

Gate resistor installed Dual N-channel MOSFET

KFC6B22090L 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: $R_{SS}(\text{on})$ typ. = 8.5 m Ω ($V_{GS} = 4.5$ V)
- CSP (Chip Size Package)
- RoHS compliant (EU RoHS / MSL: Level 1)

3. MARKING SYMBOL: 32

4. PACKAGING

Embossed type (Thermo-compression sealing): 10,000 pcs / reel (standard)

5. ABSOLUTE MAXIMUM RATINGS $T_a = 25^\circ\text{C}$

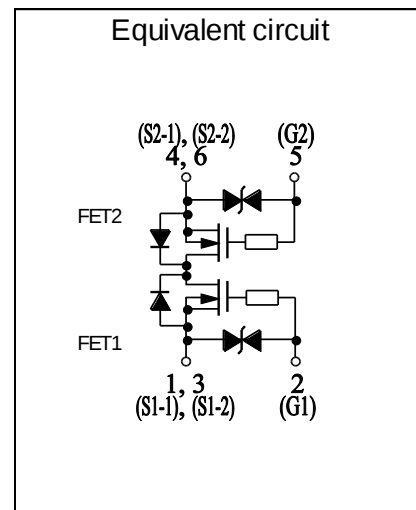
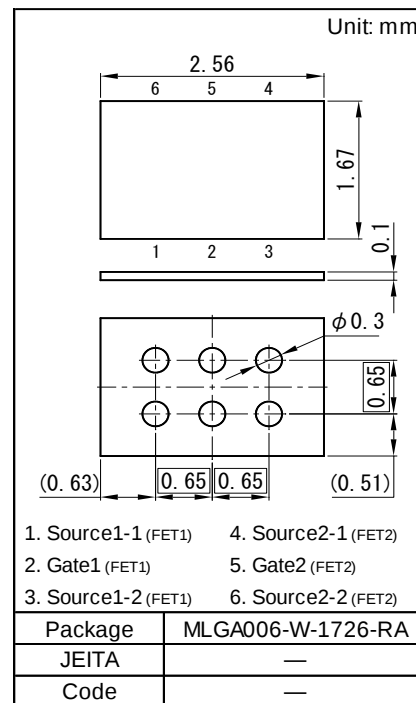
Parameter	Symbol	Rating	Unit
Source-source Voltage	VSS	24	V
Gate-source Voltage	VGS	± 12	V
Source Current	DC	IS ^{*1}	A
	Pulsed	ISp ^{*2}	
Total Power Dissipation	PD ^{*1}	2.1	W
Channel Temperature	Tch	150	$^\circ\text{C}$
Storage Temperature Range	Tstg	-55 to +150	$^\circ\text{C}$

6. THERMAL CHARACTERISTICS $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Thermal Resistance (ch-a)	Rth ^{*1}	59	$^\circ\text{C} / \text{W}$

Note *1 Mounted on ceramic substrate (70 mm $\times$ 70 mm $\times$ t1.0 mm).

