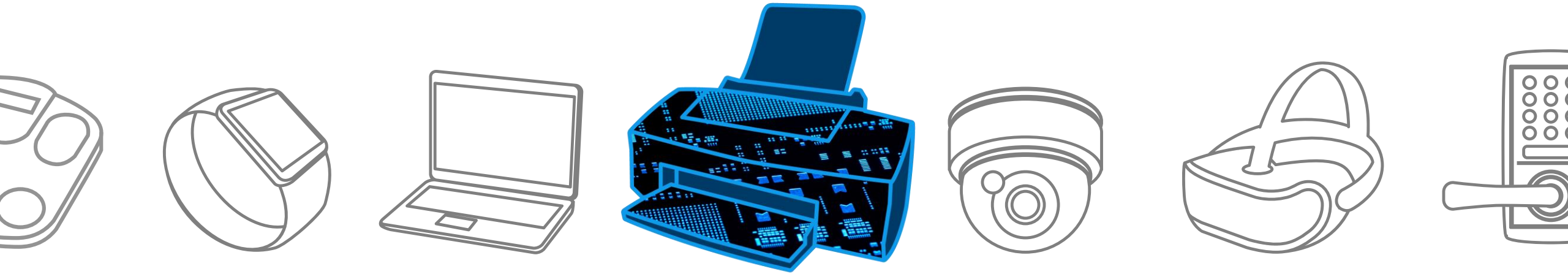
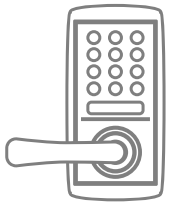
TOSHIBA

R21

Multi Function Printer

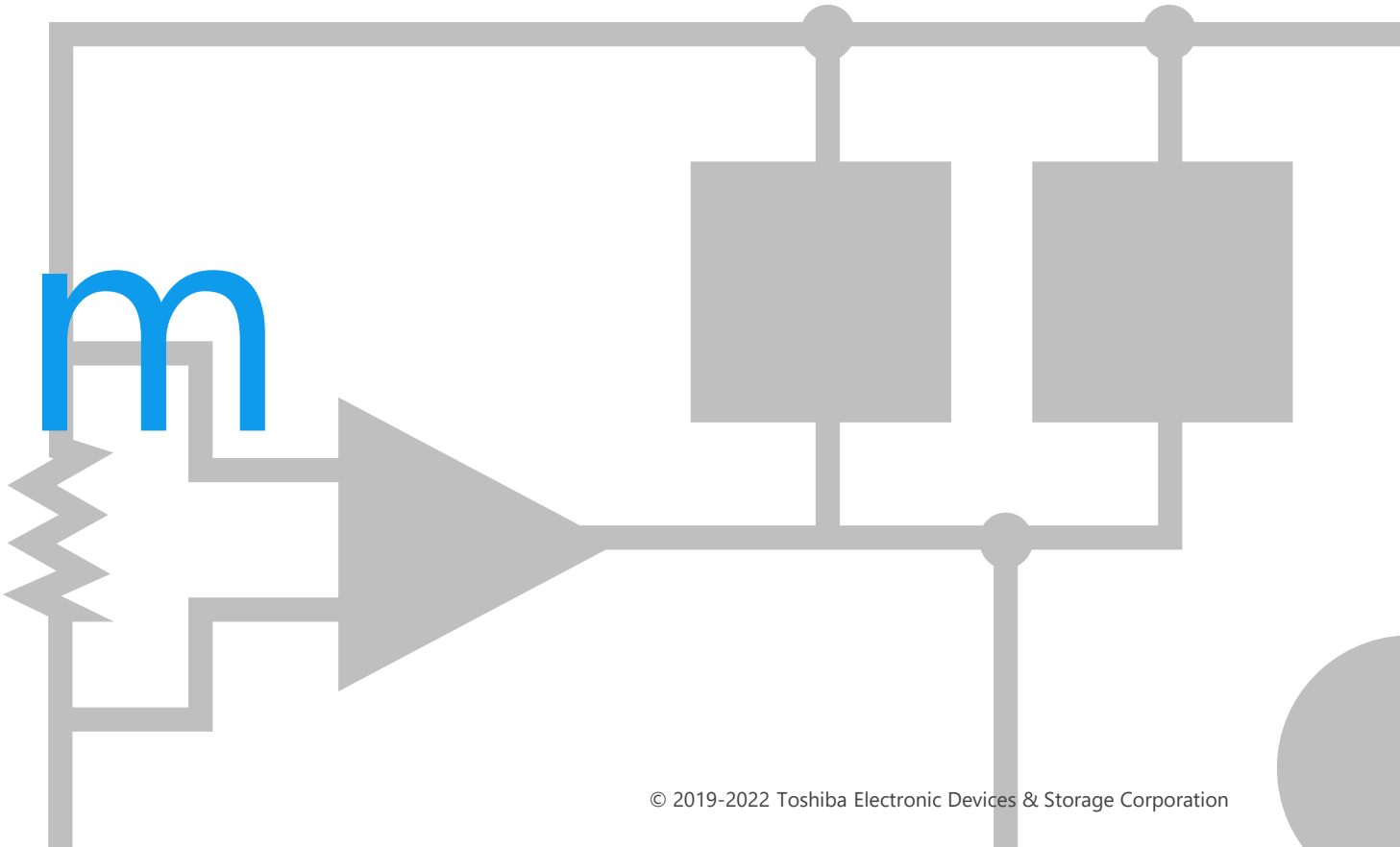
Solution Proposal by Toshiba



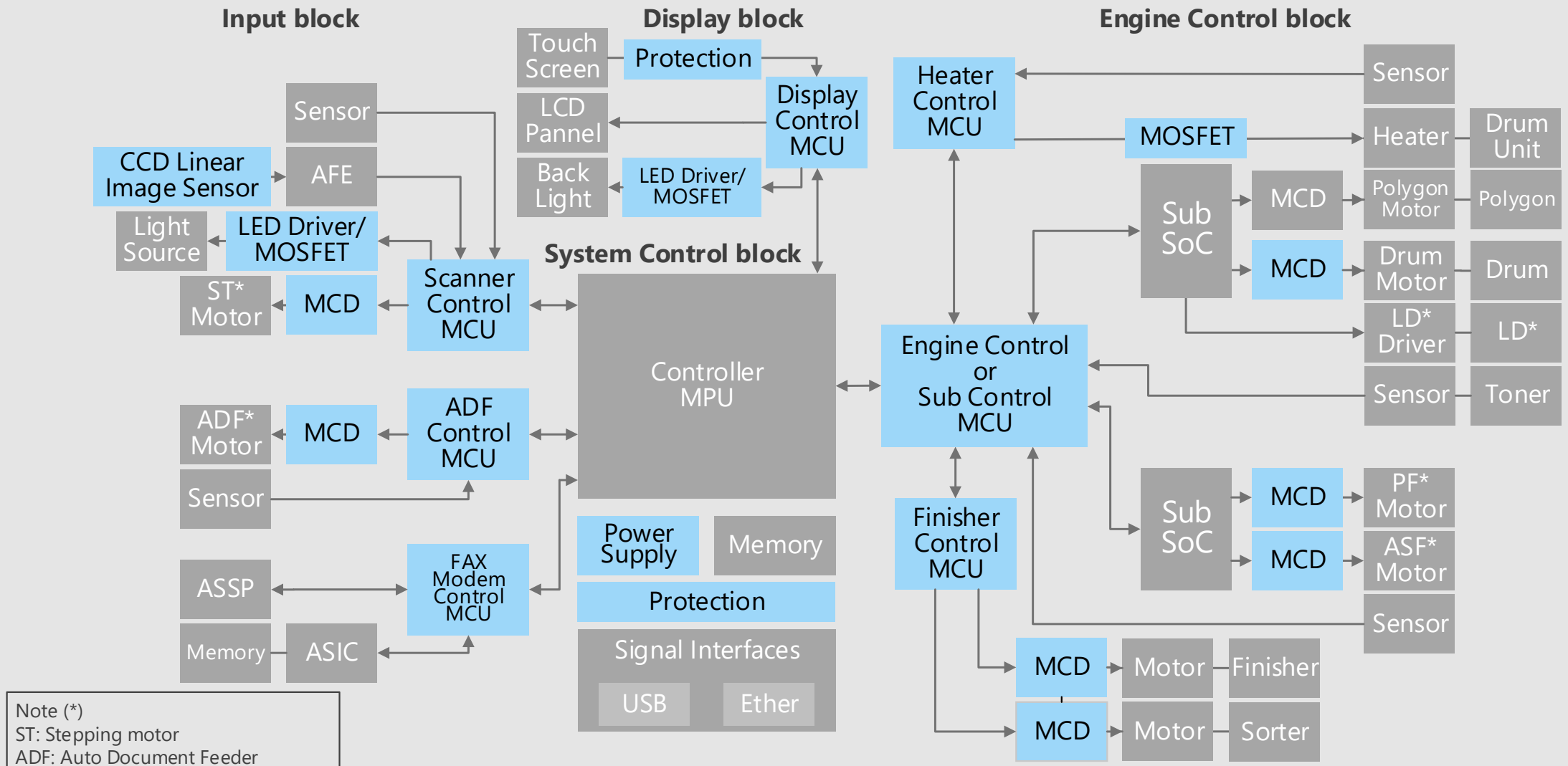


Toshiba Electronic Devices & Storage Corporation provides comprehensive device solutions to customers developing new products by applying its thorough understanding of the systems acquired through the analysis of basic product designs.

