

## **Notification about the transfer of the semiconductor business**

The semiconductor business of Panasonic Corporation was transferred on September 1, 2020 to Nuvoton Technology Corporation (hereinafter referred to as "Nuvoton"). Accordingly, Panasonic Semiconductor Solutions Co., Ltd. became under the umbrella of the Nuvoton Group, with the new name of Nuvoton Technology Corporation Japan (hereinafter referred to as "NTCJ").

In accordance with this transfer, semiconductor products will be handled as NTCJ-made products after September 1, 2020. However, such products will be continuously sold through Panasonic Corporation.

Publisher of this Document is NTCJ.

If you would find description "Panasonic" or "Panasonic semiconductor solutions", please replace it with NTCJ.

※ Except below description page

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

**Nuvoton Technology Corporation Japan**

**FK8V06060L**

**Single N-channel MOS FET**

For lithium-ion secondary battery protection circuits  
 For load switching

■ Features

- Low drain-source ON resistance: RDS(on) typ. = 70 mΩ (VGS = 4.5 V)
- Halogen-free / RoHS compliant  
 (EU RoHS / UL-94 V-0 / MSL : Level 1 compliant)

■ Marking Symbol: M1

■ Packaging

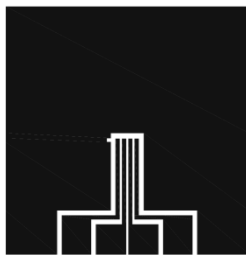
Embossed type (Thermo-compression sealing) : 3 000 pcs / reel (standard)

■ Absolute Maximum Ratings Ta = 25 °C

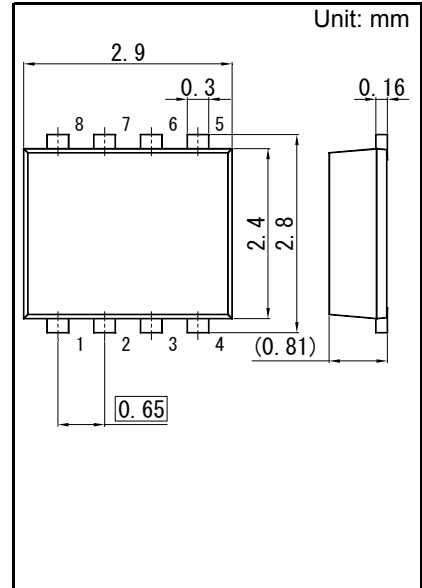
Parameter	Symbol	Rating	Unit
Drain-Source Voltage	VDS	60	V
Gate-source Voltage	VGS	±20	V
Drain Current (DC) *1	ID	3	A
Drain Current (Pulsed) *1,*2	IDp	9	A
Total Power Dissipation *1 (Steady State)	PD	1.3	W
Channel Temperature	Tch	150	°C
Storage Temperature Range	Tstg	-55 to +150	°C

Note \*1 Device mounted on a glass-epoxy board coated Copper ( see Fig . 1 )

\*2 Ensure that the channel temperature does not exceed 150°C

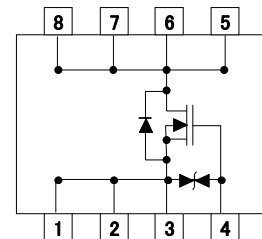


(Fig .1) Glass-Epoxy Board coated Copper  
 FR-4 25.4 × 25.4 × 0.8 ( Unit ; mm )



