

## 30V Dual N-Channel MOSFET

### Features

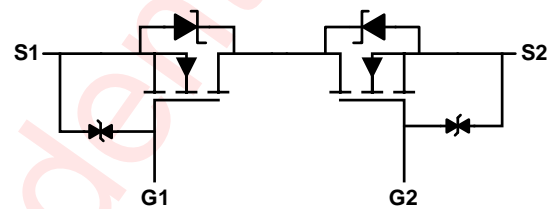
- Low source-source on resistance:
- $R_{SS(ON)}$  Typ.= 7.0mΩ ( $V_{GS}= 10V$ )
- Common-Drain type
- ESD Diode-Protected Gate
- 2kV ESD HBM
- Pb-Free, Halogen Free and RoHS compliance Applications
- WLCSP 3.37mmX1.47mmX0.205mm-10L

### Applications

- Battery protection switch
- Mobile device battery charging and discharging
- USB Type-C/PD

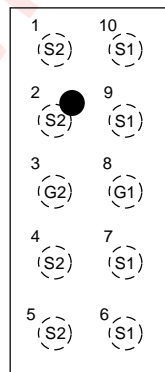
### General Description

$V_{SS}$	$R_{SS(ON)}$ Typ.
30V	7.0 mΩ @ $V_{GS}= 10V$
	10.0 mΩ @ $V_{GS}= 4.5V$

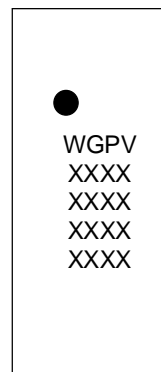


### Pin Configuration and Top Mark

AW403010QCSR  
(Top View)



AW403010QCSR Marking  
(Top View)



WGPV---AW403010QCSR  
XXXX/XXXX/XXXX/XXXX---Production Tracing Code

## Ordering Information

Part Number	Package	Marking	Moisture Sensitivity Level	Environmental Information	Delivery Form
AW403010QCSR	WLCSP 3.37mmX1.47mm X0.205mm-10L	WGPV	MSL1	RoHS+HF	9000 units/ Tape and Reel

## Absolute Maximum Ratings <sup>(NOTE 1)</sup>

T<sub>A</sub>= 25°C unless otherwise noted

Symbol	Parameter	Maximum	Unit
V <sub>SS</sub>	Source-Source Voltage	30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>S</sub>	Source Current (DC) <sup>(NOTE 2)</sup>	13	A
I <sub>SM</sub>	Source Current (Pulse) <sup>(NOTE 3)</sup>	72	A
P <sub>D</sub>	Power Dissipation <sup>(NOTE 2)</sup>	2.4	W
T <sub>J</sub>	Operating Junction Temperature	-55 to 150	°C
T <sub>STG</sub>	Storage Temperature	-55 to 150	°C
V <sub>ESD</sub>	Human Body Model <sup>(NOTE 5)</sup>	±2	kV

## Thermal Information

Symbol	Parameter	Condition	Value	Unit
R <sub>θJA</sub>	Maximum Junction to Ambient <sup>(NOTE 2,4)</sup>	Steady-State	52.4	°C/W

NOTE1: Conditions out of those ranges listed in "absolute maximum ratings" may cause permanent damages to the device. In spite of the limits above, functional operation conditions of the device should within the ranges listed in "recommended operating conditions". Exposure to absolute-maximum-rated conditions for prolonged periods may affect device reliability.

NOTE2: Mounted on FR-4 material with 1inch<sup>2</sup>, 2oz. Copper.

NOTE3: PW < 10μs pulses, duty cycle 1% max.

NOTE4: Thermal resistance from junction to ambient is highly dependent on PCB layout.

