

## **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**

**FK8V03060L**

**Silicon N-channel MOS FET**

For lithium-ion secondary battery protection circuit  
 For DC-DC Converter

■ Features

- Low drain-source On-state Resistance  
 RDS(on) typ. = 22 mΩ (VGS = 4.5 V)
- High-speed switching : Qg = 3.8 nC
- Halogen-free / RoHS compliant  
 (EU RoHS / UL-94 V-0 / MSL:Level 1 compliant)

■ Marking Symbol: 3F

■ Packaging

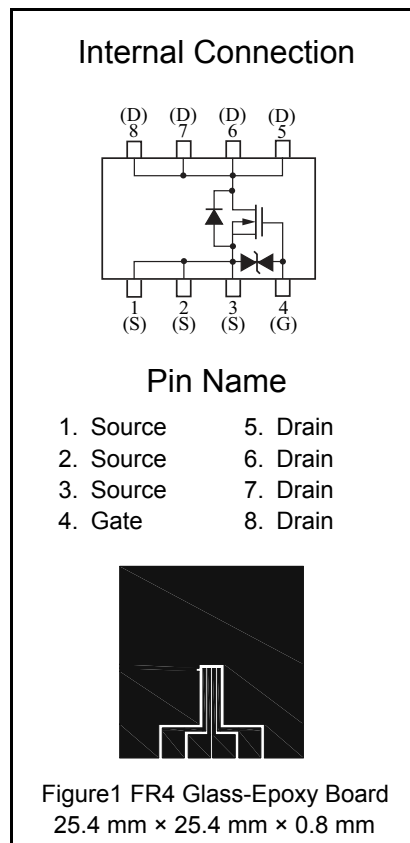
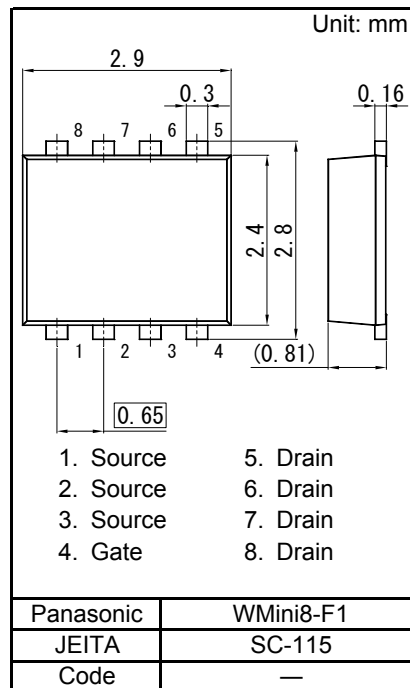
Embossed type (Thermo-compression sealing) : 3 000 pcs / reel (standard)

■ Absolute Maximum Ratings Ta = 25 °C

Parameter	Symbol	Rating	Unit
Drain-source Voltage	VDS	33	V
Gate-source Voltage	VGS	±20	V
Drain Current (Steady State) <sup>*1</sup>	ID	6.5	A
Drain Current (t = 10 s) <sup>*1</sup>		8	
Drain Current (Pulsed) <sup>*1,*2</sup>		26	
Source Current (Pulsed) (Body Diode) <sup>*1,*2</sup>	ISp (BD)	6.5	
Total Power Dissipation (Steady State) <sup>*1</sup>	PD	1	W
Total Power Dissipation (t = 10 s) <sup>*1</sup>		1.5	
Channel Temperature	Tch	150	°C
Operating Ambient Temperature	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-55 to +150	°C

Note) <sup>\*1</sup> Device mounted on a glass-epoxy board (See Figure 1)

<sup>\*2</sup> Pulse test: Ensure that the channel temperature does not exceed 150°C



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

Static Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-source Breakdown Voltage	VDSS	ID = 1 mA, VGS = 0 V	33			V
Zero Gate Voltage Drain Current	IDSS	VDS = 33 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 = 0.48 mA, VDS = 10 V	1		2.5	V
Drain-source On-state Resistance *1	RDS(on)1	ID = 3.3 A, VGS = 10 V		15	20	mΩ
	RDS(on)2	ID = 3.3 A, VGS = 4.5 V		22	35	

