TOSHIBA Field Effect Transistor Silicon P Channel MOS Type (U-MOSⅥ)

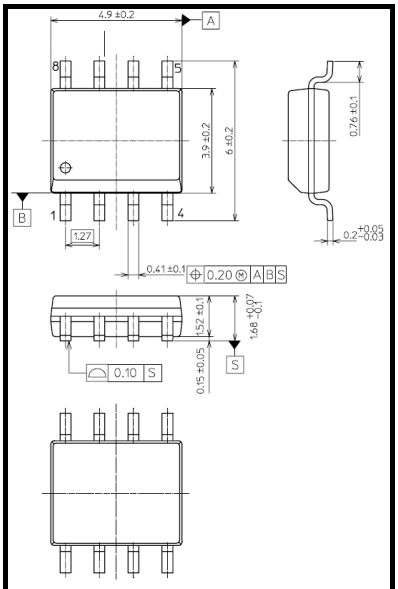
TPC8125

Lithium Ion Battery Applications

Power Management Switch Applications

- Small footprint due to small and thin package
- Low drain-source ON-resistance: $R_{DS\ (ON)}$ = 10 mΩ (typ.)
- Low leakage current: I_{DSS} = −10 μA (max) (V_{DS} = −30 V)
- Enhancement mode: V_{th} = −0.8 to −2.0 V (V_{DS} = −10 V, I_D = −0.5mA)

Unit: mm



1,2,3:SOURCE 4:GATE
5,6,7,8:DRAIN

JEDEC	―
JEITA	―
TOSHIBA	2-5R1A

Weight: 0.085 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

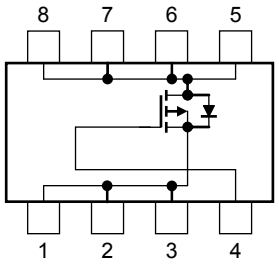
Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	−30	V
Drain-gate voltage (R_{GS} = 20 kΩ)		V_{DGR}	−30	V
Gate-source voltage		V_{GSS}	−25/+20	V
Drain current	DC (Note 1)	I_D	−10	A
	Pulse (Note 1)	I_{DP}	−40	
Drain power dissipation (t = 10 s) (Note 2a)		P_D	1.9	W
Drain power dissipation (t = 10 s) (Note 2b)		P_D	1.0	W
Single pulse avalanche energy (Note 3)		E_{AS}	65	mJ
Avalanche current (Note 1)		I_{AR}	−10	A
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Note 1, Note 2, Note 3 : See the next page.

Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

This transistor is an electrostatic-sensitive device. Handle with care.

Circuit Configuration

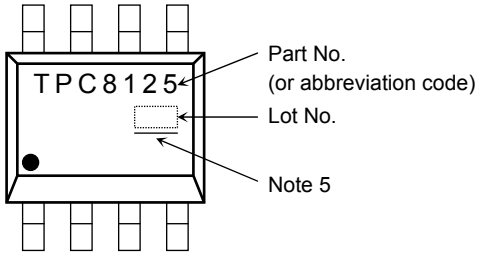


Start of commercial production
2009-11

Thermal Characteristics

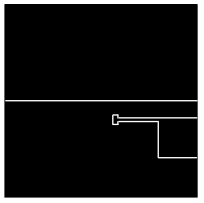
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to ambient (t = 10 s) (Note 2a)	$R_{th\ (ch\text{-}a)}$	65.8	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2b)	$R_{th\ (ch\text{-}a)}$	125	°C/W

Marking (Note 4)



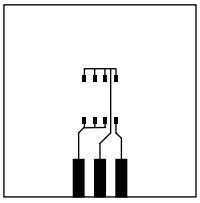
Note 1: Ensure that the channel temperature does not exceed 150°C.

Note 2: (a)Device mounted on a glass-epoxy board (a) (b)Device mounted on a glass-epoxy board (b)



FR-4
25.4 × 25.4 × 0.8
(Unit: mm)

(a)



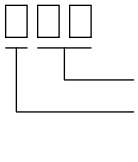
FR-4
25.4 × 25.4 × 0.8
(Unit: mm)

(b)

Note 3: V_{DD} = −24 V, T_{ch} = 25 °C (initial), L = 500 μH, R_G = 25 Ω, I_{AR} = −10A

Note 4: • on lower left of the marking indicates Pin 1.