Panasonic	WMini8-F1
JEITA	SC-115
Code	—

■ Equivalent circuit, Pin name



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

■ Electrical Characteristics Ta = 25 °C ± 3 °C

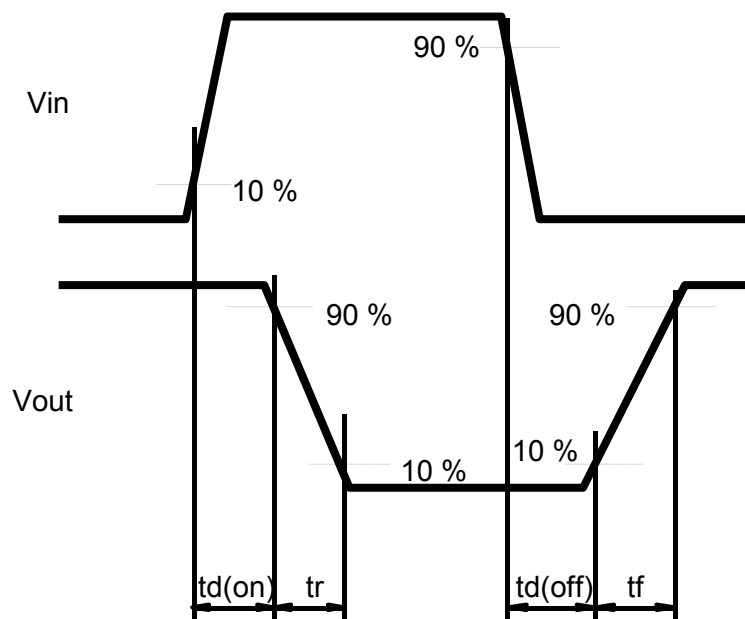
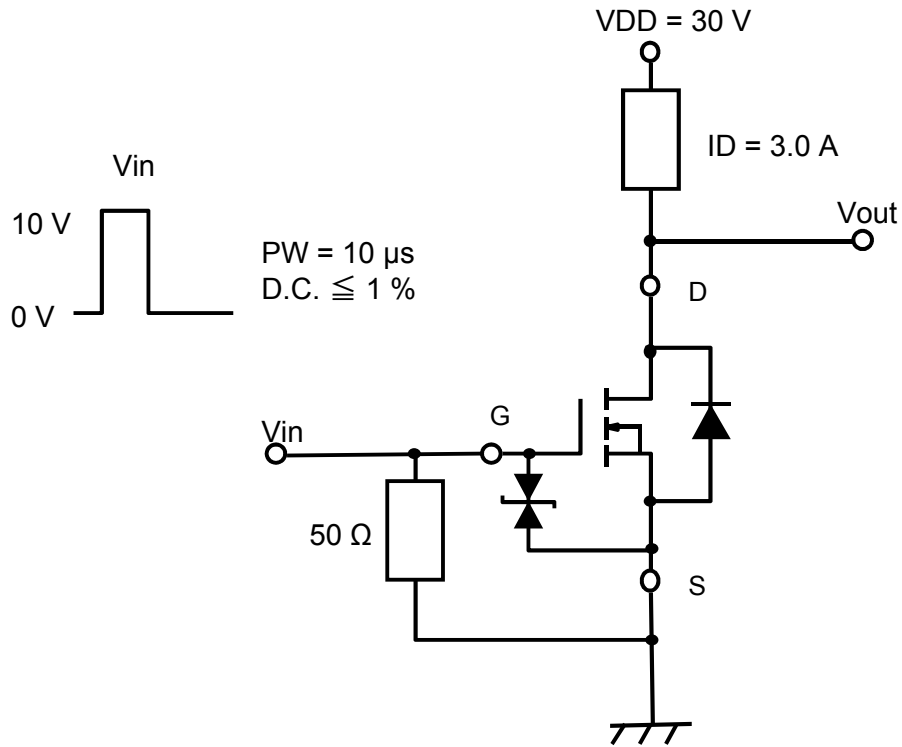
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-source Breakdown Voltage	VDSS	ID = 1 mA, VGS = 0 V	60			V
Zero Gate Voltage Source Current	IDSS	VDS = 60 V, VGS = 0 V			10	μA
Gate-source Leakage Current	IGSS	VGS = ±16 V, VDS = 0 V			±10	μA
Gate-source Threshold Voltage	Vth	ID = 480 μA, VDS = 10 V	1.0		3.0	V
Drain-source On-state Resistance	RDS(on)1	ID = 1.5 A, VGS = 10 V	-	60	85	mΩ
	RDS(on)2	ID = 1.5 A, VGS = 4.5 V	-	70	100	
Input Capacitance <sup>*1</sup>	Ciss	VDS = 10 V, VGS = 0 V, f = 1 MHz		360		pF
Output Capacitance <sup>*1</sup>	Coss			50		
Reverse Transfer Capacitance <sup>*1</sup>	Crss			20		
Turn-on delay Time <sup>*1,*2</sup>	td(on)	VDD = 30 V, VGS = 0 to 10 V		9		ns
Rise Time <sup>*1,*2</sup>	tr	ID = 3.0 A		7		
Turn-off delay Time <sup>*1,*2</sup>	td(off)	VDD = 30 V, VGS = 10 to 0 V		38		ns
Fall Time <sup>*1,*2</sup>	tf	ID = 3.0 A		6		
Total Gate Charge <sup>*1</sup>	Qg	VDD = 30 V		7.0		nC
Gate-source Charge <sup>*1</sup>	Qgs	VGS = 0 to 10 V,		1.4		
Gate-drain Charge <sup>*1</sup>	Qgd	ID = 3.0 A		1.2		
Body Diode Forward Voltage	VSD	IF = 1.5 A, VGS = 0 V		0.8	1.2	V