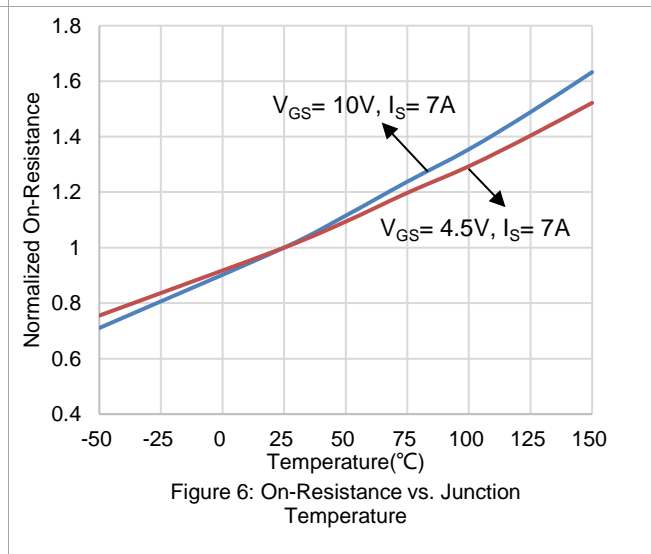
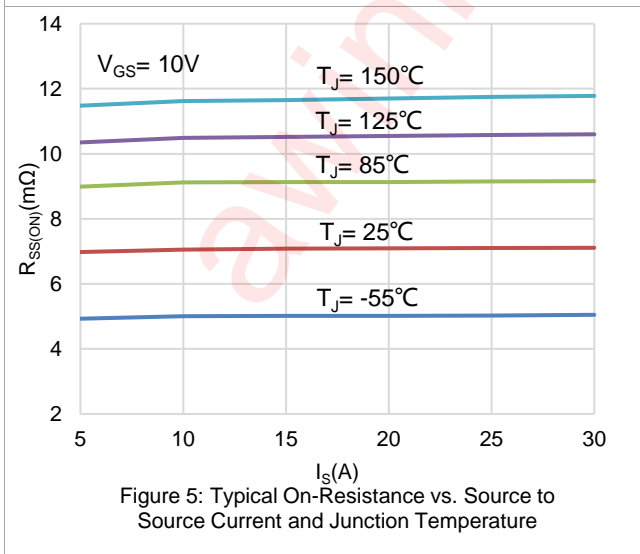
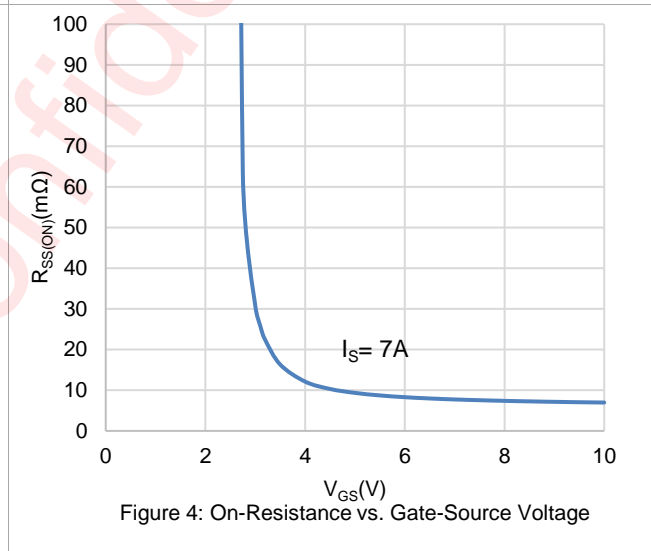
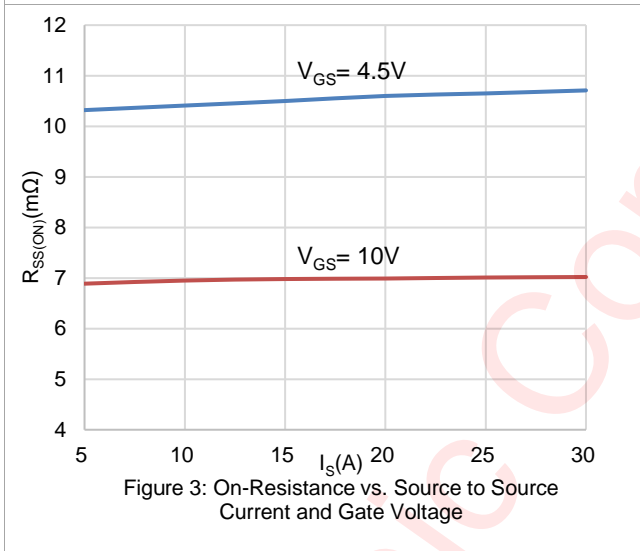
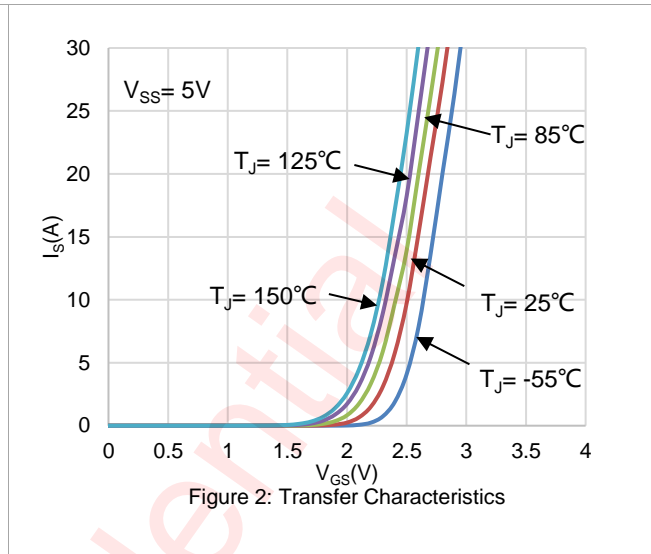
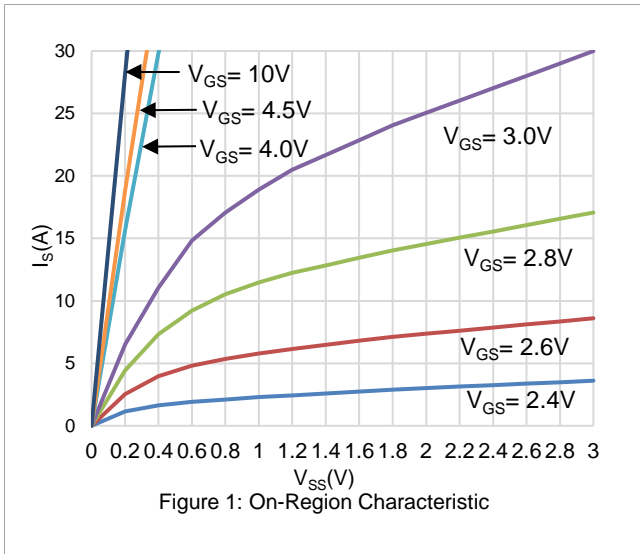
NOTE5: HBM Standards: ESDA/JEDEC JS-001-2017.

