Gate resistor installed
Dual N-channel MOSFET

KFC4B21080L
Data Sheet

For additional information or question, please contact Nuvoton Technology Corporation Japan.
www.nuvoton.co.jp

1. GENERAL DESCRIPTION

Gate resistor installed Dual N-channel MOSFET
For lithium-ion secondary battery protection circuits

2. FEATURES

- Low source-source ON resistance: Rss(on) typ. = 27 mΩ (VGS = 4.5 V)
- CSP (Chip Size Package)
- RoHS compliant (EU RoHS / MSL: Level 1 compliant)

3. MARKING SYMBOL: 12

4. PACKAGING

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

5. ABSOLUTE MAXIMUM RATINGS Ta = 25 °C

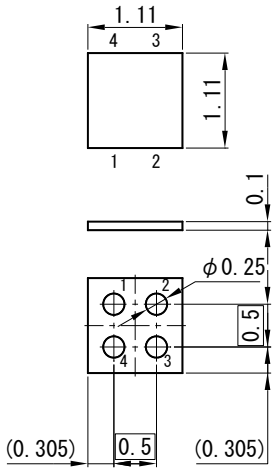
Parameter	Symbol	Rating	Unit
Source-source Voltage	VSS	12	V
Gate-source Voltage	VGS	±12	V
Source Current (DC) *1	IS	2.9	A
Source Current (Pulsed) *1,*2	ISp	29	A
Total Power Dissipation *1	PD	0.35	W
Channel Temperature	Tch	150	°C
Storage Temperature Range	Tstg	-55 to +150	°C

6. THERMAL CHARACTERISTICS Ta = 25 °C

Parameter	Symbol	Rating	Unit
Thermal Resistance (ch-a)	Rth *1	352	°C / W

Note *1 Mounted on FR4 board (25.4 mm x 25.4 mm x t1.0 mm), using the minimum recommended pad size (Cu area = 47 mm^2 including traces).
*2 t = 10 μs, Duty Cycle ≤ 1 %

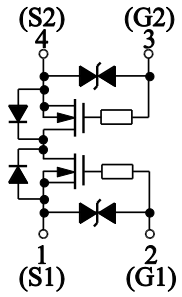
■ Package dimension Unit: mm



1. Source (FET1) 3. Gate (FET2)
2. Gate (FET1) 4. Source (FET2)

Package	ULGA004-W-1212
JEITA	—
Code	—

■ Equivalent circuit, Pin name

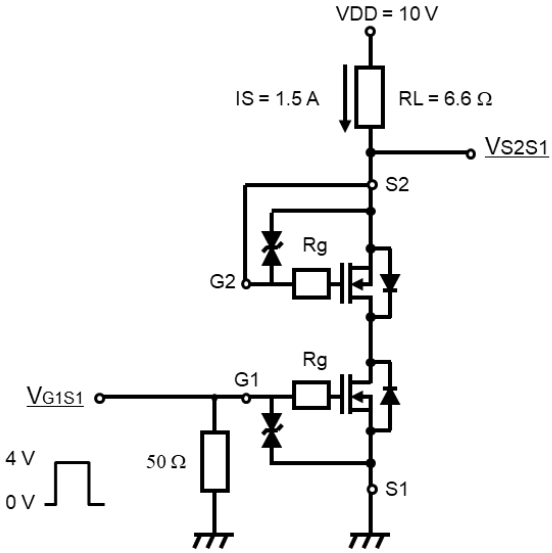


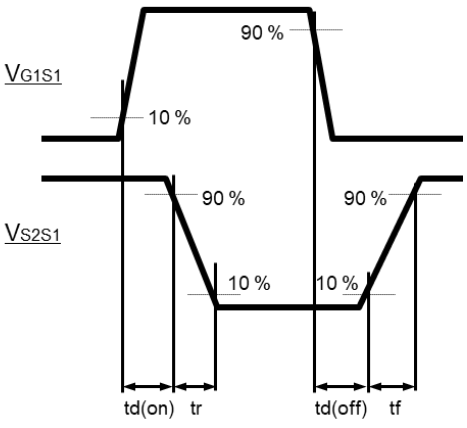
1. Source (FET1) 3. Gate (FET2)
2. Gate (FET1) 4. Source (FET2)

