

Dual N-channel Power MOSFET: 12V, 1.8mohm, 31.7A

Product Summary

VSSS	VGSS	RSS(ON) TYP/MAX	IS MAX ^{*2}
12V	± 8V	1.35/1.80 mΩ@VGS=4.5V 1.50/2.00 mΩ@VGS=3.8V 1.70/2.80 mΩ@VGS=3.1V 2.30/4.50 mΩ@VGS=2.5V	31.7A

Marking Symbol Code

❖ Laser Marking Device Code: D



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

Form

❖ Tape & Reel Embossed Type: 8,000pcs / reel

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}	16.2 A
	DC	IS2 ^{*2}	31.7 A
	Pulse	ISP ^{*2*3}	127 A
Total Dissipation	DC	PD1 ^{*1}	0.50 W
	DC	PD2 ^{*2}	1.92 W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 to +150	°C

Thermal Characteristic (Ta=25°C)

Parameter	Symbol	Rating	Unit
Thermal Resistance	Rth ^{*1}	248	°C/W
	Rth ^{*2}	65	°C/W

Note *1 Mounted on FR4 board (25.4mm x 25.4mm x t1.0mm)
with minimum copper pad (36μm thickness copper)

Note *2 Mounted on FR4 board (25.4mm x 25.4mm x t1.0mm)
with maximum copper pad (36μm thickness copper)

Note *3 t=10μs, duty cycle ≤ 1%

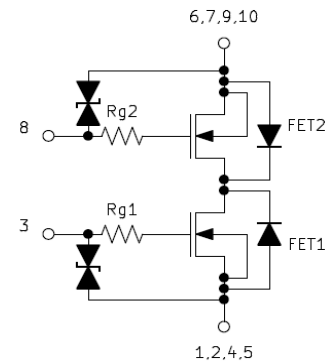
Features

- ❖ 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

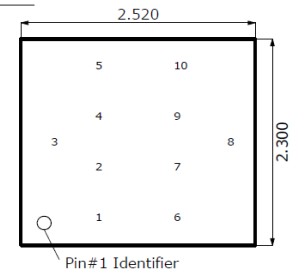
- ❖ Lithium-Ion Secondary Battery Protection Circuits

Equivalent circuit

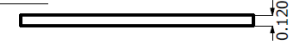


Pin Assignment

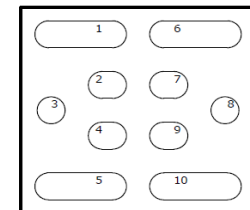
Top View Unit: mm



Front View



Bottom View



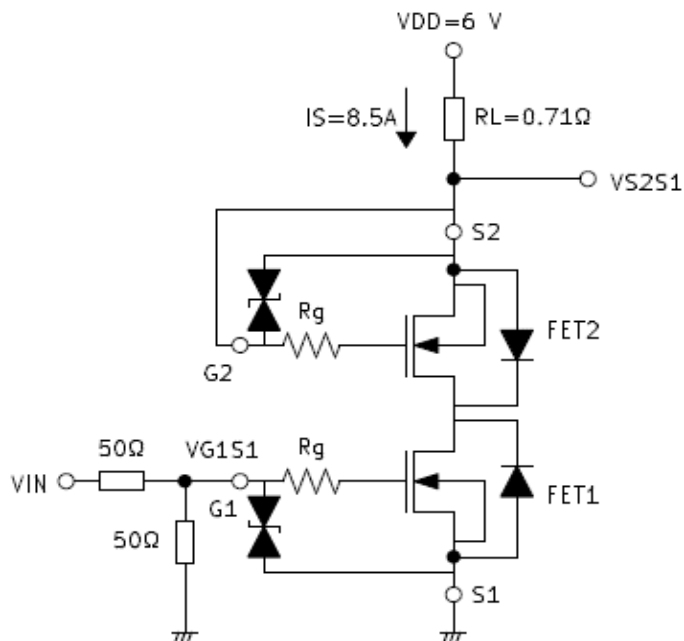
FET1: 1,2,4,5: Source1,3: Gate1
FET2: 6,7,9,10: Source2,8: Gate2