## Electrical Characteristics

T<sub>J</sub>= 25°C for typical values (unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
<b>STATIC PARAMETERS</b>						
BV <sub>SSS</sub>	Source - Source Breakdown Voltage	I <sub>S</sub> = 250μA, V <sub>GS</sub> = 0V	30	-	-	V
I <sub>SSS</sub>	Zero Gate Voltage Source Current	V <sub>SS</sub> = 24V, V <sub>GS</sub> = 0V	-	-	1	μA
I <sub>GSS</sub>	Gate Leakage Current	V <sub>SS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±10	μA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>SS</sub> = V <sub>GS</sub> , I <sub>S</sub> = 250μA	1.3	1.6	2.3	V
R <sub>SS(ON)</sub>	Static Source to Source On-Resistance	V <sub>GS</sub> = 10V, I <sub>S</sub> = 7A	-	7.0	8.5	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>S</sub> = 7A	-	10.0	12.0	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>SS</sub> =3V, I <sub>S</sub> = 7A	-	24	-	S
V <sub>FSS</sub>	Forward Source to Source Voltage	I <sub>S</sub> = 7A, V <sub>GS</sub> = 0V	-	0.8	-	V
<b>DYNAMIC PARAMETERS</b>						
R <sub>g</sub>	Series Gate Resistance	f= 1MHz	-	650	-	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V, V <sub>SS</sub> = 15V, f= 1MHz	-	840	-	pF
C <sub>oss</sub>	Output Capacitance		-	177	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	48	-	pF
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 10V, V <sub>SS</sub> = 15V, I <sub>S</sub> = 7A	-	33.4	-	nC
Q <sub>gs</sub>	Gate Source Charge		-	4.8	-	nC
Q <sub>gd</sub>	Gate Drain Charge		-	6.9	-	nC
Q <sub>g(th)</sub>	Gate Charge at V <sub>GS(TH)</sub>		-	2.7	-	nC
t <sub>d(on)</sub>	Turn - On Delay Time	V <sub>GS</sub> = 10V, V <sub>SS</sub> = 15V, R <sub>L</sub> = 2.1Ω, I <sub>S</sub> = 7A	-	255	-	ns
t <sub>r</sub>	Turn - On Rise Time		-	587	-	ns
t <sub>d(off)</sub>	Turn - Off Delay Time		-	2886	-	ns
t <sub>f</sub>	Turn - Off Fall Time		-	1864	-	ns