Block Diagram



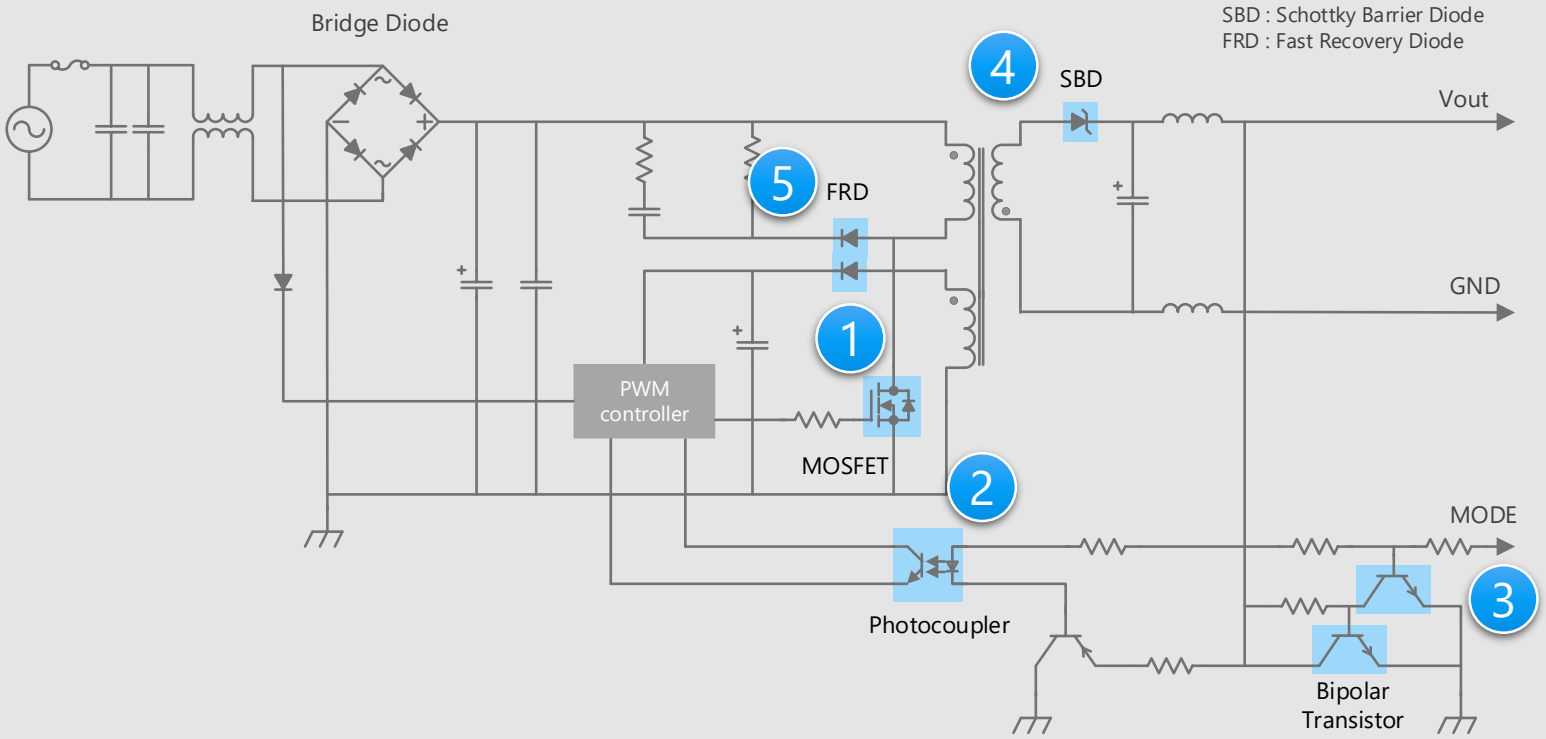
Multi Function Printer　Overall block diagram



Note (*)
ST: Stepping motor
ADF: Auto Document Feeder
LD: Laser Diode
PF: Paper Feed
ASF: Auto Sheet Feeder

Multi Function Printer　Detail of the power supply circuit

Power supply circuit



※ Click the number in the circuit diagram to jump to the detailed description page

Criteria for device selection

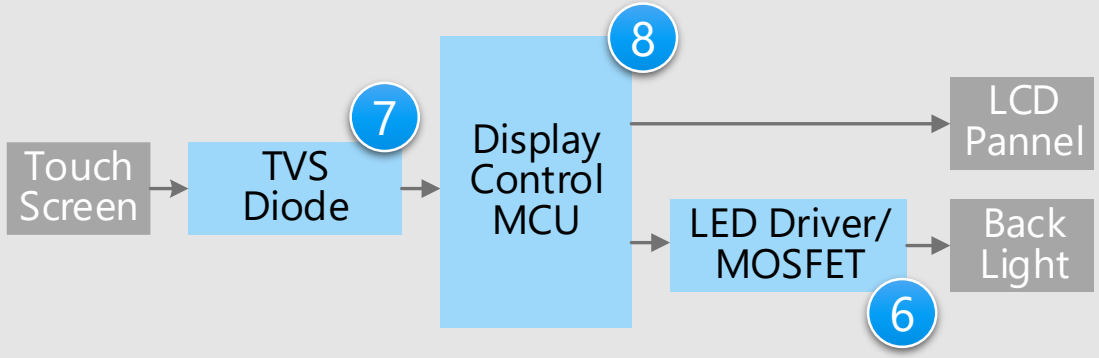
- Transistor output photocoupler is suitable for isolating feedback signals from the secondary side.
- By using a MOSFET with low on-resistance and high heat dissipation efficiency, a set having low heat generation and low power consumption is realized.
- Small package products contribute to the reduction of circuit board area.

Proposals from Toshiba

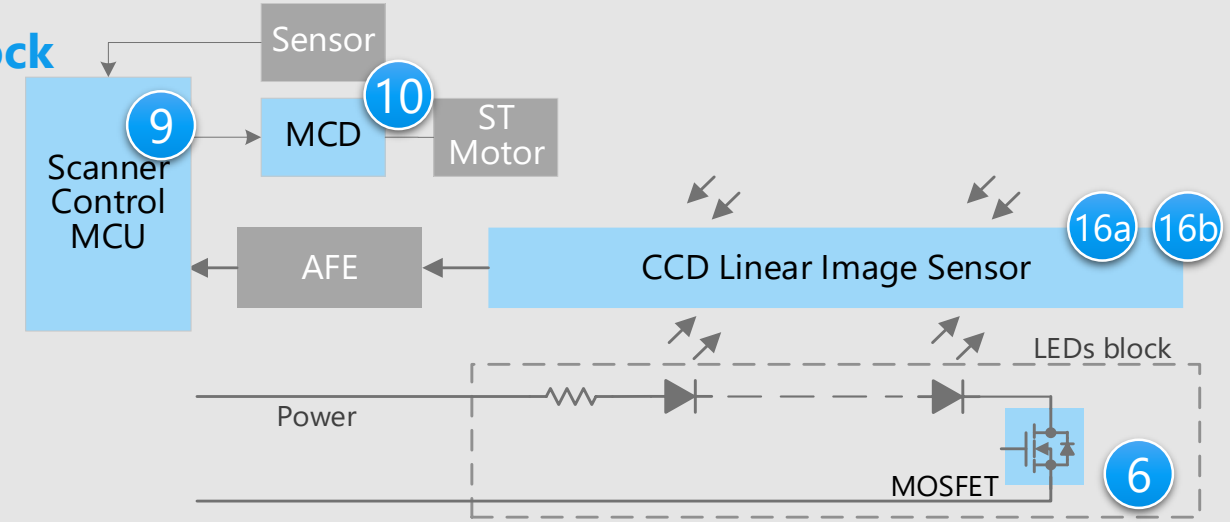
- **Suitable for high efficiency switching power supply** 1
- π-MOS Series MOSFET
- **Photocoupler with excellent environmental resistance** 2
  Transistor output photocoupler
- **High speed switching and small surface mounting** 3
  Bipolar transistor
- **High speed, low loss** 4
  Schottky barrier diode
- **High voltage and short reverse recovery time** 5
  Fast recovery diode

Multi Function Printer　Details of Display/Scanner block

Display block



Scanner block



※ Click the number in the circuit diagram to jump to the detailed description page

Criteria for device selection

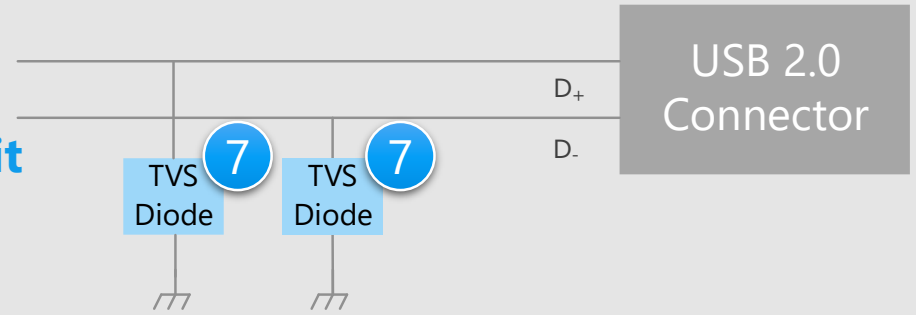
- Small package products contribute to the reduction of circuit board area.
- TVS diode is suitable for absorbing Electrostatic Discharge (ESD) from external terminals to prevent circuit malfunction and device breakdown.
- Document scanning requires fine position control of the light source and the receiving part.

