

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

The semiconductor business of Panasonic Corporation will be transferred on September 1, 2020 to Nuvoton Technology Corporation (hereinafter referred to as "Nuvoton"). Accordingly, Panasonic Semiconductor Solutions Co., Ltd. will come 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



### FK4B0343ZL

All in one N-channel MOS FET

■ Features

- For passive cell balancing circuits
- Built-in cell discharge resistor, gate-source resistor and zener diode
- CSP( Chip Size Package )
- Halogen-free / RoHS compliant ( EU RoHS / UL-94 V-0 / MSL : Level 1 )

■ Marking Symbol : 2F

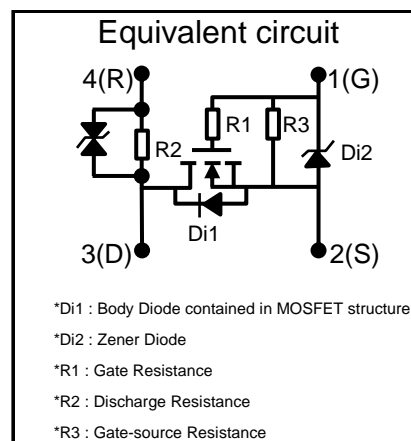
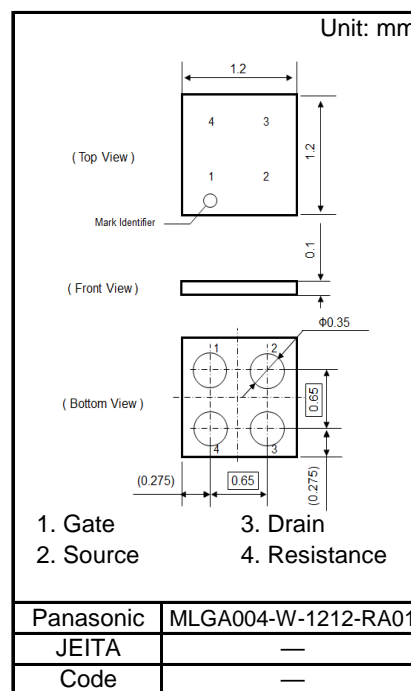
■ Packaging

Embossed type ( Thermo-compression sealing ) : 20 000 pcs / reel ( standard )

■ Absolute Maximum Ratings Ta = 25 °C

Parameter	Symbol	Rating	Unit
Drain-source Voltage	VDS	30	V
Gate-source Voltage	VGS	+5 / -0.5	V
Source-resistance Current	DC	ISR *1	mA
Total Power Dissipation	PD *1	1.3	W
Operating Junction and Storage Temperature Range	Tj, Tstg	-55 to +150	°C

Note \*1 Mounted on FR4 board ( 25.4 mm × 25.4 mm × t1.0 mm ).  
FR4 board fully covered with copper pad ( 611 mm<sup>2</sup> area, 35 μm thickness ).