## Typical Electrical and Thermal Characteristics



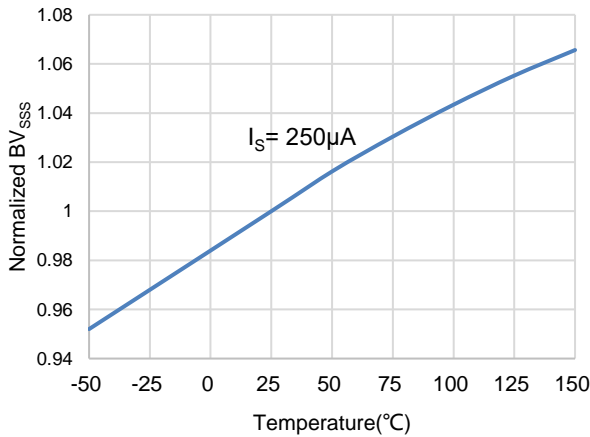


Figure 7: Source to Source Breakdown Voltage vs. Junction Temperature

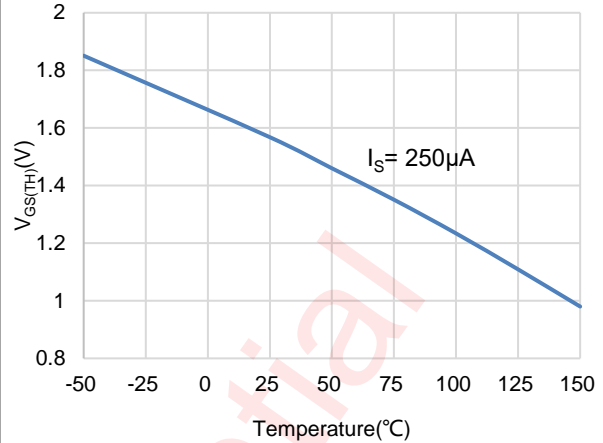


Figure 8: Gate Threshold Variation vs. Junction Temperature

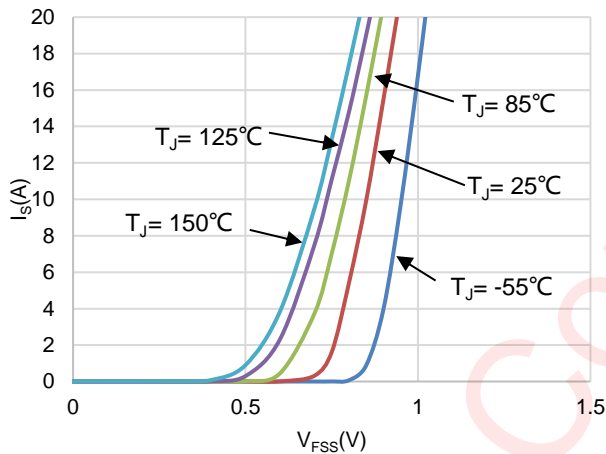


