dsPIC30F4011/4012 Enhanced Flash 16-bit Digital Signal Controller

Note: This data sheet summarizes features of this group of dsPIC30F devices and is not intended to be a complete reference source. For more information on the CPU, peripherals, register descriptions and general device functionality, refer to the *dsPIC30F Family Reference Manual* (DS70046). For more information on the device instruction set and programming, refer to the *dsPIC30F Programmer's Reference Manual* (DS70030).

High Performance Modified RISC CPU:

- Modified Harvard architecture
- C compiler optimized instruction set architecture with flexible addressing modes
- 84 base instructions
- 24-bit wide instructions, 16-bit wide data path
- 48 Kbytes on-chip Flash program space (16K Instruction words)
- 2 Kbytes of on-chip data RAM
- 1 Kbytes of non-volatile data EEPROM
- Up to 30 MIPs operation:
  - DC to 40 MHz external clock input
  - 4 MHz-10 MHz oscillator input with PLL active (4x, 8x, 16x)
- 30 interrupt sources
  - 3 external interrupt sources
  - 8 user selectable priority levels for each interrupt source
  - 4 processor trap sources
- 16 x 16-bit working register array

DSP Engine Features:

- Dual data fetch
- Accumulator write back for DSP operations
- Modulo and Bit-Reversed Addressing modes
- Two, 40-bit wide accumulators with optional saturation logic
- 17-bit x 17-bit single cycle hardware fractional/integer multiplier
- All DSP instructions single cycle
- ± 16-bit single cycle shift

Peripheral Features:

- High current sink/source I/O pins: 25 mA/25 mA
- Timer module with programmable prescaler:
  - Five 16-bit timers/counters; optionally pair 16-bit timers into 32-bit timer modules
- 16-bit Capture input functions
- 16-bit Compare/PWM output functions
- 3-wire SPI™ modules (supports 4 Frame modes)
- I^2C™ module supports Multi-Master/Slave mode and 7-bit/10-bit addressing
- 2 UART modules with FIFO Buffers
- 1 CAN modules, 2.0B compliant

Motor Control PWM Module Features:

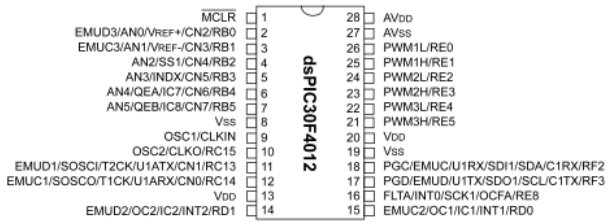
- 6 PWM output channels
  - Complementary or Independent Output modes
  - Edge and Center Aligned modes
- 3 duty cycle generators
- Dedicated time base
- Programmable output polarity
- Dead-time control for Complementary mode
- Manual output control
- Trigger for A/D conversions

Quadrature Encoder Interface Module Features:

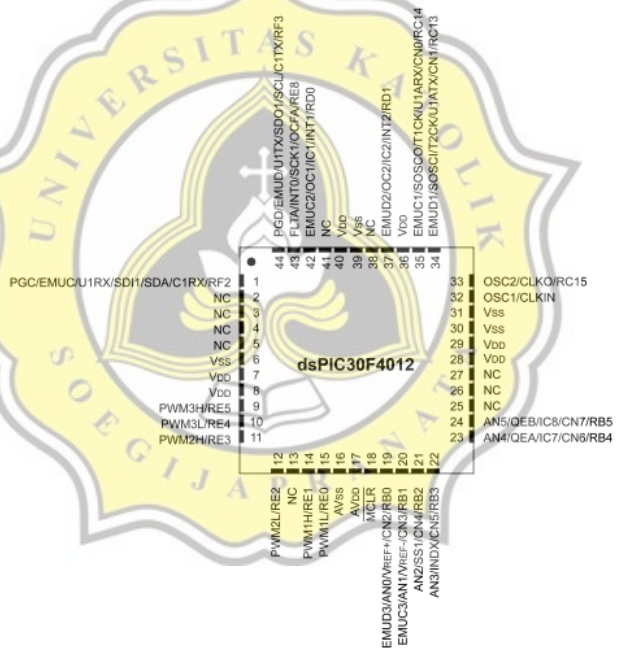
- Phase A, Phase B and Index Pulse input
- 16-bit up/down position counter
- Count direction status
- Position Measurement (x2 and x4) mode
- Programmable digital noise filters on inputs
- Alternate 16-bit Timer/Counter mode
- Interrupt on position counter rollover/underflow

Pin Diagrams (Continued)

28-Pin SPDIP
28-Pin SOIC



44-Pin QFN



TOSHIBA Photocoupler GaAℓAs Ired & Photo−IC

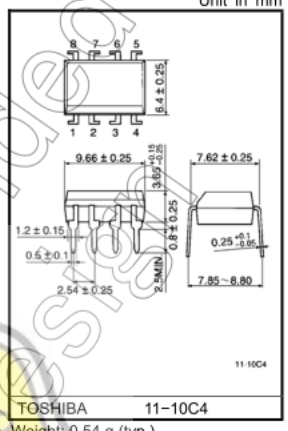
TLP250

Transistor Inverter
Inverter For Air Conditioner
IGBT Gate Drive
Power MOS FET Gate Drive

The TOSHIBA TLP250 consists of a GaAlAs light emitting diode and a integrated photodetector.
This unit is 8−lead DIP package.
TLP250 is suitable for gate driving circuit of IGBT or power MOS FET.