Electrical characteristics (Ta=25°C ± 3°C)

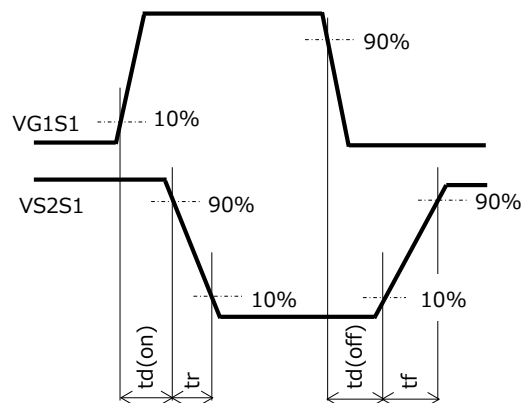
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Source-Source Breakdown Voltage	VSSS	IS=1mA, VGS=0V	12.0			V
Zero Gate Voltage Source Current	ISSS	VSS=12V, VGS=0V			1.0	μA
Gate-Source Leakage Current	IGSS1	VGS=±8V, VSS=0V			±10	μA
	IGSS2	VGS=±5V, VSS=0V			±1.0	μA
Gate-Source Threshold Voltage	Vth	VSS=6.0V, IS=1.0mA	0.4	0.9	1.4	V
Source-Source On-State Resistance	RSS(on)1	IS=8.5A, VGS=4.5V	1.10	1.35	1.80	mΩ
	RSS(on)2	IS=8.5A, VGS=3.8V	1.20	1.50	2.00	
	RSS(on)3	IS=8.5A, VGS=3.1V	1.25	1.70	2.80	
	RSS(on)4	IS=8.5A, VGS=2.5V	1.50	2.30	4.50	
Body Diode Forward Voltage	VF(S-S)	IF=8.5A, VGS=0V		0.7	1.0	V
Input Capacitance *1	Ciss	VSS=10V, VGS=0V, f=1kHz		5,700		pF
Output Capacitance *1	Coss			760		
Reverse Transfer Capacitance *1	Crss			600		
Turn-On Delay Time *1 *2	td(on)	VDD=6V, VGS=0 to 4.0V, IS=8.5A		0.92		μs
Rise Time *1 *2	tr			1.61		
Turn-Off Delay Time *1 *2	td(off)	VDD=6V, VGS=4.0 to 0V, IS=8.5A		4.69		μs
Fall Time *1 *2	tf			3.34		
Total Gate Charge *1	Qg	VDD=6V, VGS=0 to 4.0V, IS=17.0A		48.8		nC
Gate-Source Charge *1	Qgs			10		
Gate-Drain Charge *1	Qgd			14.1		
Gate Resistance *1	Rg	f=1MHz		930		Ω

Note *1 Guaranteed by Design

Note *2 Measurement Circuit for Switching Characteristics

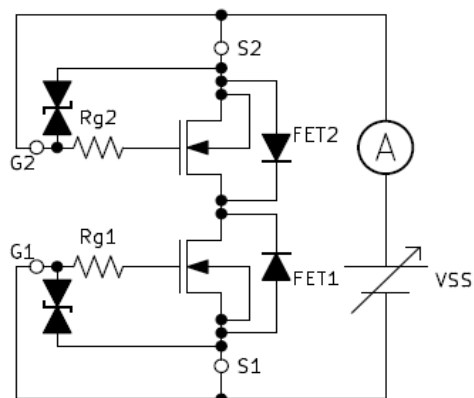
FET1 Measurement Circuit for Switching Characteristics td(on), tr, td(off), tf (FET2: Gate-Source Short)


(Definition of Switching Measurement Detection)