Proposals from Toshiba

- **Realizes low on-resistance and low power consumption set**
  Small signal MOSFET　6
- **High speed signal line protection with low capacitance characteristics**
  TVS diode　7
- **All in one chip with a built-in LCD driver**
  MCU TMPM061FWFG　8
- **Built-in high resolution AD converter for getting scanning data**
  MCU M3H / M460 / M4G / M4N Group　9
- **High precision current control for a scanner**
  Stepping motor driver with a built-in AGC　10
- **High image quality with less color registration, High-speed**
  Linear image sensor (CCD)　16a　16b

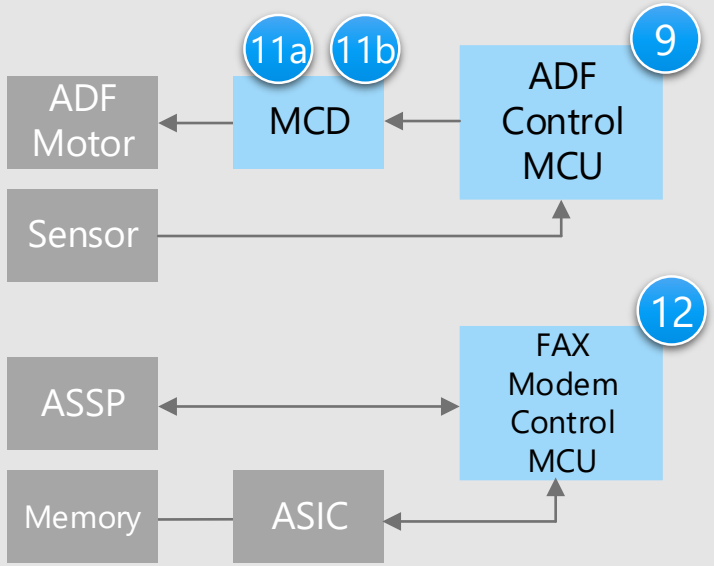
Multi Function Printer　Details of USB 2.0/ADF/FAX modem block

USB 2.0 circuit



ADF block

FAX modem block



※ Click the number in the circuit diagram to jump to the detailed description page

Criteria for device selection

- Small package products contribute to the reduction of circuit board area.
- TVS diode is suitable for absorbing Electrostatic Discharge (ESD) from external terminals to prevent circuit malfunction and device breakdown.
- Document feeding requires fine position control.

Proposals from Toshiba

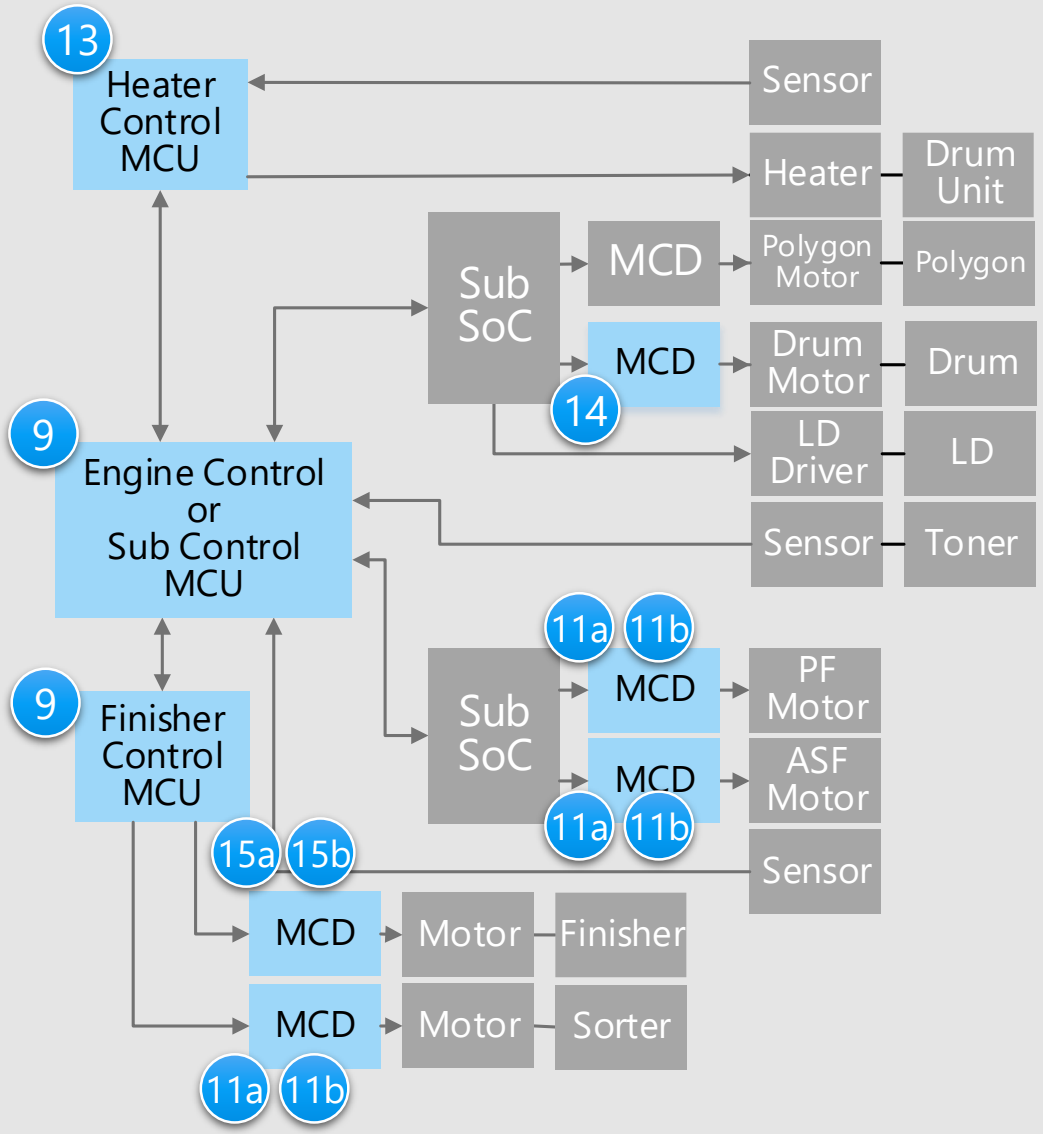
- **High speed signal line protection with low capacitance characteristics**
  TVS diode 7
- **Built-in AD converter, high processing performance for ADF sensor output**
  MCU M3H / M460 / M4G / M4N Group 9
- **High precision current control for ADF**
  Stepping motor driver 11a 11b
- **Efficient execution of the FAX upper protocol**
  MCU TMPM036FWFG / TMPM037FWUG 12

Multi Function Printer　Details of Engine/Heater/Finisher block

Engine block

Heater block

Finisher block



※ Click the number in the circuit diagram to jump to the detailed description page