7. ELECTRICAL CHARACTERISTICS Ta = 25 °C ± 3 °C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Source-source Breakdown Voltage	VSSS	IS = 1 mA, VGS = 0 V	12			V
Zero Gate Voltage Source Current	ISSS	VSS = 12 V, VGS = 0 V			1.0	μA
Gate-Source Leakage Current	IGSS	VGS = ±8 V, VSS = 0 V			±10	μA
		VGS = ±5 V, VSS = 0 V			±1.0	
Gate-source Threshold Voltage	Vth	IS = 1.0 mA, VSS = 10 V	0.40	0.85	1.40	V
Source-source On-state Resistance	RSS(on)1	IS = 1.5 A, VGS = 4.5 V	18.0	27.0	37.0	mΩ
	RSS(on)2	IS = 1.5 A, VGS = 3.8 V	21.0	30.0	41.5	
	RSS(on)3	IS = 1.5 A, VGS = 3.1 V	23.0	39.0	64.0	
	RSS(on)4	IS = 1.5 A, VGS = 2.5 V	30.0	60.0	100	
Input Capacitance *1	Ciss	VSS = 10 V, VGS = 0 V, f = 1 kHz		850		pF
Output Capacitance *1	Coss			205		
Reverse Transfer Capacitance *1	Crss			203		
Turn-on delay Time *1,*2	td(on)	VDD = 10 V, VGS = 0 to 4 V		0.6		μs
Rise Time *1,*2	tr	IS = 1.5 A		1.7		
Turn-off delay Time *1,*2	td(off)	VDD = 10 V, VGS = 4 to 0 V		2.6		μs
Fall Time *1,*2	tf	IS = 1.5 A		3.1		
Total Gate Charge *1	Qg	VDD = 10 V		7.1		nC
Gate-source Charge *1	Qgs	VGS = 0 to 4 V		1.5		
Gate-drain Charge *1	Qgd	IS = 2.9 A		2.7		
Body Diode Forward Voltage	VF(s-s)	IF = 2.9 A, VGS = 0 V		0.8	1.2	V

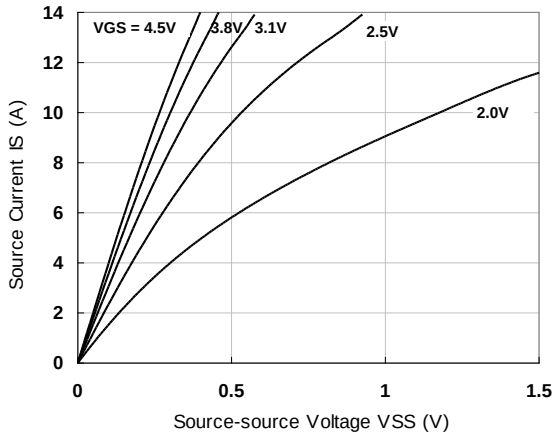
Note Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.
*1 Assured by design
*2 Measurement circuit for Turn-on Delay Time / Rise time / Turn-off Delay Time / Fall Time



