

Dual N-channel Power MOSFET:
12V, 2.05mohm, 24A

Product Summary

VSSS	VGSS	RSS(ON) TYP/MAX	IS MAX
12V	± 8V	2.05/2.70 mΩ@VGS=4.5V 2.20/2.85 mΩ@VGS=3.8V 2.55/3.90 mΩ@VGS=3.1V 3.30/6.60 mΩ@VGS=2.5V	24A

Marking Symbol Code

- ❖ Laser Marking Device Code: G



GS : Gostone (fixed)
G : Marking Device Code (fixed)
G : Factory Code (fixed)
Y : Year Code
W : Week Code
L : LOT Code
● : Pin#1 Identifier

Form

- ❖ Tape & Reel Embossed Type: 5,000pcs / reel

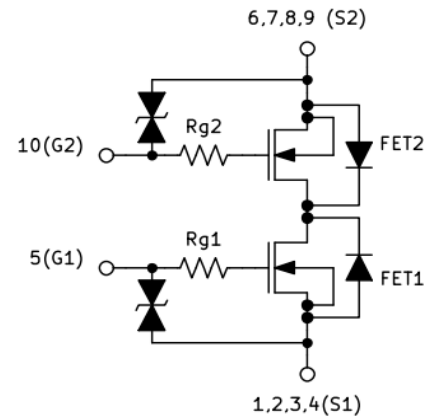
Features

- ❖ CSP (Chip Size Package)
- ❖ Halogen-Free / RoHS Compliant
- ❖ 2.5V Drive Low Source-Source On-State Resistance
- ❖ Gate Resistor Installed Common-Drain Type MOSFET
- ❖ ESD Protection Diode Installed (Gate-Source)

Application

- ❖ Lithium-Ion Secondary Battery Protection Circuits

Equivalent circuit



Absolute Maximum Rating Ta=25°C

Parameter	Symbol	Rating	Unit
Source to Source Voltage	VSS	12	V
Gate to Source Voltage	VGS	±8	V
Source Current	DC	IS1 ^{*1}	12.7 A
	DC	IS2 ^{*2}	24.0 A
	Pulse	ISP ^{*2*3}	97 A
Total Dissipation	DC	PD1 ^{*1}	0.44 W
	DC	PD2 ^{*2}	1.69 W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 to +150	°C

Thermal Characteristics Ta = 25°C

Parameter	Symbol	Rating	Unit
Thermal Resistance	Rth ^{*1}	286	°C/W
	Rth ^{*2}	74	°C/W

Note *1 Mounted on FR4 board (25.4mm x 25.4mm x t1.0mm)

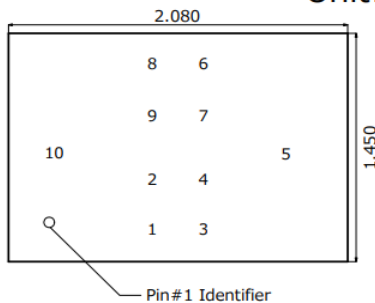
with minimum copper pad (44.6mm², 36μm thickness copper)

Note *2 Mounted on FR4 board (25.4mm x 25.4mm x t1.0mm)

with maximum copper pad (617.5mm², 36μm thickness copper)

