

**Gate resistor installed  
Dual N-channel MOSFET**

**KFC4B21220L  
Data Sheet**

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### 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. = 21 mΩ (VGS = 4.5 V)
- CSP (Chip Size Package)
- RoHS compliant (EU RoHS / MSL: Level 1 compliant)

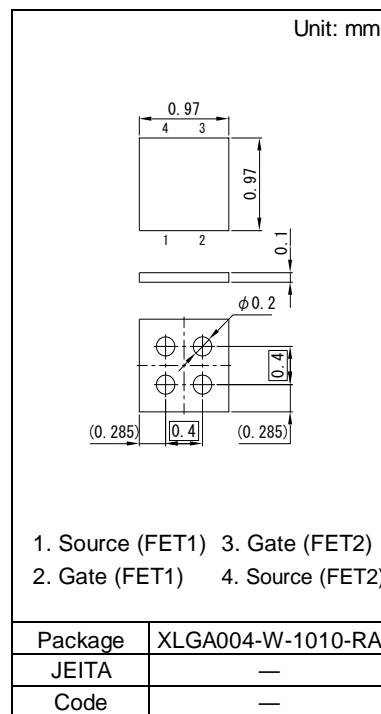
### 3. MARKING SYMBOL: 19

### 4. PACKAGING

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

### 5. ABSOLUTE MAXIMUM RATINGS Ta = 25 °C

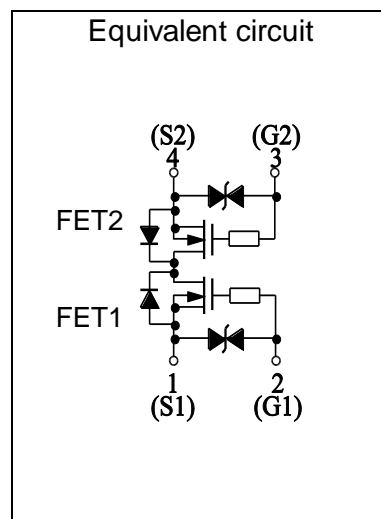
Parameter	Symbol	Rating	Unit
Source-source Voltage	VSS	12	V
Gate-source Voltage	VGS	±8	V
Source Current	DC	IS1 *1	3
		IS2 *2	5.5
	Pulsed	ISp *3	30
Total Power Dissipation	DC	PD1 *1	0.35
		PD2 *2	1
Channel Temperature	Tch	150	°C
Storage Temperature Range	Tstg	-55 to +150	°C



### 6. THERMAL CHARACTERISTICS Ta = 25 °C

Parameter	Symbol	Rating	Unit
Thermal Resistance ( ch-a )	Rth1 *1	357	°C / W
	Rth2 *2	125	

- Note \*1 Mounted on FR4 board (25.4 mm x 25.4 mm x t1.0 mm) using the minimum recommended pad size (36μm Copper).  
\*2 Mounted on Ceramic substrate (70 mm x 70 mm x t1.0 mm).  
\*3 t = 10 μs, Duty Cycle ≤ 1 %



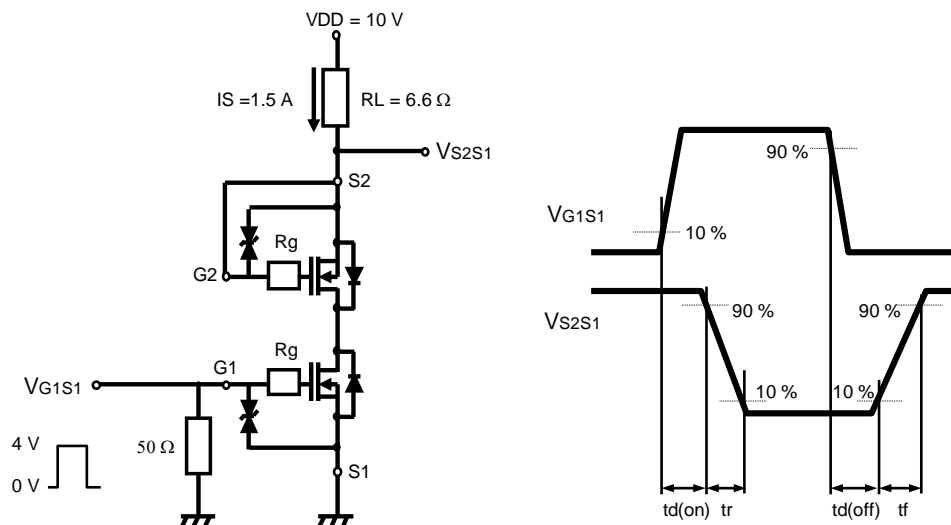
7. ELECTRICAL CHARACTERISTICS Ta = 25 °C ± 3 °C

