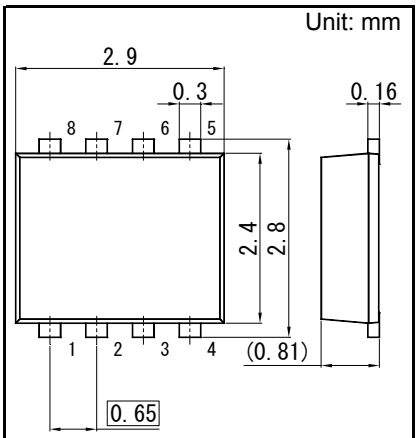
Panasonic

FC8V22040L

Gate Resistor installed Dual N-Channel MOS Type

For lithium-ion secondary battery protection circuit



1. Tr.1 Source
2. Tr.1 Gate
3. Tr.2 Source
4. Tr.2 Gate
5. Tr.2 Drain
6. Tr.2 Drain
7. Tr.1 Drain
8. Tr.1 Drain

Panasonic	WMini8-F1
JEITA	SC-115
Code	—

■ Features

- Low drain-source On-state Resistance:
  RDS(on)typ. = 10.5 mΩ (VGS = 4.5 V)
- Halogen-free / RoHS compliant
  (EU RoHS / UL-94 V-0 / MSL:Level 1 compliant)

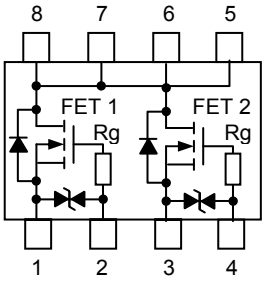
■ Marking Symbol: 4C

■ Basic Part Number : Dual Nch MOS 24V (Drain Common type)

■ Packaging

Embossed type (Thermo-compression sealing) : 3 000 pcs / reel (standard)

Internal Connection



Pin Name

1. Tr.1 Source
2. Tr.1 Gate
3. Tr.2 Source
4. Tr.2 Gate
5. Tr.2 Drain
6. Tr.2 Drain
7. Tr.1 Drain
8. Tr.1 Drain

Resistance value	Rg	1	kΩ

■ Absolute Maximum Ratings Ta = 25 °C Tr.1,Tr.2

Parameter		Symbol	Rating	Unit
FET1 FET2	Drain-source Voltage	VDS	24	V
	Gate-source Voltage	VGS	±12	V
	Drain Current	ID	8	A
	Drain Current (Pulsed)	IDp	48	A
Overall	Power Dissipation	PD1 *1	1.0	W
		PD2 *1,2	1.2	
		PD3 *3	0.4	
	Channel Temperature	Tch	150	°C
	Operating Ambient Temperature	Topr	-40 to + 85	°C
	Storage Temperature Range	Tstg	-55 to +150	°C

Note) *1 Glass epoxy board: 25.4 mm × 25.4 mm × 0.8 mm Copper foil of the drain portion should have a area of 300 mm^2 or more
PD absolute maximum rating without a heat shink: 400 mW
*2 t = 10 s
*3 Stand-alone (without the board)

Established : 2011-05-16
Revised : 2013-09-02

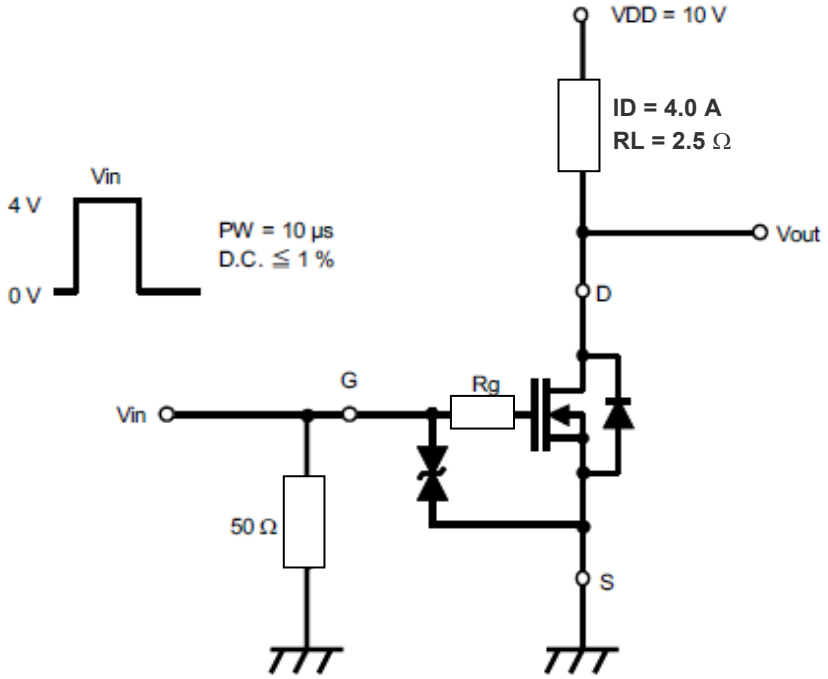
■ Electrical Characteristics Ta = 25°C ± 3°C Tr.1,Tr.2

