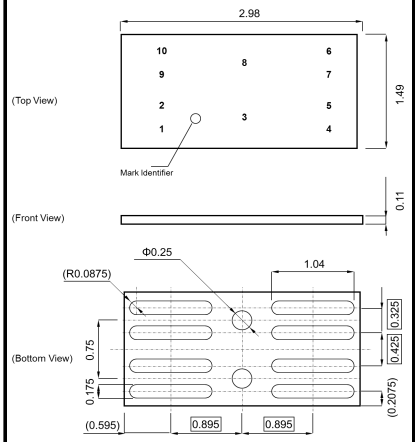
FCAB21490L

Gate resistor installed Dual N-channel MOS FET

For lithium-ion secondary battery protection circuits

Unit: mm



1,2,4,5. Source1(FET1) 3. Gate1 (FET1)
6,7,9,10. Source2(FET2) 8. Gate2 (FET2)

Panasonic	TCSP1530011-N1
JEITA	—
Code	—

■ Features

- Source-source ON resistance:RSS(on) typ. = 2.2 mΩ（VGS = 3.8 V)
- CSP(Chip Size Package)
- Halogen-free / RoHS compliant (EU RoHS / UL-94 V-0 / MSL : Level 1)

■ Marking Symbol: 7F

■ Packaging

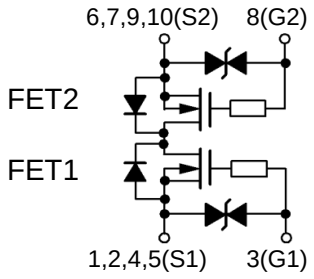
Embossed type (Thermo-compression sealing) : 10 000 pcs / reel (standard)

■ 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 *1	IS1	13.5	A
	DC *2	IS2	29	A
	Pulse *3	ISp	135	A
Total Power Dissipation	DC *1	PD1	0.54	W
	DC *2	PD2	3.5	W
Channel Temperature		Tch	150	°C
Storage Temperature Range		Tstg	-55 to +150	°C

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

Equivalent circuit



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

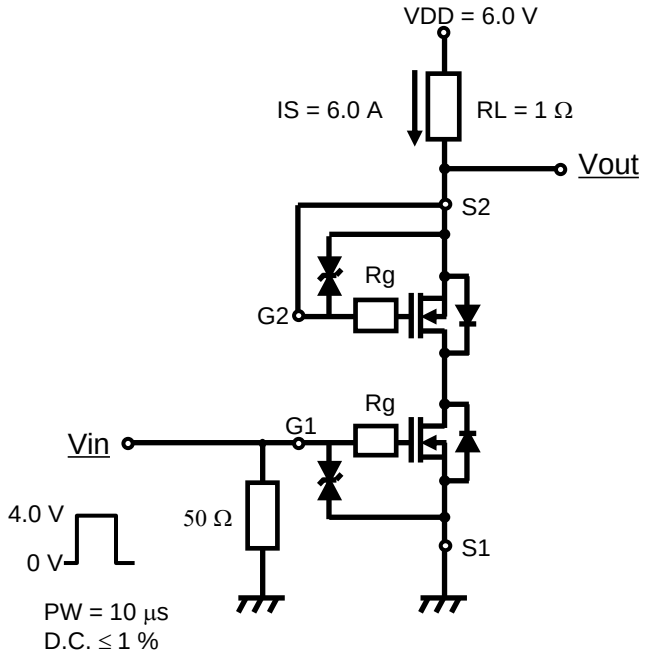
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Source-source Breakdown Voltage	VSSS	IS = 1.0 mA, VGS = 0 V	12			V
Zero Gate Voltage Source Current	ISSS	VSS = 12 V, VGS = 0 V			1.0	μA
Gate-source Leakage Current	IGSS	VGS = ±8 V, VSS = 0 V			±10	μA
		VGS = ±5 V, VSS = 0 V			±1.0	
Gate-source Threshold Voltage	Vth	IS = 1.11 mA, VSS = 10 V	0.35	0.90	1.4	V
Source-source On-state Resistance	RSS(on)1	IS = 6.0 A, VGS = 4.5 V	1.55	2.1	2.75	mΩ
	RSS(on)2	IS = 6.0 A, VGS = 3.8 V	1.6	2.2	2.85	
	RSS(on)3	IS = 6.0 A, VGS = 3.1 V	1.65	2.4	3.95	
	RSS(on)4	IS = 6.0 A, VGS = 2.5 V	1.9	3.1	6.1	
Body Diode Forward Voltage	VF(s-s)	IF = 6.0 A, VGS = 0 V		0.6	1.2	V
Input Capacitance *1	Ciss	VSS = 10 V, VGS = 0 V, f = 1 kHz		3570		pF
Output Capacitance *1	Coss			460		
Reverse Transfer Capacitance *1	Crss			410		
Turn-on delay Time *1,*2	td(on)	VDD = 6.0 V, VGS = 0 to 4.0 V		0.7		μs
Rise Time *1,*2	tr	IS = 6.0 A		1.5		
Turn-off delay Time *1,*2	td(off)	VDD = 6.0 V, VGS = 4.0 to 0 V		6.7		μs
Fall Time *1,*2	tf	IS = 6.0 A		4.1		
Total Gate Charge *1	Qg	VDD = 6.0 V		25		nC
Gate-source Charge *1	Qgs	VGS = 0 to 4.0 V,		12		
Gate-drain Charge *1	Qgd	IS = 6.0 A		6		