※ Weekly code: (Three digits)



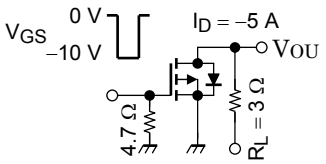
Week of manufacture
(01 for the first week of a year: sequential number up to 52 or 53)

Year of manufacture
(The last digit of a year)

Note 5: A line under a Lot No. identifies the indication of product Labels.
Not underlined: [[Pb]]/INCLUDES > MCV
Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

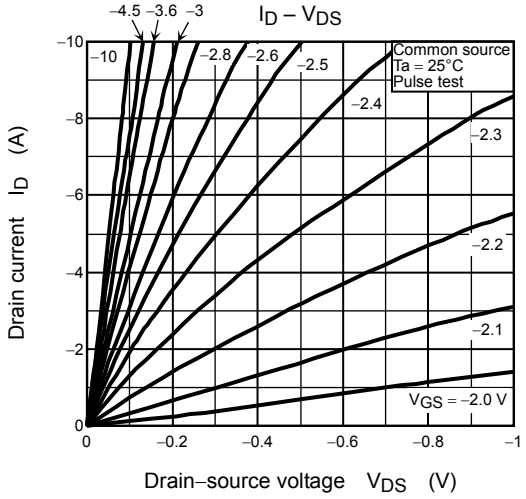
Electrical Characteristics (Ta = 25°C)

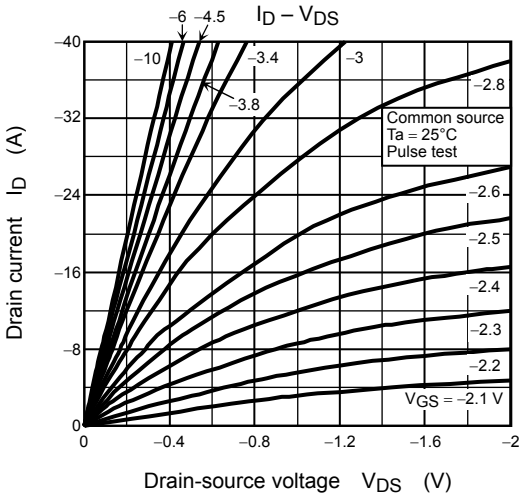
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V	—	—	±100	nA
Drain cut-OFF current		I_{DSS}	V_{DS} = −30 V, V_{GS} = 0 V	—	—	−10	μA
Drain-source breakdown voltage		$V_{(BR)\ DSS}$	I_D = −10 mA, V_{GS} = 0 V	−30	—	—	V
		$V_{(BR)\ DSX}$	I_D = −10 mA, V_{GS} = 10 V (Note 6)	−21	—	—	
Gate threshold voltage		V_{th}	V_{DS} = −10 V, I_D = −0.5 mA	−0.8	—	−2.0	V
Drain-source ON-resistance		$R_{DS\ (ON)}$	V_{GS} = −4.5 V, I_D = −5 A	—	13	17	mΩ
			V_{GS} = −10 V, I_D = −5 A	—	10	13	
Input capacitance		C_{iss}	V_{DS} = −10 V, V_{GS} = 0 V, f = 1 MHz	—	2580	—	pF
Reverse transfer capacitance		C_{rss}		—	430	—	
Output capacitance		C_{oss}		—	490	—	
Switching time	Rise time	t_r	 Duty ≤ 1%, t_w = 10 μs	—	8	—	ns
	Turn-ON time	t_{on}		—	16	—	
	Fall time	t_f		—	75	—	
	Turn-OFF time	t_{off}		—	245	—	
Total gate charge (gate-source plus gate-drain)		Q_g	V_{DD} ≈ −24 V, V_{GS} = −10 V, I_D = −10 A	—	64	—	nC
Gate-source charge 1		Q_{gs1}		—	6	—	
Gate-drain (“miller”) charge		Q_{gd}		—	17	—	

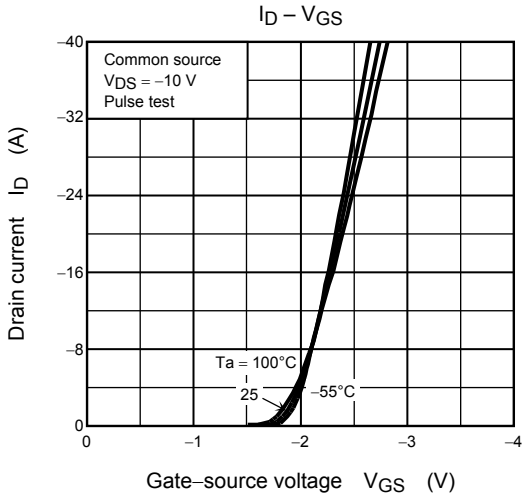
Source-Drain Ratings and Characteristics (Ta = 25°C)