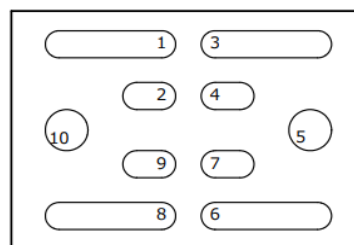
Note *3 t=10μs, duty cycle ≤ 1%

Top View



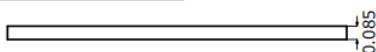
Unit: mm

Bottom View



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

Front View

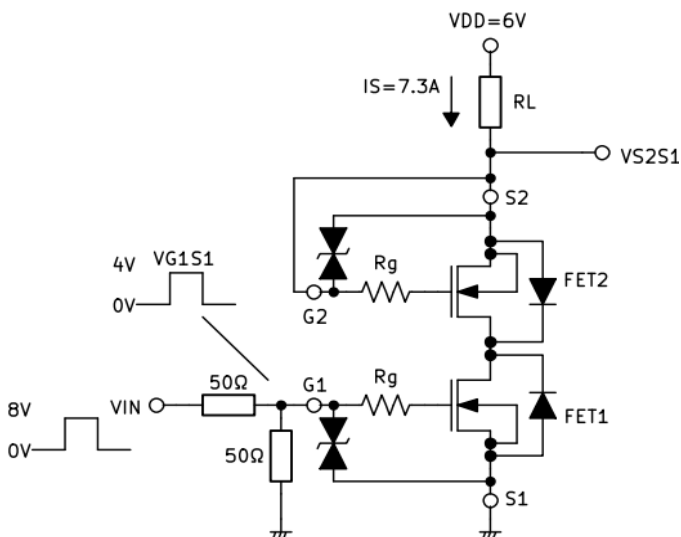


Electrical Characteristics (Ta=25degC +/- 3degC)

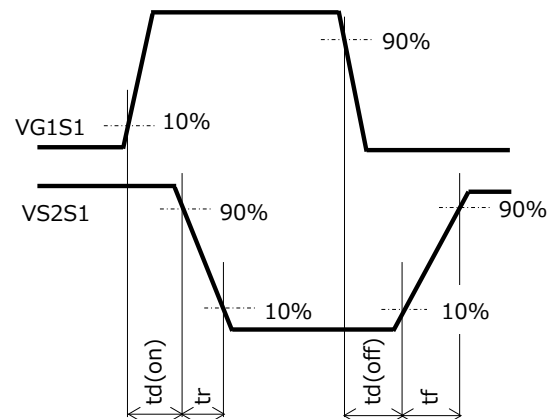
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Source-Source Breakdown Voltage	VSSS	IS=1mA, VGS=0V	12			V
Zero Gate Voltage Source Current	ISSS	VSS=12V, VGS=0V			1	μA
Gate-Source Leakage Current	IGSS1	VGS=±8V, VSS=0V			±10	μA
	IGSS2	VGS=±5V, VSS=0V			±1	μA
Gate-Source Threshold Voltage	Vth	VSS=6V, IS=1.0mA	0.35	0.90	1.40	V
Source-Source On-State Resistance	RSS(on)1	IS=7.3A, VGS=4.5V	1.50	2.05	2.70	mΩ
	RSS(on)2	IS=7.3A, VGS=3.8V	1.60	2.20	2.85	
	RSS(on)3	IS=7.3A, VGS=3.1V	1.75	2.55	3.90	
	RSS(on)4	IS=7.3A, VGS=2.5V	2.00	3.30	6.60	
Body Diode Forward Voltage	VF(S-S)	IF=7.3A, VGS=0V		0.71	1.0	V
Input Capacitance *1	Ciss	VSS=10V, VGS=0V, f=1kHz		2,193		pF
Output Capacitance *1	Coss			586		
Reverse Transfer Capacitance *1	Crss			574		
Turn-On Delay Time *1 *2	td(on)	VDD=6V, VGS=0 to 4.0V, IS=7.3A		0.7		μs
Rise Time *1 *2	tr			2.1		
Turn-Off Delay Time *1 *2	td(off)	VDD=6V, VGS=4.0 to 0V, IS=7.3A		3.4		μs
Fall Time *1 *2	tf			3.8		
Total Gate Charge *1	Qg	VDD=6V, VGS=0 to 4.0V, IS=14.6A		30		nC
Gate-Source Charge *1	Qgs			4		
Gate-Drain Charge *1	Qgd			13		
Gate Resistance *1	Rg	f=1MHz		663		Ω

