

For lithium-ion secondary battery protection circuits

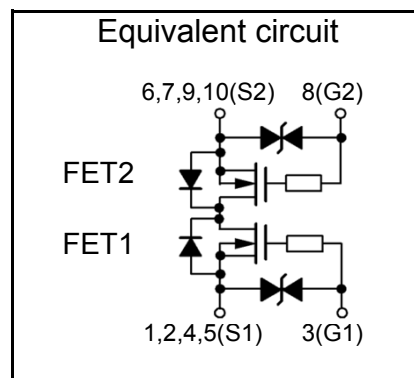
- Source-source ON resistance:RSS(on) typ. = 2.2 mΩ (VGS = 3.8 V)
- CSP (Chip Size Package)
- Halogen-free / RoHS compliant (EU RoHS / UL-94 V-0 / MSL : Level 1)

■ Packaging

Embossed type (Thermo-compression sealing) : 1 000 pcs / reel (standard)

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 %



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

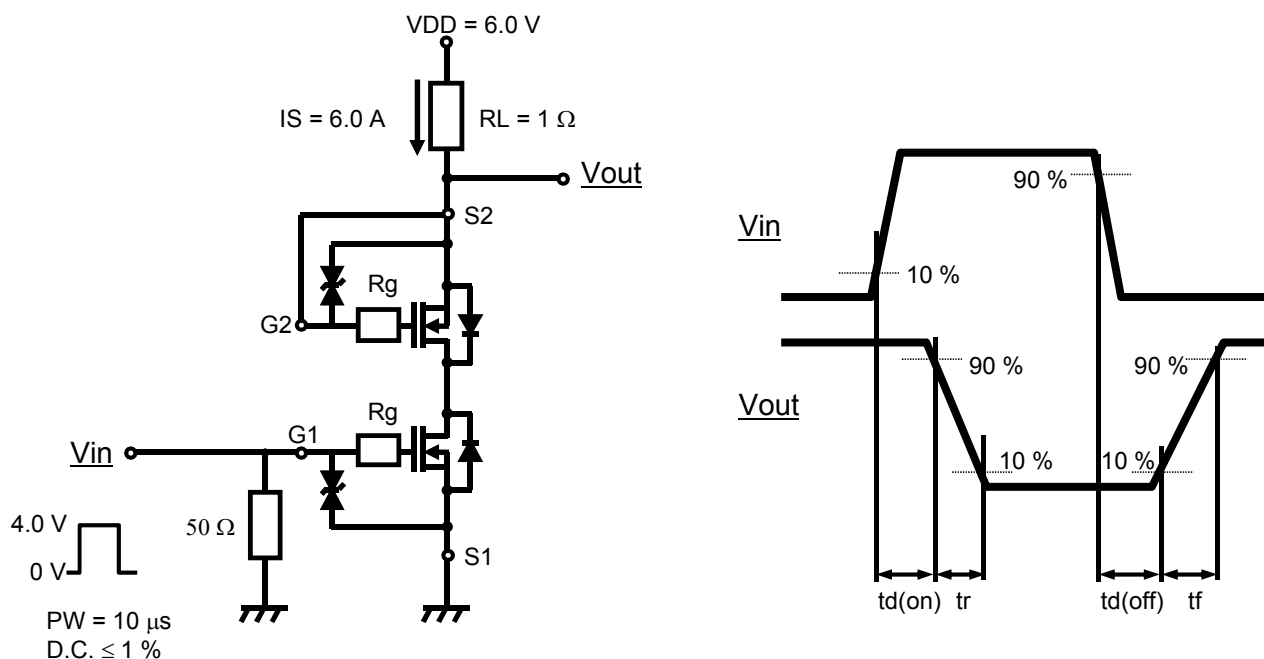
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Source-source Breakdown Voltage	VSSS	IS = 1.0 mA, VGS = 0 V	12			V
Zero Gate Voltage Source Current	ISSS	VSS = 12 V, VGS = 0 V			1.0	μA
Gate-source Leakage Current	IGSS	VGS = ±8 V, VSS = 0 V			±10	μA
		VGS = ±5 V, VSS = 0 V			±1.0	
Gate-source Threshold Voltage	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		