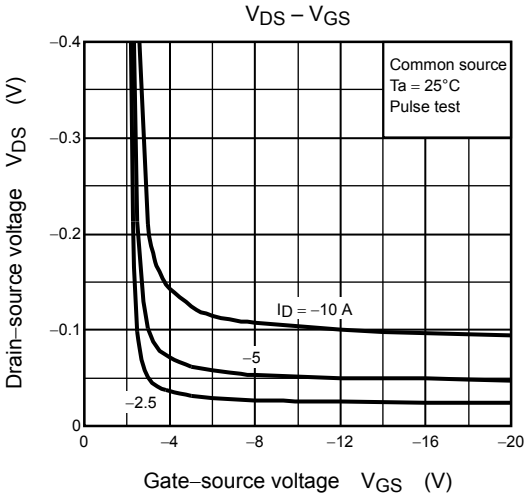
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	−40	A
Forward voltage (diode)		V_{DSF}	I_{DR} = −10 A, V_{GS} = 0 V	—	—	1.2	V

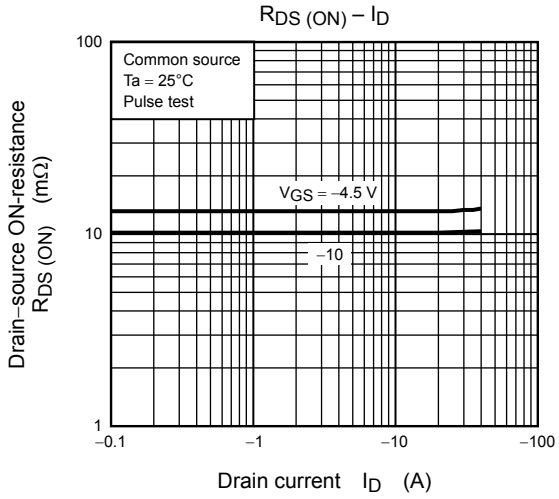
Note 6: VDSX mode (the application of a plus voltage between gate and source) may cause decrease in maximum rating of drain-source voltage.


$I_D - V_{DS}$
−4.5 −3.6 −3
−10
−2.8
−2.6
−2.5
−2.4
−2.3
−2.2
−2.1
V_{GS} = −2.0 V
Common source
Ta = 25°C
Pulse test
Drain current I_D (A)
Drain–source voltage V_{DS} (V)

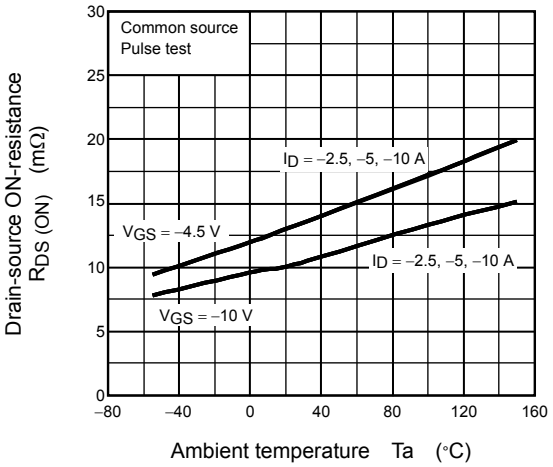

$I_D - V_{DS}$
−6 −4.5
−10
−3.4
−3.8
−3
−2.8
−2.6
−2.5
−2.4
−2.3
−2.2
V_{GS} = −2.1 V
Common source
Ta = 25°C
Pulse test
Drain current I_D (A)
Drain-source voltage V_{DS} (V)


$I_D - V_{GS}$
Common source
V_{DS} = −10 V
Pulse test
Ta = 100°C
25
−55°C
Drain current I_D (A)
Gate–source voltage V_{GS} (V)