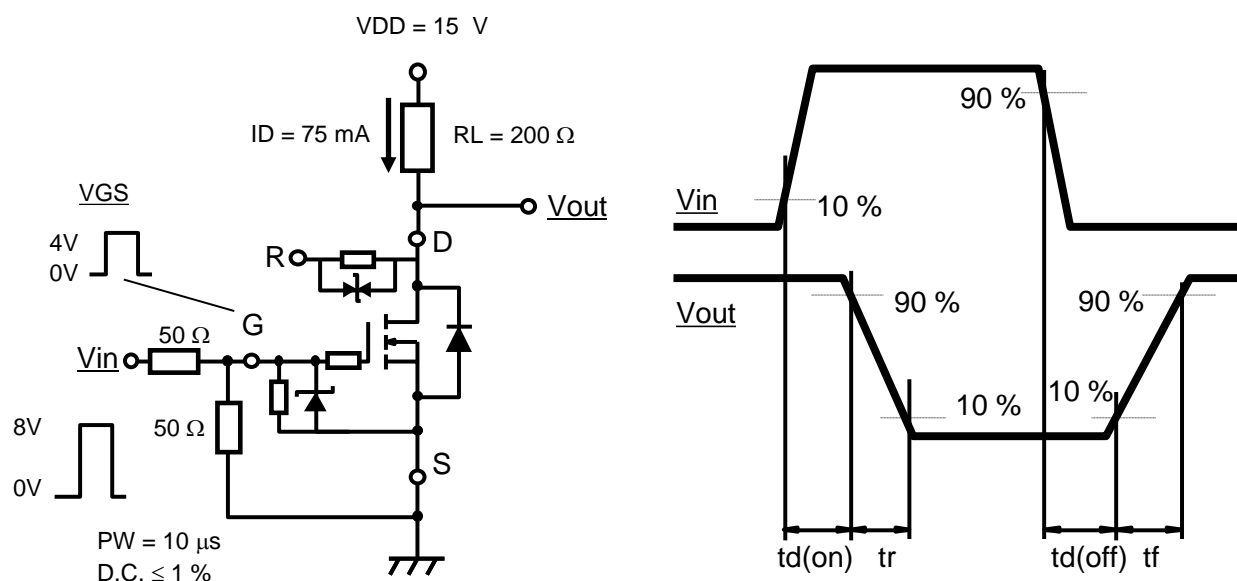
**■ Electrical Characteristics** Ta = 25 °C ± 3 °C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	
Drain-source Breakdown Voltage	VDSS	IDS = 1 mA, VGS = 0 V	30			V	
Zero Gate Voltage Drain Current	IDSS	VDS = 30 V, VGS = 0 V			1	μA	
Gate-source Leakage Current	IGSS	VGS = 5 V, VDS = 0 V			30	μA	
Gate-source Threshold Voltage	Vth	IDS = 320 μA, VDS = 10 V	0.35	0.65	0.9	V	
Drain-source On-state Resistance	RDS(on)1	IDS = 75 mA, VGS = 4.5 V		40	280	mΩ	
	RDS(on)2	IDS = 75 mA, VGS = 2.5 V		45	310		
	RDS(on)3	IDS = 75 mA, VGS = 1.5 V		60	900		
Di1	Body Diode Forward Voltage	VF(s-d)	IF = 75 mA, VGS = 0 V	0.6	1.2	V	
Di2	Zener Diode Forward Voltage	VF	IF = -1 mA	0.7	1.1	V	
	Zener Diode Reverse Voltage	VZ	IZ = 1 mA	5.0	6.0	V	
Input Capacitance <sup>*1</sup>	Ciss	VDS = 15 V, VGS = 0 V f = 1 kHz		380		pF	
Output Capacitance <sup>*1</sup>	Coss			58			
Reverse Transfer Capacitance <sup>*1</sup>	Crss			43			
Turn-on Delay Time <sup>*1,*2</sup>	td(on)	VDD = 15 V, VGS = 0 to 4 V		160		ns	
Rise Time <sup>*1,*2</sup>	tr	IDS = 75 mA		315			
Turn-off Delay Time <sup>*1,*2</sup>	td(off)	VDD = 15 V, VGS = 0 to 4 V		2100			
Fall Time <sup>*1,*2</sup>	tf	IDS = 75 mA		945			
Total Gate Charge <sup>*1</sup>	Qg1	VDD = 15 V, VGS = 1.5 V IDS = 150 mA		2.6		nC	
	Qg2			5.5			
Gate-source Charge <sup>*1</sup>	Qgs	VDD = 15 V, VGS = 4 V IDS = 150 mA		0.4			
Gate-drain Charge <sup>*1</sup>	Qgd			1.6			
R1	Gate Resistance <sup>*1</sup>	Rg	f = 1 MHz		1.5	kΩ	
R2	Discharge Resistance	Rd	VDR = 1 V	45	50	55	Ω
R3	Gate-source Resistance <sup>*1</sup>	Rgs	VGS = 1 V	200	300	400	kΩ