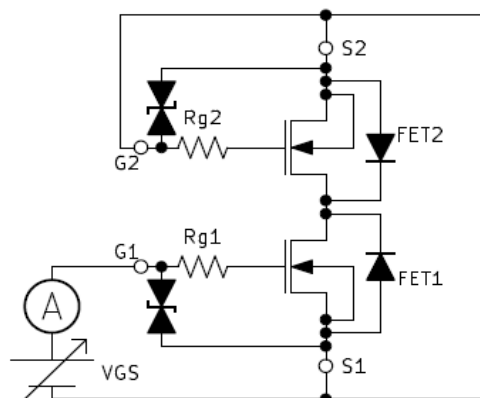


□ **Test circuits for FET1**

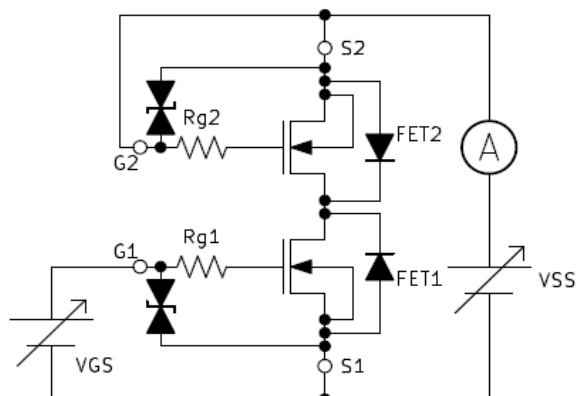
Test Circuit 1
 V_{SS}/I_{SS}



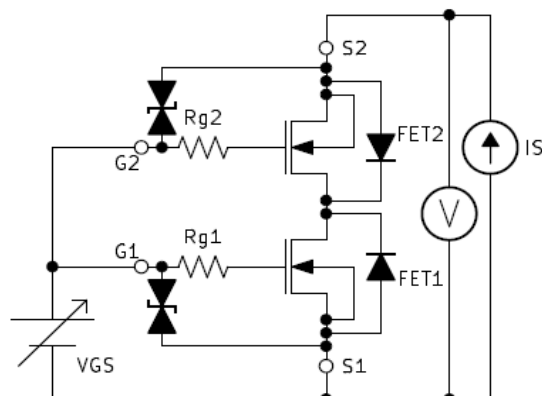
Test Circuit 2
 $I_{GSS1/2}$



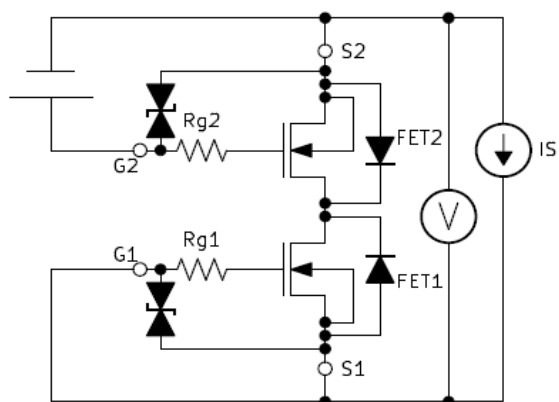
Test Circuit 3
 V_{th}



