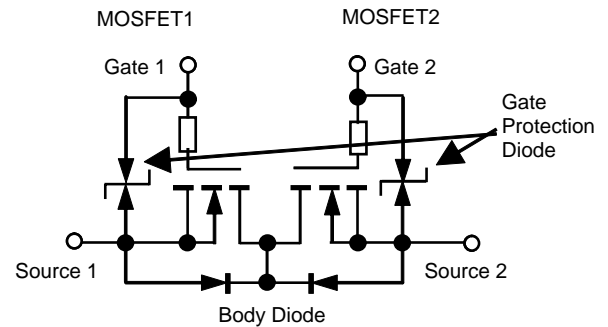
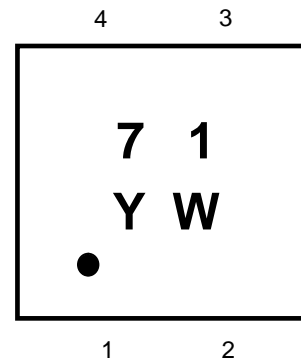


WNMD2171
Dual N-Channel, 20V, 6A, Power MOSFET
www.sh-willsemi.com

V_{SSS} (V)	Typ $R_{SS(on)}$ (m Ω)
20	36 @ $V_{GS}=4.5V$
	38 @ $V_{GS}=3.8V$
	41 @ $V_{GS}=3.1V$
	43 @ $V_{GS}=2.5V$
ESD Rating:2000V HBM	


CSP 4L

Descriptions

The WNMD2171 is Dual N-Channel enhancement MOS Field Effect Transistor and connecting the Drains on the circuit board is not required because the Drains of the MOSFET1 and the MOSFET2 are internally connected. Uses advanced trench technology and design to provide excellent $R_{SS(ON)}$ with low gate charge. This device is designed for Lithium-Ion battery protection circuit. The WNMD2171 is available in CSP-4L package. Standard Product WNMD2171 is Pb-free and Halogen-free.

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package CSP 4L

- 1: Source 1 71 = Device Code
- 2: Gate 1 Y = Year
- 3: Gate 2 W = Week (A~z)
- 4: Source 2

Pin configuration (TOP view) & Marking
Order information

Device	Package	Shipping
WNMD2171-4/TR	CSP 4L	3000/Reel&Tape

Applications

- Lithium-Ion battery protection circuit

Electronics Characteristics (Ta=25°C, unless otherwise noted)