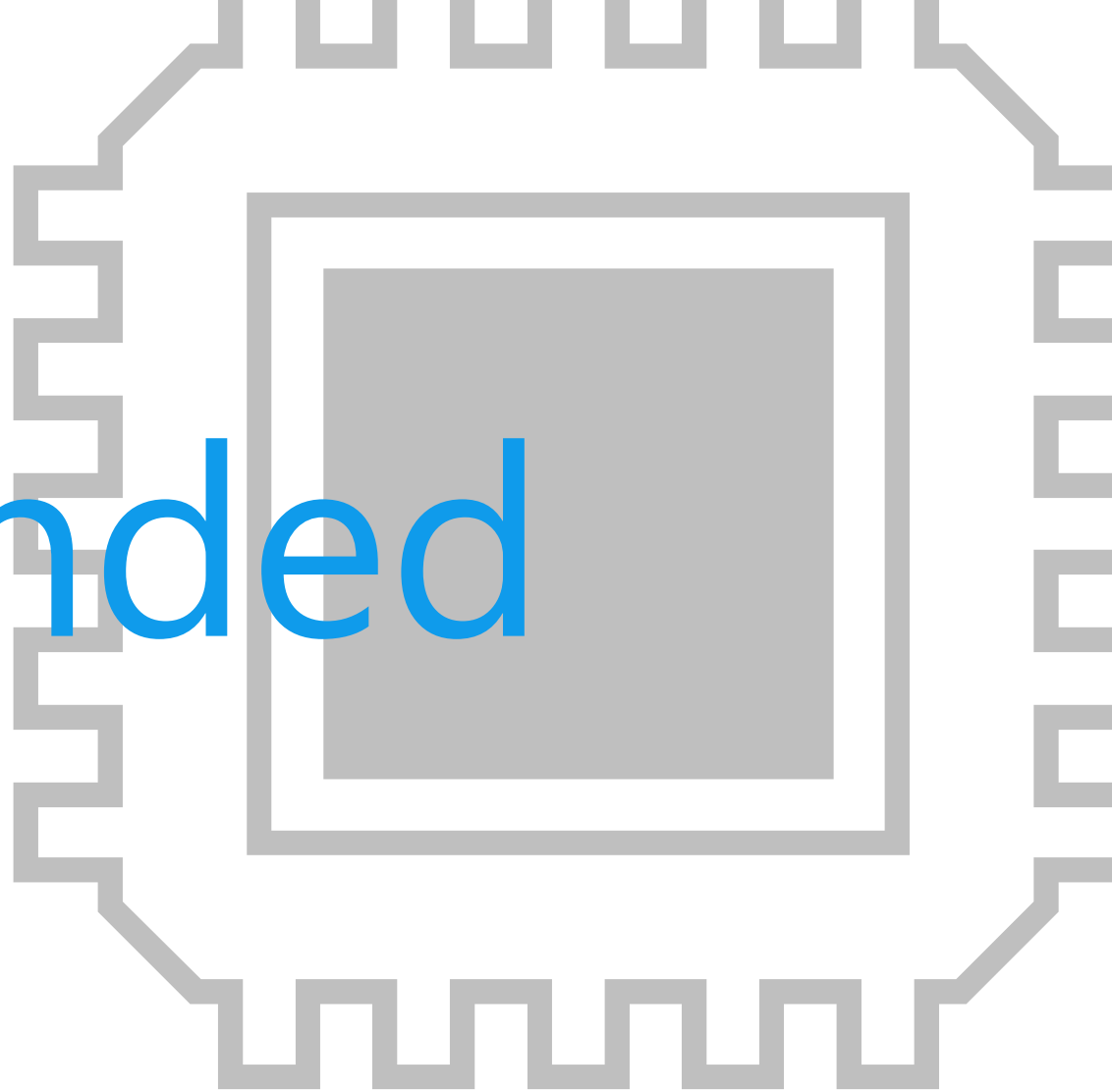
Criteria for device selection

- An engine control MCU works closely with each sub system and high processing performance is required.
- Document and print paper feeding requires fine position control.

Proposals from Toshiba

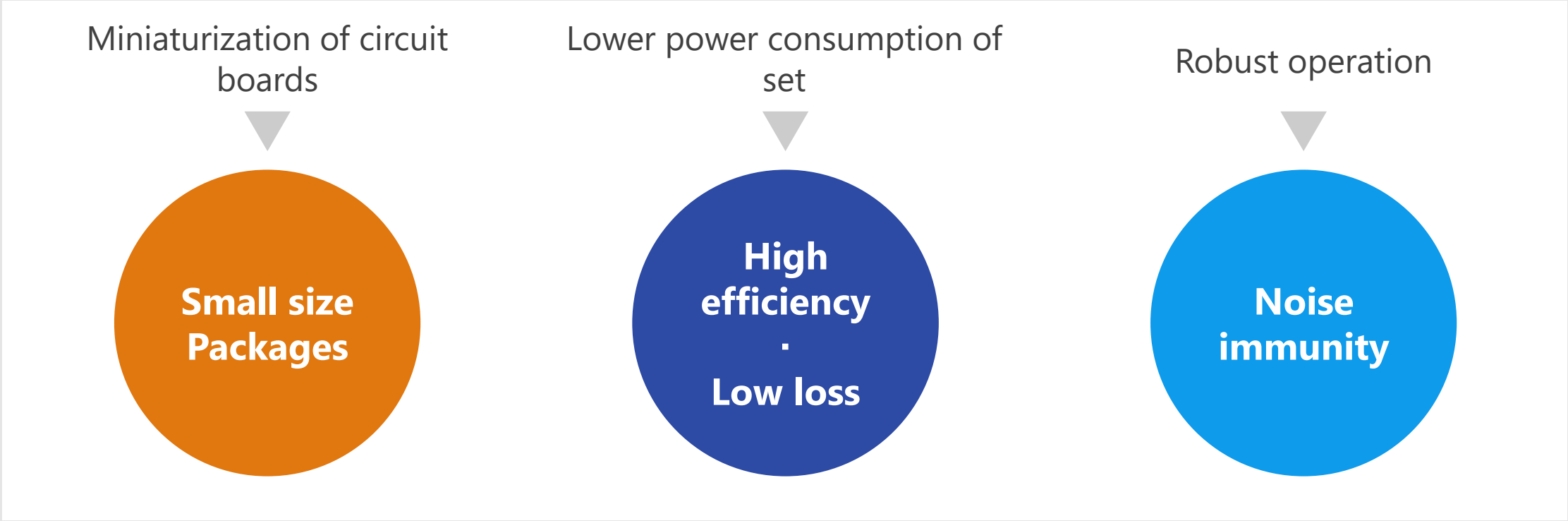
- **Analyze various sensor outputs and control the system with high efficiency** 9
  MCU M3H / M460 / M4G / M4N Group
- **High efficient finisher control** 9
  MCU M3H / M460 / M4G / M4N Group
- **High precision setting location for sort, PF and ASF** 11a 11b
  Stepping motor driver
- **Built-in PWM output for heater control** 13
  MCU M3H Group
- **High durability for a drum rotation** 14
  Three-phase brushless DC motor driver
- **High output current for a finisher** 15a 15b
  Brushed DC motor driver

Recommended Devices

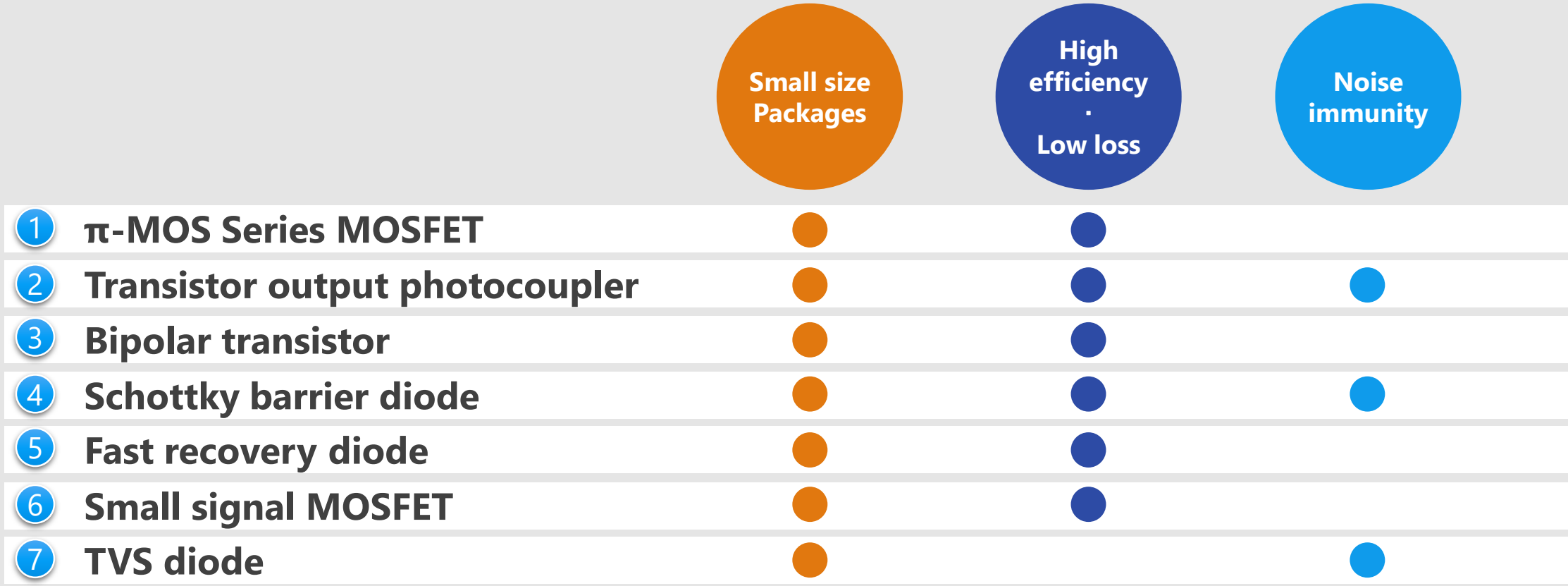


Device solutions to address customer needs

As described above, in the design of Multi Function Printer, **"Miniaturization of circuit boards"**, **"Low power consumption of set"** and **"Robust operation"** are important factors. Toshiba's proposals are based on these three solution perspectives.



Device solutions to address customer needs



Device solutions to address customer needs

	Small size Packages	High efficiency · Low loss	Noise immunity
8 MCU TMPM061FWFG	●	●	
9 MCU M3H / M460 / M4G / M4N Group	●	●	
10 Stepping motor driver with a built-in AGC	●	●	
11a 11b Stepping motor driver	●	●	
12 MCU TMPM036FWFG / TMPM037FWUG	●	●	
13 MCU M3H Group	●	●	
14 Three-phase brushless DC motor driver	●	●	
15a 15b Brushed DC motor driver	●	●	
16a 16b Linear image sensor (CCD)		●	

1 π-MOS Series MOSFET

TK2K2A60F

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

This MOSFET is suitable for switching regulators and is easy to handle and greatly contributes to miniaturization.

1 Low on-resistance

By keeping the on-resistance between the drain and source low, heat generation and power consumption can be kept low.