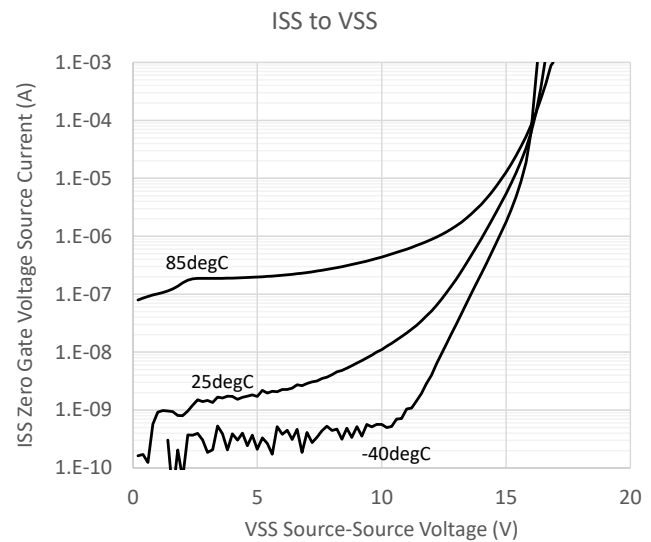
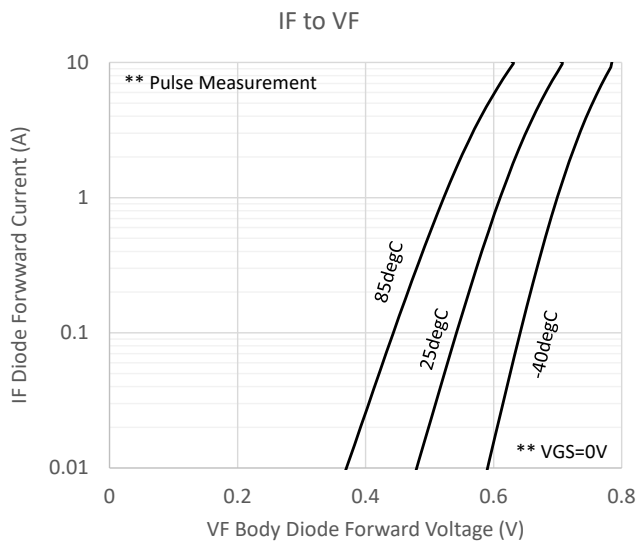
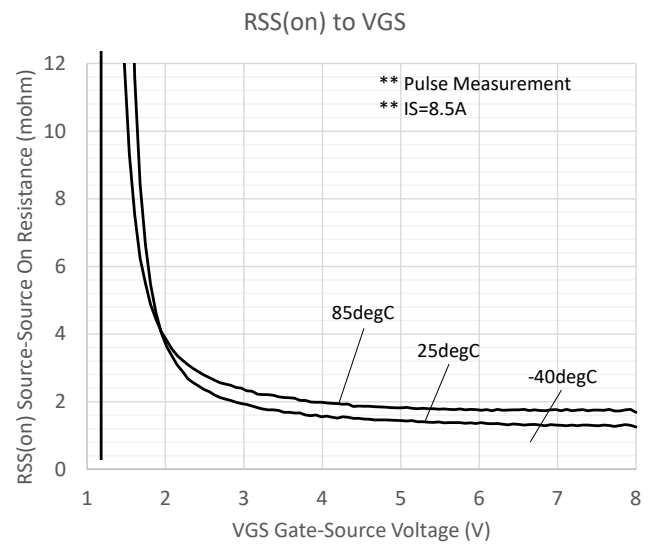
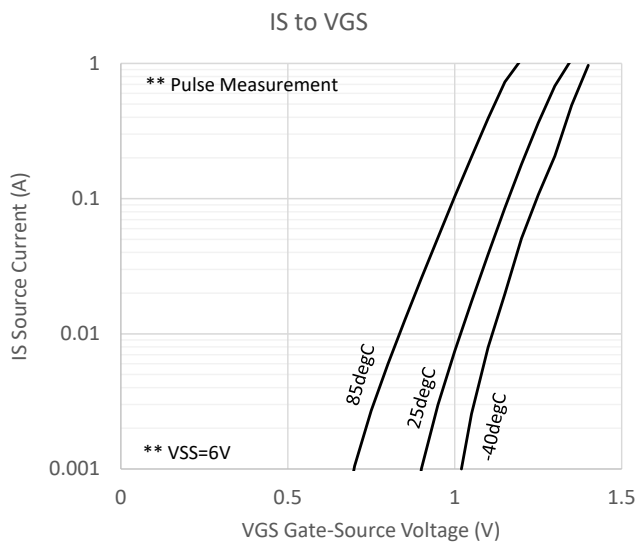
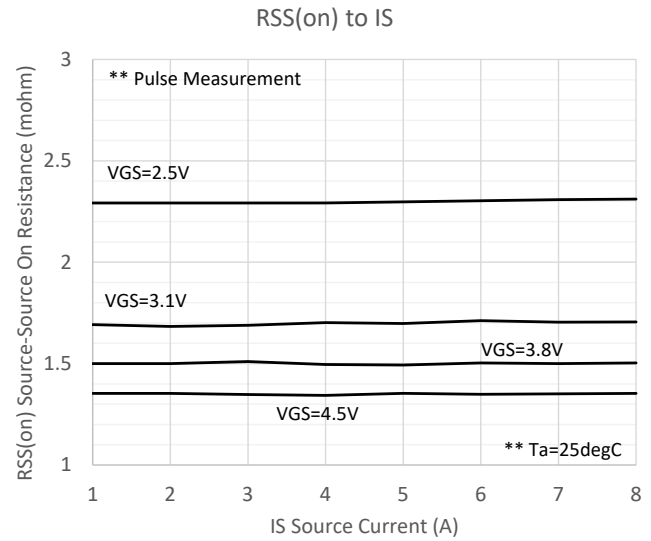
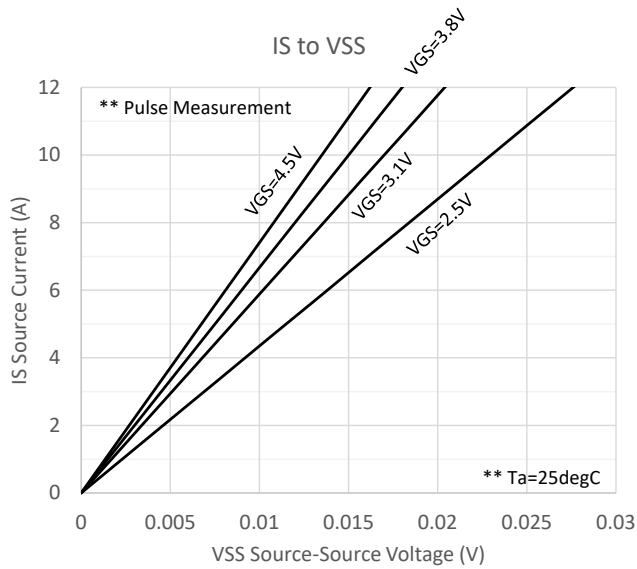
Test Circuit 4
 $R_{SS(on)}$