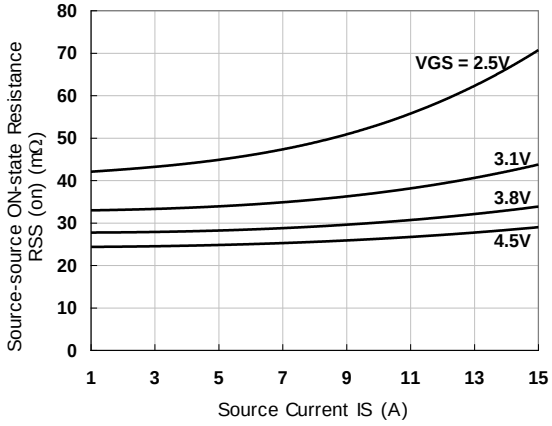


8. TECHNICAL DATA (Reference)

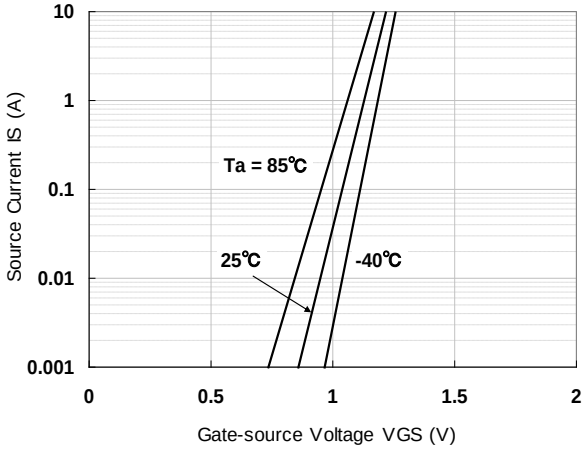
IS - VSS



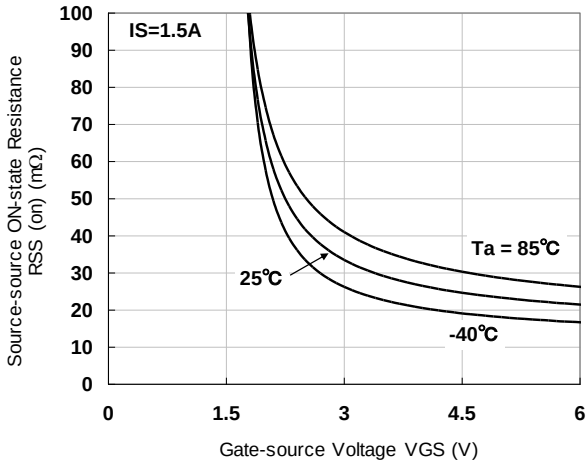
RDS(on) - ID



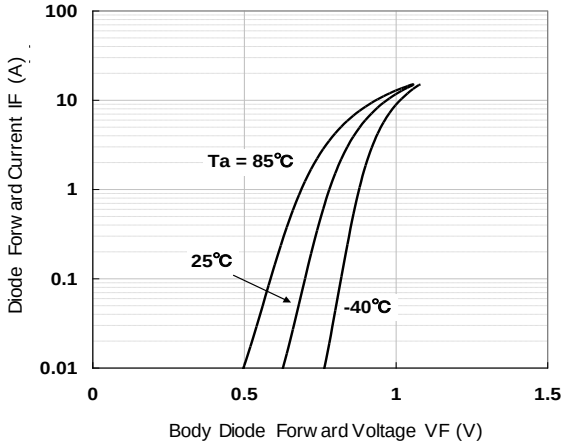
IS - VGS



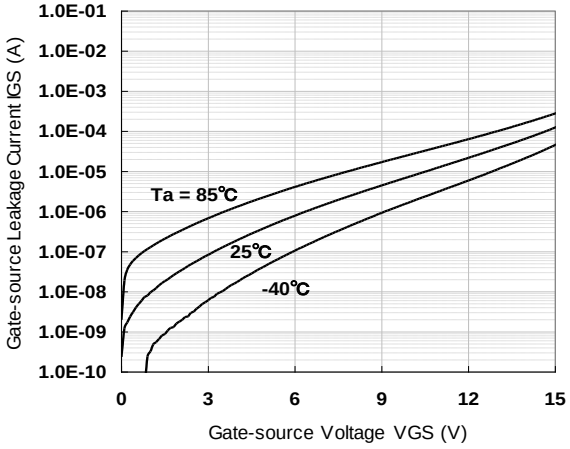
RDS(on) - VGS



IF - VF

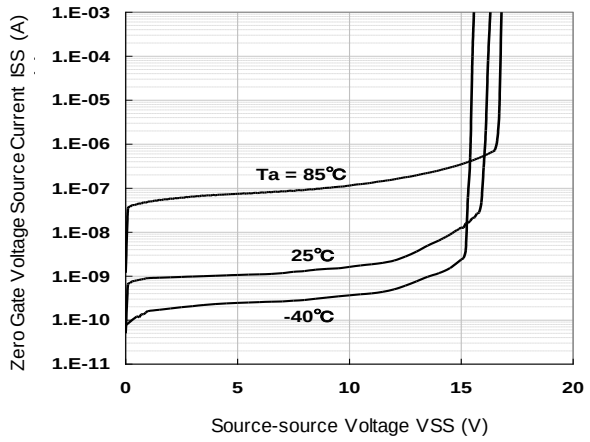


IGS - VGS



TECHNICAL DATA (Reference)