Note *1 Guaranteed by Design

Note *2 Measurement Circuit for Switching Characteristics

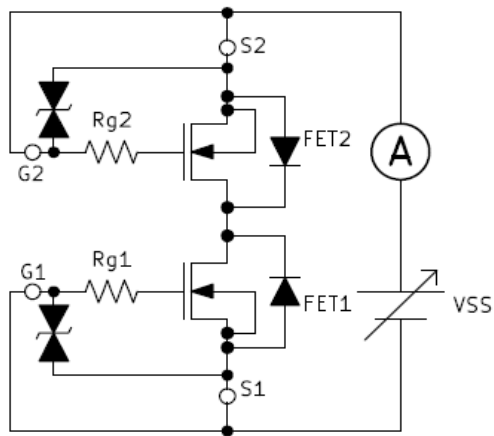
FET1 Measurement Circuit for Switching Characteristics td(on), tr, td(off), tf (FET2: Gate-Source Short)


(Definition of Switching Measurement Detection)

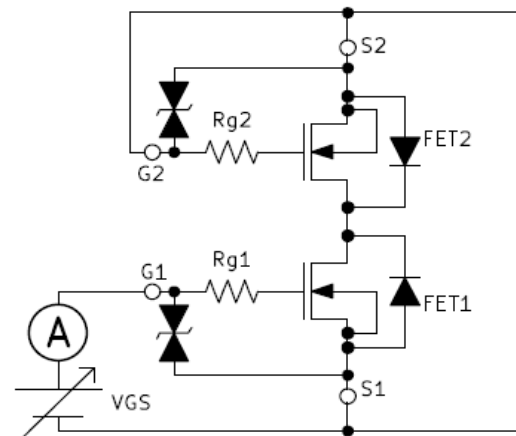


Test circuits for FET1

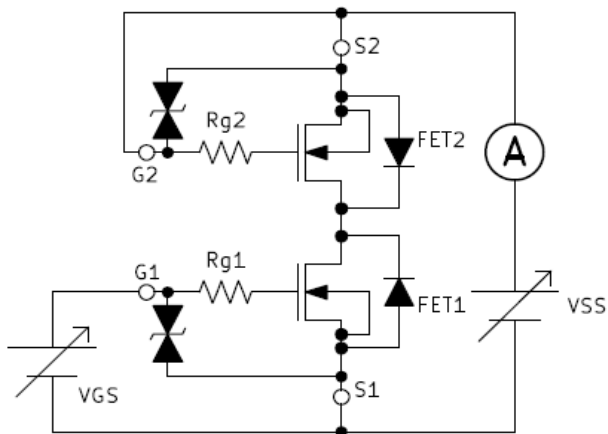
Test Circuit 1
VSSS/ISSS



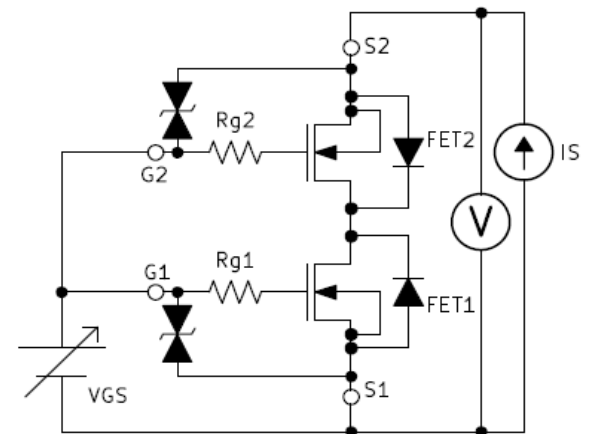
Test Circuit 2
IGSS1/2



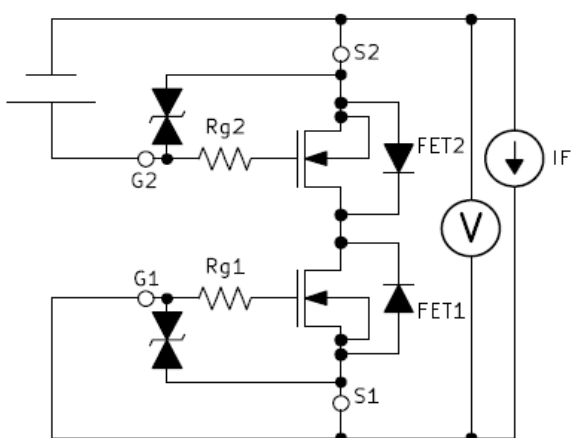