Note Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.

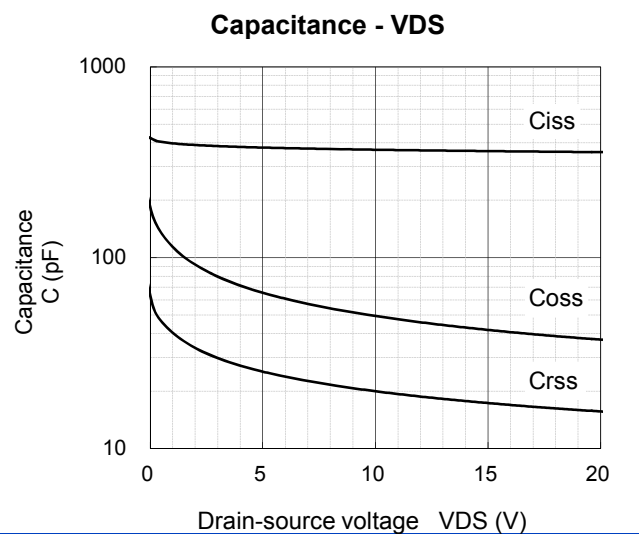
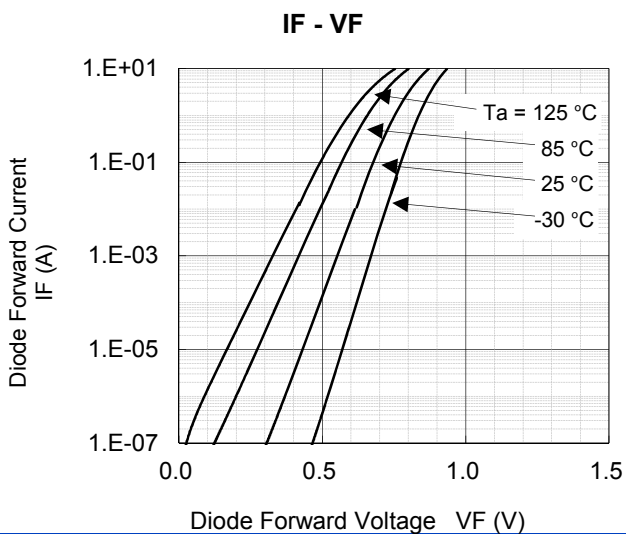
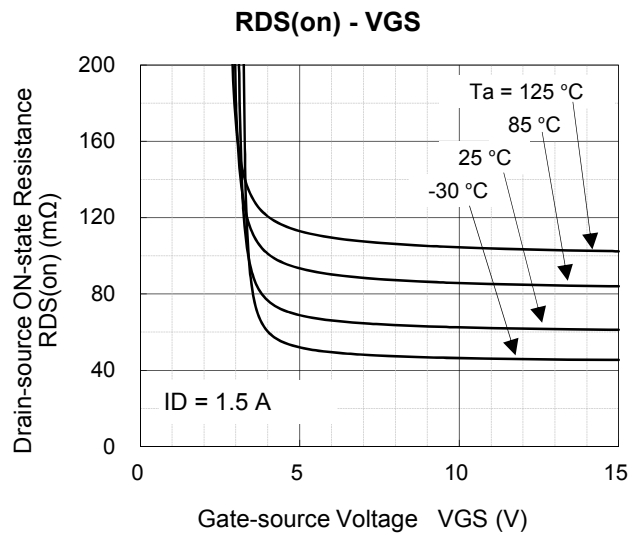
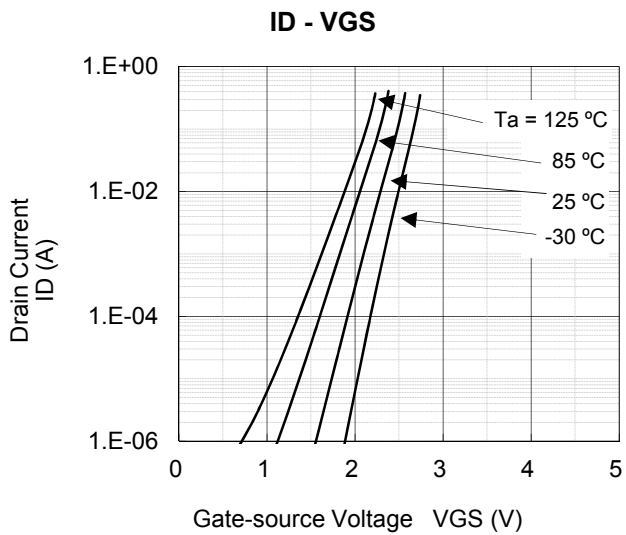
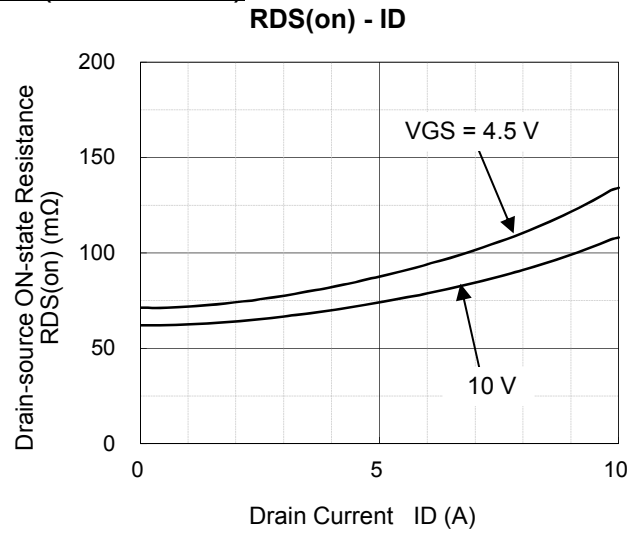
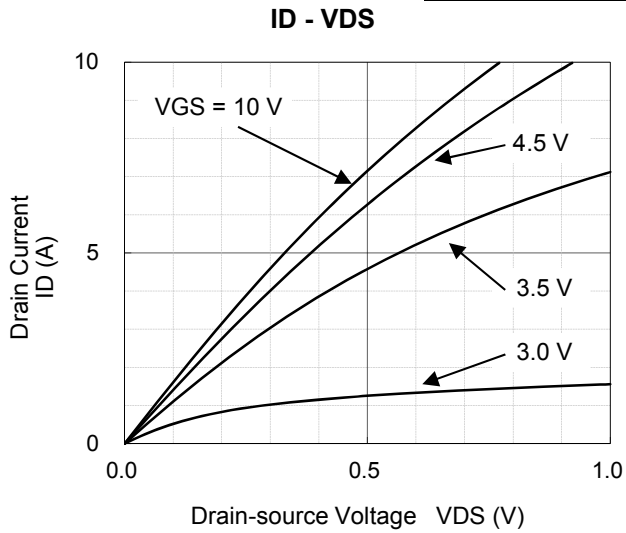
\*1 Assured by design