2 Low leakage current

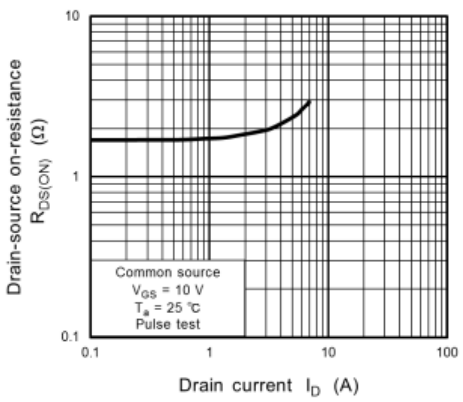
Drain cut-off current :

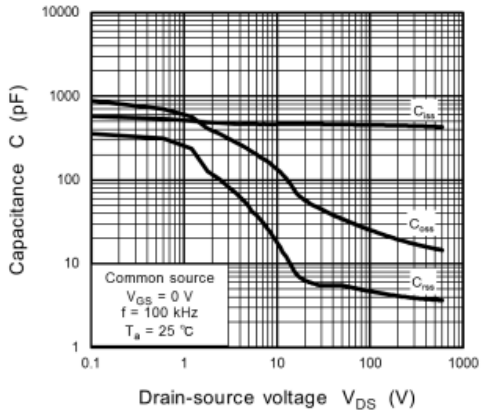
I_{DSS} = 10 μA (Max) @V_{DS} = 600 V

3 Enhancement type

It is easy to handle because it is an enhancement type in which no drain current flows when no gate voltage is applied.

TK2K2A60F
Characteristics Curves





Lineup

Part number		TK2K2A60F
Package		TO-220SIS
V_{DSS} [V]		600
I_D [A]		3.5
C_{iss} (Typ.) [pF]		450
$R_{DS(ON)}$ [Ω]	Typ.	1.82
	Max	2.2
Polarity		N-ch

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2 Transistor output photocoupler

TLP383 / TLP385 / TLP387 / TLP388

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

Reduction in required circuit board area and improving reliability enabling maintenance-free operation.

1 High isolation voltage is realized even using small and thin package

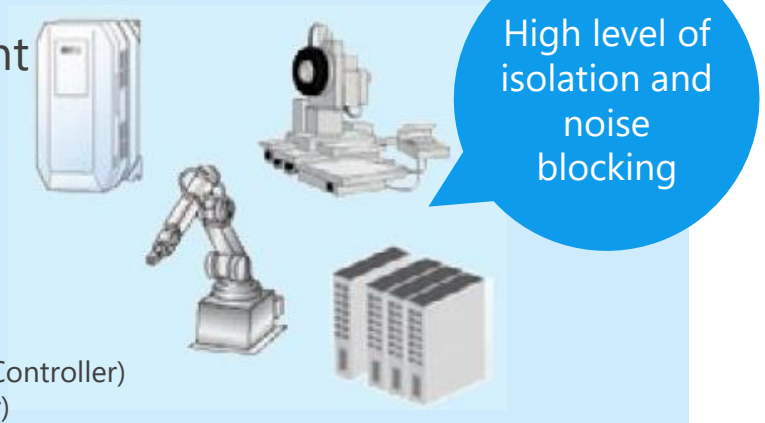
It is a highly isolated photocoupler that phototransistors and infrared light emitting diodes are optically coupled, and achieved a high isolation voltage of 5000 Vrms. In addition, since the SO6L package is smaller and thinner than Toshiba standard DIP package, high density mounting is possible.

2 Operating temperature is expanded to 110 °C or 125 °C

It is designed to operate even under severe ambient temperature conditions.

Industrial equipment

- General purpose inverter
- Servo amplifier
- Robot
- Machine Tool
- High output power supply
- Security equipment
- Semiconductor tester
- PLC (Programmable Logic Controller)
- MFP (Multi Function Printer)



Lineup

Part number	TLP383	TLP385	TLP387	TLP388
Package	4pin SO6L 			
V_{CEO} [V]	80	80	300	350
BV_S [Vrms]	5000	5000	5000	5000
T_{opr} [°C]	-55 to 125	-55 to 110	-55 to 110	-55 to 125

◆Return to Block Diagram TOP

3 Bipolar transistor
TMBT3904

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

Various products are provided for radio frequency applications, power supply applications and others.

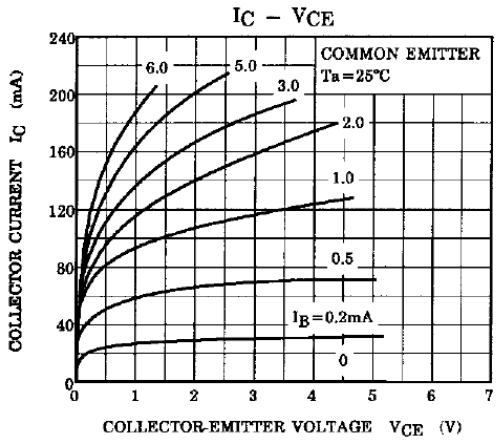
1 High voltage

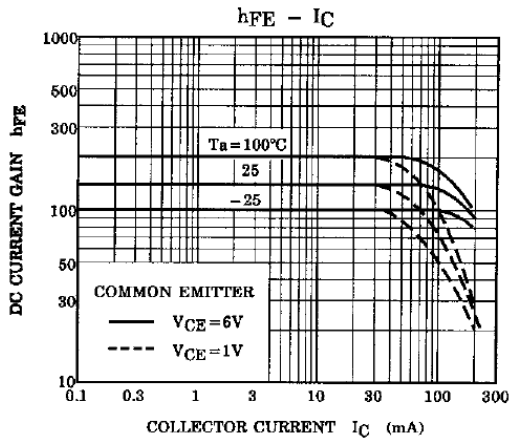
High voltage allows for large loads and instantaneous voltage changes.

2 High current (rated collector current)

It covers a wide range of applications from high frequency applications to power supply applications.

TMBT3904
Characteristics chart





Lineup

Part number	TMBT3904
Package	SOT23 
V_{CEO} [V]	50
I_C [mA]	200
$V_{CE(sat)}$ (Max) [V]	0.3
h_{FE}	100 to 300 @ I_C = 10 mA
Polarity	NPN

◆Return to Block Diagram TOP

4 Schottky barrier diode
CMS15

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

It is suitable for high frequency rectification of switching power supplies and greatly contributes to miniaturization.

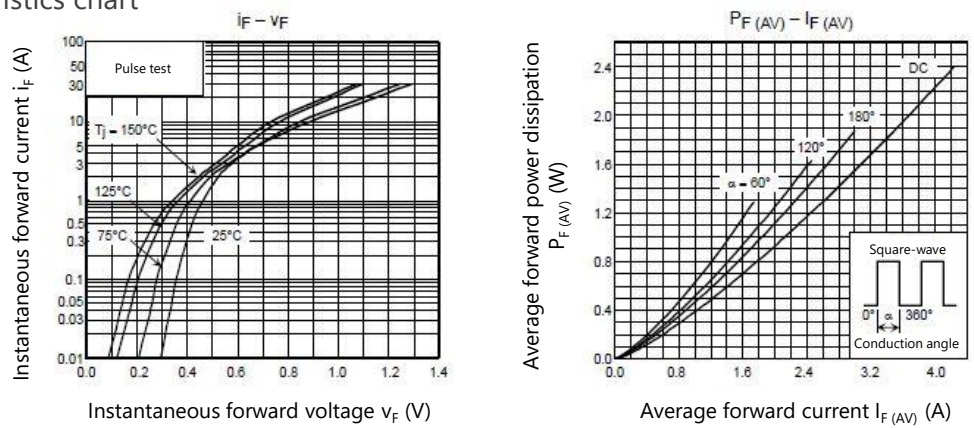
1 High speed switching

It is suitable for high speed switching applications.

2 Small package

This small package is suitable for high density mounting.

CMS15
Characteristics chart



Lineup

Part number	CMS15
Package	M-FLAT™
V_{RRM} [V]	60
$I_{F(AV)}$ [A]	3.0
V_{FM} (Max) [V]	0.58
C_j (Typ.) [pF]	102

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5 Fast recovery diode
CRF03A

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

This is a silicon diffused junction type high frequency rectifier diode. Contributes to higher efficiency and miniaturization of power supplies.

1 High voltage

Repetitive peak reverse voltage (V_{RRM}) is high.
(CRF03A: Rated 600 V)

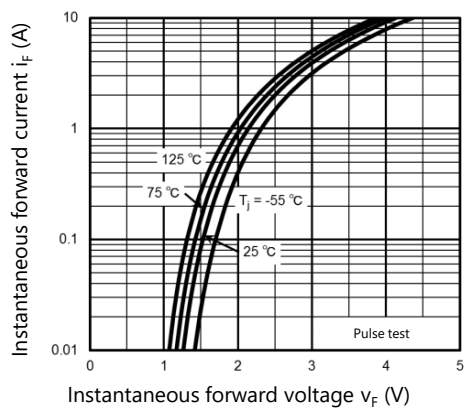
2 Fast reverse recovery time

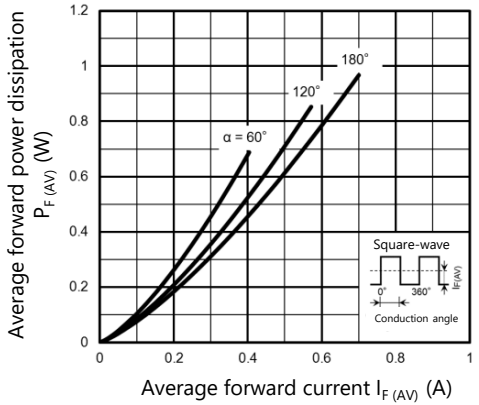
The reverse recovery time (t_{rr}) is fast and is suitable for high speed operation.
(CRF03A: 100 ns (Max))

3 Small package

This small package is suitable for high density mounting.

