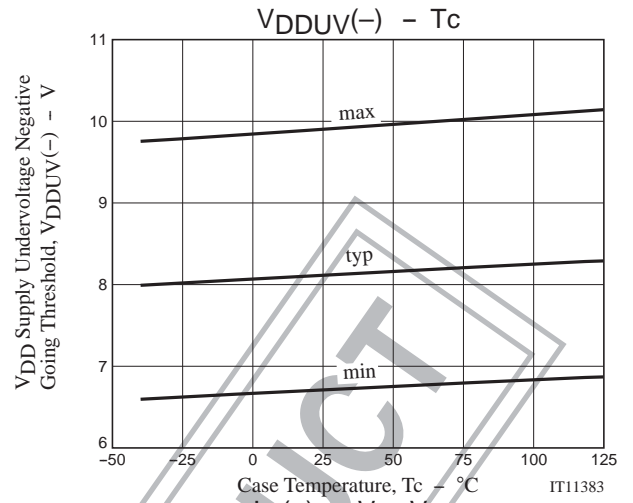
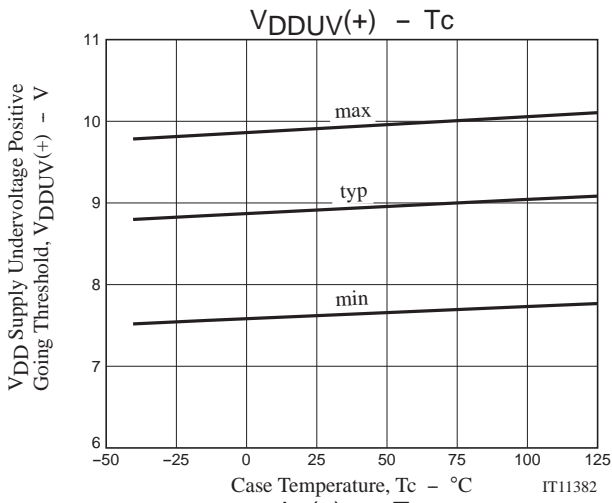
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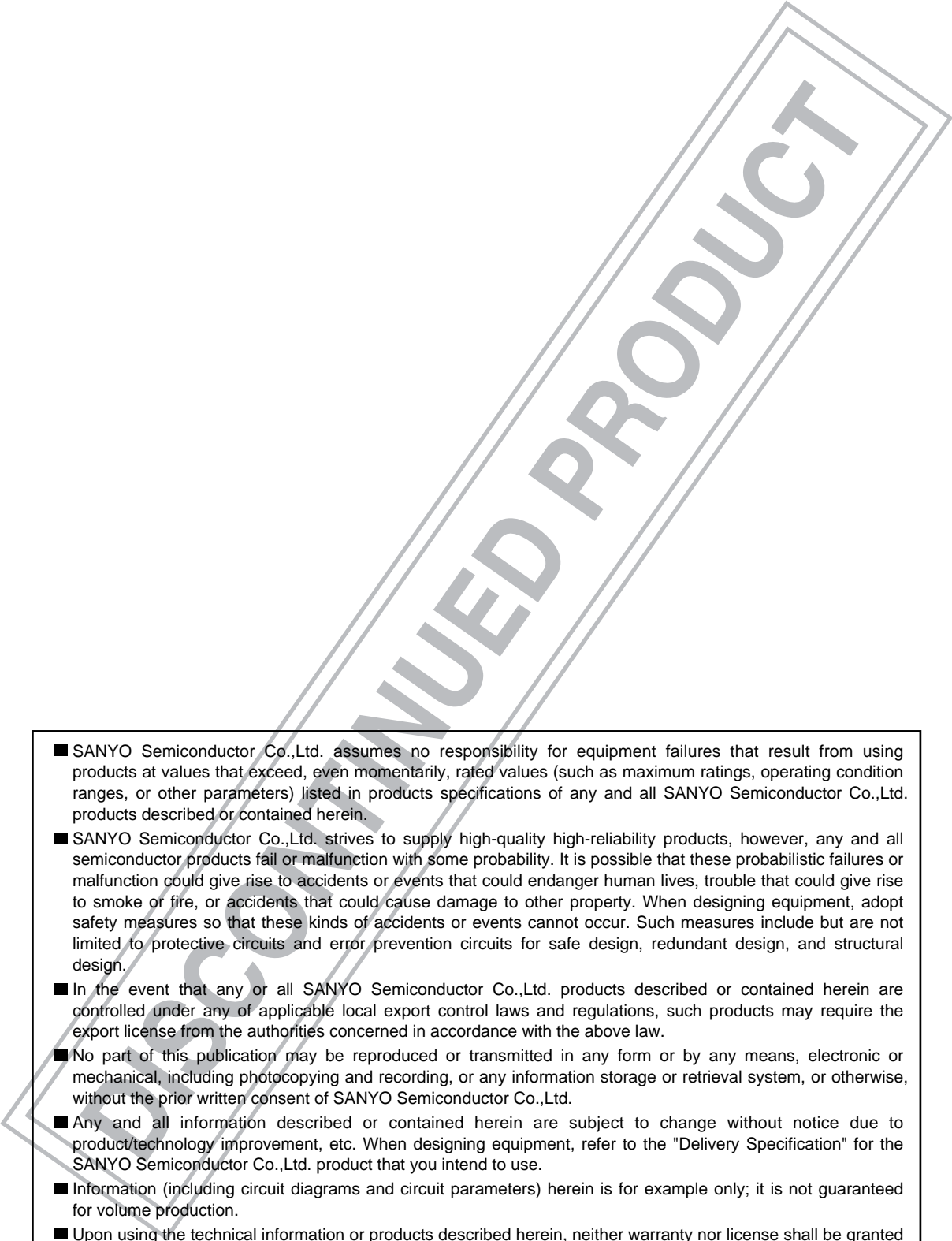


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