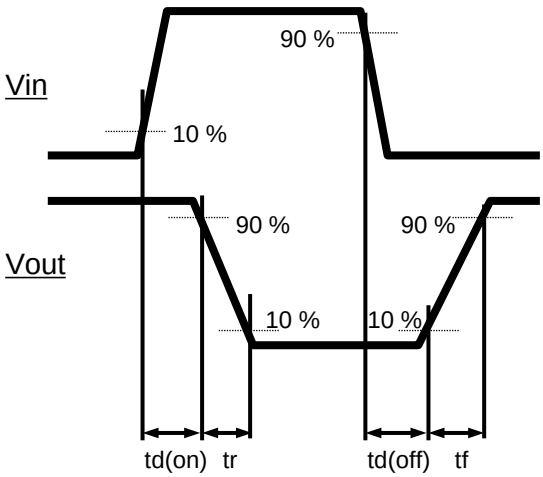
Note Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.

*1 Guaranteed by design, not subject to production testing

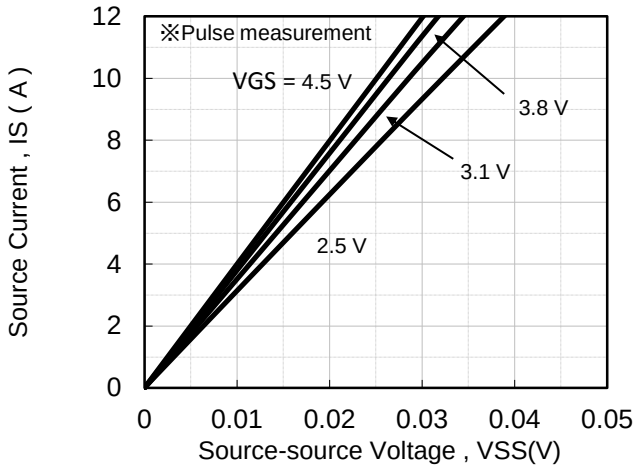
*2 Measurement circuit for Turn-on Delay Time / Rise Time / Turn-off Delay Time / Fall Time