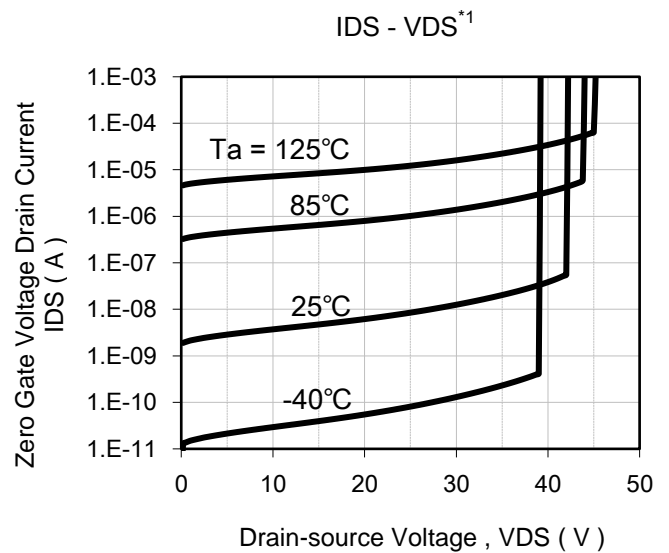
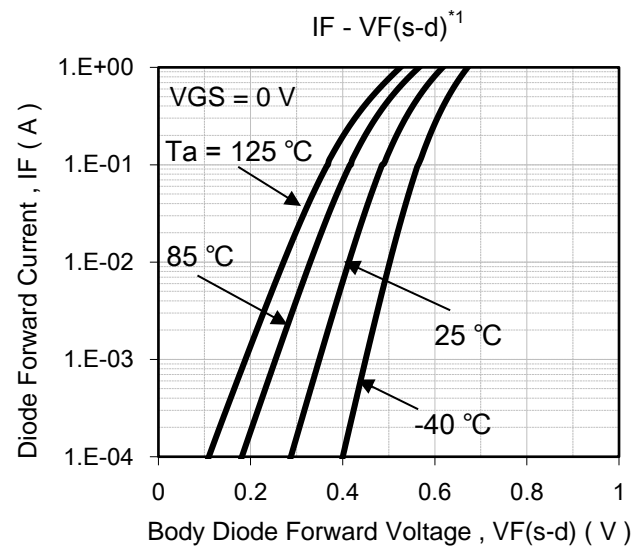
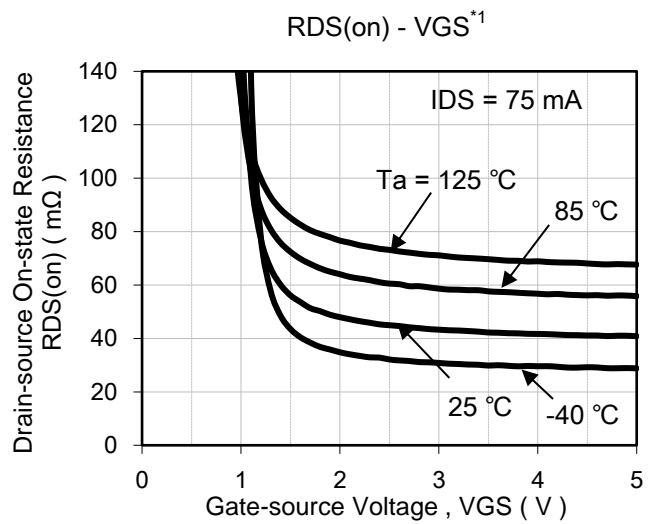
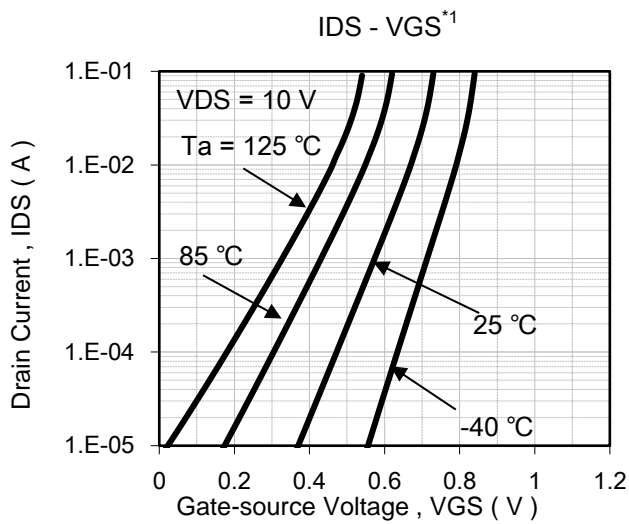
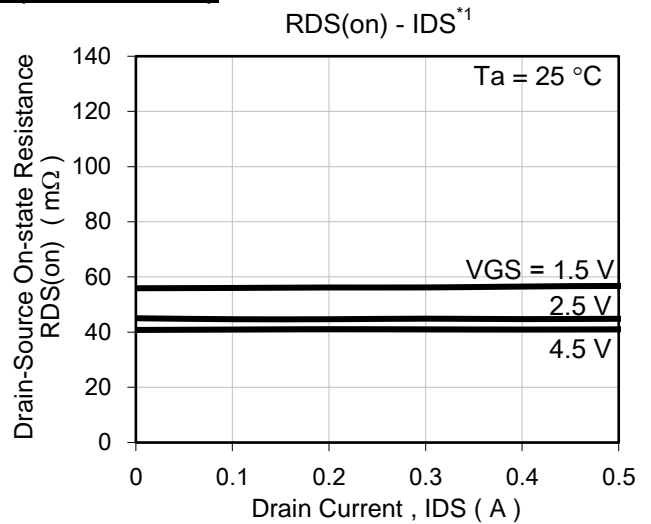
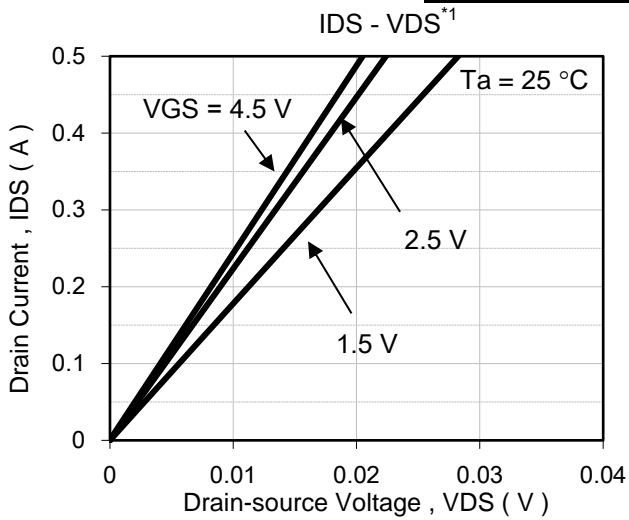
Note Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.