ISSS - VSSS



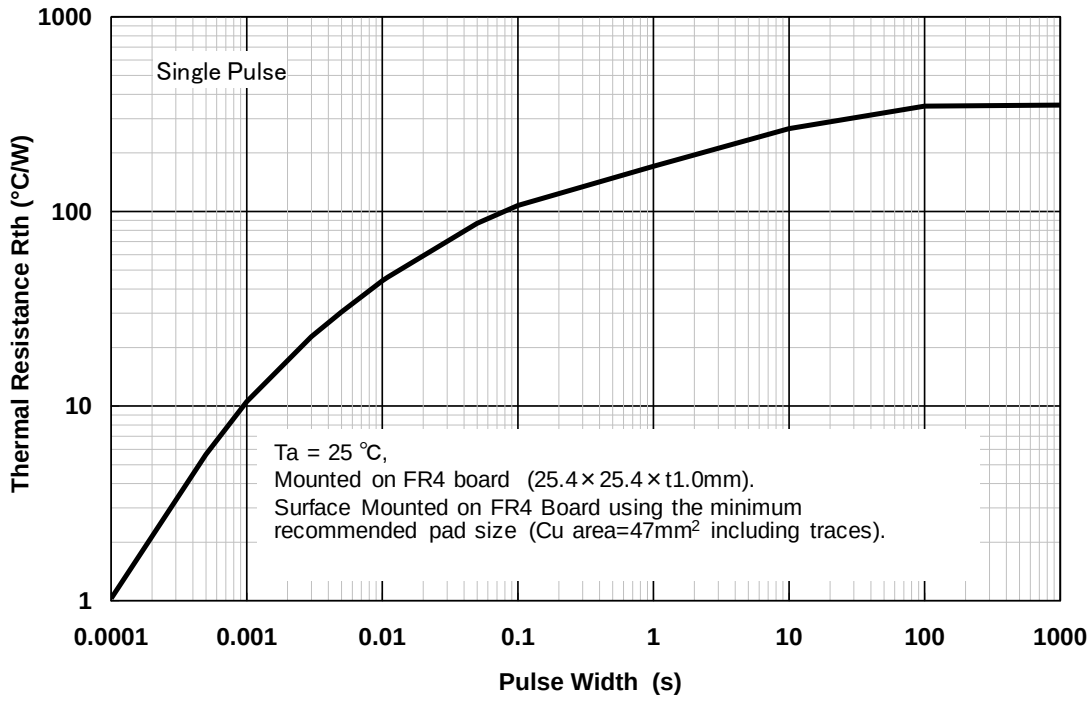
Destruction Current

Parameter	Conditions	Result
Operation Test *1	VGS = 3.8 V, IS = 12 A, t = 3 ms	PASS
	VGS = 3.8 V, IS = 4.5 A, t = 11 ms	PASS
Destruction Current *1	VGS = 3.8 V, t = 3 ms	31 A
	VGS = 3.8 V, t = 11 ms	16 A