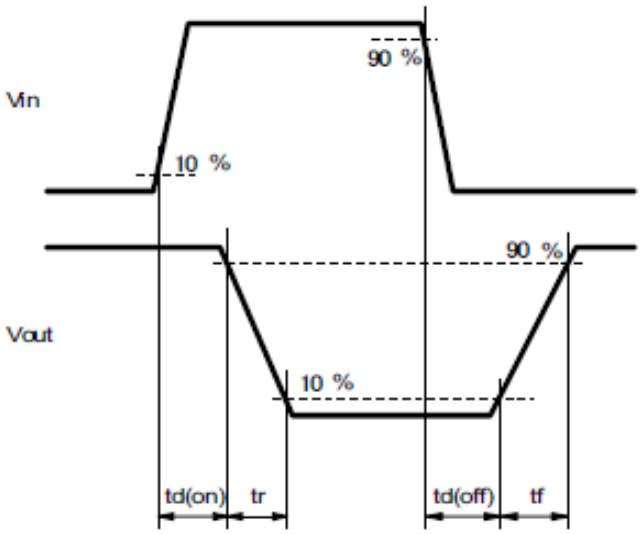
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-source surrender voltage	VDSS	ID = 1.0 mA, VGS = 0	24			V
Drain-source cutoff current	IDSS	VDS = 24 V, VGS = 0			1.0	μA
Gate-source cutoff current	IGSS	VGS = ±8.0 V, VDS = 0			±10	μA
Gate threshold voltage	Vth	ID = 1.0 mA, VDS = 10 V	0.40	0.85	1.50	V
Drain-source ON resistance	RDS(ON)1	ID = 4.0 A, VGS = 4.5 V	7.0	10.5	15	mΩ
	RDS(ON)2	ID = 4.0 A, VGS = 4.0 V	7.2	11.0	16	mΩ
	RDS(ON)3	ID = 4.0 A, VGS = 3.1 V	7.5	12.0	18	mΩ
	RDS(ON)4	ID = 4.0 A, VGS = 2.5 V	8.0	13.5	20	mΩ
Turn-on delay time *1	td(on)	VDD = 10 V, VGS = 0 V to 4 V		0.6		μs
Rise time *1	tr	ID = 4.0 A		1.5		μs
Turn-off delay time *1	td(off)	VDD = 10 V, VGS = 4 V to 0 V		4.4		μs
Fall time *1	tf	ID = 4.0 A		2.8		μs
Source to Drain Diode Forward Voltage	VSD	IS = 4.0 A, VGS = 0 V		0.8	1.2	V

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.
2. *1 Measurement circuit for Turn-on Delay Time/Rise Time/Turn-off Delay Time/Fall Time

Established : 2011-05-16
Revised : 2013-09-02

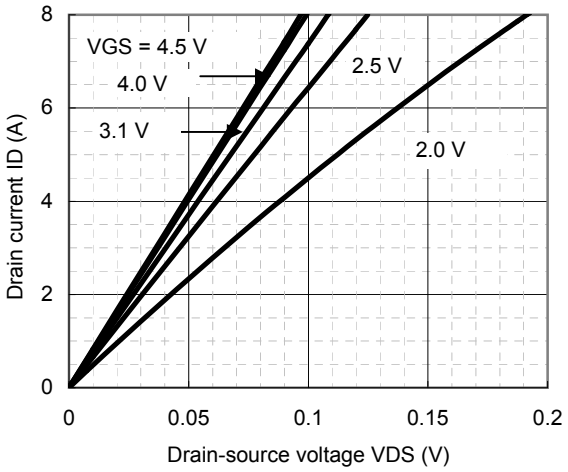
*1 Measurement circuit for Turn-on Delay Time/Rise Time/Turn-off Delay Time/Fall Time