\*1 Guaranteed by design, not subject to production testing.

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

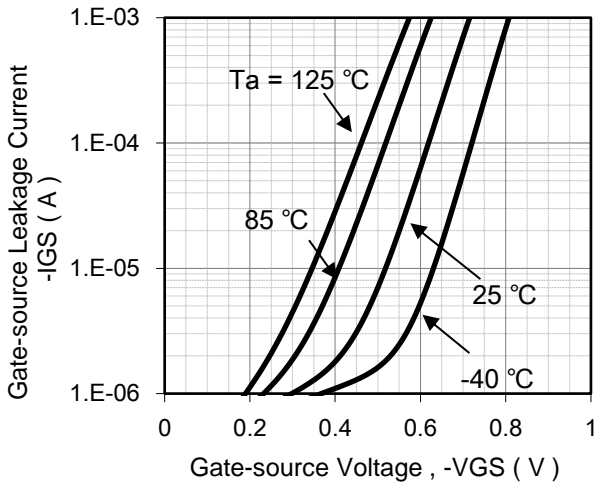


Technical Data ( reference )

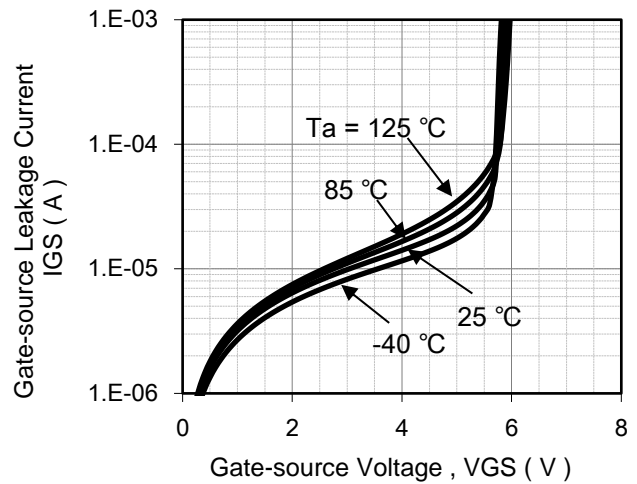


Technical Data ( reference )