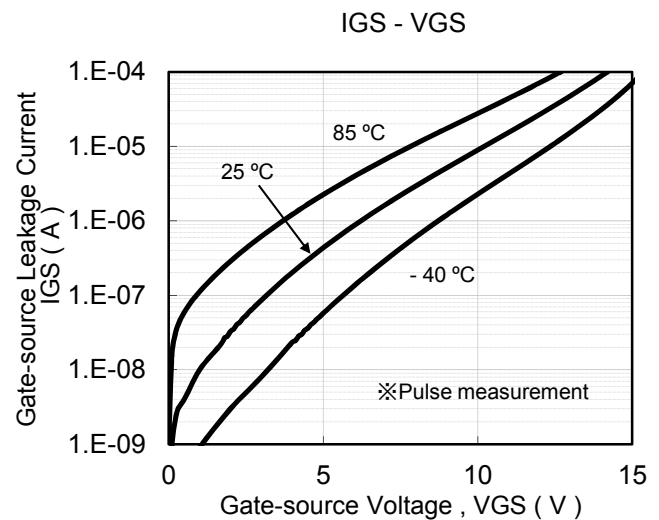
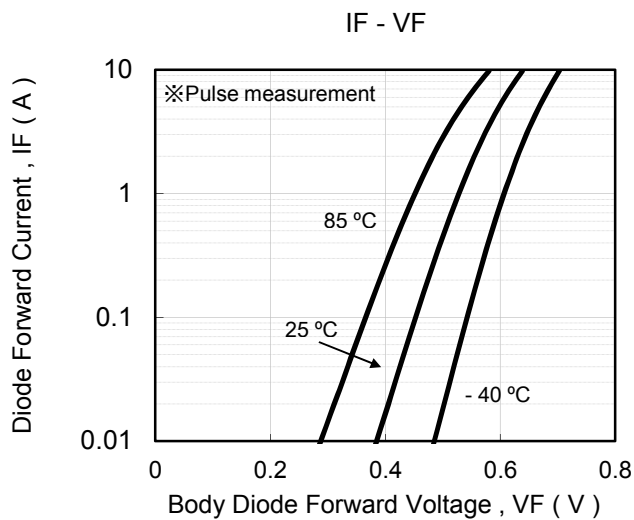
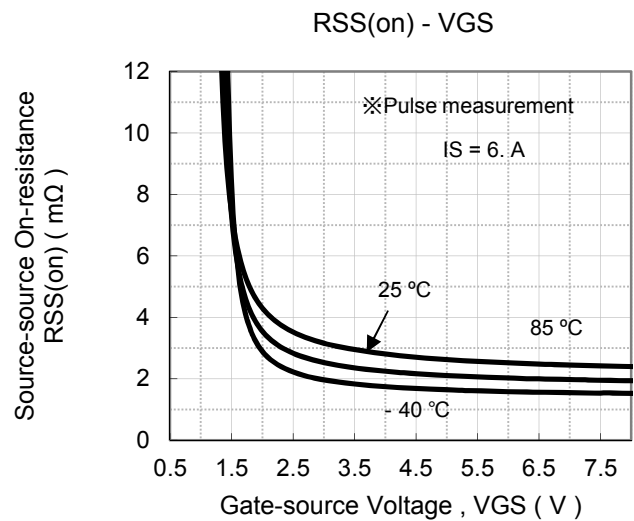
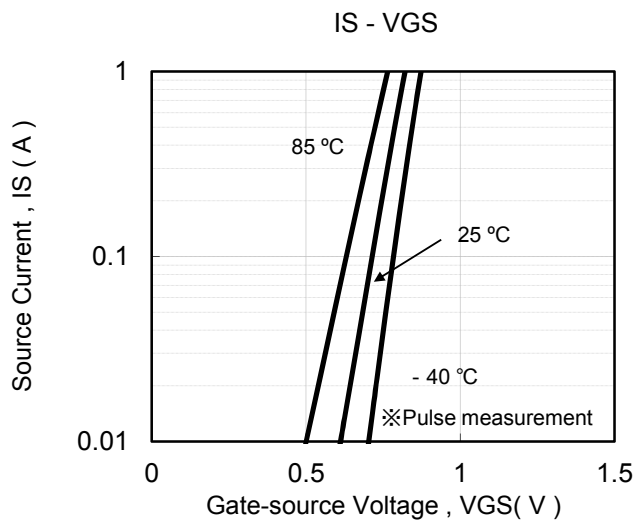