CRF03A
Characteristics chart





Lineup

Part number	CRF03A
Package	S-FLAT™ 
V_{RRM} [V]	600
$I_{F(AV)}$ [A]	0.7
V_{FM} (Max) [V]	2.0
I_{RRM} (Max) [μA]	50

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6 Small signal MOSFET

SSM3K35FS / SSM3K35AFS / SSM3J35FS / SSM3J35AFS

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

It is suitable for high speed switches and greatly contributes to miniaturization.

1 Low voltage operation

Operates at | V_{GS} | = 1.2 V.

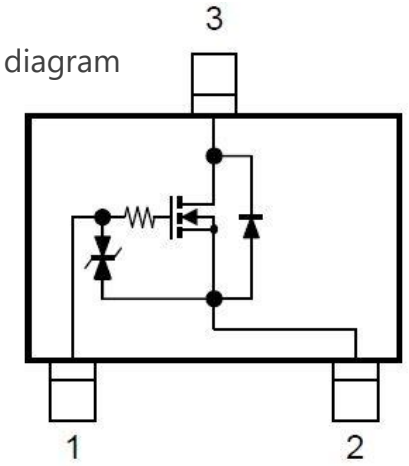
2 Low on-resistance

By keeping the on-resistance between the drain and source low, heat generation and power consumption can be kept low.

3 Wide package line up

In addition to SSM packages, CST3C packages, VESM packages, ES6 packages and US6 packages are available.

SSM3K35FS
Internal connection diagram



Lineup

Part number		SSM3K35FS	SSM3K35AFS	SSM3J35FS	SSM3J35AFS
Package		SSM 	SSM 	SSM 	SSM 
V_{DSS} [V]		20	20	-20	-20
I_D [A]		0.18	0.25	-0.1	-0.25
$R_{DS(ON)}$ [Ω] @| V_{GS} |=2.5 V	Typ.	2	1.1	5.6	1.5
	Max	4	1.6	11	2.1
Polarity		N-ch	N-ch	P-ch	P-ch

◆Return to Block Diagram TOP

7 TVS diode

DF2B5M4ASL / DF2B6M4ASL / DF2B6USL / DF6D6UFE / DF2B6M4BSL

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

Absorbs static electricity (ESD) from external terminals, prevents circuit malfunction and protects devices.

1 Improved ESD pulse absorption

Improved ESD absorption compared to our conventional products. (50 % reduction in operating resistance) For some products, both low operating resistance and low capacitance are realized and ensures high signal protection performance and signal quality.

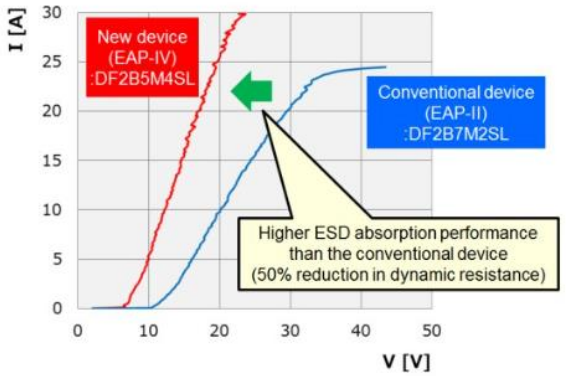
2 Suppress ESD energy by low clamp voltage

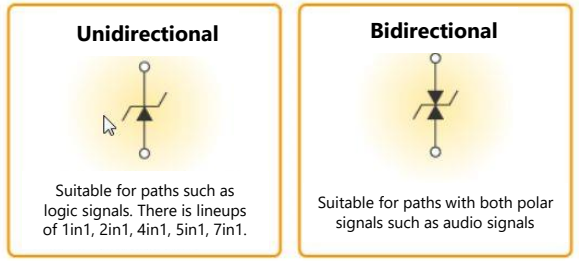
Protect the connected circuits/devices using Toshiba own technology.

3 Suitable for high density mounting

A variety of small packages are available.

ESD Pulse Absorption Performance (Toshiba internal comparison)





Lineup

Part number	DF2B5M4ASL	DF2B6M4ASL	DF2B6USL	DF6D6UFE	DF2B6M4BSL
Package	SL2	SL2	SL2	ES6	SL2
V_{ESD} [kV]	±16	±15	±10	±10	±8
V_{RWM} (Max) [V]	3.6	5.5	5.5	5.5	5.5
C_t (Typ.) [pF]	0.15	0.15	1.5	1.5	0.12
R_{DYN} (Typ.) [Ω]	0.7	0.7	0.25	0.25	1.05

(Note) This product is an ESD protection diode and cannot be used for purposes other than ESD protection.

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Value provided

It contributes to system cost down, high efficiency system and development efficiency improvement.

1 Built-in Arm® Cortex®-M0 CPU core

Built-in Arm Cortex-M0 core with Thumb instruction set improves energy efficiency. Various development tool and their partners allow users many options.

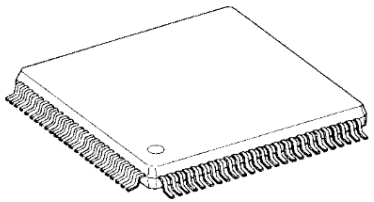
2 Suitable for sensing analog signal

Built-in multi channel AD converter and CPU system executes sensing data processing efficiently at low cost.

3 Small package and low power consumption

Cortex-M0 and Toshiba original NANOFLASH™ technology bring to the small package and low power consumption. They contribute to reduce circuit board area and power consumption.

TMPM061FWFG



LQFP100

Lineup

Part number	TMPM061FWFG
Maximum operation frequency	16 MHz
Instruction ROM	128 KB
RAM	8 KB
Timer	9ch
UART/SIO	4ch
AD converter	2ch (10bits), 3ch (24bits)
LCDD	40 seg x 4 com

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9 MCU

TXZ+™3A Series M3H Group / TX04 Series M460 Group / TXZ+™4A Series M4G / M4N Group

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

Monitoring sensor at low power consumption by using built-in AD converters, timers and various communication interfaces.

1 Built-in Arm® Cortex®-M3/M4 CPU core

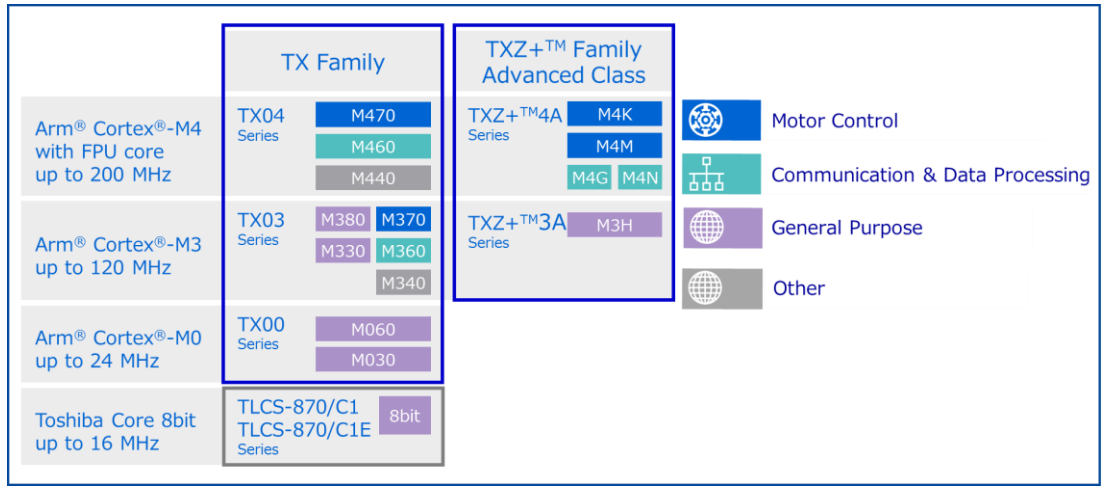
The product lineup is equipped with Arm Cortex-M3/M4 cores . It is suitable for processing sensor data at real time. Various development tool and their partners allow users many options.

2 System cost down and development efficiency improvement

These devices executes sensing data monitoring and processing efficiently by combining built-in analog function such as AD converter and CPU system. In addition, M4G Group products have a lineup of 20 products to provide the best products for the set.

3 Various communication interfaces

These devices supports major communication interfaces such as UART, FUART, SPI, I²C and External bus. User can construct a communication system easily with a cloud.



Lineup

Series	Group	Function
TXZ+™3A Series	M3H Group	Arm® Cortex®-M3, 120 MHz operation frequency (Max).
TX04 Series	M460 Group	Arm® Cortex®-M4, 120 MHz operation frequency (Max).
TXZ+™4A Series	M4G / M4N Group	Arm® Cortex®-M4, 200 MHz operation frequency (Max).

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10 Stepping motor driver with a built-in AGC

TB67S289FTG / TB67S128FTG

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

Motor current is optimized in real time by using built-in AGC (Active gain control).