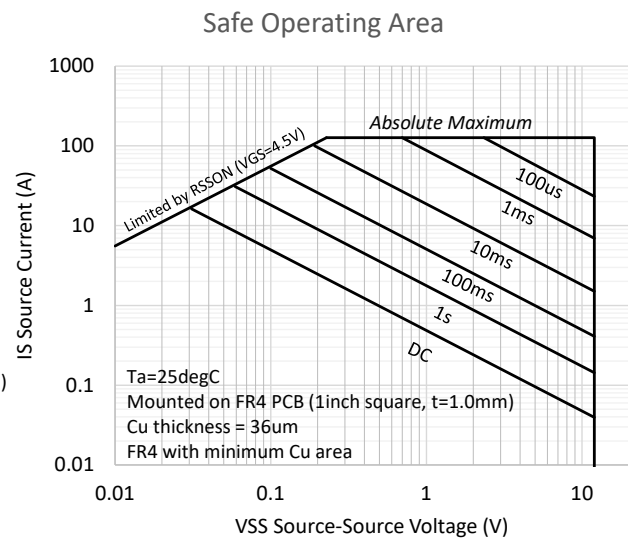
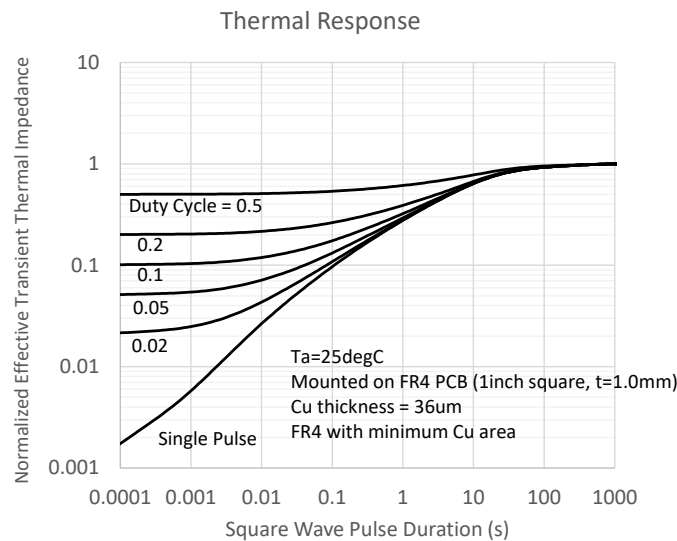
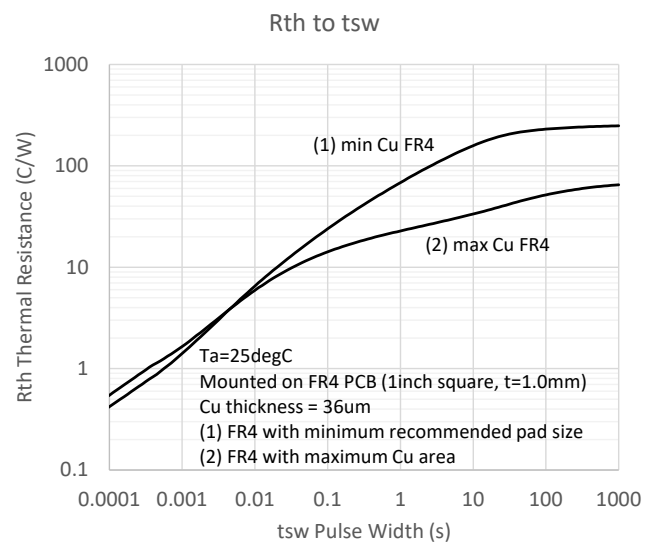