*2 $t = 10$ μs , Duty Cycle $\leq 1\%$



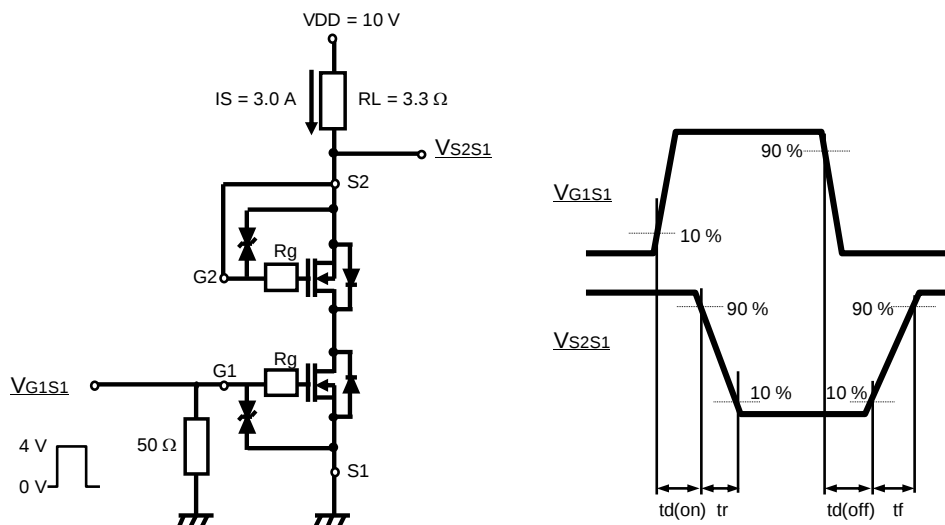
7. ELECTRICAL CHARACTERISTICS $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Source-source Breakdown Voltage	VSSS	$I_S = 1\text{ mA}$, $V_{GS} = 0\text{ V}$	24			V
Zero Gate Voltage Source Current	ISSS	$V_{SS} = 24\text{ V}$, $V_{GS} = 0\text{ V}$			1.0	μA
Gate-source Leakage Current	IGSS1	$V_{GS} = \pm 8\text{ V}$, $V_{SS} = 0\text{ V}$			± 10	μA
	IGSS2	$V_{GS} = \pm 5\text{ V}$, $V_{SS} = 0\text{ V}$			± 1.0	μA
Gate-source Threshold Voltage	V_{th}	$I_S = 1.2\text{ mA}$, $V_{SS} = 10\text{ V}$	0.4	0.9	1.4	V
Source-source On-state Resistance	RSS(on)1	$I_S = 3.0\text{ A}$, $V_{GS} = 4.5\text{ V}$	6.0	8.5	11.5	$\text{m}\Omega$
	RSS(on)2	$I_S = 3.0\text{ A}$, $V_{GS} = 3.8\text{ V}$	6.2	9.0	12.5	
	RSS(on)3	$I_S = 3.0\text{ A}$, $V_{GS} = 3.1\text{ V}$	6.7	10.0	15.0	
	RSS(on)4	$I_S = 3.0\text{ A}$, $V_{GS} = 2.5\text{ V}$	7.5	13.0	23.0	
Body Diode Forward Voltage	$V_{F(s-s)}$	$I_F = 6.0\text{ A}$, $V_{GS} = 0\text{ V}$		0.8	1.2	V
Input Capacitance ^{*1}	Ciss	$V_{SS} = 10\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ kHz}$		3000		pF
Output Capacitance ^{*1}	Coss			250		
Reverse Transfer Capacitance ^{*1}	Crss			220		
Turn-on Delay Time ^{*1,*2}	$t_d(\text{on})$	$V_{DD} = 10\text{ V}$, $V_{GS} = 0\text{ to }4\text{ V}$		1.1		μs
Rise Time ^{*1,*2}	t_r	$I_S = 3.0\text{ A}$		1.8		
Turn-off Delay Time ^{*1,*2}	$t_d(\text{off})$	$V_{DD} = 10\text{ V}$, $V_{GS} = 4\text{ to }0\text{ V}$		6.9		μs
Fall Time ^{*1,*2}	t_f	$I_S = 3.0\text{ A}$		3.6		
Total Gate Charge ^{*1}	Qg	$V_{DD} = 10\text{ V}$		27.6		nC
Gate-source Charge ^{*1}	Qgs	$V_{GS} = 0\text{ to }4\text{ V}$		5.6		
Gate-drain Charge ^{*1}	Qgd	$I_S = 6.0\text{ A}$		7.5		