1 High voltage (50 V)

Raising the maximum voltage rating to 50 V, it can be used in a supply of 12 to 36 V with sufficient margin.

2 Step-out prevention and high efficiency control using AGC

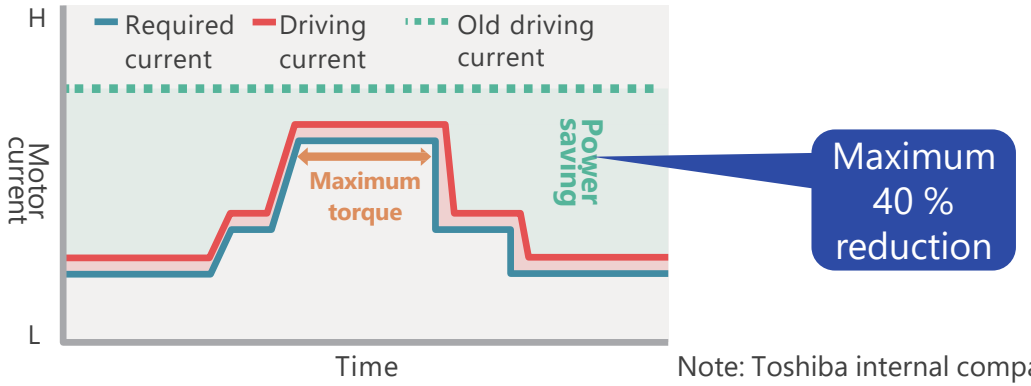
By detecting the motor load torque with just the driver IC and automatically optimizing the current according to the drive condition, step-out avoidance and highly efficient motor control are possible.

3 High precision current control ADMD (Advanced Dynamic Mixed Decay)

Toshiba's original ADMD technology tracks input current more closely than the conventional mixed decay mode, making highly efficient motor control possible at high rpm[Note].

[Note] Comparison with Toshiba's products

■Active Gain Control



Note: Toshiba internal comparison

Lineup

Part number		TB67S128FTG	TB67S289FTG
Absolute Maximum Ratings	Output voltage	50 V	
	Output current	5.0 A	3.0 A
On-resistance (H+L)		0.25 Ω (Typ.)	0.4 Ω (Typ.)
Control interface		Clock / serial	Clock input
Step		1/1, 1/2,1/4, 1/8, 1/16, 1/32, 1/64	1/1, 1/2, 1/4, 1/8, 1/16, 1/32
Features		ADMD (high efficiency control at high speed rotation) ACDS (built-in sense resistor less current control architecture)	
Error detection function		TSD, ISD, POR, OPD	
Package		VQFN64	VQFN48

◆Return to Block Diagram TOP

11a Stepping motor driver

TB67S511FTAG / TB67S512FTAG / TB67S521FTAG / TB67S522FTAG

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

The maximum voltage rating of 40 V. Standard stepping motor drivers with a small package

1 High voltage and current

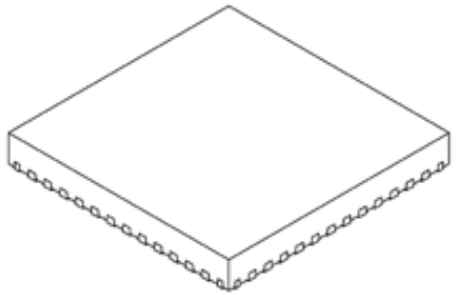
Raising the maximum voltage rating to 40 V, also the maximum current rating to 2 A or 2.8 A.
Low on-resistance contributes to low power consumption and low heat.

2 Small size and high heat dissipation

Adopted QFN package which has a high heat dissipation by an E-Pad. As per connecting the E-Pad, achieve high heat dissipation. The mounting space can be reduced to 6 x 6 mm.

3 Abnormality detection functions

Over current detection (ISD), Over heat detection (TSD) & Power On Reset (POR) are available.



WQFN36 (6 x 6 mm)

Lineup

Part number		TB67S511FTAG	TB67S512FTAG	TB67S521FTAG	TB67S522FTAG
Absolute Maximum Ratings	Output voltage	40 V			
	Output current	2.0 A		2.8 A	
On-resistance (H+L)		0.8 Ω (Typ.)		0.53 Ω (Typ.)	
Driving type		PWM constant current drive			
Excitation mode		full, half and quarter step resolutions			
Features		Phase type	Clock type	Phase type	Clock type
Error detection function		TSD, ISD, POR			
Package		WQFN36			

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11b Stepping motor driver
TB67S539FTG

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

The maximum voltage rating of 40 V. Standard stepping motor drivers with a small package

1 High voltage and current

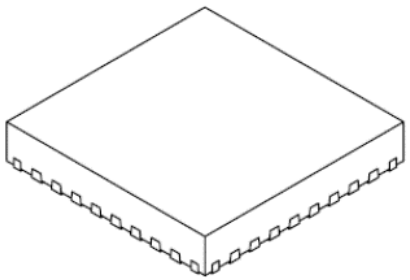
Raising the maximum voltage rating to 40 V, also the maximum current rating to 2 A. Low on-resistance contributes to low power consumption and low heat.

2 Small size and high heat dissipation

Adopted QFN package which has a high heat dissipation by an E-Pad. As per connecting the E-Pad, achieve high heat dissipation. The mounting space can be reduced to 5 x 5 mm.

3 Abnormality detection functions

Over heat detection (TSD), over current detection (ISD), and under voltage lockout (UVLO) are available.



VQFN32 (5 x 5 mm)

Lineup

Part number		TB67S539FTG
Absolute Maximum Ratings	Output voltage	40 V
	Output current	2.0 A
On-resistance (H+L)		0.8 Ω (Typ.)
Driving type		PWM constant current drive
Excitation mode		full, half, quarter, 1/8, 1/16 and 1/32 step resolutions
Features		Clock type
Error detection function		TSD, ISD, UVLO
Package		VQFN32

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Value provided

It contributes to system cost down, high efficiency system and development efficiency improvement.

1 Built-in Arm® Cortex®-M0 CPU core

Built-in Arm Cortex-M0 core with Thumb instruction set improves energy efficiency. Various development tool and their partners allow users many options.

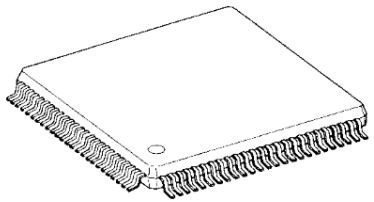
2 Suitable for sensing analog signal

Built-in multichannel AD converter executes sensing data processing efficiently at low cost.

3 Small package and low power consumption

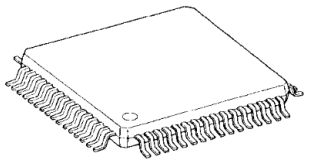
Cortex-M0 and Toshiba original NANOFLASH™ technology bring to the small package and low power consumption. They contribute to reduce circuit board area and power consumption.

TMPM036FWFG



LQFP100

TMPM037FWUG



LQFP64

Lineup

Part number	TMPM036FWFG	TMPM037FWUG
Maximum operation frequency	20 MHz	20 MHz
Instruction ROM	128 KB	128 KB
RAM	16 KB	16 KB
Timer	14ch	10ch
UART/SIO	6	5
I^2C	2	1
AD converter	8ch (10bit)	8ch (10bit)

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Value provided

Built-in AD converters, timers and 3-phase PWM output(s). System control at low power consumption.

1 Built-in Arm® Cortex®-M3 CPU core

These implement Arm Cortex-M3 core with 120 MHz maximum operation frequency.
Various development tool and their partners allow users many options.

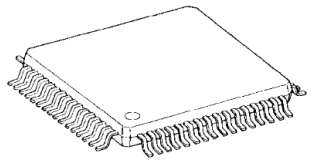
2 System cost down and development efficiency improvement

These execute sensing data monitoring and motor control efficiently by multiple built-in analog function such as AD converter, and timer system. The Toshiba original NANOFLASH™ is possible to rewrite at high speed. It reduces user software development time period.

3 Small package and low power consumption

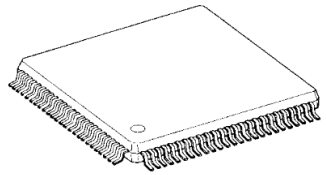
These support low power consumption library and stand by function and contribute to reduce power consumption. The packages lineup includes small LQFP64 to LQFP144.

TMPM3HLFYAUG



LQFP64

TMPM3HNFYAFG



LQFP100

Lineup

Part number	TMPM3HLFD/Z/YAUG	TMPM3HNFD/Z/YAFG
Max. operation frequency	120 MHz	
Instruction ROM	512/384/256 KB	
RAM	66 KB	
Timer	32bit x 8ch (16bit x 16ch)	
AD converter	12bit x 12ch	12bit x 17ch
Serial communication	UART 7ch, I^2C 2ch, SPI 1ch	UART 8ch, I^2C 3ch, SPI 4ch
Package	LQFP64	LQFP100

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14 Three-phase brushless DC motor controller

TC78B004AFTG

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

Built-in speed control function, high efficient and low heat performance by 2-phase modulation system based on PWM sine wave drive

1 Motor speed control function

Built-in FLL + PLL [Note1] circuit controls motor speed high efficiently.