Test Circuit 3
Vth

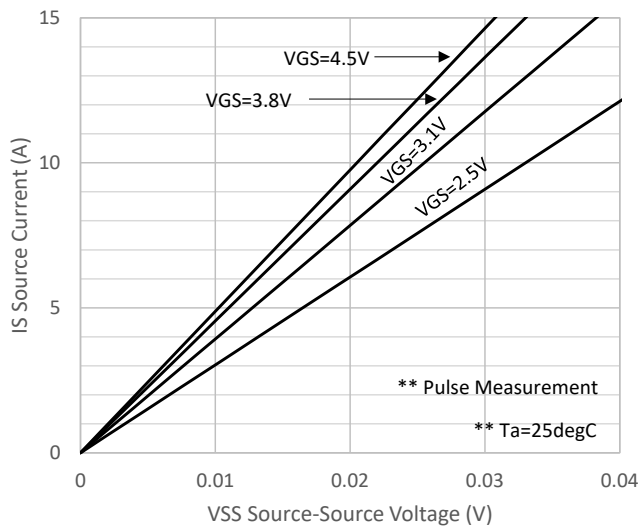
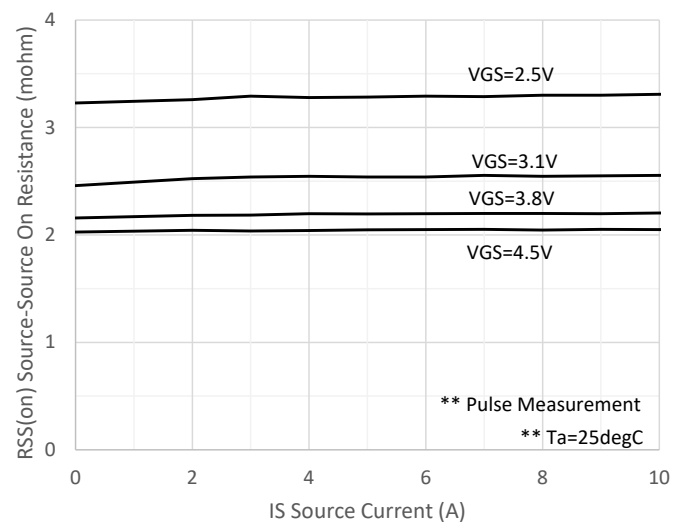
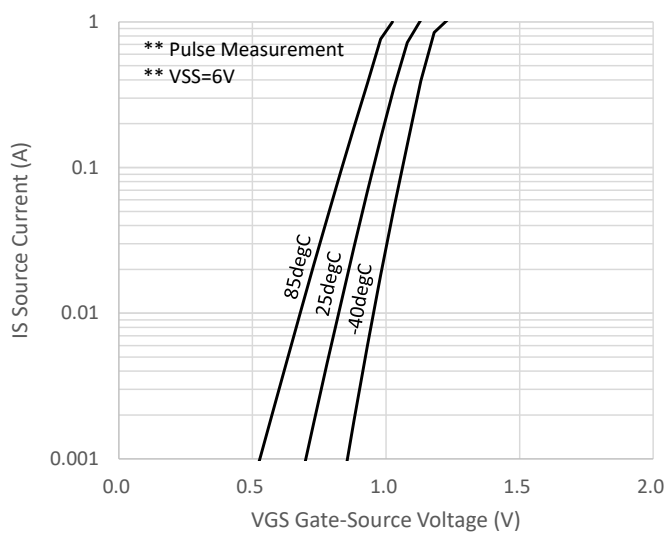
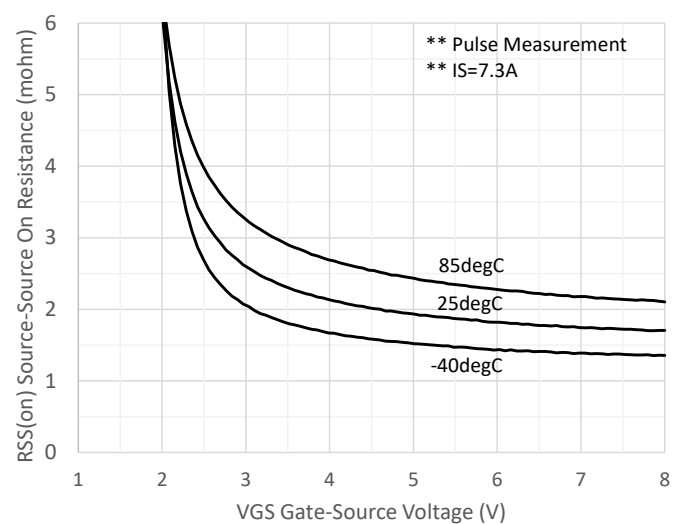
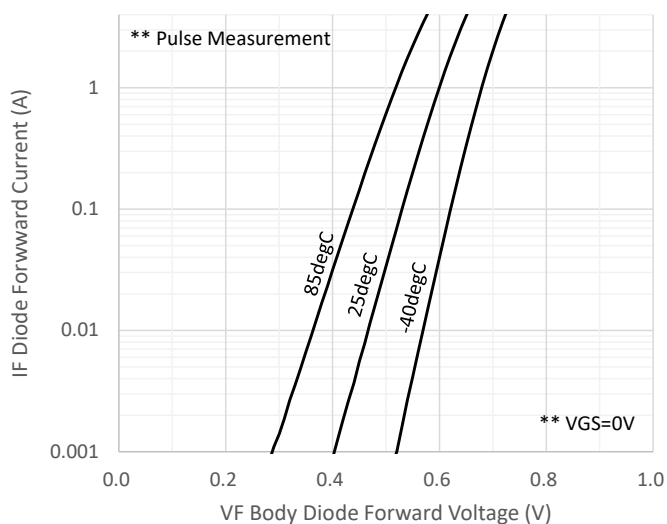
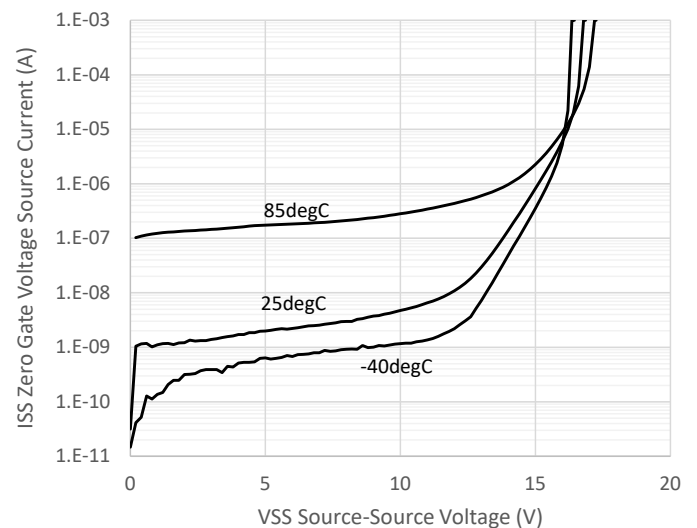