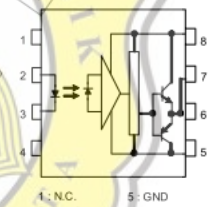
- Input threshold current: I_F=5mA(max.)
- Supply current (I_{CC}): 11mA(max.)
- Supply voltage (V_{CC}): 10−35V
- Output current (I_O): ±1.5A (max.)
- Switching time (t_{pLH}/t_{pHL}): 0.5μs(max.)
- Isolation voltage: 2500V_{rms}(min.)
- UL recognized: UL1577, file No.E67349
- Option(D4)
  VDE Approved : DIN EN60747-5-2
  Maximum Operating Insulation Voltage : 890V_{PK}
  Highest Permissible Over Voltage : 4000V_{PK}
  (Note):When a EN60747-5-2 approved type is needed,
  Please designate "Option(D4)"

Unit in mm



TOSHIBA 11−10C4
Weight: 0.54 g (typ.)

Pin Configuration (top view)

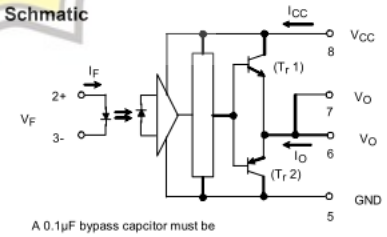


1 : N.C.
2 : Anode
3 : Cathode
4 : N.C.
5 : GND
6 : V_O (Output)
7 : V_O
8 : V_{CC}

Truth Table

		Tr1	Tr2
Input LED	On	On	Off
	Off	Off	On

Schmatic

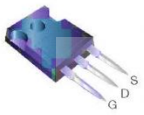


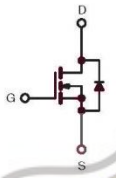
A 0.1μF bypass capcitor must be connected between pin 8 and 5 (See Note 5).

Power MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	200	
$R_{DS(on)}$ (Ω)	V_{GS} = 10 V	0.085
Q_g (Max.) (nC)	140	
Q_{gs} (nC)	28	
Q_{gd} (nC)	74	
Configuration	Single	

TO-247AC





N-Channel MOSFET

FEATURES

- Dynamic dV/dt Rating
- Repetitive Avalanche Rated
- Isolated Central Mounting Hole
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Compliant to RoHS Directive 2002/95/EC

Available

RoHS* COMPLIANT

DESCRIPTION

Third generation Power MOSFETs from Vishay provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-220AB package is universally preferred for commercial-industrial applications where higher power levels preclude the use of TO-220AB devices. The TO-247AC is similar but superior to the earlier TO-218 package because of its isolated mounting hole. It also provides greater creepage distance between pins to meet the requirements of most safety specifications.

ORDERING INFORMATION	
Package	TO-247AC
Lead (Pb)-free	IRFP250PbF
	SiHFP250-E3
SnPb	IRFP250
	SiHFP250

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)

PARAMETER			SYMBOL	LIMIT	UNIT
Drain-Source Voltage			V_{DS}	200	V
Gate-Source Voltage			V_{GS}	± 20	
Continuous Drain Current	V_{GS} at 10 V	T_C = 25 °C	I_D	30	A
		T_C = 100 °C		19	
Pulsed Drain Current[a]			I_{DM}	120	
Linear Derating Factor				1.5	W/°C
Single Pulse Avalanche Energy[b]			E_{AS}	410	mJ
Repetitive Avalanche Current[a]			I_{AR}	30	A
Repetitive Avalanche Energy[a]			E_{AR}	19	mJ
Maximum Power Dissipation	T_C = 25 °C		P_D	190	W
Peak Diode Recovery dV/dt[c]			dV/dt	5.0	V/ns
Operating Junction and Storage Temperature Range			T_J, T_{stg}	- 55 to + 150	°C
Soldering Recommendations (Peak Temperature)	for 10 s			300[d]	
Mounting Torque	6-32 or M3 screw			10	lbf · in
				1.1	N · m

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
b. V_{DD} = 50 V, starting T_J = 25 °C, L = 683 µH, R_g = 25 Ω, I_{AS} = 30 A (see fig. 12).
c. I_{SD} ≤ 30 A, dI/dt ≤ 190 A/µs, V_{DD} ≤ V_{DS}, T_J ≤ 150 °C.
d. 1.6 mm from case.

* Pb containing terminations are not RoHS compliant, exemptions may apply

Current Transducer HX 03 .. 50-P/SP2

I_{PN} = 3 .. 50 A

For the electronic measurement of currents: DC, AC, pulsed, mixed, with a galvanic isolation between the primary circuit (high power) and the secondary circuit (electronic circuit).