Dynamic Characteristics

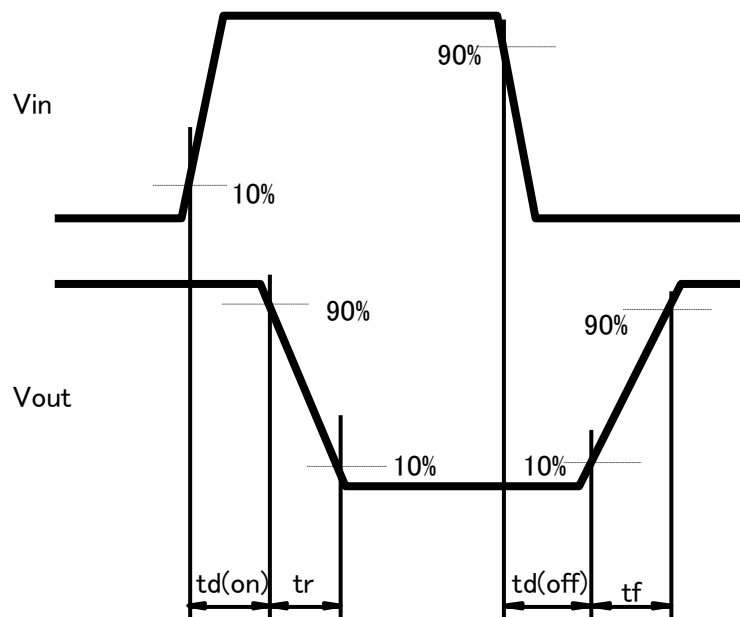
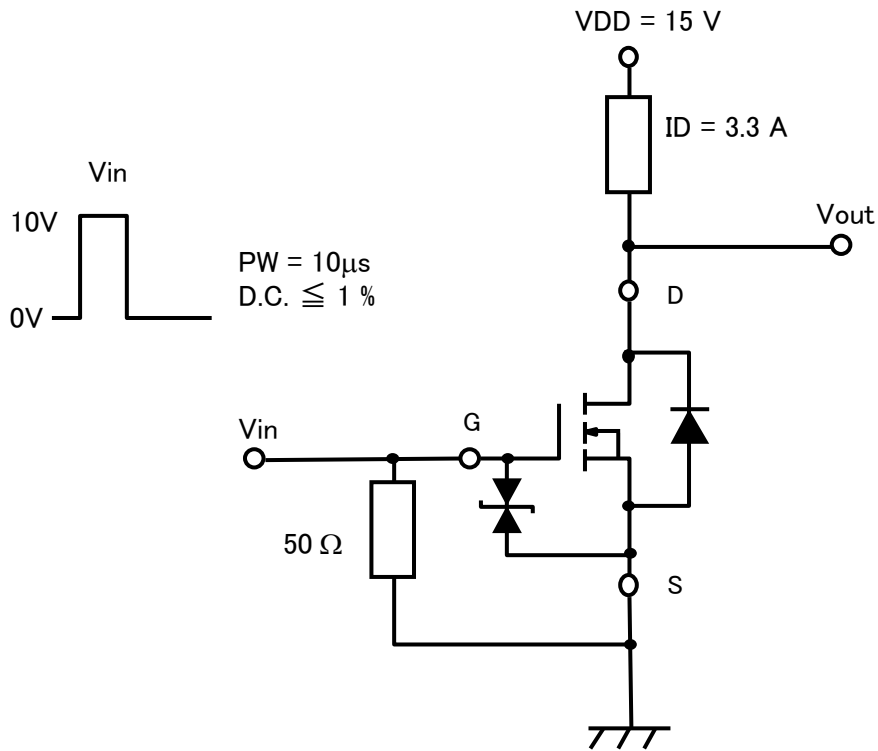
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input Capacitance	Ciss	VDS = 10 V, VGS = 0 V f = 1 MHz		360		pF
Output Capacitance	Coss			70		
Reverse Transfer Capacitance	Crss			50		
Turn-on Delay Time *2	td(on)	VDD = 15 V, VGS = 0 to 10 V		8		ns
Rise Time *2	tr	ID = 3.3 A		3		
Turn-off Delay Time *2	td(off)	VDD = 15 V, VGS = 10 to 0 V		24		
Fall Time *2	tf	ID = 3.3 A		9		
Total Gate Charge	Qg	VDD = 15 V, VGS = 0 to 4.5 V, ID = 6.5 A		3.8		nC
Gate-source Charge	Qgs			1.4		
Gate-drain Charge	Qgd			1.6		