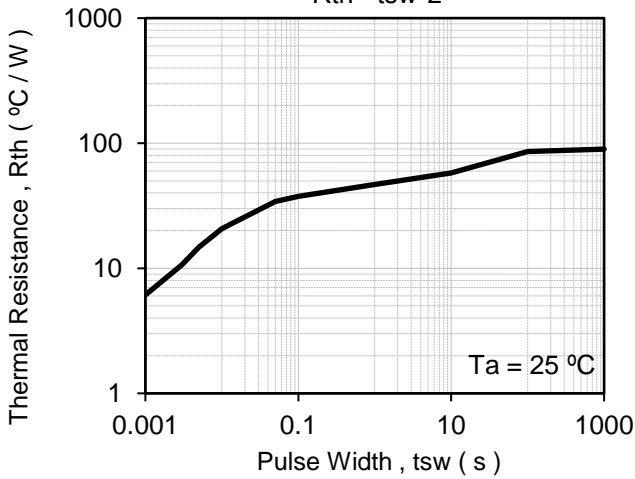
IGS - VGS ( IF - VF ) \*1



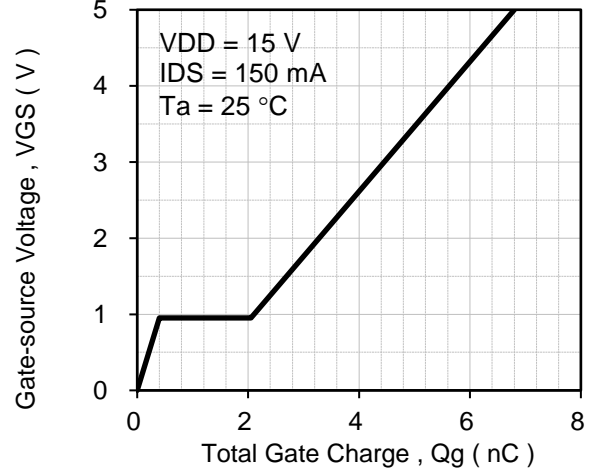
IGS - VGS ( IR - VR ) \*1



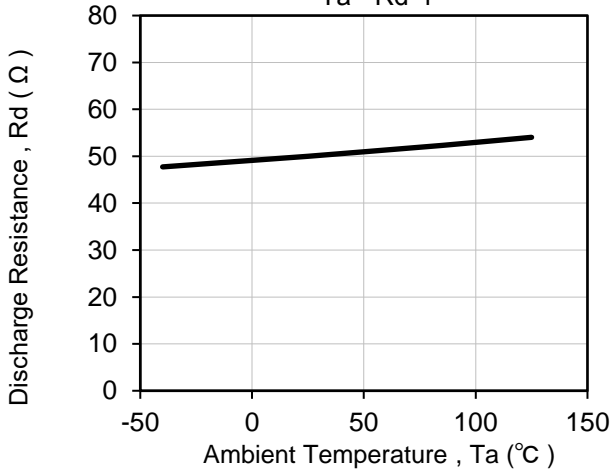
Rth - tsw\*2



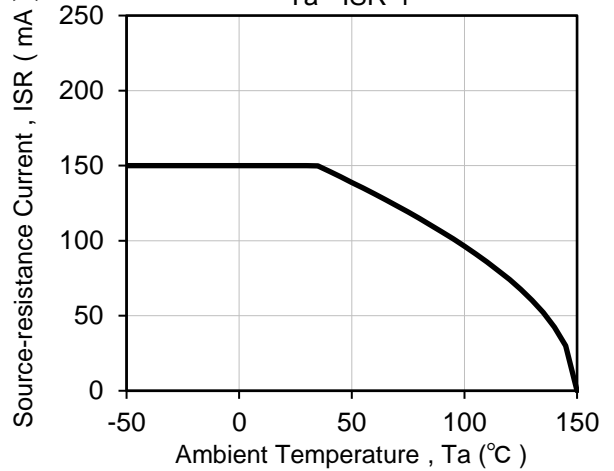
Dynamic Input / Output Characteristics



Ta - Rd\*1



Ta - ISR\*1



\*1 Pulse measurement