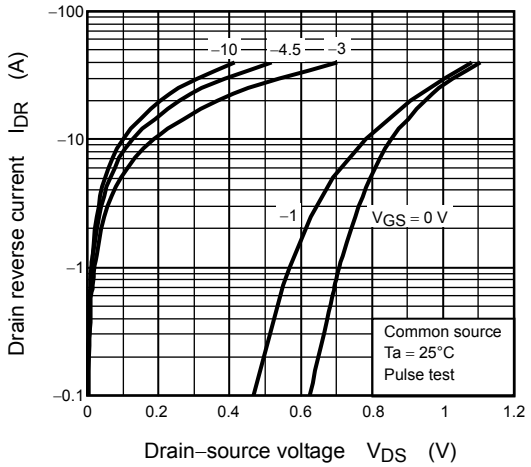

$V_{DS} - V_{GS}$
Common source
Ta = 25°C
Pulse test
I_D = −10 A
−5
−2.5
Drain–source voltage V_{DS} (V)
Gate–source voltage V_{GS} (V)


$R_{DS\ (ON)} - I_D$
Common source
Ta = 25°C
Pulse test
V_{GS} = −4.5 V
−10
Drain–source ON-resistance $R_{DS\ (ON)}$ (mΩ)
Drain current I_D (A)