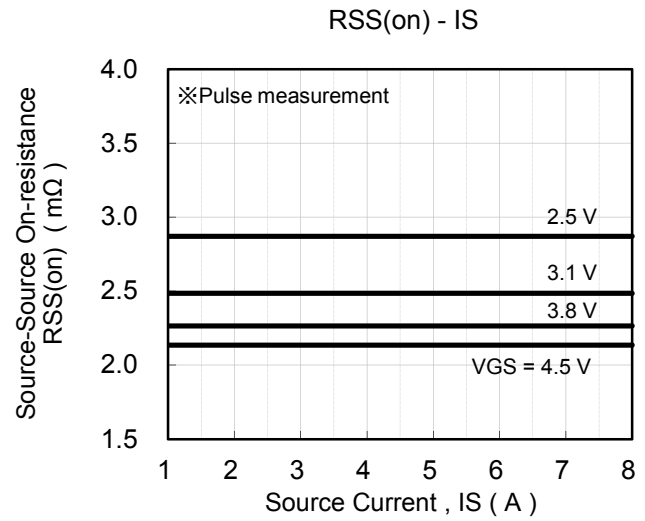
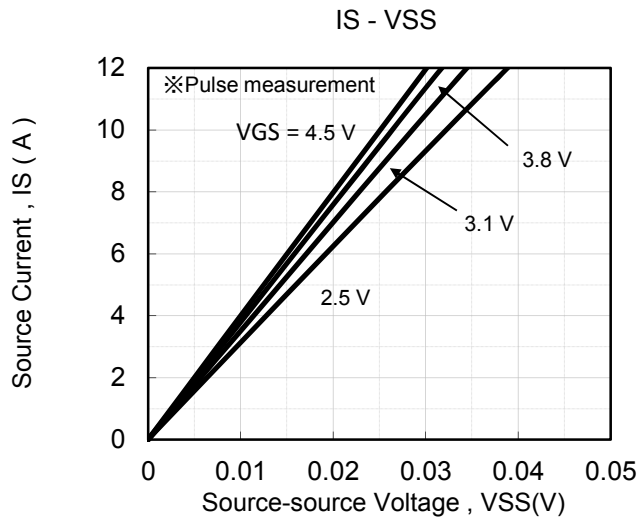
Note Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 Measuring methods for transistors.