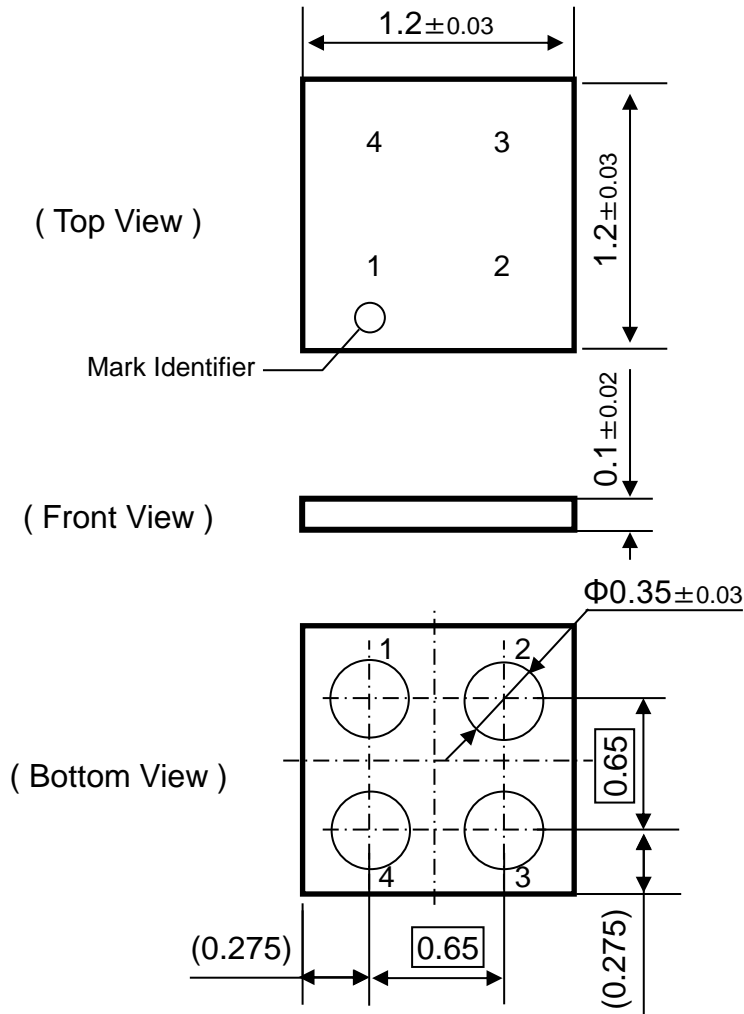
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FR4 board fully covered with copper pad ( 611 mm<sup>2</sup> area, 35 μm thickness ).



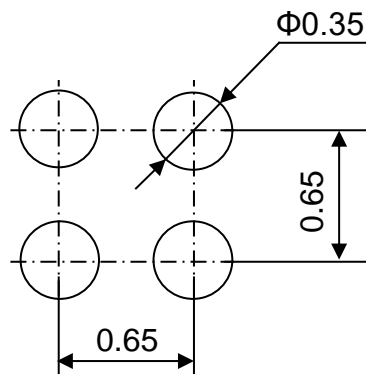
■ Outline

Unit: mm



■ Land & Stencil Pattern ( Reference )

Unit: mm



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