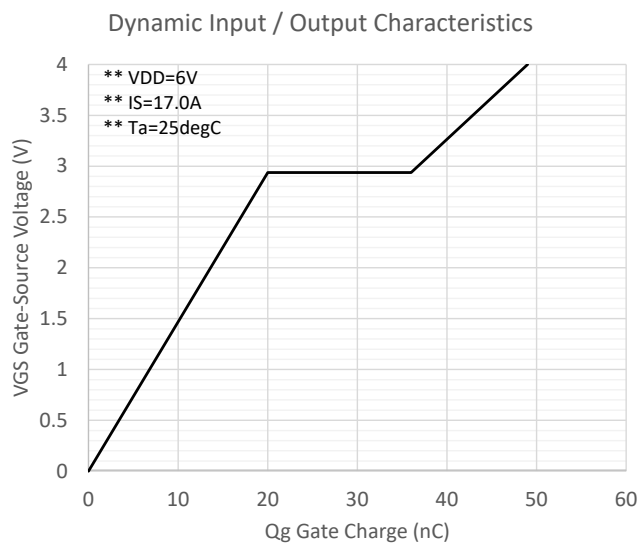
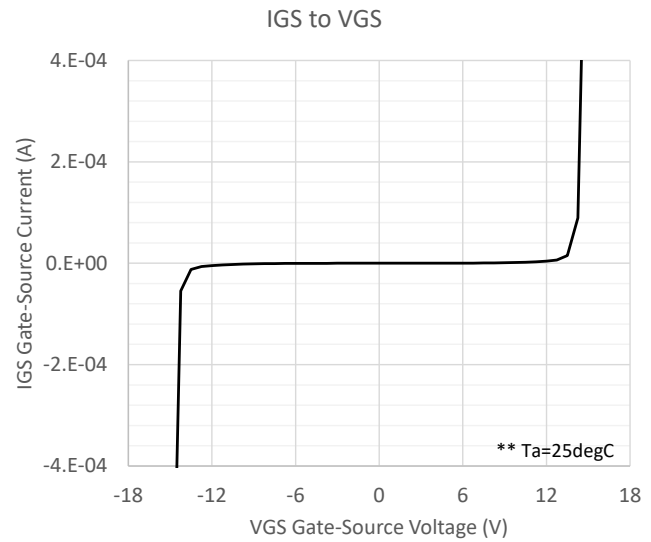
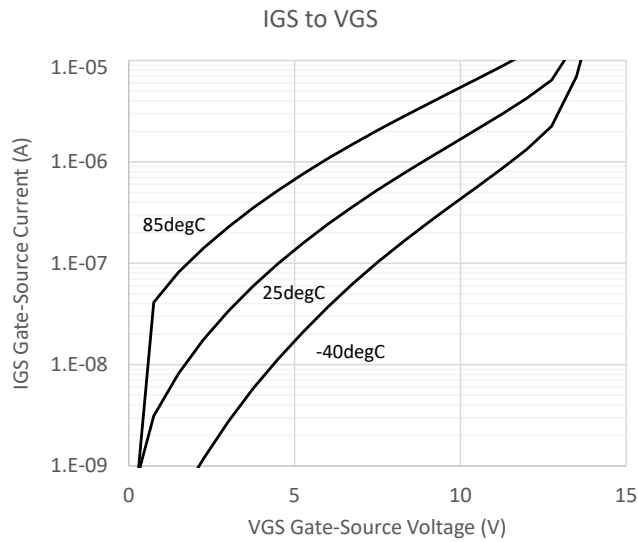
Test Circuit 5
 $V_F(S-S)$