*1 Guaranteed by design, not subject to production testing

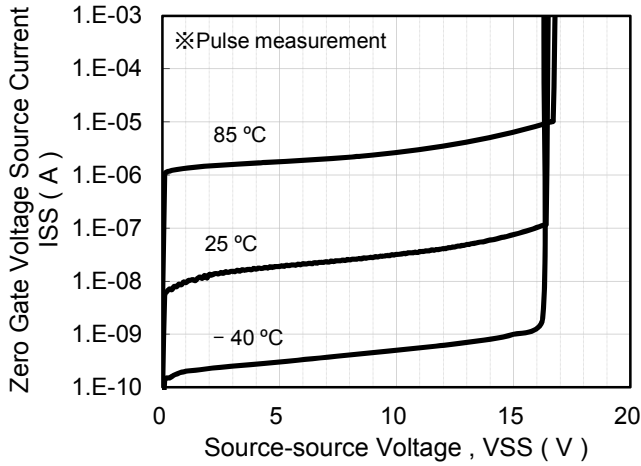
*2 Measurement circuit for Turn-on Delay Time / Rise Time / Turn-off Delay Time / Fall Time

Note2: Measurement circuit

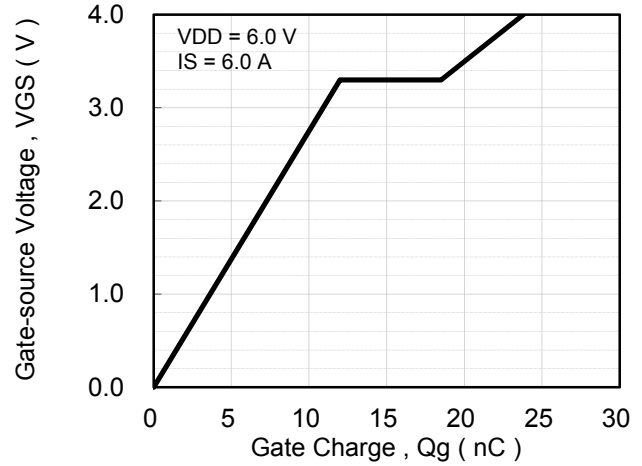




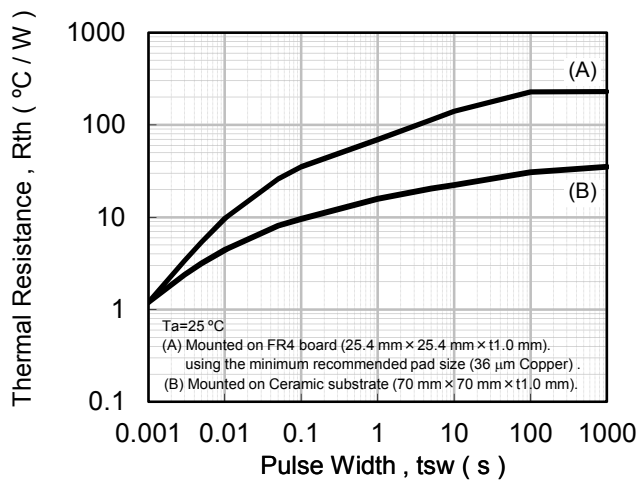
ISS - VSS



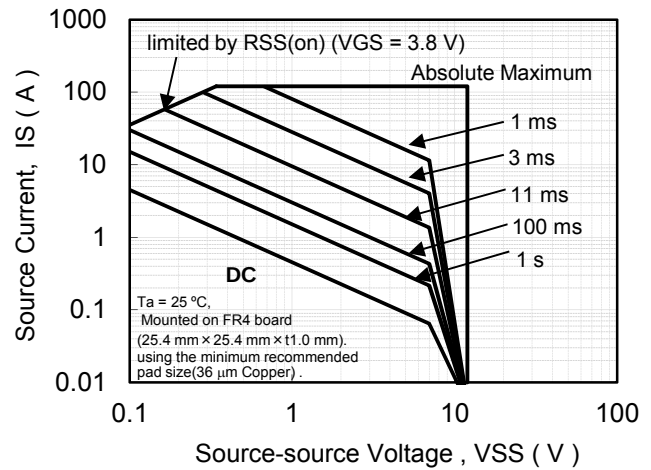