Note2:Measurement circuit

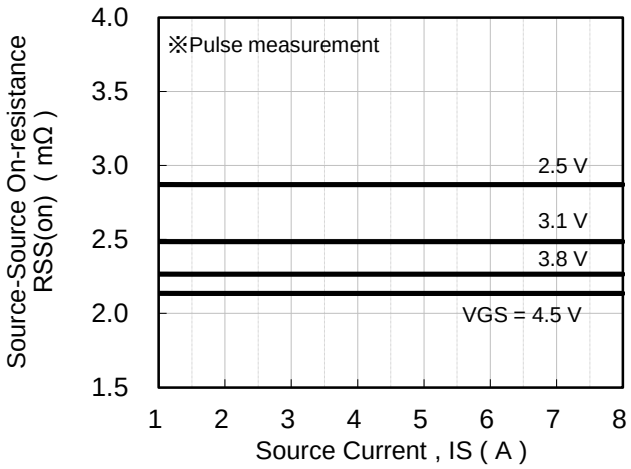




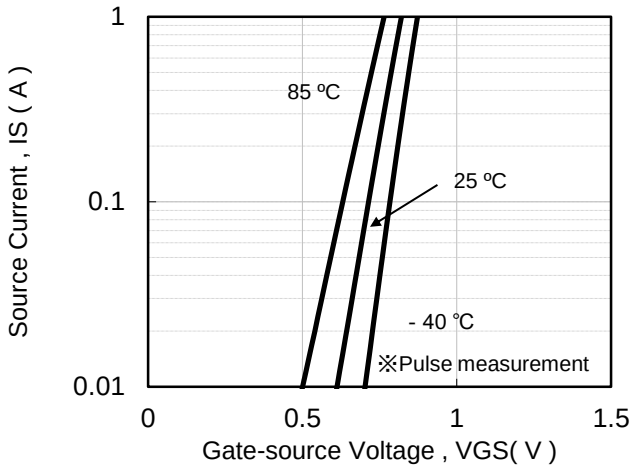
IS - VSS



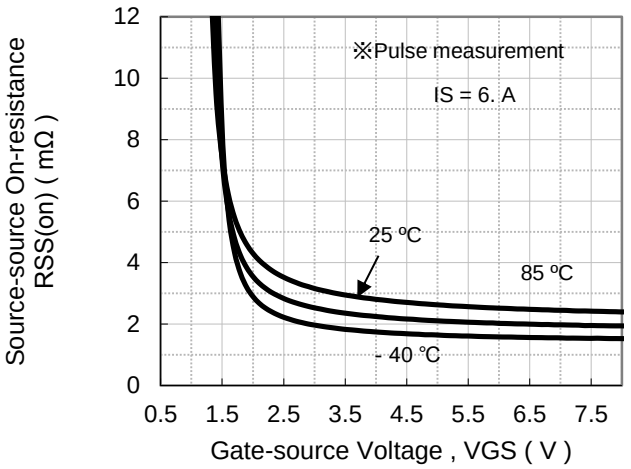
RSS(on) - IS



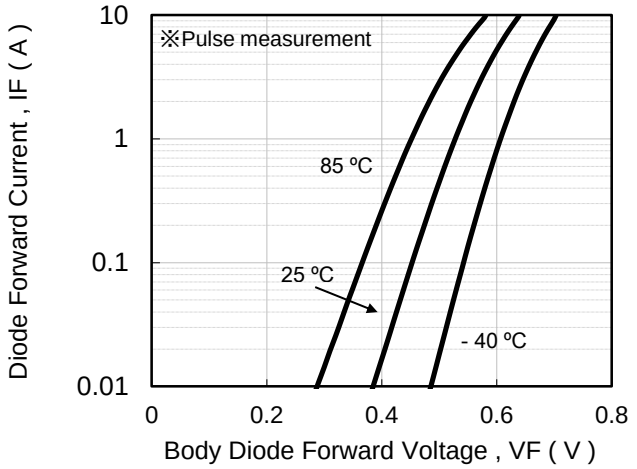
IS - VGS