□ Technical data

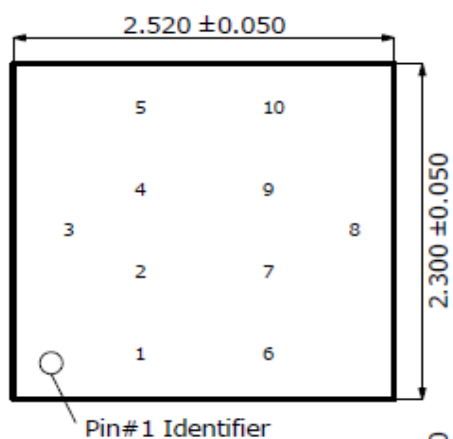
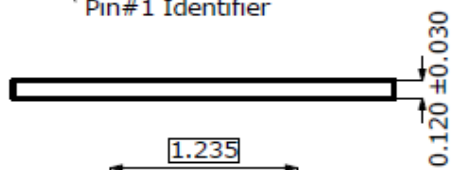
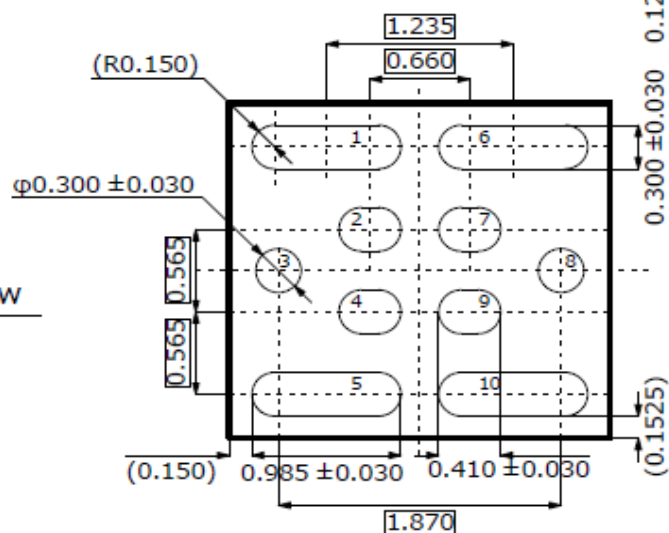
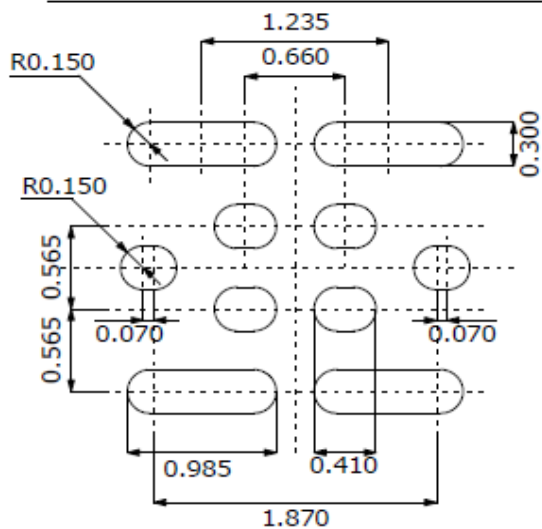
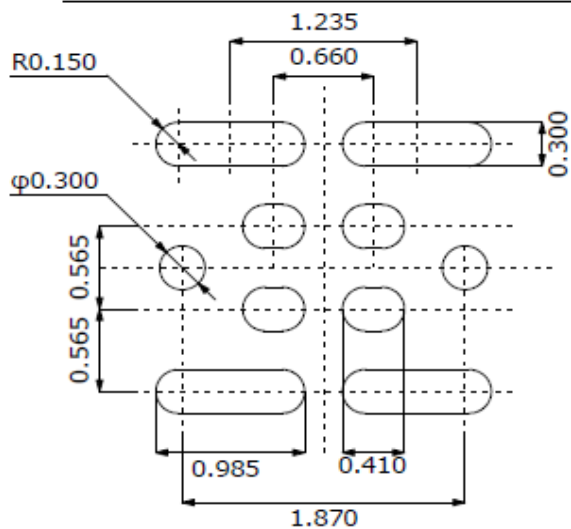