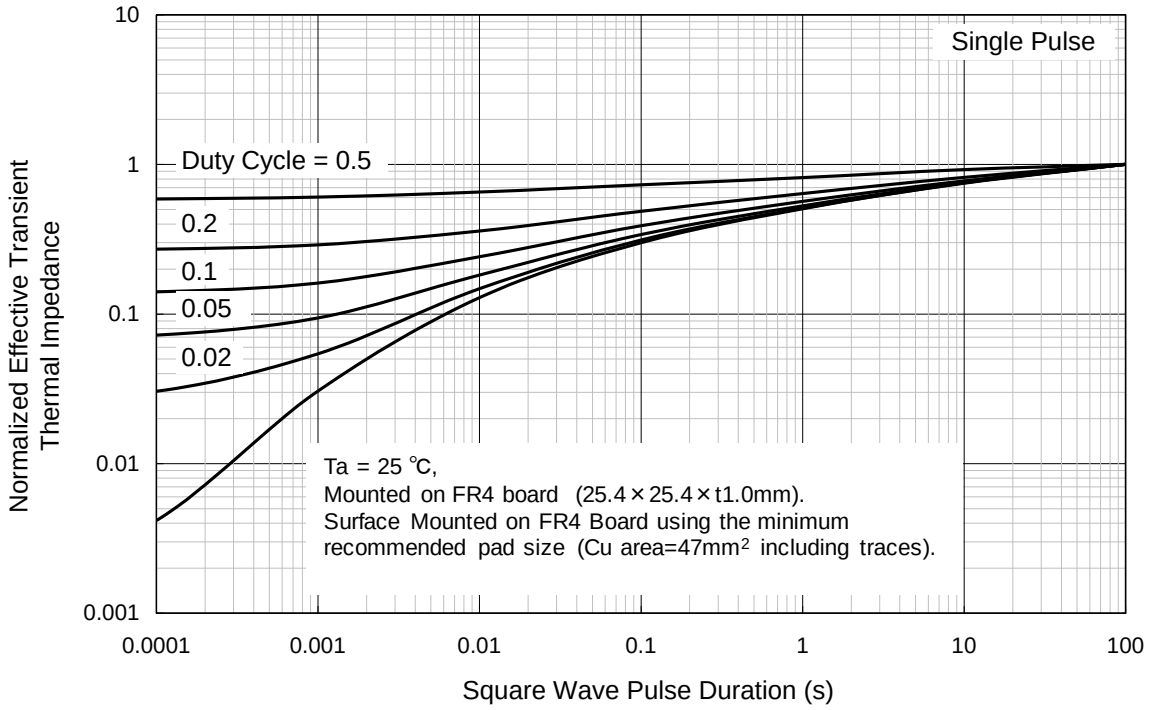
Ta = 25 °C,
Mounted on FR4 board (25.4 mm × 25.4 mm × t1.0 mm)
using the minimum recommended pad size
(Cu area = 47 mm2 including traces).

TECHNICAL DATA (Reference)