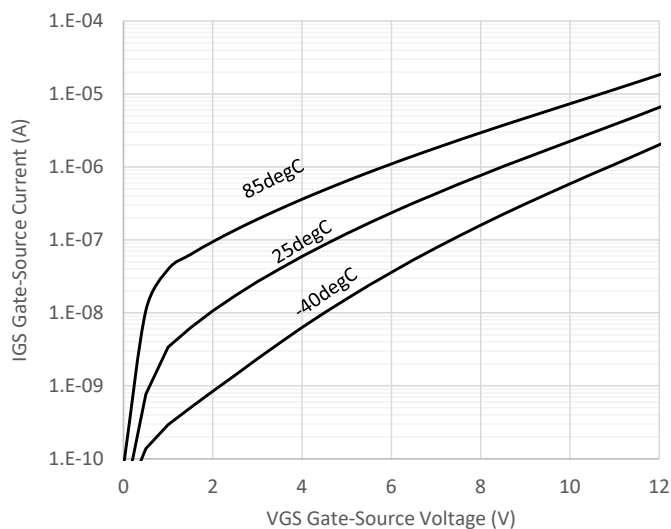
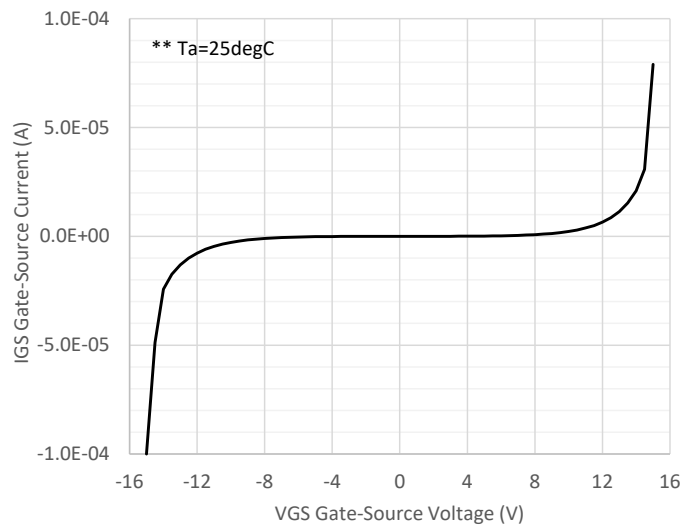
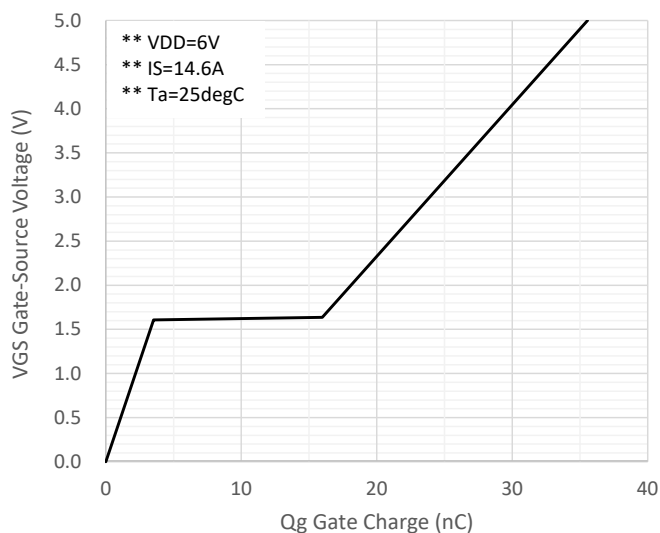