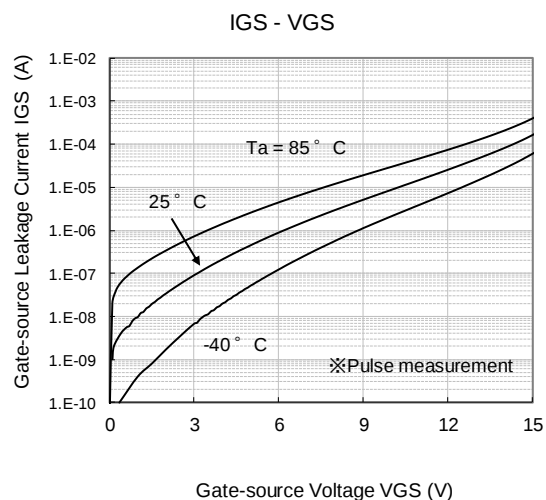
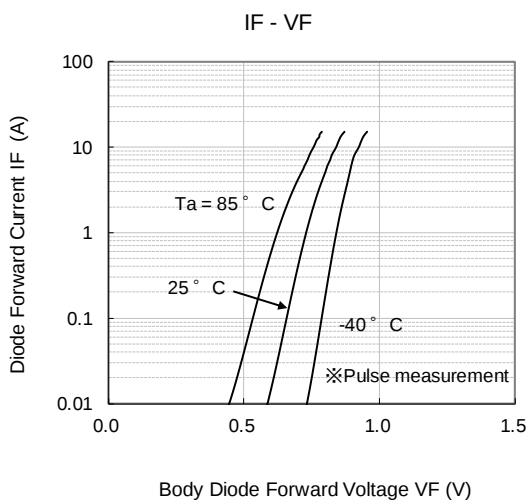
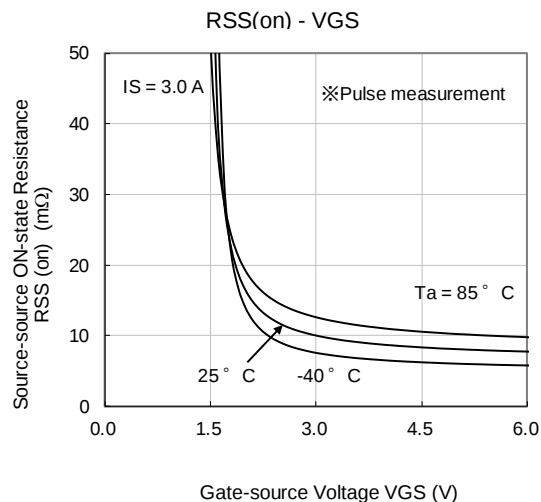
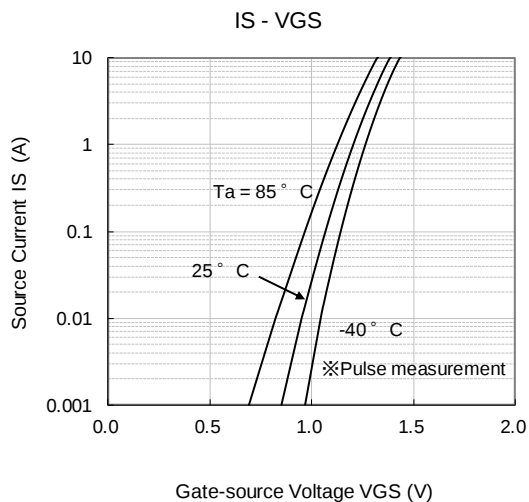
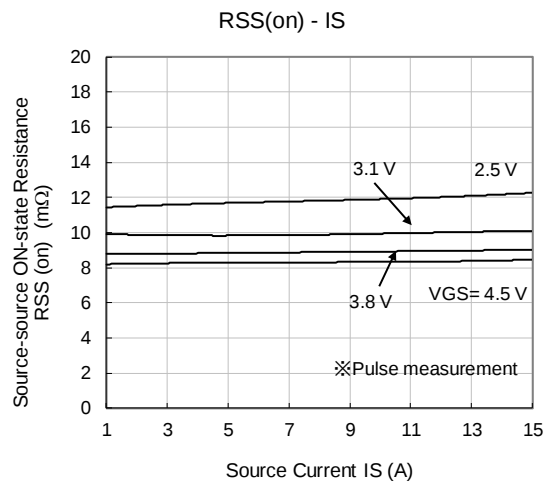
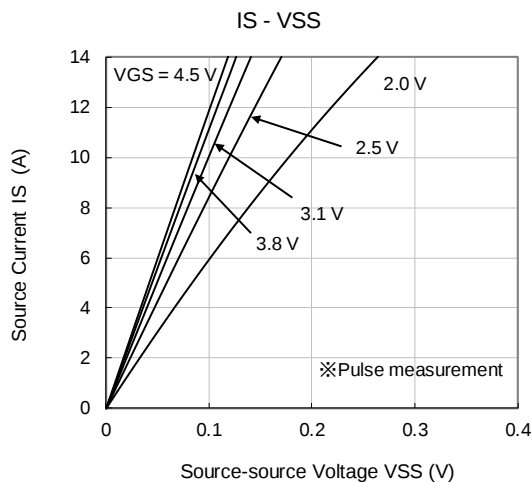
Note Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.