Figure 9: Diode Forward Voltage vs. Current and Junction Temperature

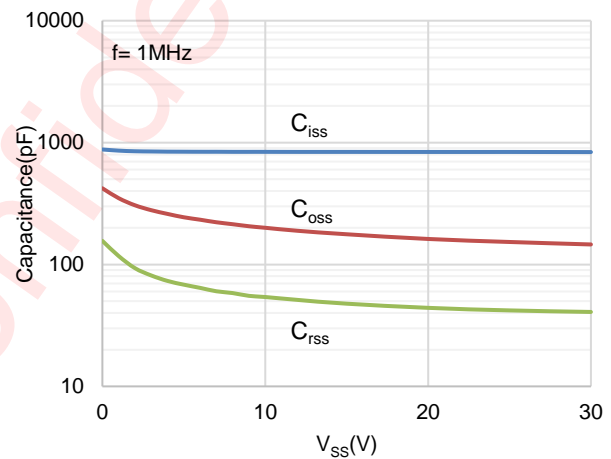


Figure 10: Typical Junction Capacitance

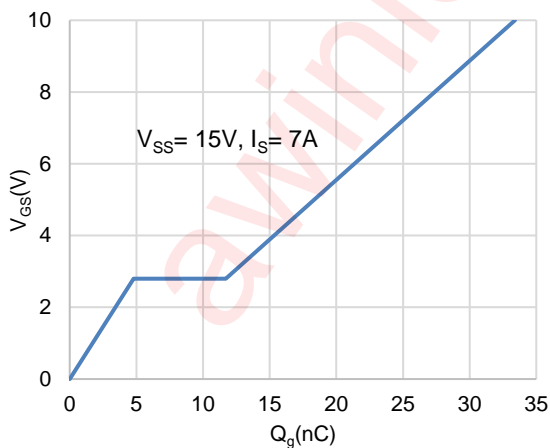


Figure 11: Gate Charge

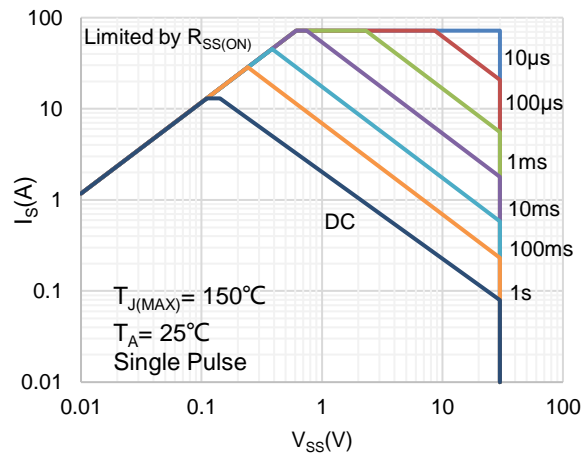
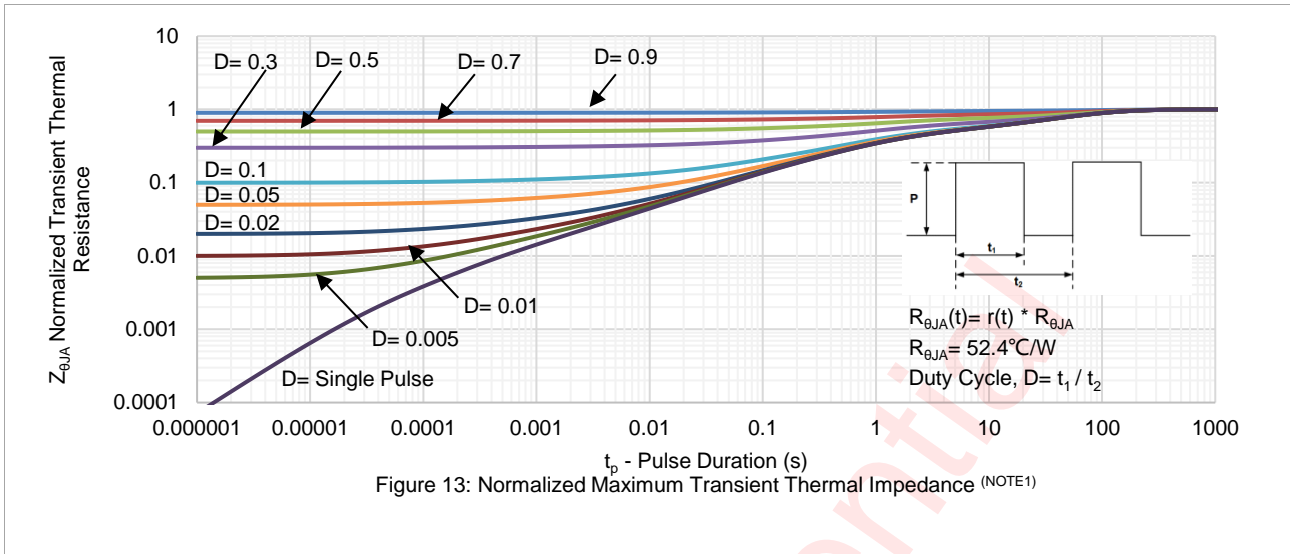
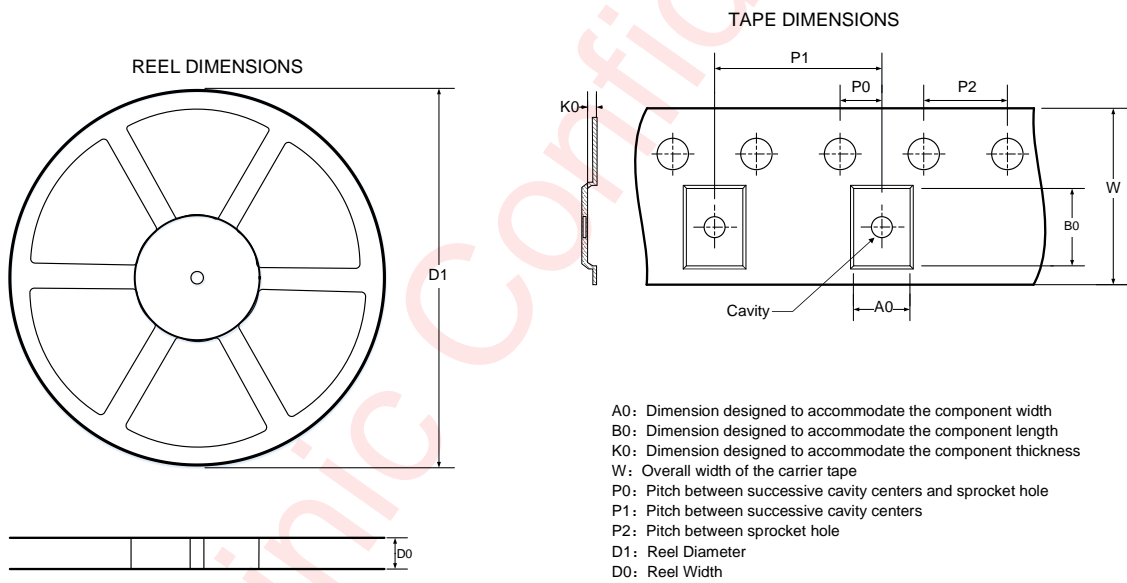