Electrical data

Primary nominal r.m.s. current I_{PN} (A)	Primary current measuring range I_P (A) [1]	Primary Conductor Diameter x Turns (mm)	Type
3	± 9	0.6d x 20T	HX 03-P/SP2
5	± 15	0.8d x 12T	HX 05-P/SP2
10	± 30	1.1d x 6T	HX 10-P/SP2
15	± 45	1.4d x 4T	HX 15-P/SP2
20	± 60	1.6d x 3T	HX 20-P/SP2
25	± 75	1.6d x 2T	HX 25-P/SP2
50	± 150	1.2 x 6.3 x 1T	HX 50-P/SP2

V_{OUT}	Output voltage @ $\pm I_{PN}$, R_L = 2 kΩ, T_A = 25°C		V_{OE} ±0.625	V
R_{OUT}	Output impedance		< 50	Ω
R_L	Load resistance		≥ 2	kΩ
V_C	Supply voltage (± 5 %)		+12 .. +15	V
I_C	Current consumption		< 15	mA
V_d	R.m.s. voltage for AC isolation test, 50/60Hz, 1 mn		> 3	kV
V_e	R.m.s. voltage for partial discharge extinction at 10pC		≥ 1	kV
	Impulse withstand voltage, 1.2/50µs		≥ 6	kV

Accuracy-Dynamic performance data

X	Accuracy @ I_{PN}, T_A = 25°C (without offset)		< ± 1	% of I_{PN}
ε_L	Linearity (0 .. ± I_{PN})		< ± 1	% of I_{PN}
V_{OE}	Electrical offset voltage, T_A = 25°C		+2.5V±50	mV
V_{OH}	Hysteresis offset voltage @ I_P = 0; after an excursion of 3 x I_{PN}		< ± 10	mV
V_{OT}	Thermal drift of V_{OE}	max.	± 1.5	mV/K
$TC\varepsilon_G$	Thermal drift of the gain (% of reading)		± 0.1	%/K
t_r	Response time @ 90% of I_P		≤ 3	µs
f	Frequency bandwidth (-3 dB) [2]		50	kHz

General data

T_A	Ambient operating temperature	- 25 .. + 85	°C
T_S	Ambient storage temperature	- 25 .. + 85	°C
m	Mass	8	g
	Min. internal creepage distance/clearance	≥ 5.5	mm
	Isolation material group	I	
	Standards	EN50178	

Notes : [1] With R_L=2kΩ
[2] Small signal only to avoid excessive heating of the magnetic core

Features

- Galvanic isolation between primary and secondary circuit
- Hall effect measuring principle
- Isolation voltage 3000V
- Low power consumption
- Extended measuring range (3x I_{PN})
- Single supply from +12V to +15V
- Material according to UL94-V0

Advantages

- Low insertion losses
- Easy to mount with automatic handling system
- Small size and space saving
- Only one design for wide current ratings range
- High immunity to external interference.

Applications

- Switched Mode Power Supplies (SMPS)
- AC variable speed drives
- Uninterruptible Power Supplies (UPS)
- Electrical appliances
- Battery supplied applications
- DC motor drives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4th IEEE CONFERENCE ON ENERGY CONVERSION
16-17 October 2019 | Royal Ambarrukmo Hotel, Yogyakarta, Indonesia
CERTIFICATE OF APPRECIATION
is awarded to
Anissa Firmana Dewi
In recognition and appreciation of your contribution as
Presenter
for paper entitled
The Impact of SRM Rotor Speed on Regenerative Braking to Optimize the Performance
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Tole Sutikno
Director of LPPI UAD/General Chair
Tan Chee Wei
General Chair
Nik Rumzi Nik Idris
General Chair

Report #10476502

BAB IPENDAHULUANLatar BelakangPolusi udara telah menjadi suatu masalah besar di era modern ini, terutama di kota besar seperti kota Jakarta, Semarang, Bandung dan lainnya. Pada tahun 2018 hingga 2019 tercatat bahwa Air Quality Index kota Jakarta berada pada ambang batas sedang – tidak sehat, sedangka n World Health Organization (WHO) menentukan batas aman pada Air Quality Index (AQI) berkisar antara 0 – 50 mikrogram per meter kubik. Pada tahun 201 8 rata – rata tahunan konsentrasi partikel halus di udara kota Jakarta mencapa i 42,42 mikrogram per meter kubik, sedangkan pada 1 Januari – 4 Juni 201 9 tercatat bahwa rata – ratanya meningkat hingga 57,66 mikrogram per mete r kubik. Pemeritah kota telah menggerakan masyarakat untuk mengurangi masalah polusi udara, dengan membatasi penggunaan kendaraan pribadi dan digantikan dengan alat transportasi umum. Pada dekade 2000-an para peneliti dalam dunia otomotif modern telah mengembangkan suatu teknologi kendaraan listrik untuk mencegah polusi udara, karena pengoperasian pada kendaraan listrik hanya membutuhkan energi yang bersumber dari batere sehingga kendaraan listrik tidak menghasilkan emisi ADDIN [1]ADDIN [2]. Switched reluctance motor cocok diaplikasikan pada kendaraan listrik, karena memiliki beberapa karakteristik yang tidak dimiliki oleh penggerak elektrik lainnya.