Body Diode Characteristic

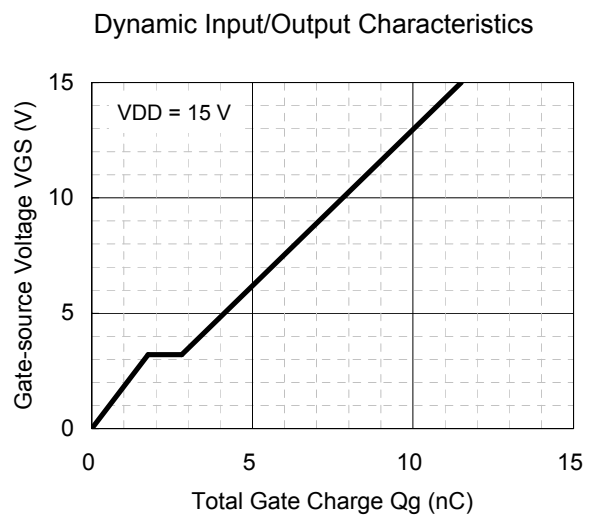
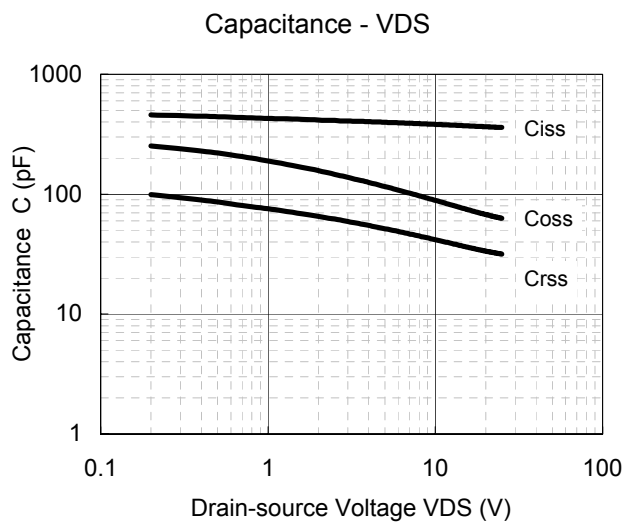
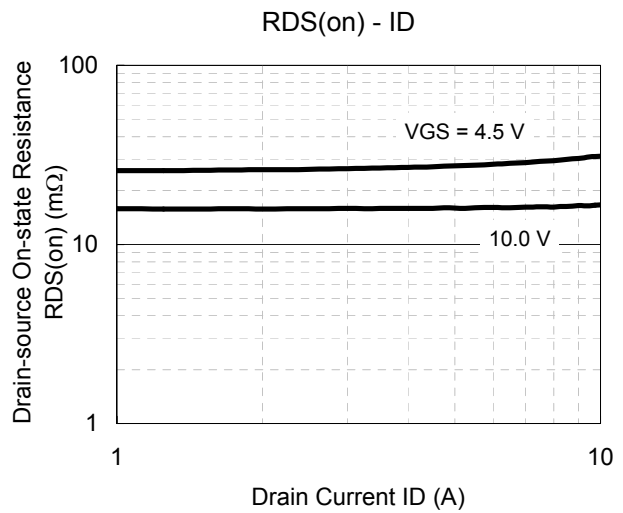
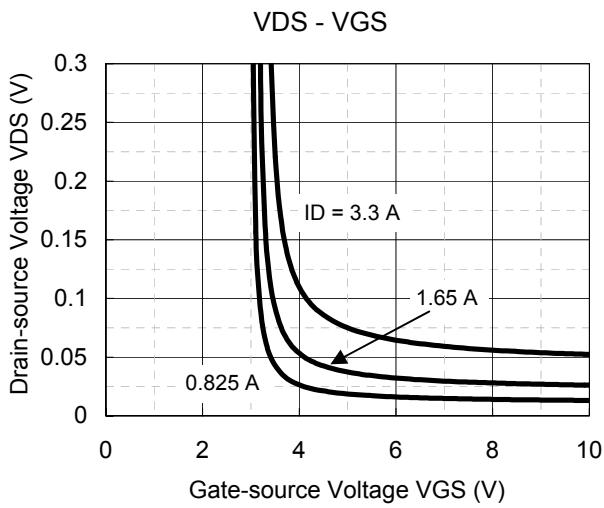
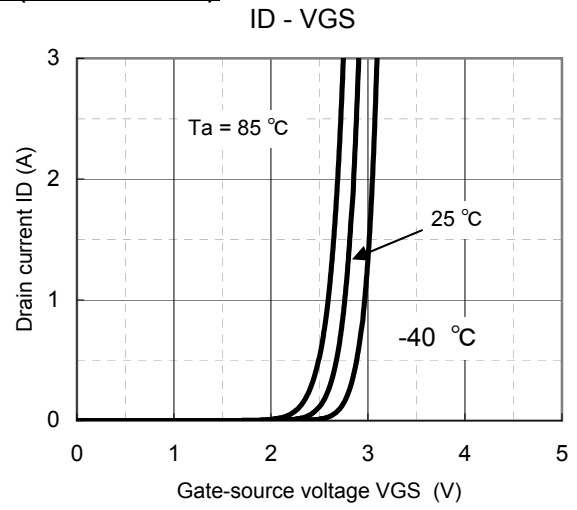
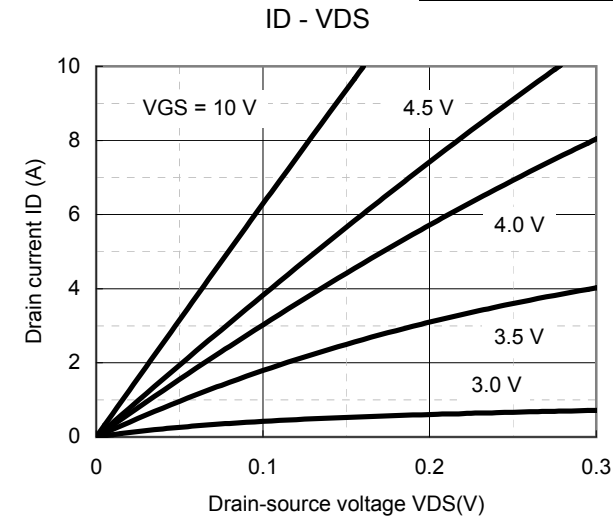
Diode Forward Voltage *1	VSD	IS = 3.3 A, VGS = 0 V	Min	Typ	Max	Unit
				0.8	1.2	V

- Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.  
 2. \*1 Pulse test: Ensure that the channel temperature does not exceed 150°C  
 \*2 Measurement circuit for Turn-on Delay Time/Rise Time/Turn-off Delay Time/Fall Time

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

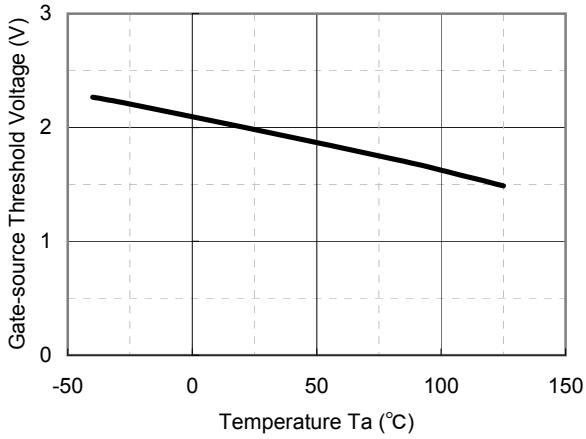


Technical Data ( reference )

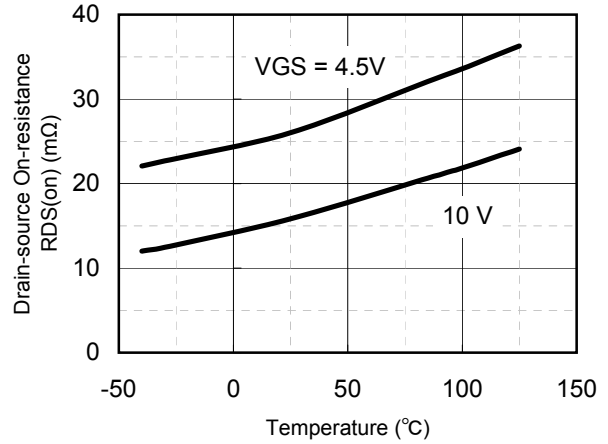


Technical Data ( reference )