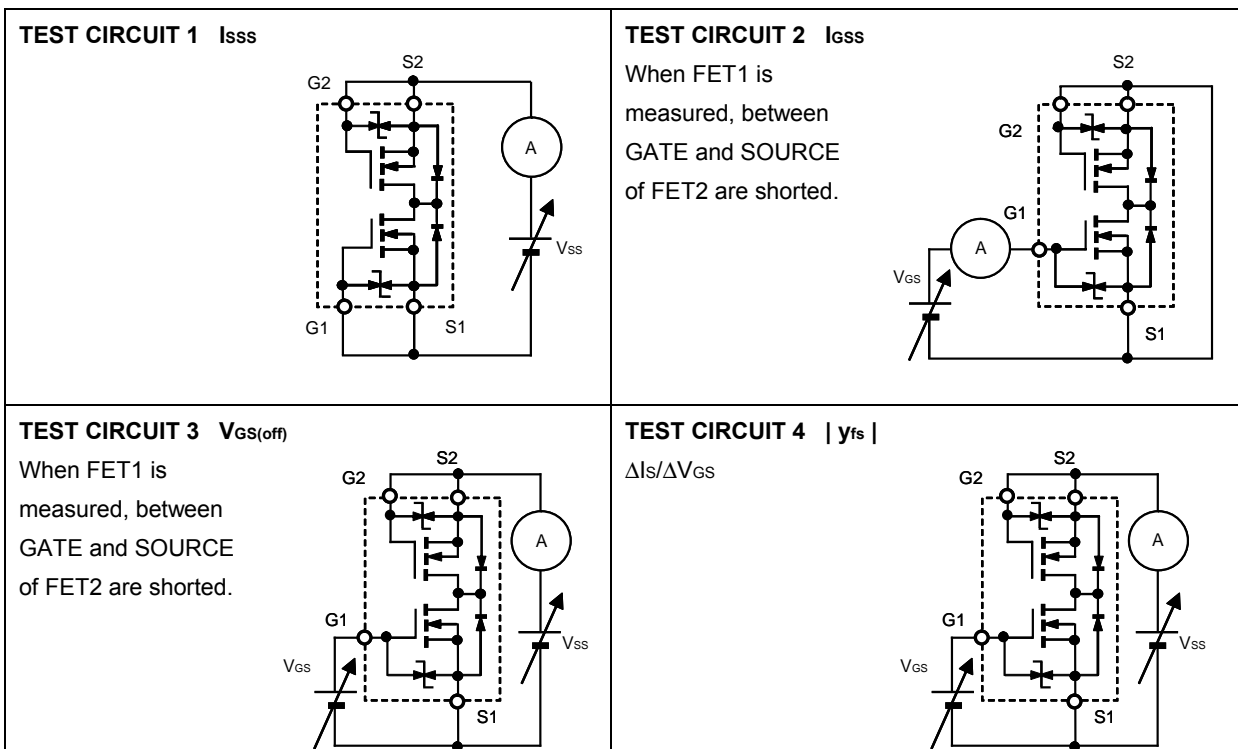
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Source to Source Voltage	V _{SSS}	V _{GS} = 0 V, I _S = 250uA	20			V
Zero Gate Voltage Drain Current	I _{SSS}	V _{SS} = 16 V, V _{GS} = 0V TEST CIRCUIT 1			1	uA
Gate Leakage Current	I _{GSS}	V _{SS} = 0 V, V _{GS} = ±12V TEST CIRCUIT 2			±10	uA
ON CHARACTERISTICS						
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{GS} = V _{SS} , I _S = 250uA TEST CIRCUIT 3	0.4	0.74	1.0	V
Source to Source On-state Resistance	R _{SS(on)}	V _{GS} = 4.5V, I _S = 3.0A TEST CIRCUIT 5	17	36	45	mΩ
		V _{GS} = 3.8V, I _S = 3.0A TEST CIRCUIT 5	18	38	47	
		V _{GS} = 3.1V, I _S = 3.0A TEST CIRCUIT 5	19	41	54	
		V _{GS} = 2.5V, I _S = 3.0A TEST CIRCUIT 5	21	43	65	
Forward Transfer Admittance	y _{fs}	V _{SS} = 10 V, I _S = 1.8A TEST CIRCUIT 4		11		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1kHz, V _{SS} = 10 V TEST CIRCUIT 7		1210		pF
Output Capacitance	C _{OSS}			149		
Reverse Transfer Capacitance	C _{RSS}			135		
Total Gate Charge	Q _{G(TOT)}	V _{G1S1} = 4.5 V, V _{SS} = 10V, I _S = 6A TEST CIRCUIT 9		15.6		nC
Threshold Gate Charge	Q _{G(TH)}			1.15		
Gate-to-Source Charge	Q _{GS}			2.8		
Gate-to-Drain Charge	Q _{GD}			3.8		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} = 4.5 V, V _{SS} = 10V, I _S = 5.0A, R _G = 6Ω TEST CIRCUIT 8		410		ns
Rise Time	t _r			1200		
Turn-Off Delay Time	t _{d(OFF)}			6100		
Fall Time	t _f			3500		
BODY DIODE CHARACTERISTICS						
Body Diode Forward Voltage	V _{F(S-S)}	V _{GS} = 0 V, I _F = 1.0A TEST CIRCUIT 6			1.5	V