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	IGSS1	VGS = ±8 V, VSS = 0 V			±10	μA
	IGSS2	VGS = ±5 V, VSS = 0 V			±1.0	
Gate-source Threshold Voltage	Vth	IS = 0.14 mA, VSS = 10 V	0.35	0.90	1.40	V
Source-source On-state Resistance	RSS(on)1	IS = 1.5 A, VGS = 4.5 V	15.5	21.0	28.0	mΩ
	RSS(on)2	IS = 1.5 A, VGS = 3.8 V	17.5	23.0	31.0	
	RSS(on)3	IS = 1.5 A, VGS = 3.1 V	18.5	26.0	43.0	
	RSS(on)4	IS = 1.5 A, VGS = 2.5 V	20.0	33.0	65.0	
Body Diode Forward Voltage	VF(s-s)	IF = 1.5 A, VGS = 0 V		0.8	1.2	V
Input Capacitance *1	Ciss	VSS = 10 V, VGS = 0 V, f = 1 kHz		540		pF
Output Capacitance *1	Coss			85		
Reverse Transfer Capacitance *1	Crss			60		
Turn-on Delay Time *1,*2	td(on)	VDD = 10 V, VGS = 0 to 4 V		0.65		μs
Rise Time *1,*2	tr	IS = 1.5 A		1.00		
Turn-off Delay Time *1,*2	td(off)	VDD = 10 V, VGS = 4 to 0 V		2.5		μs
Fall Time *1,*2	tf	IS = 1.5 A		1.5		
Total Gate Charge *1	Qg	VDD = 10 V		5.6		nC
Gate-source Charge *1	Qgs	VGS = 0 to 4 V		1.2		
Gate-drain Charge *1	Qgd	IS = 1.5 A		1.6		

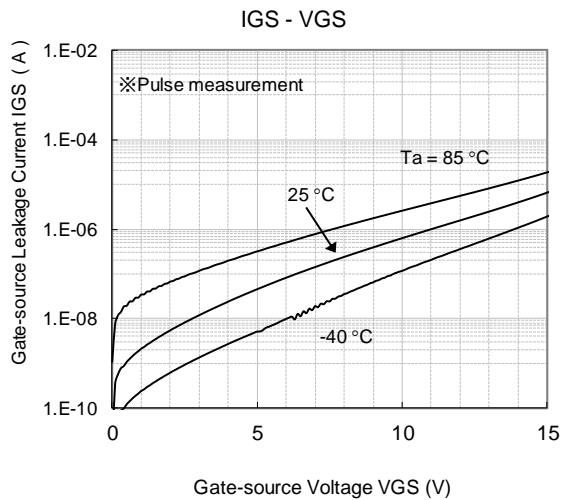
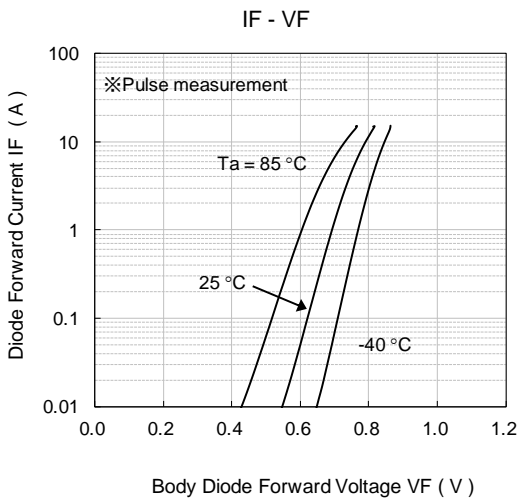
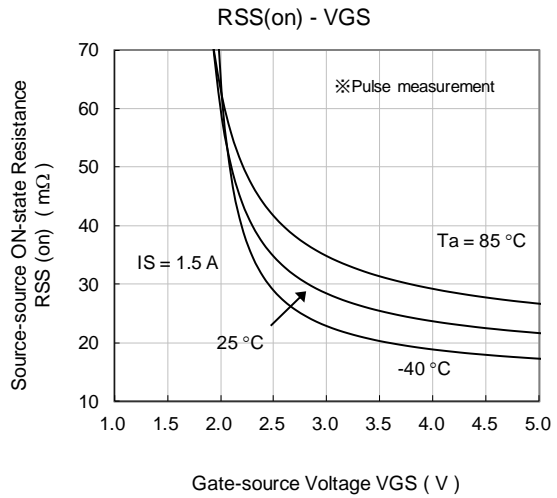
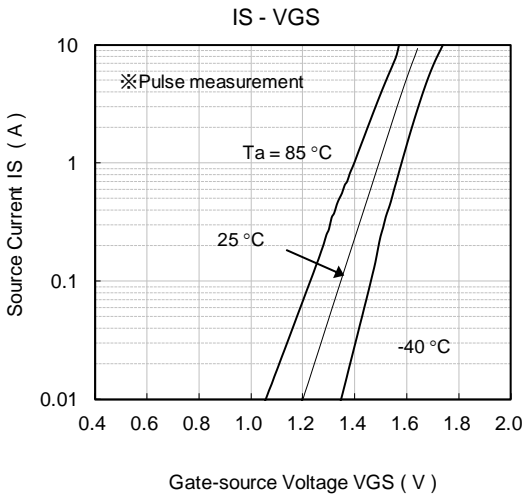
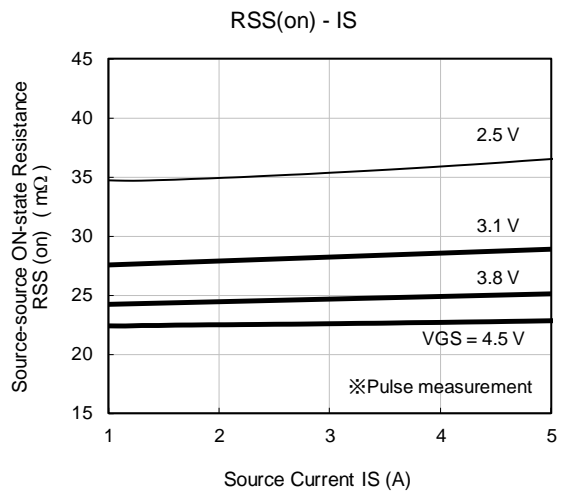
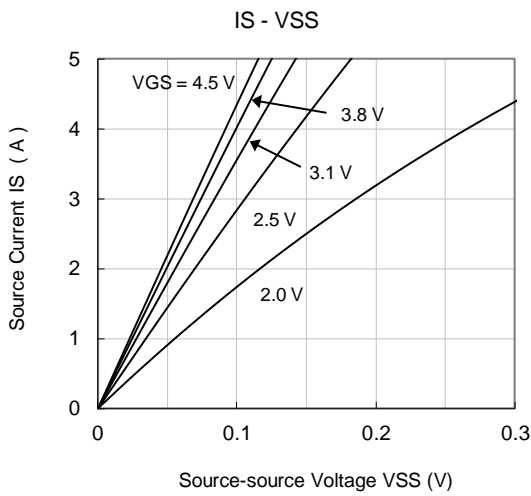
Note Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.