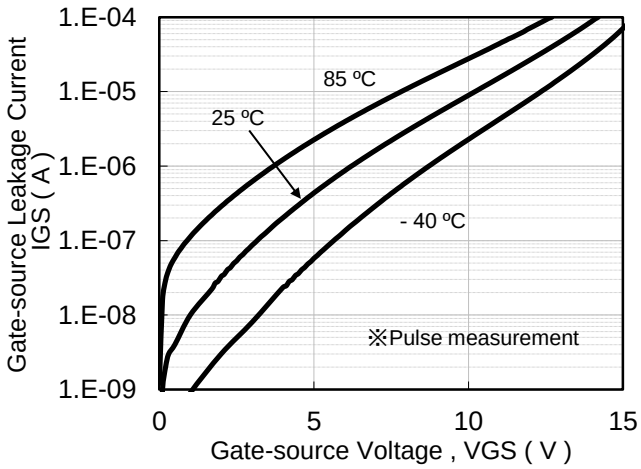
RSS(on) - VGS



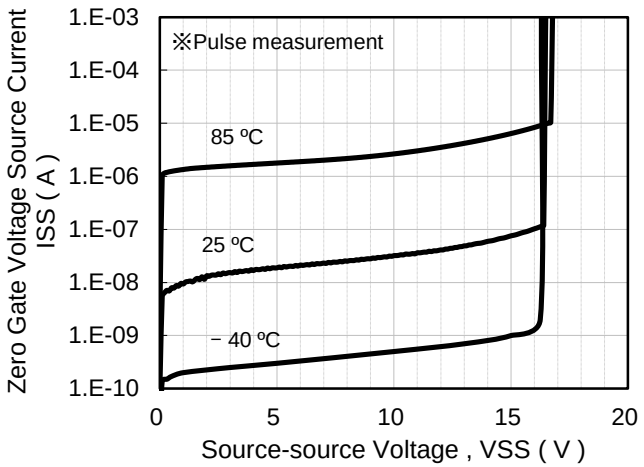
IF - VF



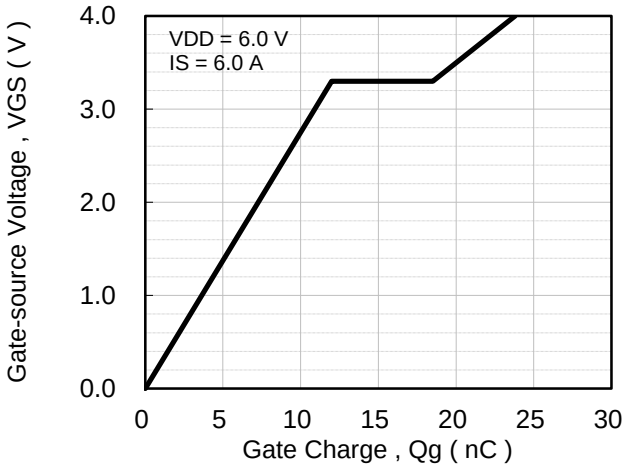
IGS - VGS



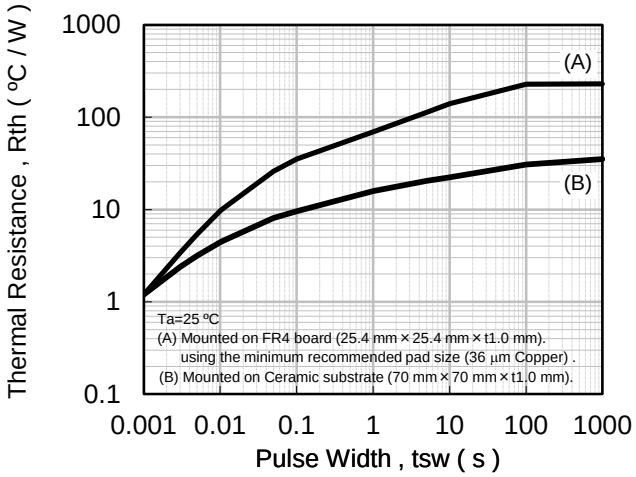
ISS - VSS



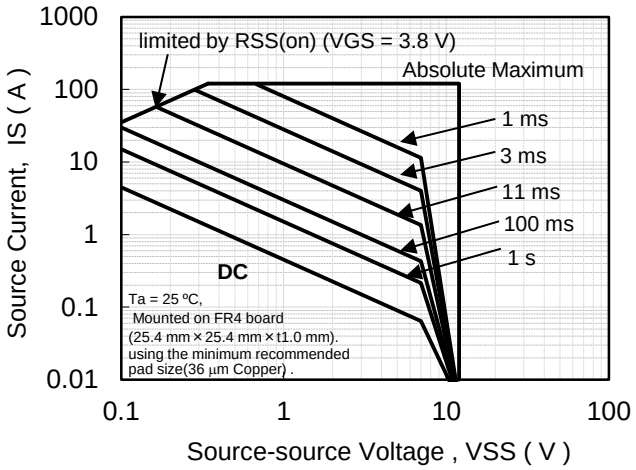