□ Technical data



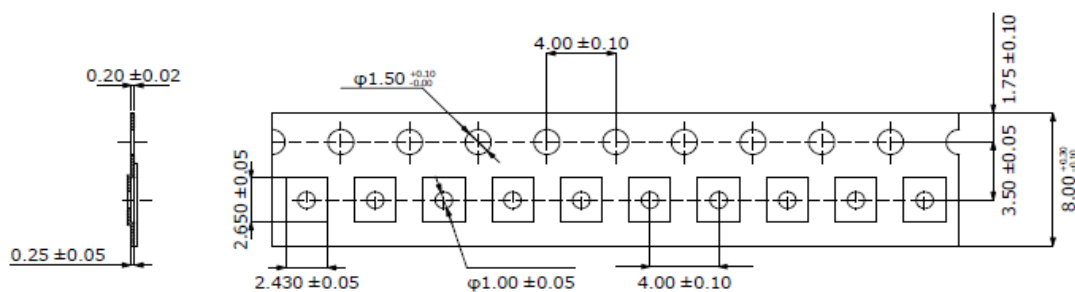
Package outline dimensions

Unit: mm

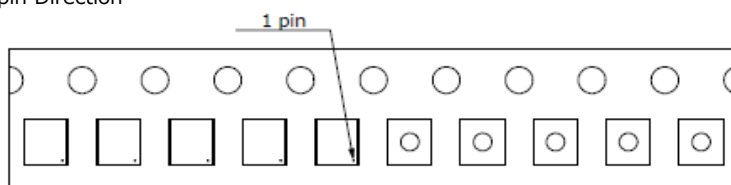
Top View

Front View

Bottom View

(Reference) Land Mask Pattern

(Reference) Stencil Mask Pattern


□ **Form**

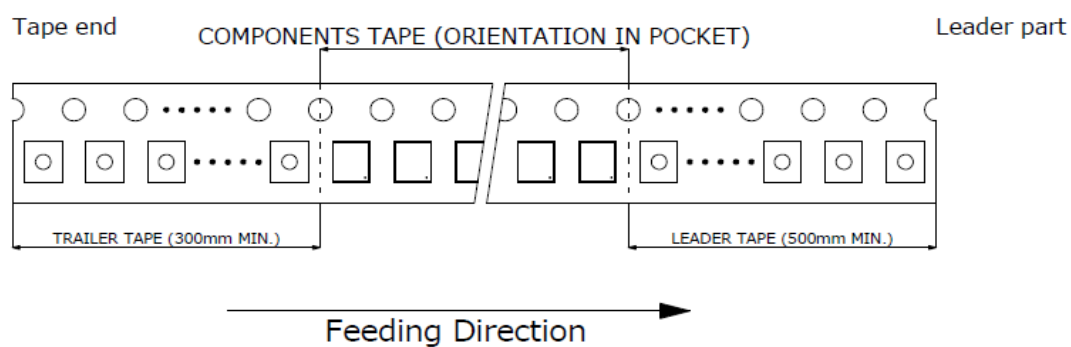
Tape & Reel Embossed Type: 8,000pcs / reel
Tape Width: 8mm, Pitch: 4mm, Reel Size: 7inch



1pin Direction



Tape end ~ Leader part (mm)



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