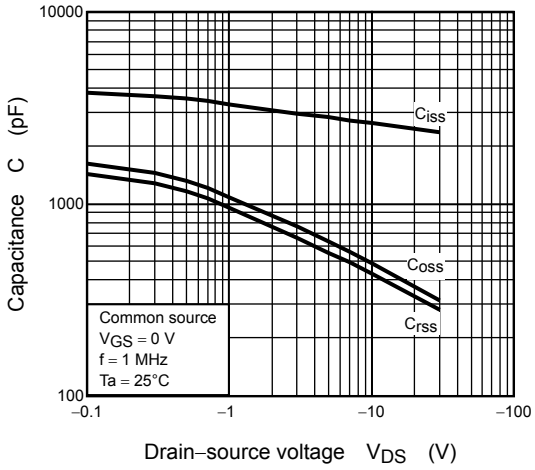
$R_{DS\ (ON)}$ – Ta



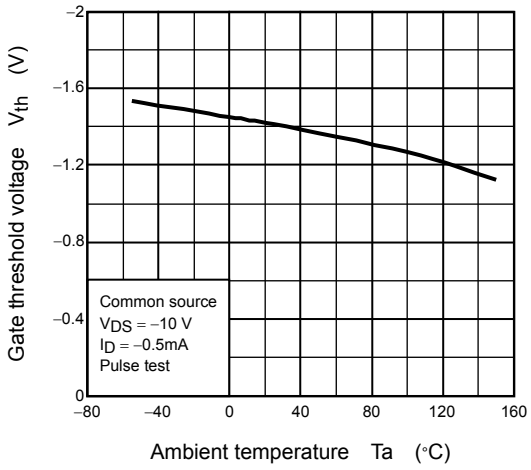
I_{DR} – V_{DS}



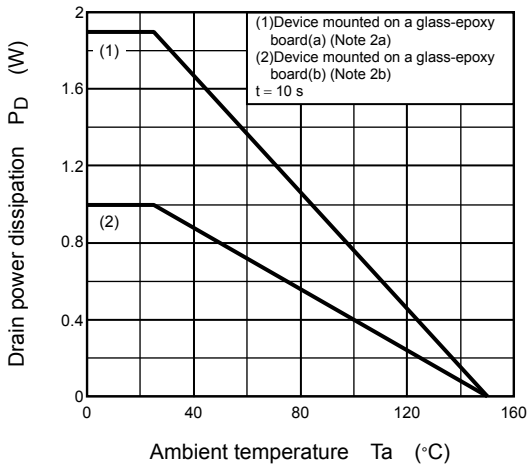
Capacitance – V_{DS}



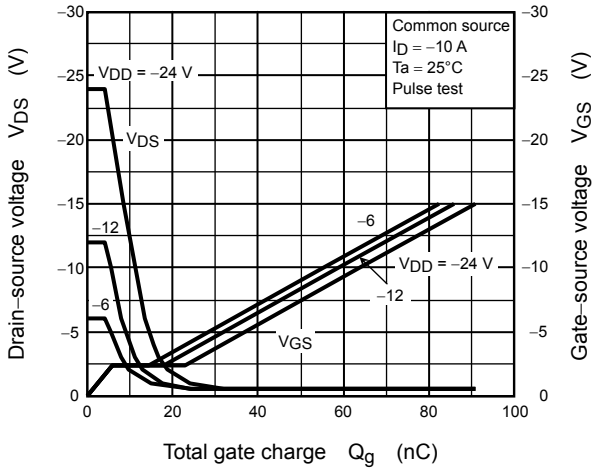
V_{th} – Ta

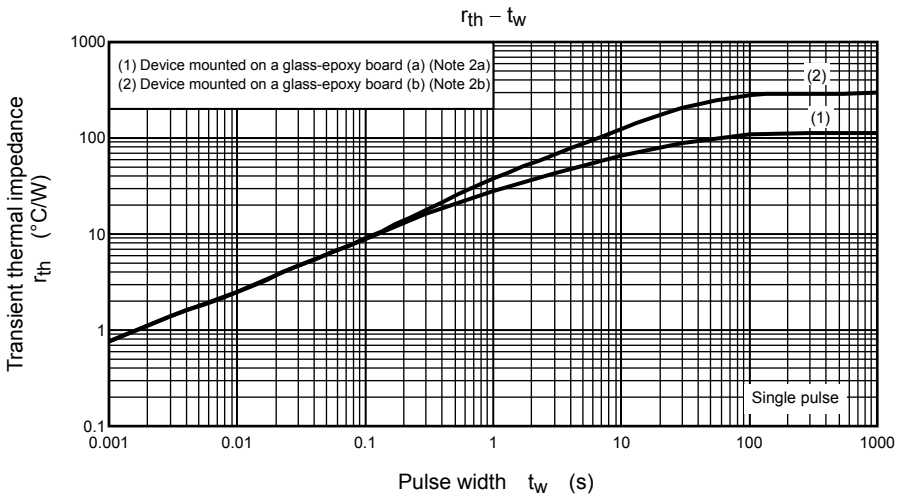


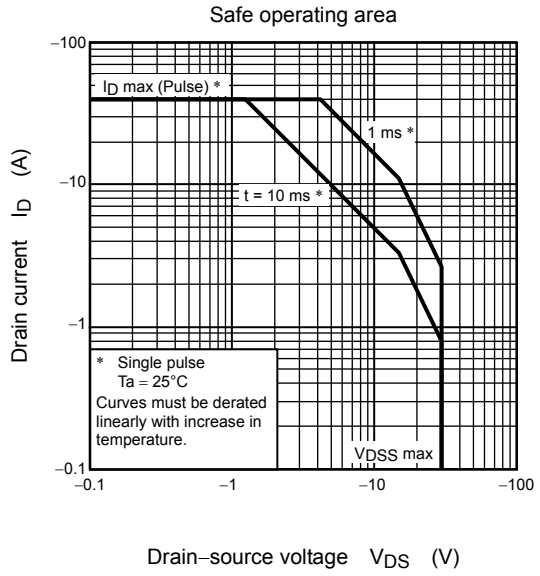
P_D – Ta



Dynamic input/output characteristics




$r_{th} - t_w$
(1) Device mounted on a glass-epoxy board (a) (Note 2a)
(2) Device mounted on a glass-epoxy board (b) (Note 2b)
(2)
(1)
Single pulse
Transient thermal impedance r_{th} (°C/W)
1000
100
10
1
0.1
0.001
0.01
0.1
1
10
100
1000
Pulse width t_w (s)


Safe operating area
I_D max (Pulse) *
1 ms *
t = 10 ms *
* Single pulse
Ta = 25°C
Curves must be derated linearly with increase in temperature.
V_{DSS} max
Drain current I_D (A)
−100
−10
−1
−0.1
−0.1
−1
−10
−100
Drain−source voltage V_{DS} (V)