Dynamic Input / Output Characteristics



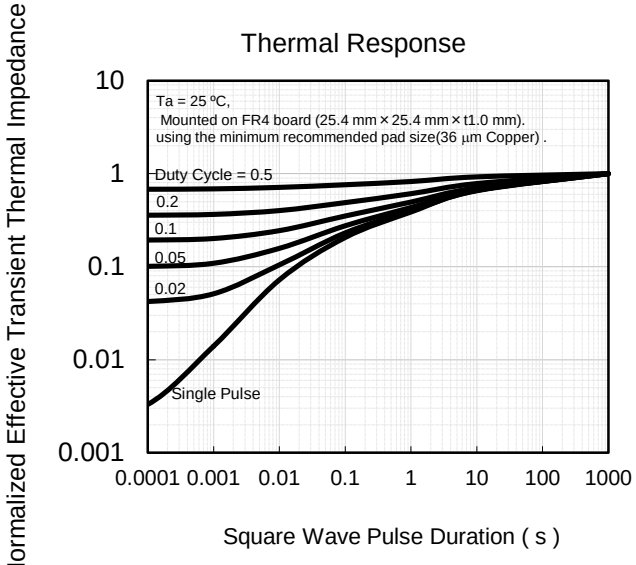
Rth - tsw



Safe Operating Area

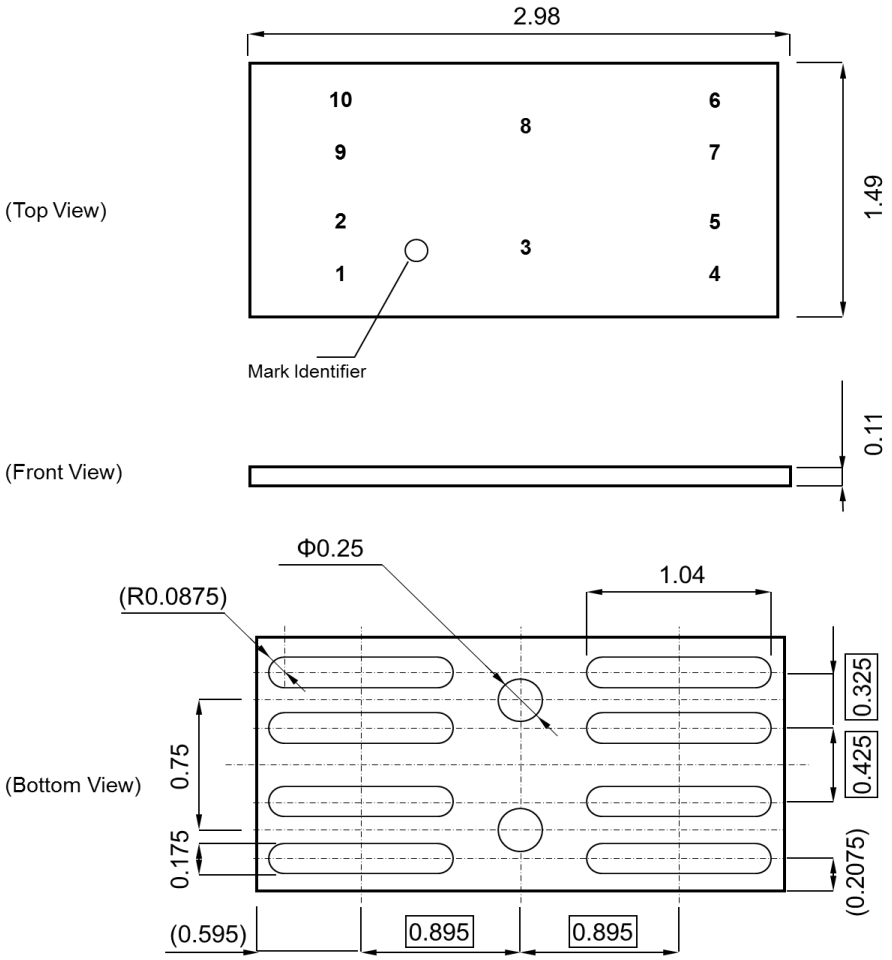


Thermal Response



■ Outline

Unit: mm



■ Land Pattern (Reference)

Unit: mm