*1 Guaranteed by design, not subject to production testing

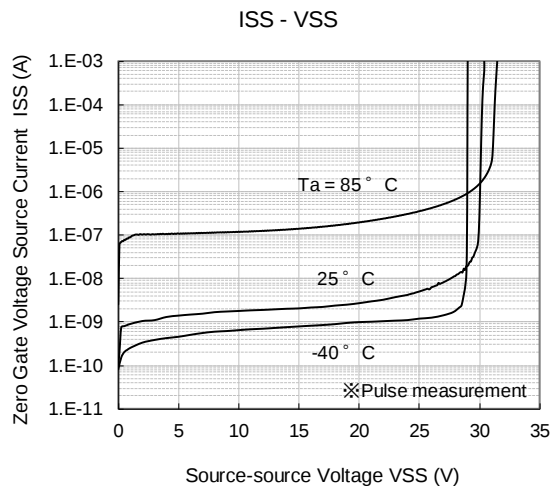
*2 Measurement circuit for Turn-on Delay Time / Rise Time / Turn-off Delay Time / Fall Time



8. TECHNICAL DATA (Reference)



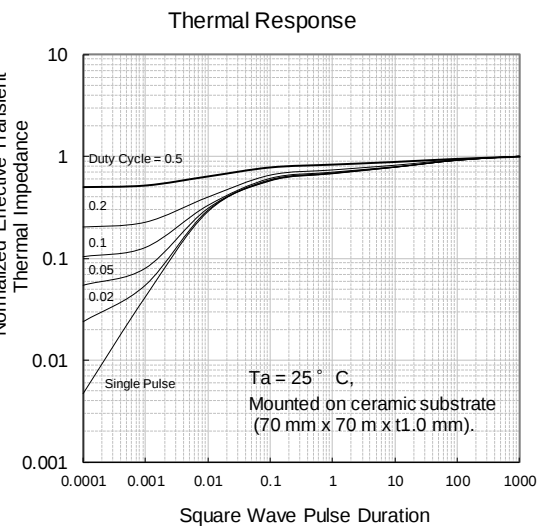
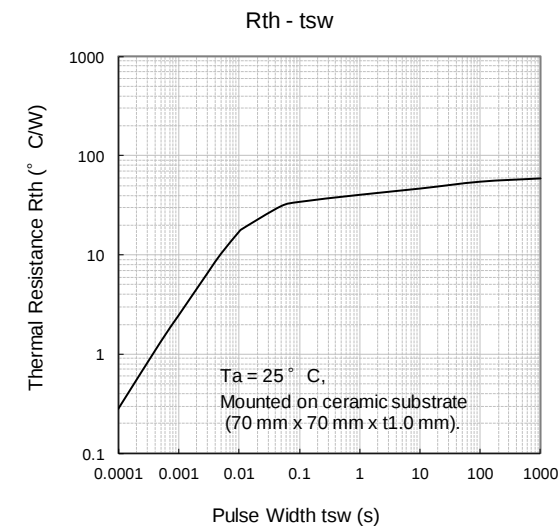
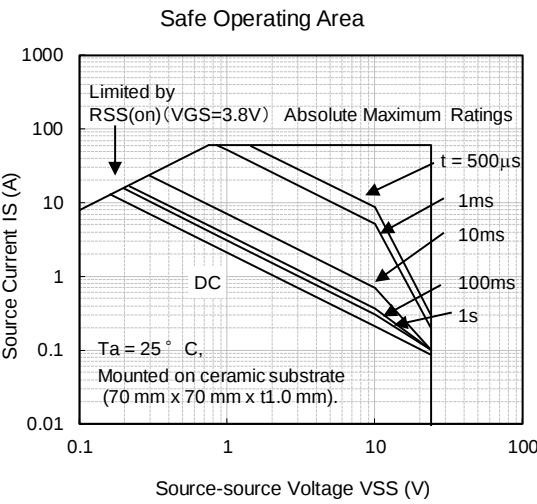
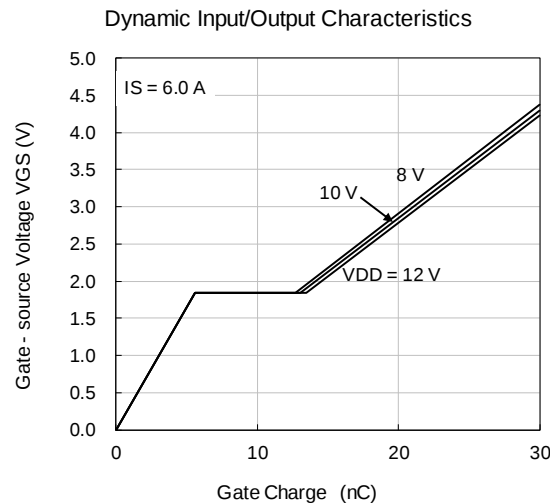
TECHNICAL DATA (Reference)