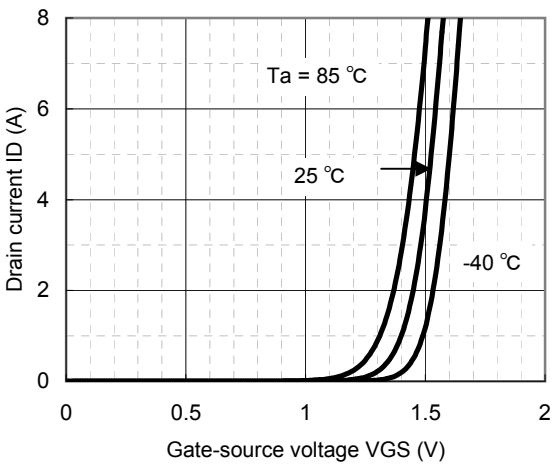


Established : 2011-05-16
Revised : 2013-09-02

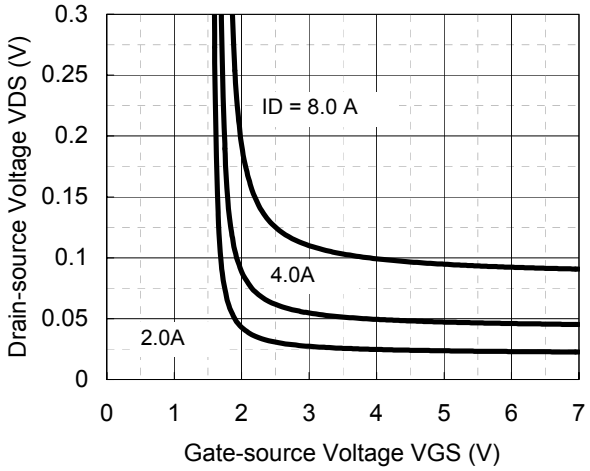
ID - VDS



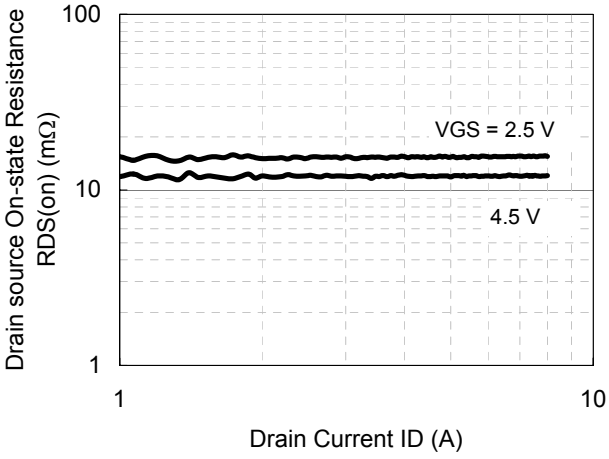
ID - VGS



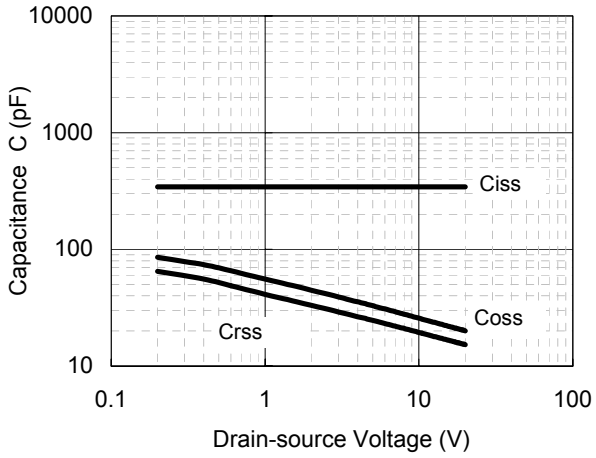
VDS - VGS



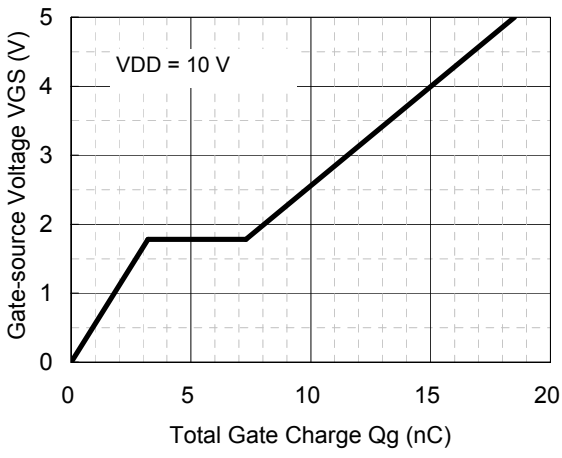
RDS(on) - ID



Capacitance - VDS

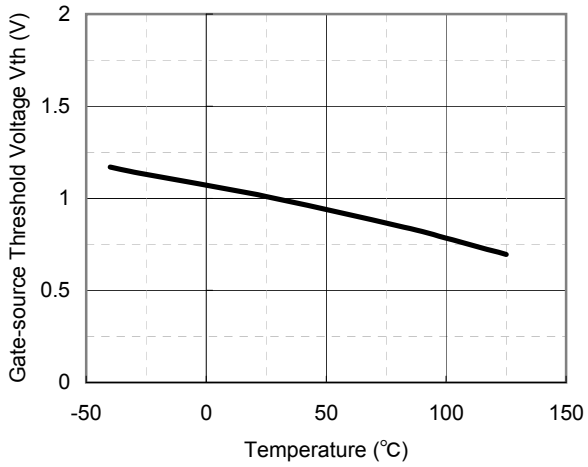


Dynamic Input/Output Characteristics

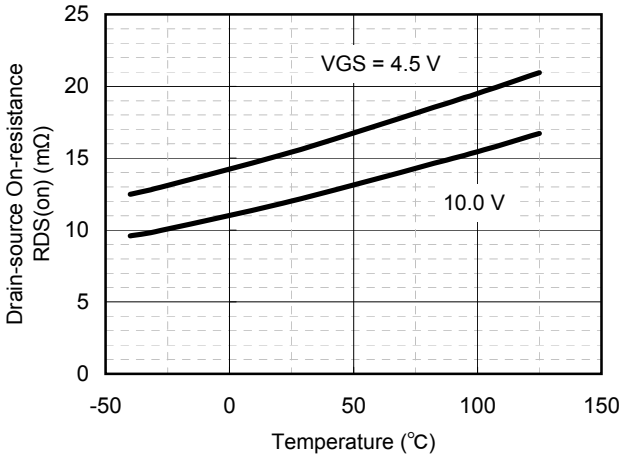


Established : 2011-05-16
Revised : 2013-09-02

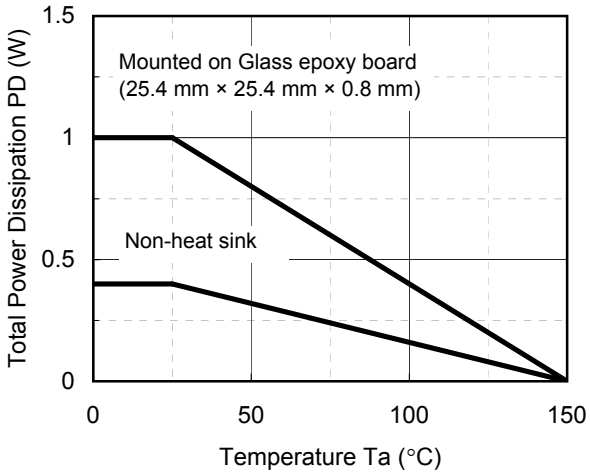
Vth - Ta



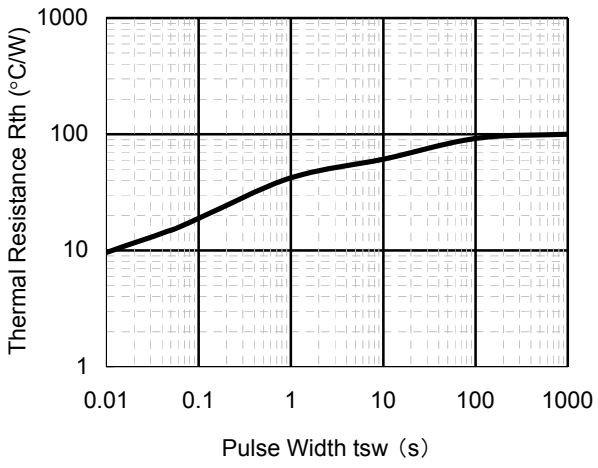
RDS(on) - Ta



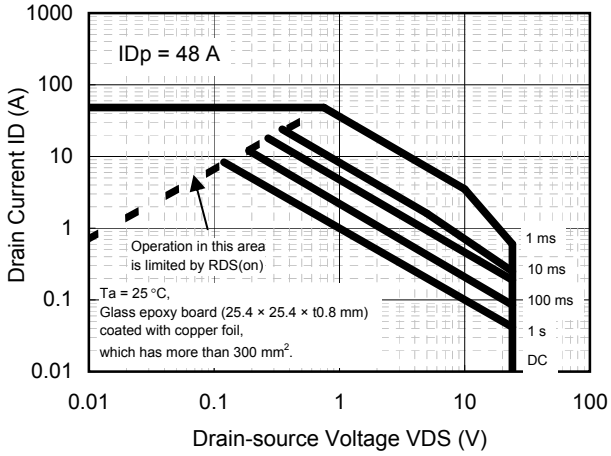
PD - Ta



Rth -tsw



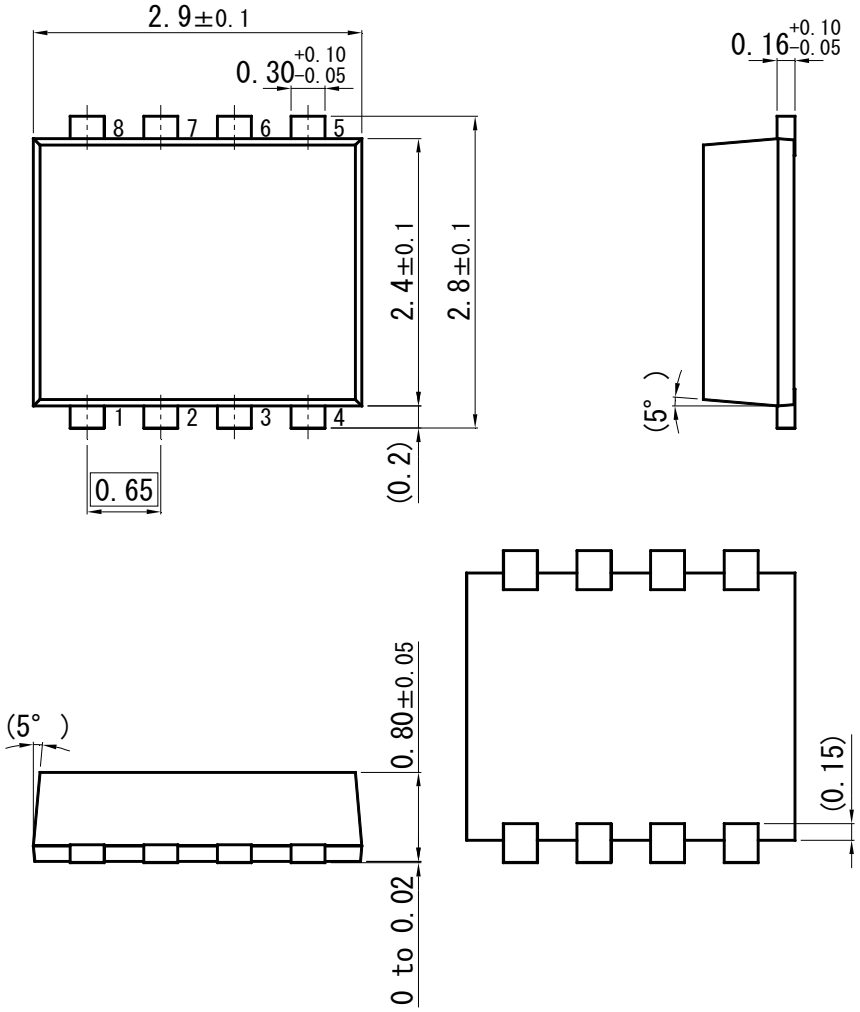