[Note1] FLL: Frequency locked loop, PLL: phase locked loop

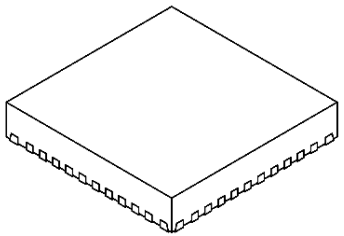
2 Low noise, low vibration motor control

Sine wave PWM drive with smooth current waveforms contributes to lower motor noise and vibration compared to conventional rectangular wave drive. [Note2]

[Note2] Comparison with Toshiba's products

3 Small package

Adopted QFN40 contributes to reduce 25 % mounting area compared with our previous product such as TB6604AFTG with QFN48.



WQFN40（6 x 6 x 0.8 mm）

Lineup

Part number	TC78B004AFTG
Power supply voltage (Operating range) [V]	10 to 28
Output voltage (Max.rating) [V]	-0.3 to 40 (upper side drive), 15 (Lower side drive)
Drive system	Sine wave PWM drive system
Other / Features	Lead angle control : Automatic lead angle correction function Sensor input : Hall element Speed control : External clock input, FLL + PLL speed control circuit Lock protection function

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1ch brushed DC motor driver

TB67H450AFNG / TB67H451AFNG

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

High voltage, high current & low power consumption with BiCD process. Simple single channel version.

1 High voltage (50 V)/ High current

Maximum rating of the output voltage is improved from 40 to 50 V to allow margin for air discharge test, etc.

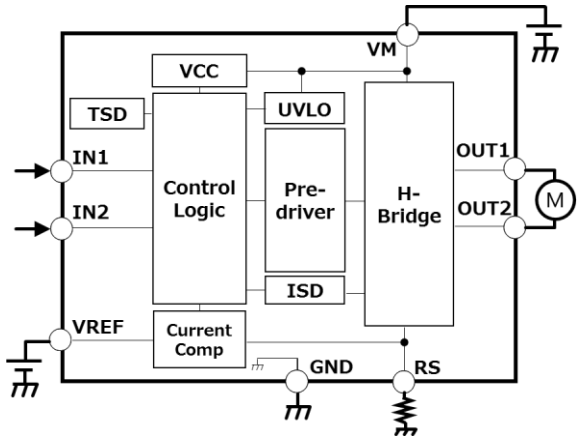
2 Wide operation voltage range

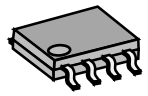
Wide power supply voltage range from 4.5 to 44 V supports battery driven applications.

3 General package

Adopting HSOP8 package compatible with competitor's products or Toshiba conventional products.

■ Simple solution





HSOP8
(4.9 x 6.0 mm)

Lineup

Part number		TB67H450AFNG	TB67H451AFNG
Motor type		Brushed DC motor	
Absolute Maximum Ratings	Output voltage	50 V	
	Output current	3.5 A	
ON resistance		0.6 Ω (Typ.)	
Output circuit		1 circuit	
Error detection function		TSD, ISD, UVLO	
Package		HSOP8	

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15b 2ch brushed DC motor driver

TB67H400AFTG / TB67H420FTG / TB67H303FTG

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

High voltage, high current with BiCD process. Mode selection supports higher current driving.

1 High voltage (50 V)/ High current

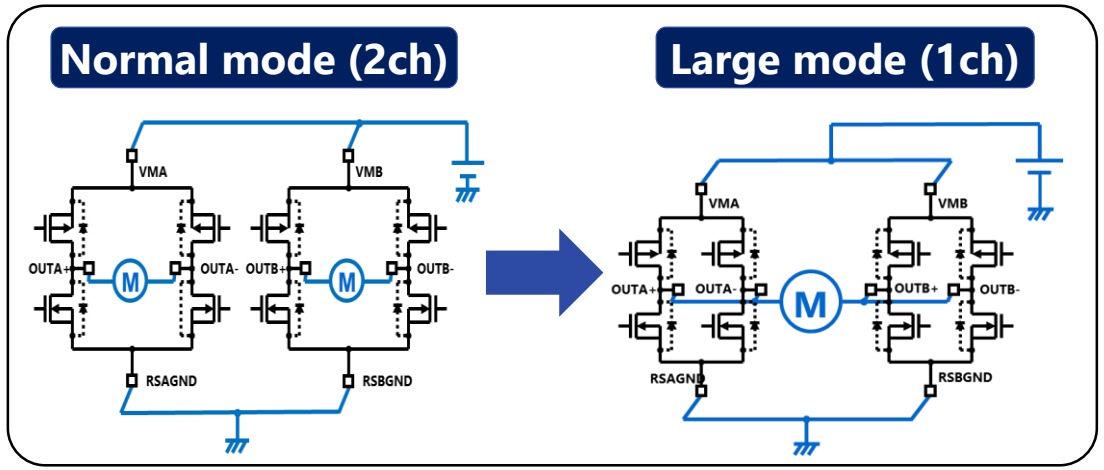
Maximum rating of the output voltage is improved from 40 to 50 V to allow margin for air discharge test, etc.

2 Wide operation voltage range

Wide operation voltage range from 10 to 47 V supports battery driven applications.

3 High current drive

Built-in 2ch of H-bridge circuit can drive two brushed DC motors or a single brushed motor by using large mode which obtains two times current.



Lineup

Part number		TB67H400AFTG	TB67H410FTG	TB67H420FTG
Motor type		Brushed DC motor		
Absolute Maximum Ratings	Output voltage [V]	50		
	Output current (Normal) [A]	4	2.5	4.5
	Output current (Large) [A]	8	5.0	9.0
On-resistance (Normal) (H+L) [Ω]		0.49 (Typ.)	0.8 (Typ.)	0.33 (Typ.)
On-resistance (Large) (H+L) [Ω]		0.25 (Typ.)	0.4 (Typ.)	0.17 (Typ.)
Error detection function		TSD, ISD, POR		TSD, ISD, POR, OPD
Package		WQFN48		VQFN48

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16a Linear image sensor (CCD)

TCD2569BFG

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

Image quality is improved by less color registration and blooming[Note].

[Note] saturation of the CCD shift register by over exposed pixels

1 High image quality

2 line spacing (10.5 µm) between pixel arrays (red-green, green-blue) offers high image quality with less color registration.

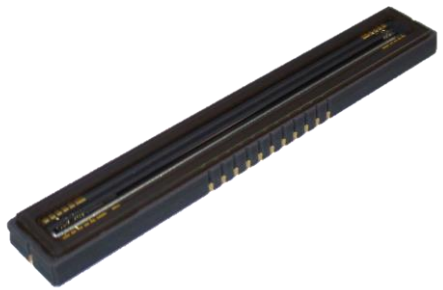
2 Easy to speed up

A built-in sample and hold circuit lengthens the video output signal period and offers stable video output signal sampling at high speed operation.

3 Performance improvement in high reflectance object scanning

The built-in output voltage clip function suppresses the maximum output voltage to 1.8 V or less, and the saturated output voltage of the CCD shift register is 4 V or more. This reduces blooming caused by scanning high reflectance objects.

TCD2569BFG



・22pin-CLCC (Ceramic Leadless Chip Carrier)
・SMT (Surface Mount Technology)

Lineup

Pixel Size	5.25 µm by 5.25 µm
Line Spacing (Line Distance)	2 line spacing (10.5 µm)
Effective Pixel Number	5340 pixels by 3 lines
Sensitivity (A light source + CM500S) (Typ.)	Red: 13.2 V/(lx·s); Green: 15.0 V/(lx·s); Blue: 5.9 V/(lx·s)
Maximum Clock Pulse Frequency	35 MHz
Power Supply Voltage (Operating Range)	9.5 to 10.5 V
Maximum Output Voltage （Max）	1.8 V
Saturation Output Voltage of CCD Shift Register (Min)	4.0 V
Features	Sample and Hold Circuit; Clipping Function; Clamp Circuit

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Linear image sensor (CCD)

TCD2726DG

Small size Packages | High efficiency · Low loss | Noise immunity

Value provided

High speed operation at a data rate of 100 MHz (50 MHz x 2 ch) and installation of a timing generator are realized.

1 High speed CCD linear image sensor

100 MHz (50 MHz x 2ch) data rate.

2 Easy to system development

A built-in Timing Generator circuit and has a lower CCD driver pin count. This reduces EMI [Note1] and timing-adjustment and the number of peripheral parts.

[Note1] electromagnetic interference

3 Low power consumption

10 V power supply voltage for amplifier circuit lowered to 3.3 V. [Note2]

[Note2] 10 V power supply is used partially. Dual power supply of 3.3 V and 10 V.

TCD2726DG

・32pin-CERDIP (Ceramic Dual In-line Package)
・DIP (Dual In-line Package)

Lineup

Pixel Size		4.7 µm by 4.7 µm
Line Spacing (Line Distance)		2 line spacing (9.4 µm)
Effective Pixel Number		7500 pixels by 3 lines
Sensitivity (A light source + CM500S) (Typ.)		Red: 11.1 V/(lx·s); Green: 14.9 V/(lx·s); Blue: 5.2 V/(lx·s)
Maximum Clock Pulse Frequency		100 MHz (50 MHz × 2 ch)
Power Supply Voltage (Operating Range)	3.3 V (Digital)	3.1 to 3.5 V
	3.3 V (Analog)	3.1 to 3.5 V
	10 V	9.5 to 10.5 V
Features		Timing Generator circuit, CCD driver

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