Destruction Current

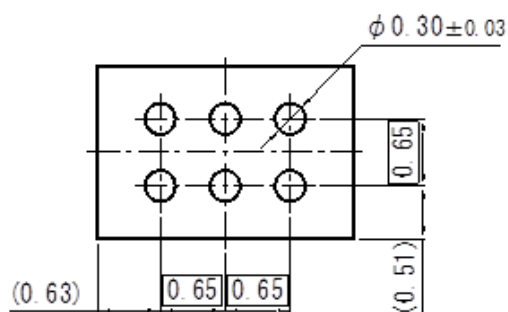
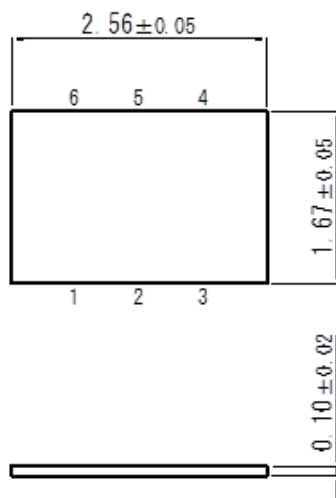
Parameter	Conditions	Result
Operation Test ^{*1}	VGS = 3.8 V, IS = 30 A, t = 3 ms	PASS
	VGS = 3.8 V, IS = 15 A, t = 11 ms	PASS
Destruction Current ^{*1}	VGS = 3.8 V, t = 3 ms	100 A
	VGS = 3.8 V, t = 11 ms	68 A

Ta = 25 °C,
Mounted on FR4 board (25.4 mm × 25.4 mm × t1.0 mm)
using the minimum recommended pad size (36μm Copper).



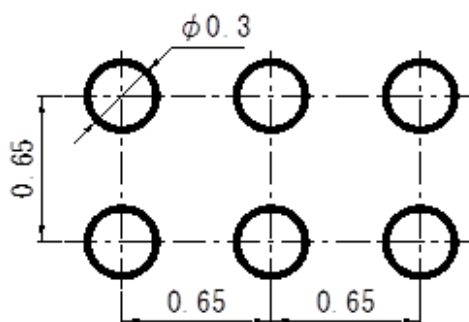
9. OUTLINE

Unit : mm



10. LAND PATTERN (Reference)

Unit: mm



12. REVISION HISTORY

Date	Revision	Description
2021.2.5	1.00	1. initially issued.

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