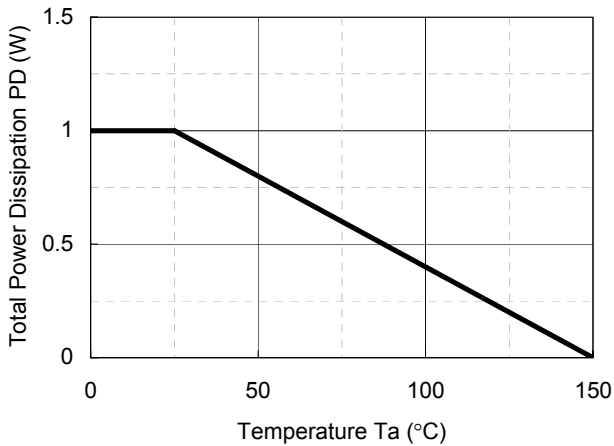
V<sub>th</sub> - T<sub>a</sub>



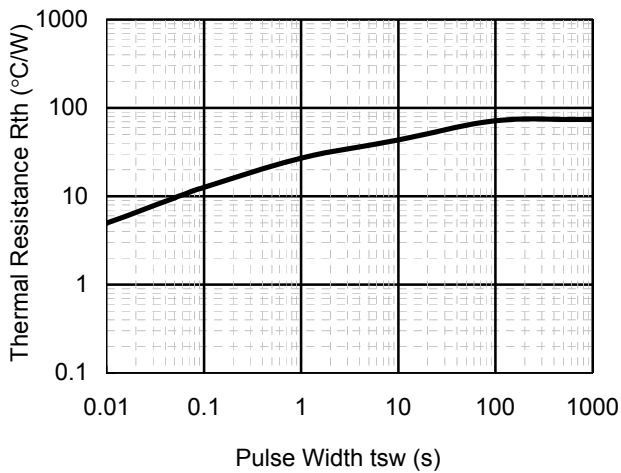
R<sub>DS(on)</sub> - T<sub>a</sub>



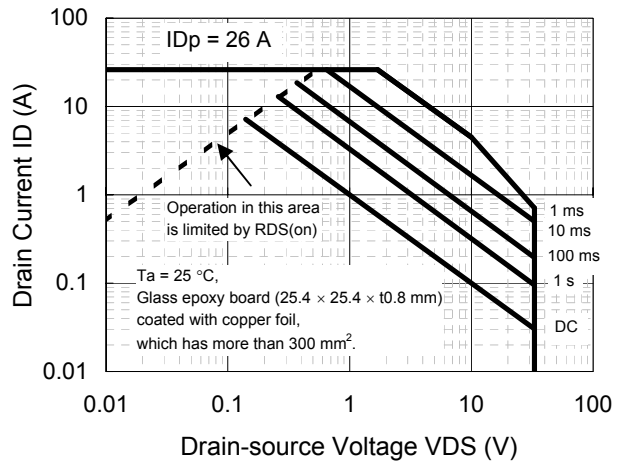
PD - T<sub>a</sub>



R<sub>th</sub> - t<sub>sw</sub>