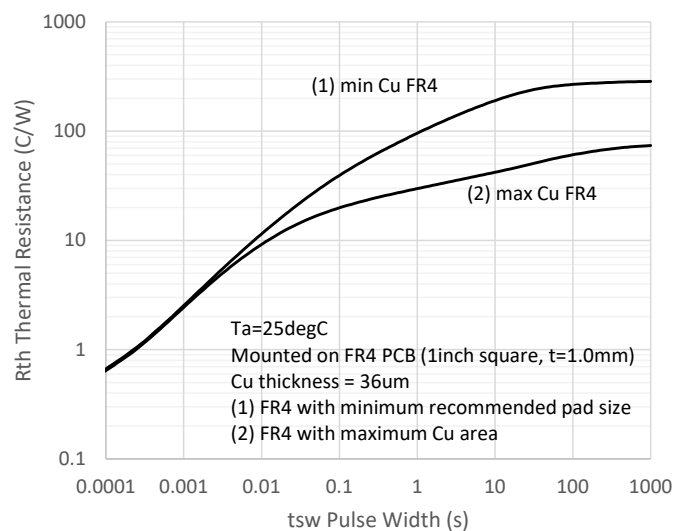
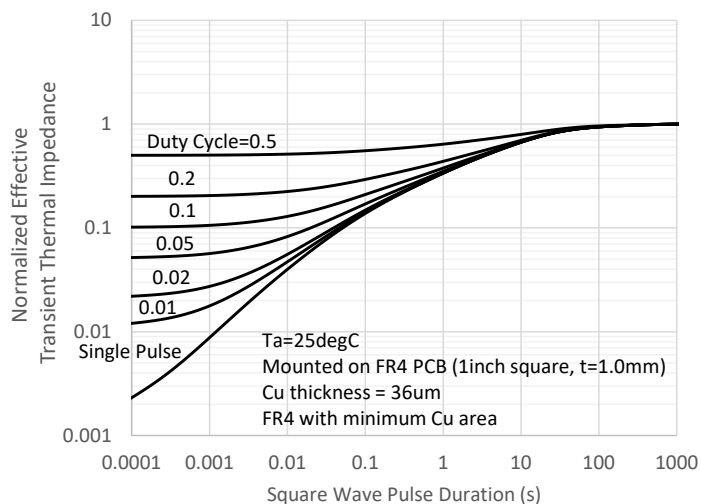
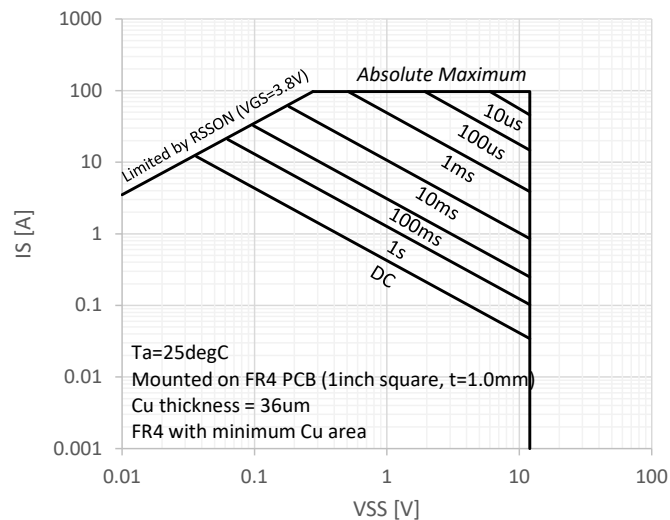
Test Circuit 4
RSS(on)