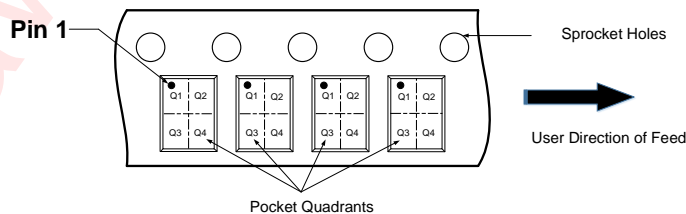
Figure 12: Maximum Safe Operating Area



### Tape And Reel Information



#### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



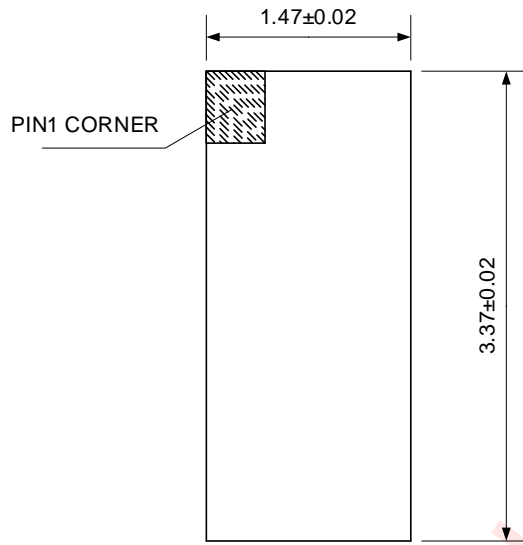
Note: The above picture is for reference only. Please refer to the value in the table below for the actual size

#### DIMENSIONS AND PIN1 ORIENTATION

D1 (mm)	D0 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
330	12.4	1.78	3.59	0.54	2	8	4	12	Q1