Safe Operating Area



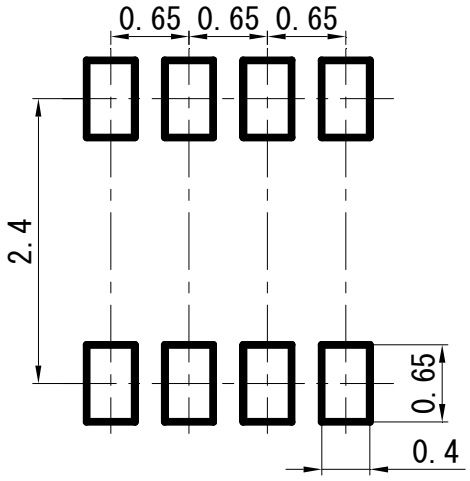
Established : 2011-05-16
Revised : 2013-09-02

WMini8-F1

Unit : mm



■ Land Pattern (Reference) (Unit : mm)



Established : 2011-05-16
Revised : 2013-09-02

Request for your special attention and precautions in using the technical information and semiconductors described in this book

(1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.

(2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products. No license is granted in and to any intellectual property right or other right owned by Panasonic Corporation or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.

(3) The products described in this book are intended to be used for general applications (such as office equipment, communications equipment, measuring instruments and household appliances), or for specific applications as expressly stated in this book.
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automotive equipment, traffic signaling equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.

It is to be understood that our company shall not be held responsible for any damage incurred as a result of or in connection with your using the products described in this book for any special application, unless our company agrees to your using the products in this book for any special application.

(4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.

20100202