\*2 Measurement circuit for Turn-on Delay Time / Rise Time / Turn-off Delay Time / Fall Time

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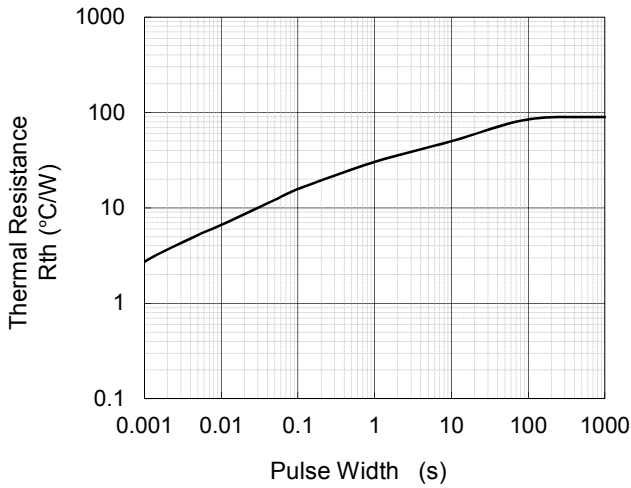


Technical Data ( reference )

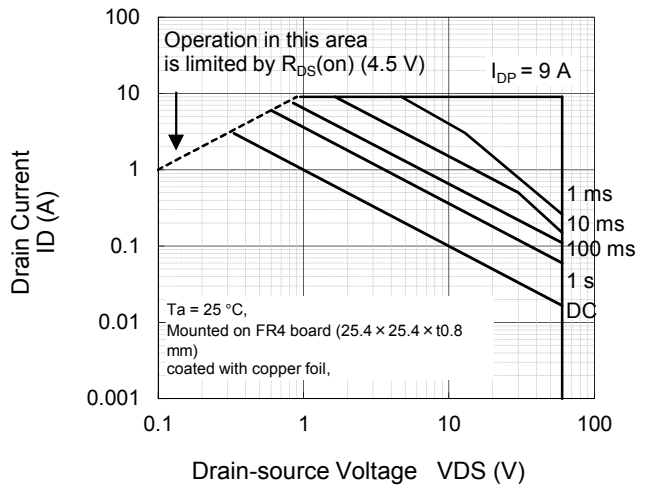


Technical Data ( reference )