Rth - tsw

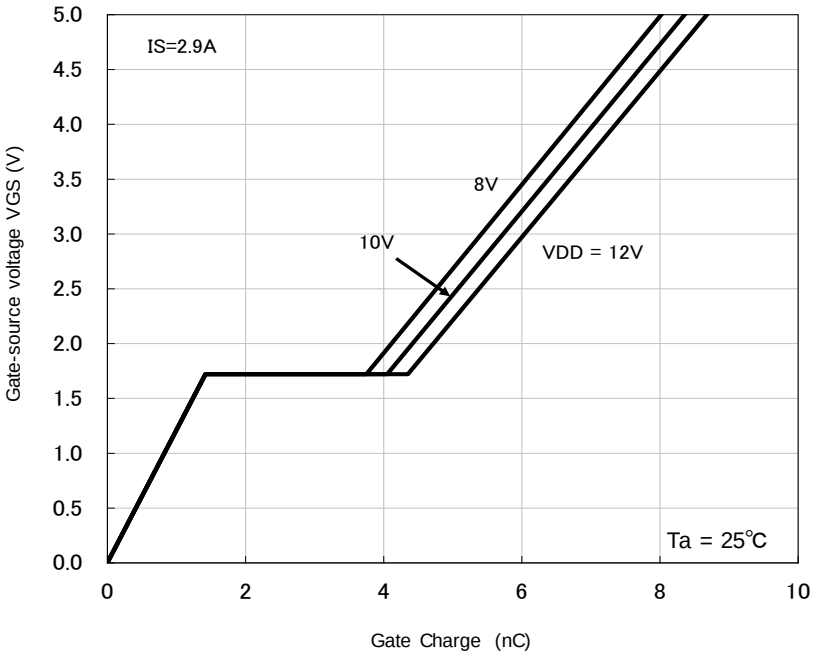


Thermal Response

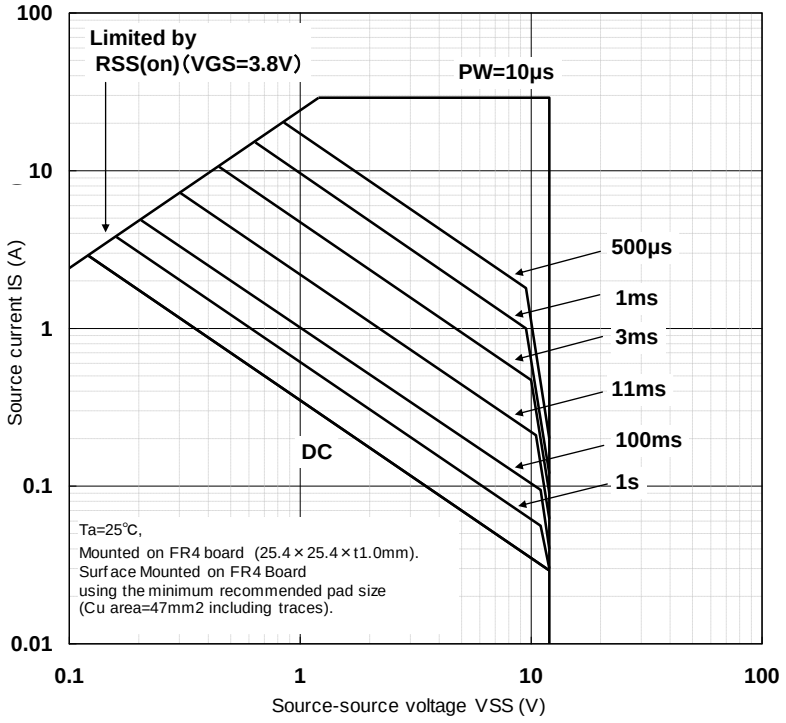


TECHNICAL DATA (Reference)

Dynamic Input/Output Characteristics

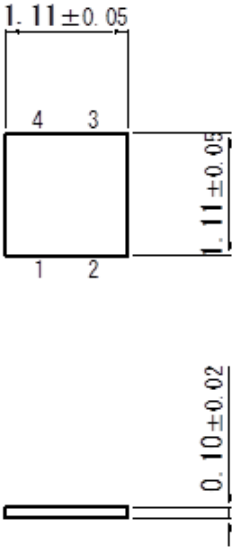


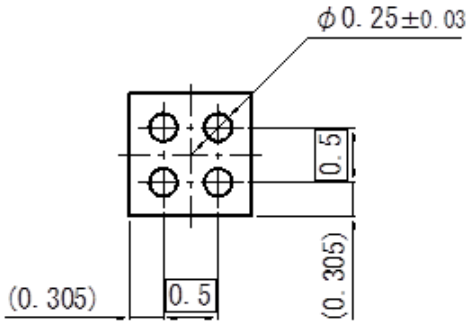
Safe Operating Area



9. OUTLINE

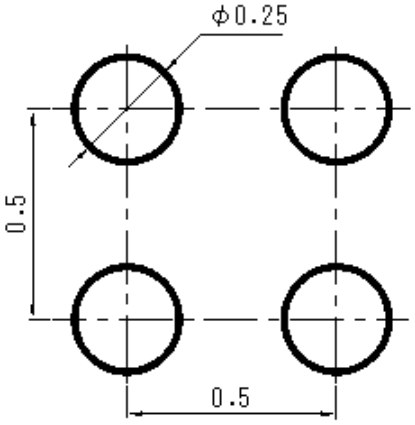
Unit : mm





10. LAND PATTERN (Reference)

Unit : mm



11. REVISION HISTORY

Date	Revision	Description
2021.2.5	1.00	1. initially issued.

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