RESTRICTIONS ON PRODUCT USE

- Toshiba Corporation, and its subsidiaries and affiliates (collectively "TOSHIBA"), reserve the right to make changes to the information in this document, and related hardware, software and systems (collectively "Product") without notice.
- This document and any information herein may not be reproduced without prior written permission from TOSHIBA. Even with TOSHIBA's written permission, reproduction is permissible only if reproduction is without alteration/omission.
- Though TOSHIBA works continually to improve Product's quality and reliability, Product can malfunction or fail. Customers are responsible for complying with safety standards and for providing adequate designs and safeguards for their hardware, software and systems which minimize risk and avoid situations in which a malfunction or failure of Product could cause loss of human life, bodily injury or damage to property, including data loss or corruption. Before customers use the Product, create designs including the Product, or incorporate the Product into their own applications, customers must also refer to and comply with (a) the latest versions of all relevant TOSHIBA information, including without limitation, this document, the specifications, the data sheets and application notes for Product and the precautions and conditions set forth in the "TOSHIBA Semiconductor Reliability Handbook" and (b) the instructions for the application with which the Product will be used with or for. Customers are solely responsible for all aspects of their own product design or applications, including but not limited to (a) determining the appropriateness of the use of this Product in such design or applications; (b) evaluating and determining the applicability of any information contained in this document, or in charts, diagrams, programs, algorithms, sample application circuits, or any other referenced documents; and (c) validating all operating parameters for such designs and applications. **TOSHIBA ASSUMES NO LIABILITY FOR CUSTOMERS' PRODUCT DESIGN OR APPLICATIONS.**
- **PRODUCT IS NEITHER INTENDED NOR WARRANTED FOR USE IN EQUIPMENTS OR SYSTEMS THAT REQUIRE EXTRAORDINARILY HIGH LEVELS OF QUALITY AND/OR RELIABILITY, AND/OR A MALFUNCTION OR FAILURE OF WHICH MAY CAUSE LOSS OF HUMAN LIFE, BODILY INJURY, SERIOUS PROPERTY DAMAGE AND/OR SERIOUS PUBLIC IMPACT ("UNINTENDED USE").** Except for specific applications as expressly stated in this document, Unintended Use includes, without limitation, equipment used in nuclear facilities, equipment used in the aerospace industry, Class 3 medical devices, equipment used for automobiles, and military vehicles and munitions. **IF YOU USE PRODUCT FOR UNINTENDED USE, TOSHIBA ASSUMES NO LIABILITY FOR PRODUCT.** For details, please contact your TOSHIBA sales representative or contact us via our website.
- Do not disassemble, analyze, reverse-engineer, alter, modify, translate or copy Product, whether in whole or in part.
- Product shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable laws or regulations.
- The information contained herein is presented only as guidance for Product use. No responsibility is assumed by TOSHIBA for any infringement of patents or any other intellectual property rights of third parties that may result from the use of Product. No license to any intellectual property right is granted by this document, whether express or implied, by estoppel or otherwise.
- **ABSENT A WRITTEN SIGNED AGREEMENT, EXCEPT AS PROVIDED IN THE RELEVANT TERMS AND CONDITIONS OF SALE FOR PRODUCT, AND TO THE MAXIMUM EXTENT ALLOWABLE BY LAW, TOSHIBA (1) ASSUMES NO LIABILITY WHATSOEVER, INCLUDING WITHOUT LIMITATION, INDIRECT, CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OR LOSS, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF OPPORTUNITIES, BUSINESS INTERRUPTION AND LOSS OF DATA, AND (2) DISCLAIMS ANY AND ALL EXPRESS OR IMPLIED WARRANTIES AND CONDITIONS RELATED TO SALE, USE OF PRODUCT, OR INFORMATION, INCLUDING WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY OF INFORMATION, OR NONINFRINGEMENT.**
- Do not use or otherwise make available Product or related software or technology for any military purposes, including without limitation, for the design, development, use, stockpiling or manufacturing of nuclear, chemical, or biological weapons or missile technology products (mass destruction weapons). Product and related software and technology may be controlled under the applicable export laws and regulations including, without limitation, the Japanese Foreign Exchange and Foreign Trade Law and the U.S. Export Administration Regulations. Export and re-export of Product or related software or technology are strictly prohibited except in compliance with all applicable export laws and regulations.
- Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. Please use Product in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. **TOSHIBA ASSUMES NO LIABILITY FOR DAMAGES OR LOSSES OCCURRING AS A RESULT OF NONCOMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.**

ENTEGRECİ

Bu belge www.entegreci.com üzerinden sunulmaktadır.

Elektronik komponent tedarikinde Entegreci

Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

www.entegreci.com

Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

Kategorilere göz atın

Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

Üreticileri görün

Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

Teklif isteyin

www.entegreci.com | **destek@entegreci.com** | **0850 305 90 34**

Entegreci is an online electronic components store based in Türkiye. Search by manufacturer part number to see stock, prices and datasheets for integrated circuits, microcontrollers, transistors, passive components and connectors, or request a quote for parts that are not listed.

Bu sayfa Entegreci tarafından eklenmiştir. Belgenin önceki sayfaları asıl yayıncısına aittir ve içeriği değiştirilmemiştir; en güncel sürüm için belgenin yayıncısına başvurun.