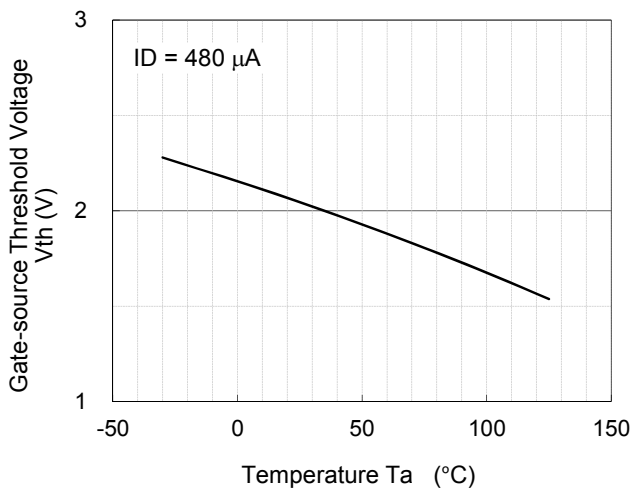
**Rth - tsw**



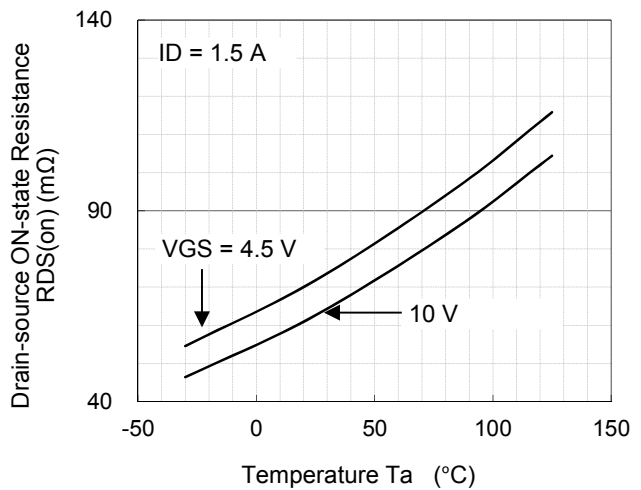
**Safe Operating Area**



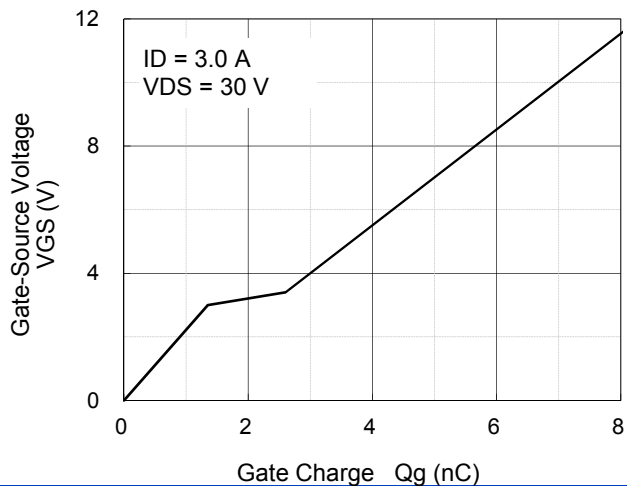
**Vth - Ta**



**RDS(on) - Ta**

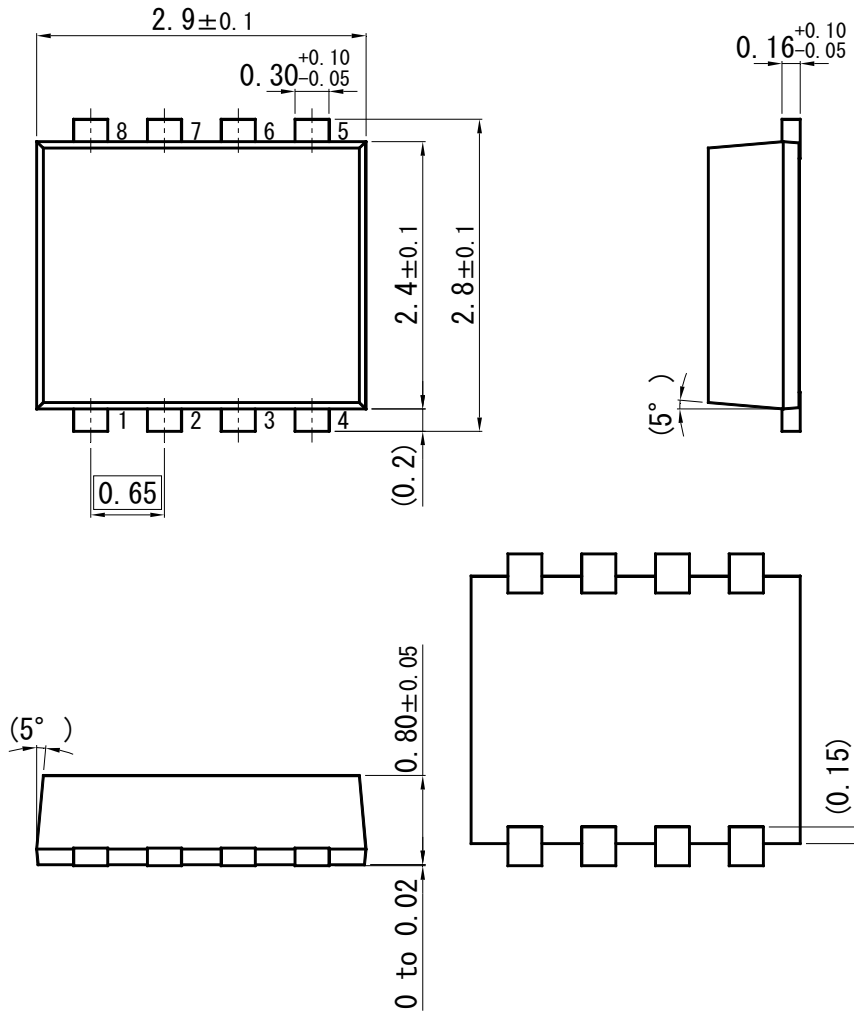


**Dynamic Input/Output Characteristics**

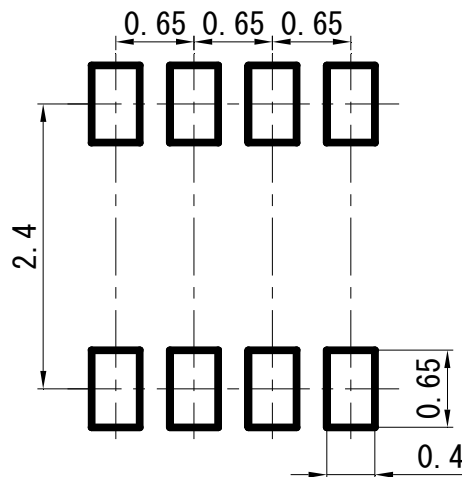


WMini8-F1

Unit: mm



■ Land Pattern (Reference) (Unit: mm)



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