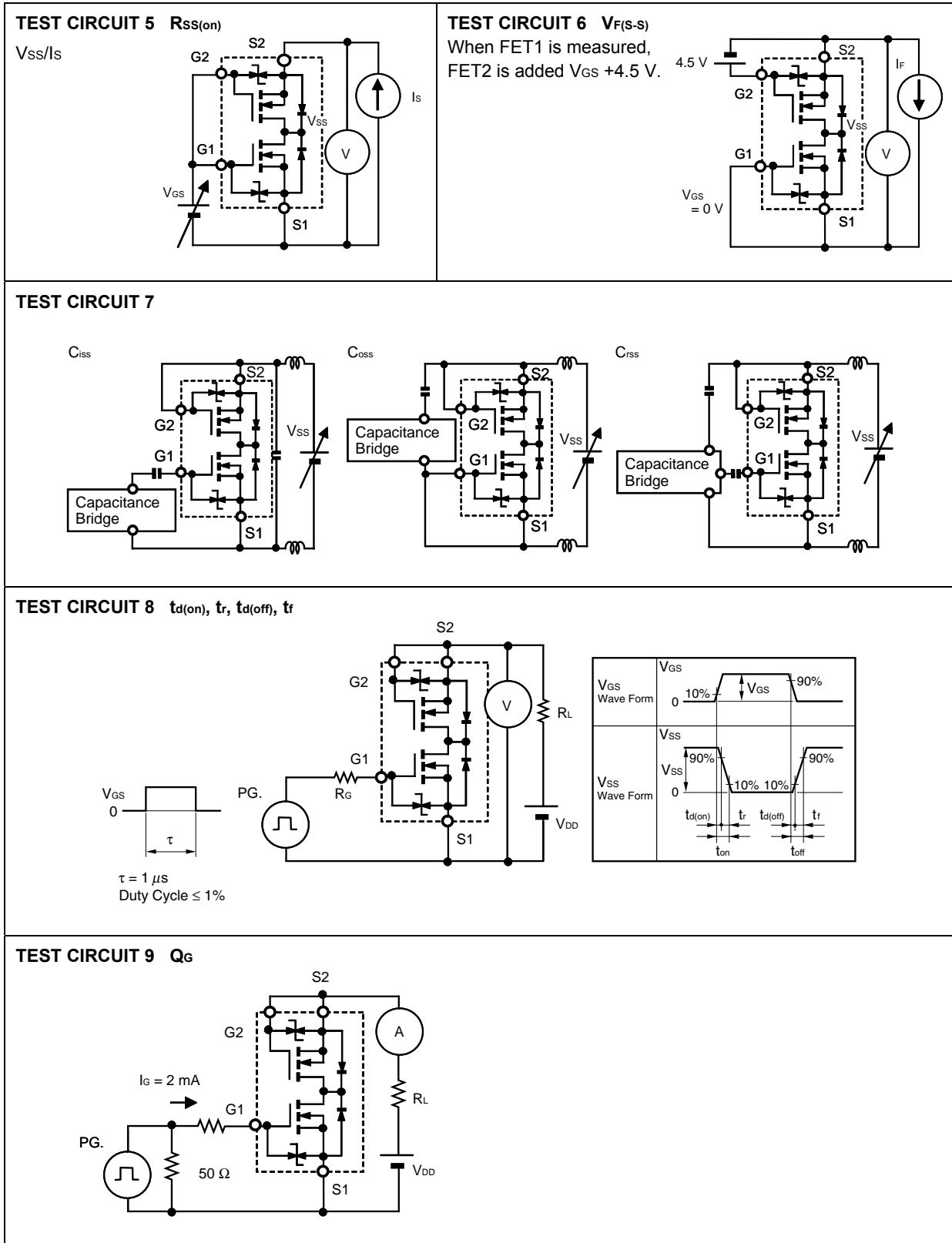
Absolute Maximum ratings

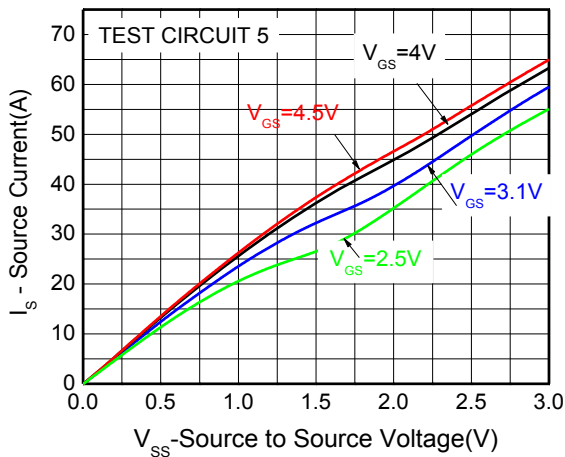
Parameter	Symbol	10 s	Steady State	Unit
Source to Source Voltage ($V_{GS} = 0\text{ V}$)	V_{SSS}	20		V
Gate to Source Voltage ($V_{SS} = 0\text{ V}$)	V_{GSS}	± 12		
Source Current (pulse) ^{Note.c}	$I_{S(\text{pulse})}$	60		A
Source Current (DC)	I_S	6		A
Channel Temperature	T_{ch}	150		$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-55 to 150		$^{\circ}\text{C}$

Note.c $PW \leq 10\mu\text{s}$, duty cycle $\leq 1\%$;

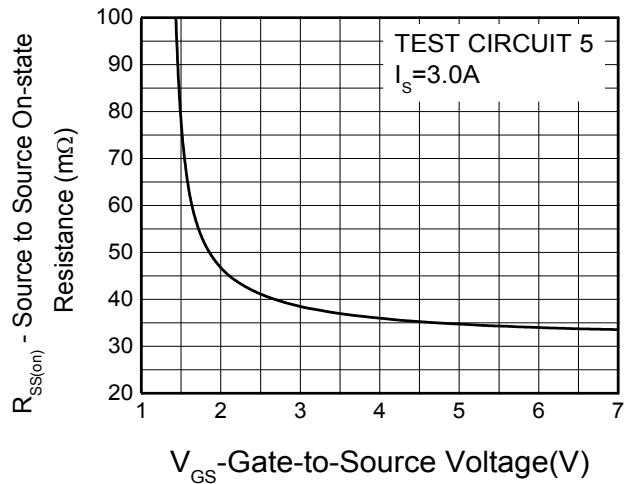
Both the FET1 and the FET2 are measured. Test circuits are example of measuring the FET1 side.