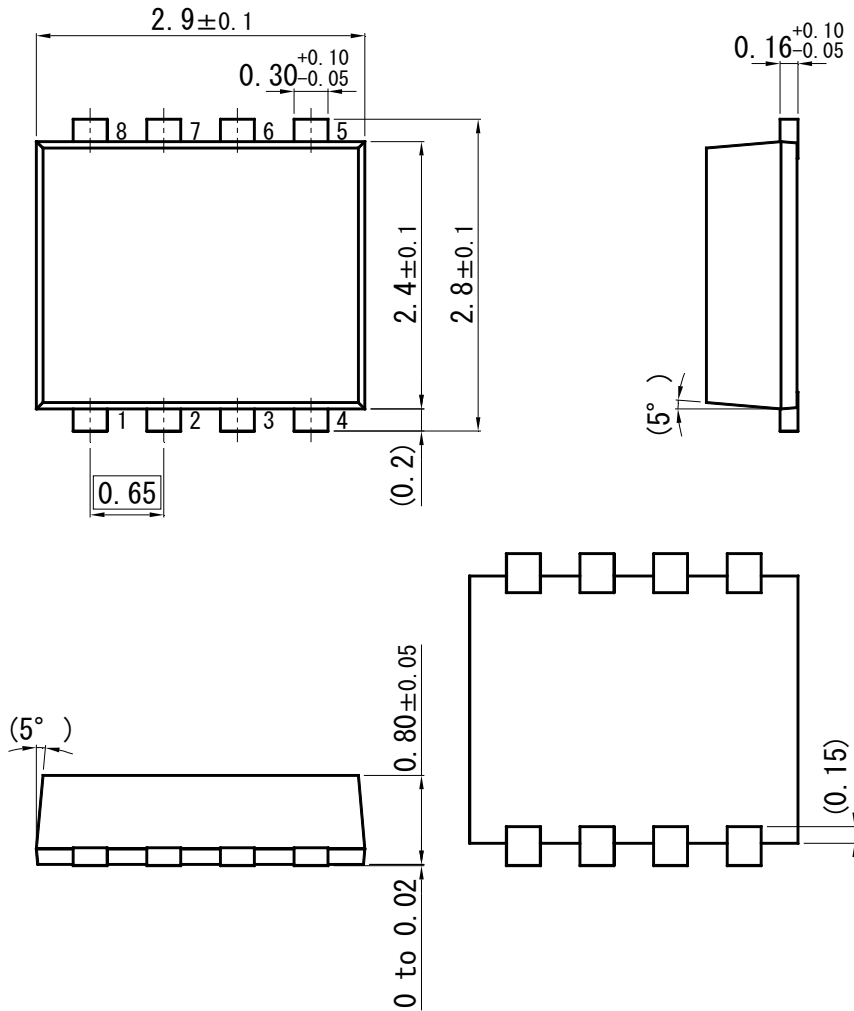


Safe Operating Area

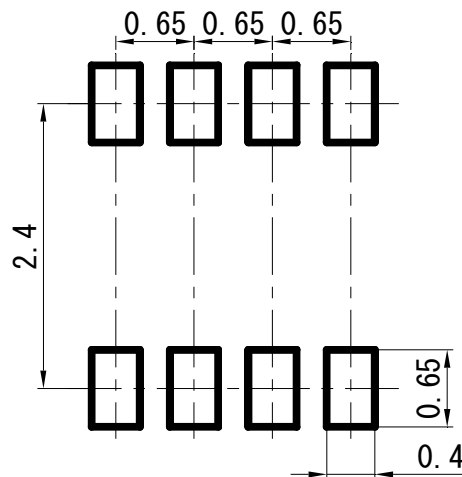


WMini8-F1

Unit : mm



■ Land Pattern (Reference) (Unit : mm)



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