All dimensions are nominal

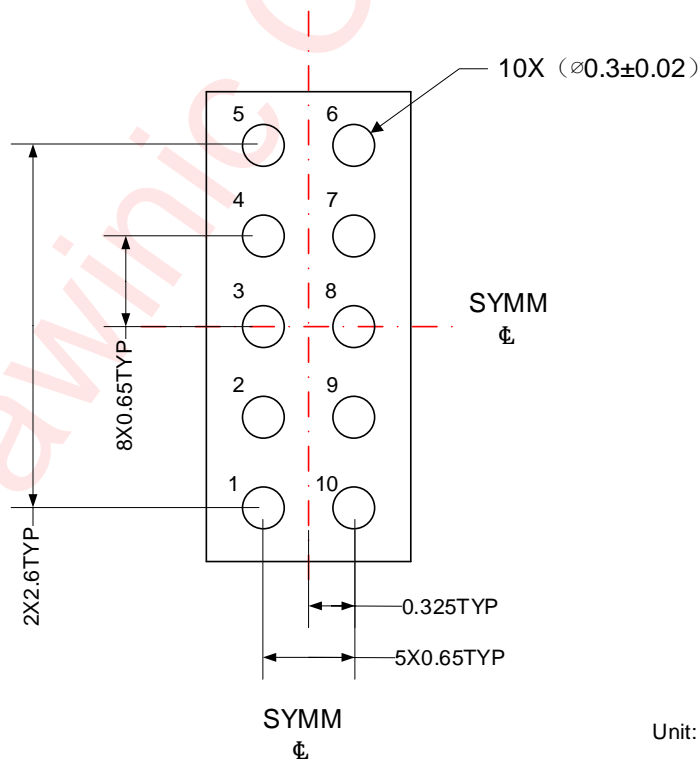
Package Description



Top View



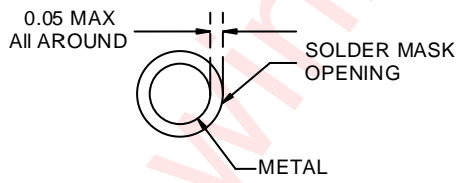
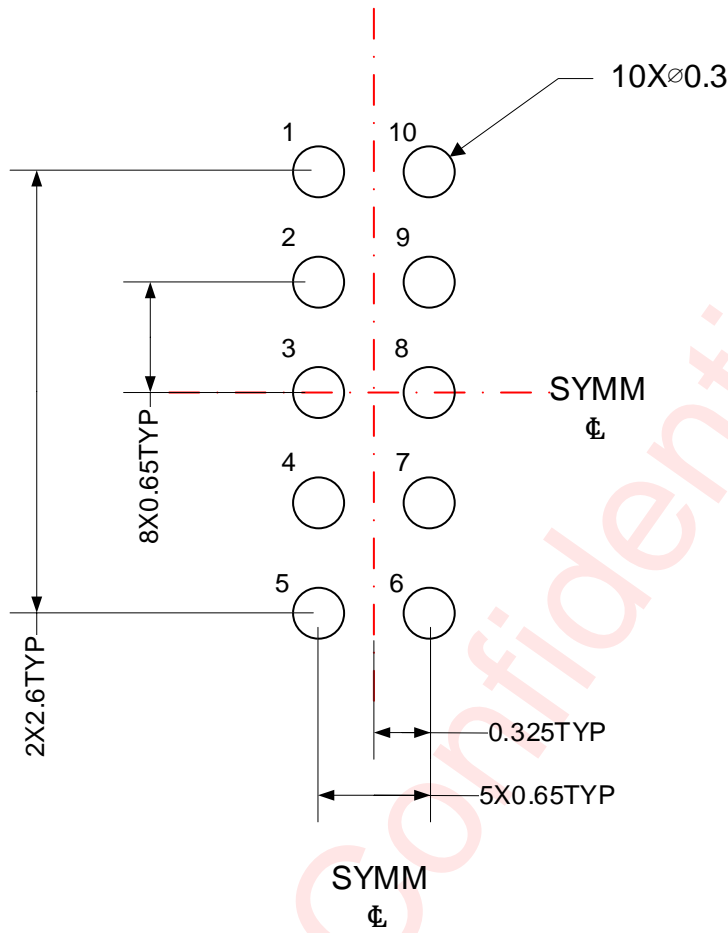
Side View



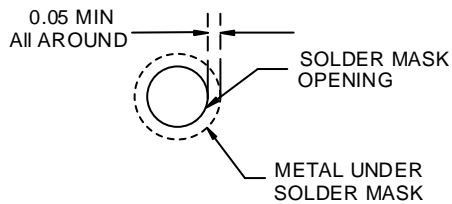
Bottom View

Unit: mm

Land Pattern Data



NON SOLDER MASK DEFINED



SOLDER MASK DEFINED

Unit: mm

## Revision History

Version	Date	Change Record
V1.0	Feb. 2023	Officially released
V1.1	Feb. 2023	Updated the value of A0/B0/K0 in Tape And Reel Information. (P6)
V1.2	Mar. 2023	Updated the value of V <sub>ss</sub> in Switching Parameters Condition. (P3)
V1.3	May. 2023	Updated Tape And Reel Information. (P6)

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