Test Circuit 5
VF(S-S)



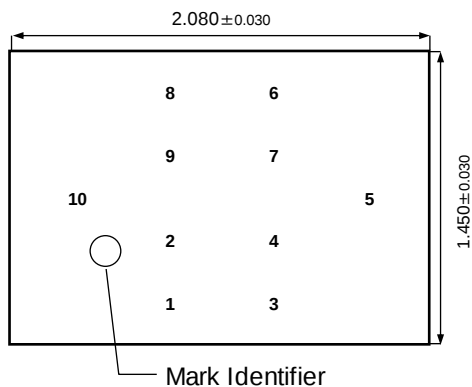
Technical data
IS to VSS

RSS(on) to IS

IS to VGS

RSS(on) to VGS

IF to VF

ISS to VSS


Technical data
IGS to VGS

IGS to VGS

Dynamic Input / Output Characteristics

Rth to tsw

Thermal Response

Safe Operating Area


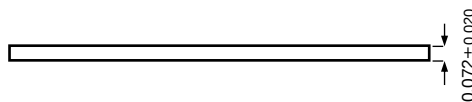
Package Outline Dimensions

(Top View)

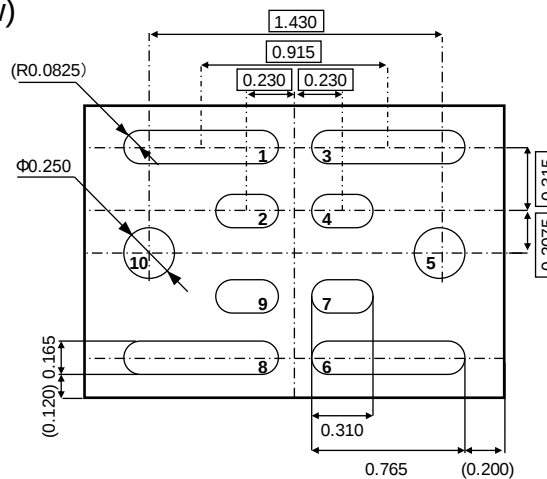
Unit: mm



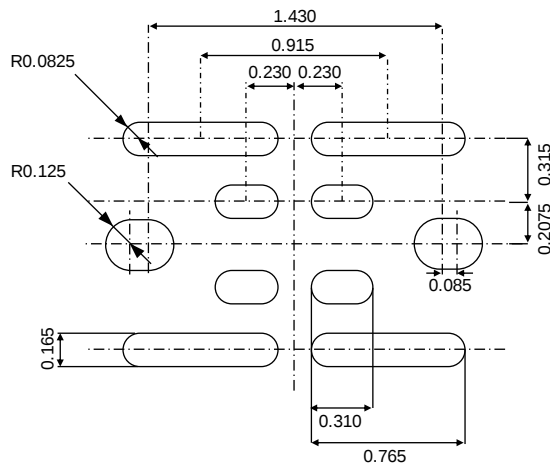
(Front View)



(Bottom View)



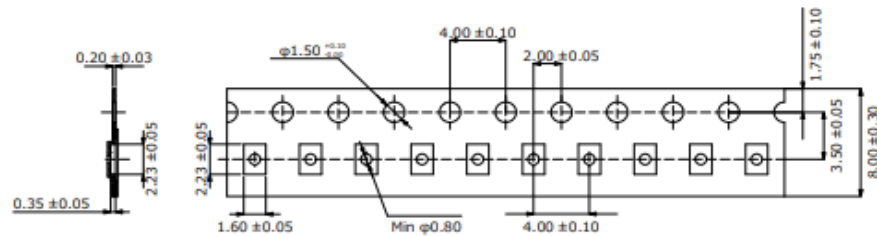
LAND & STENCIL PATTERN (Reference)



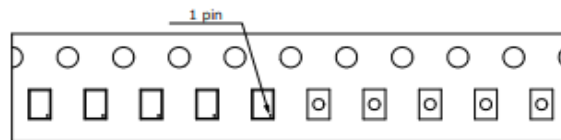
Form

- ❖ Tape & Reel Embossed Type: 5,000pcs / reel
- ❖ Factory PKG Code: WLCSP 2.08X1.45_10
- ❖ Tape Width: 8mm, Pitch: 4mm, Reel Size: 7inch

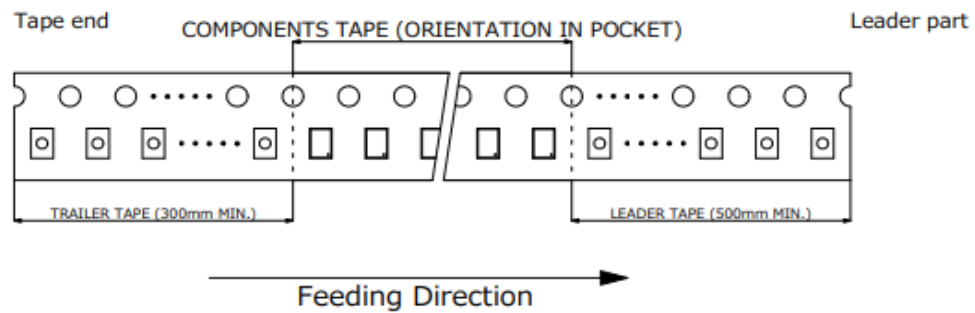
Tape size (mm)



Pin1 Direction



Tape end ~ Leader part (mm)



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