Dynamic Input / Output Characteristics



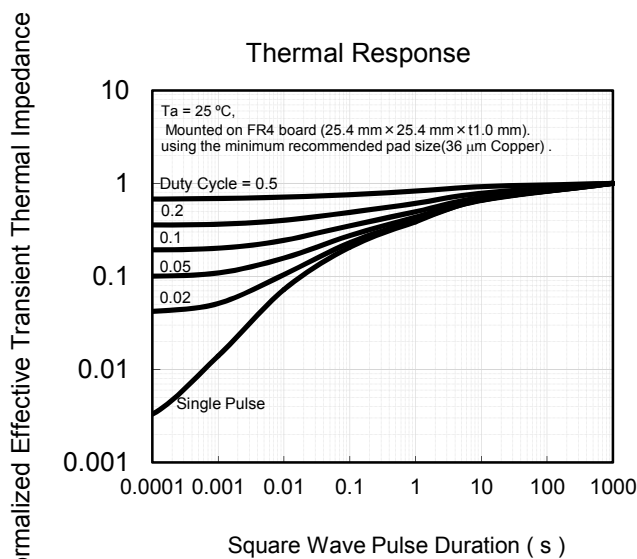
Rth - tsw



Safe Operating Area

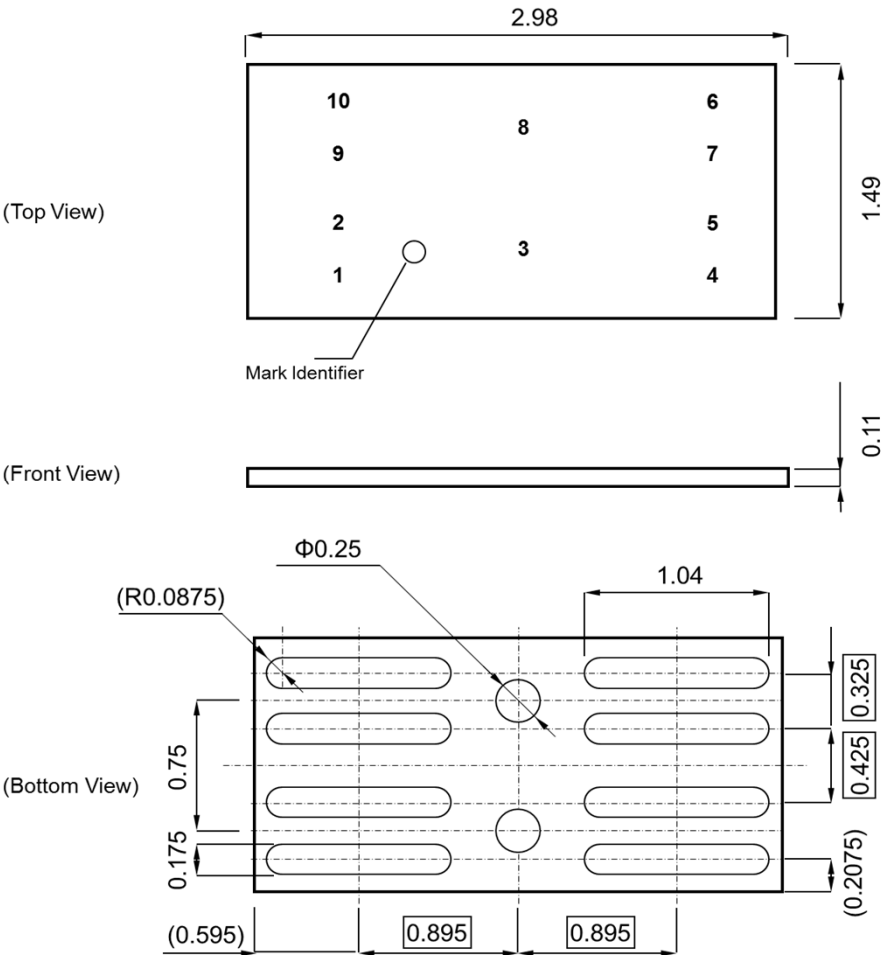


Thermal Response



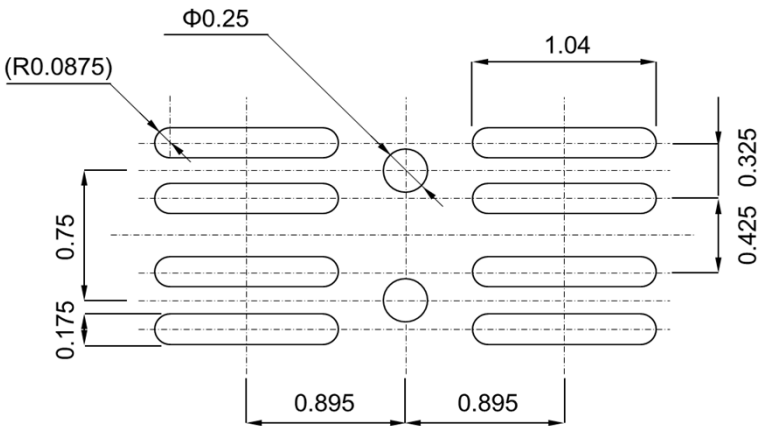
■ Outline

Unit: mm



■ Land Pattern (Reference)

Unit: mm



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