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

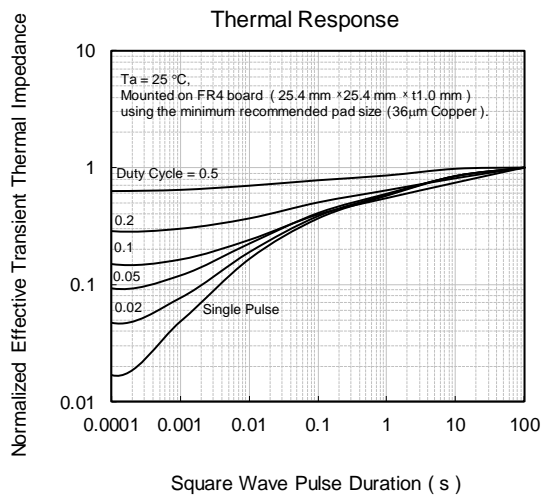
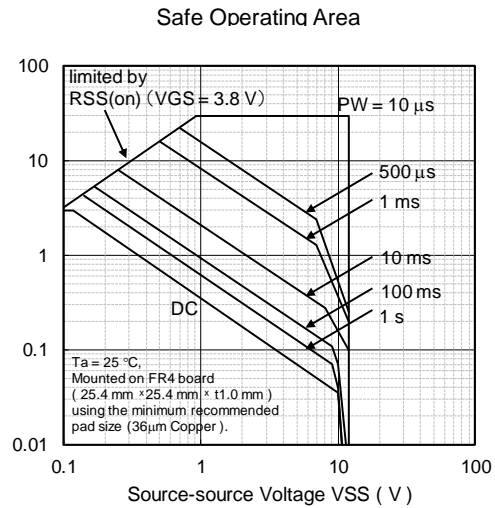
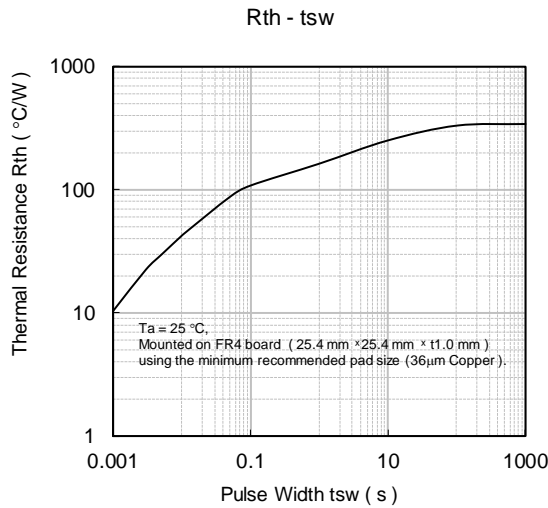
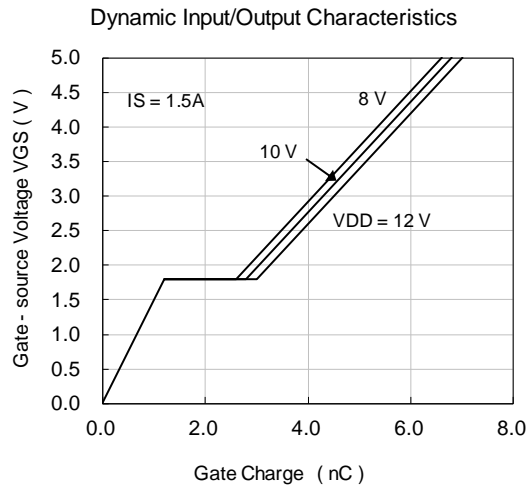
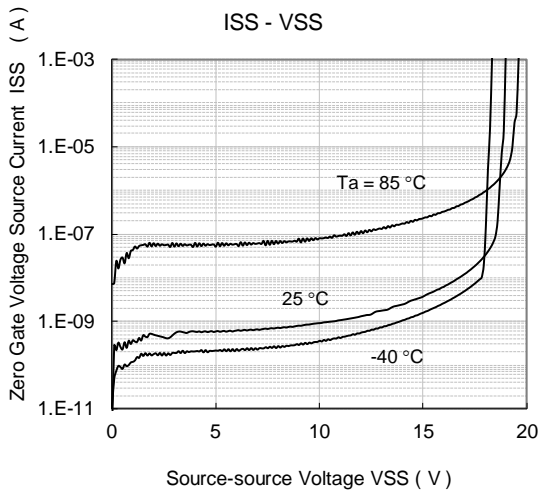
\*2 Measurement circuit for Turn-on Delay Time / Rise Time / Turn-off Delay Time / Fall Time



8. TECHNICAL DATA (Reference)

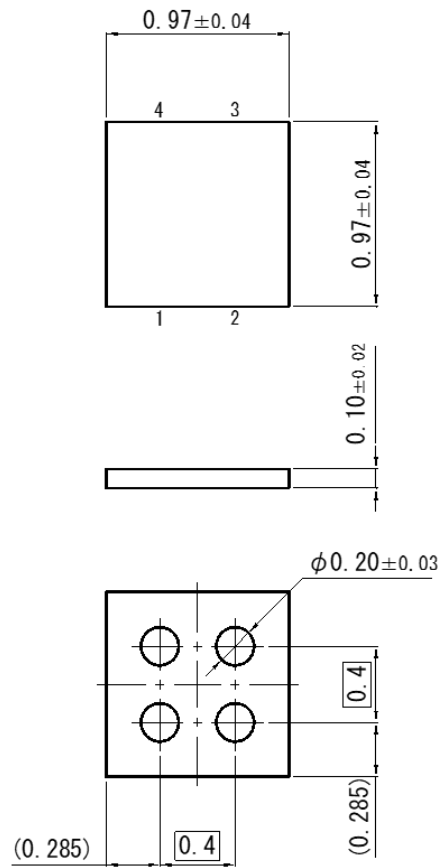


TECHNICAL DATA (Reference)



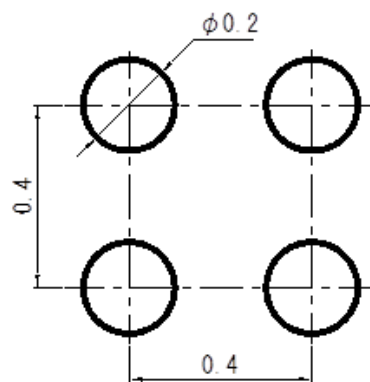
9. OUTLINE

Unit : mm



10. LAND PATTERN (Reference)

Unit: mm



**12. REVISION HISTORY**

Date	Revision	Description
2021.2.3	1.00	1. initially issued.

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