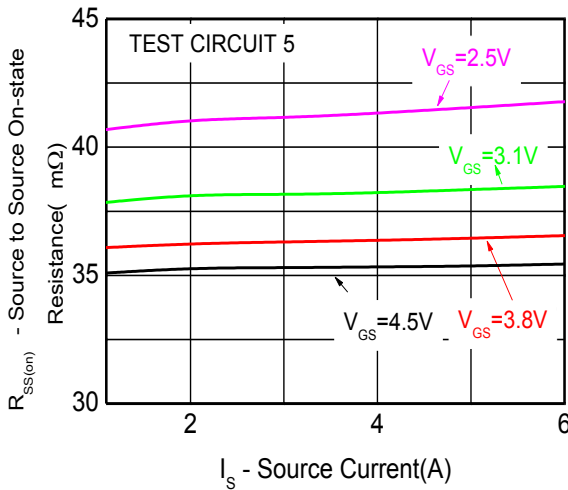


Typical Characteristics (Ta=25°C, unless otherwise noted)


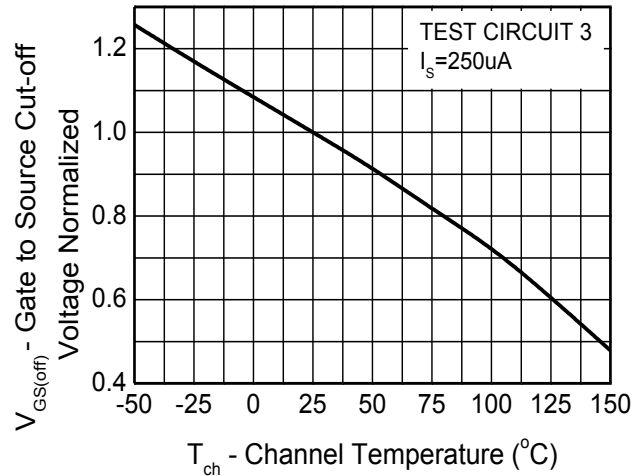
**SOURCE CURRENT vs.
SOURCE TO SOURCE VOLTAGE**



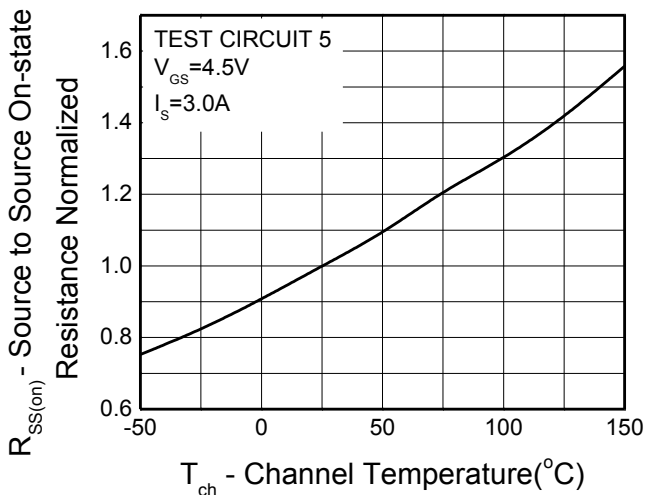
**SOURCE TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE**



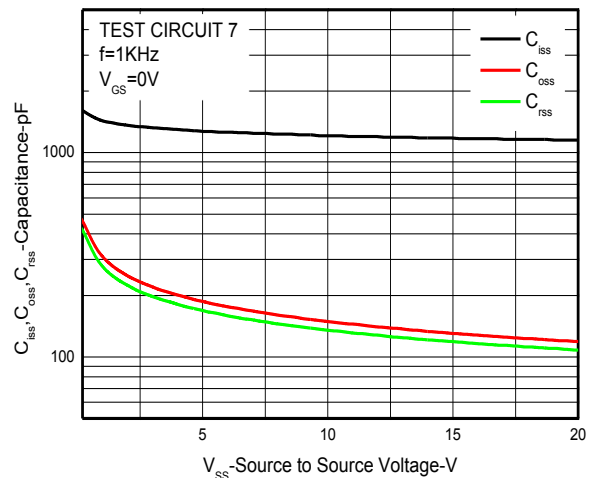
**SOURCE TO SOURCE ON-STATE RESISTANCE vs.
SOURCE CURRENT**



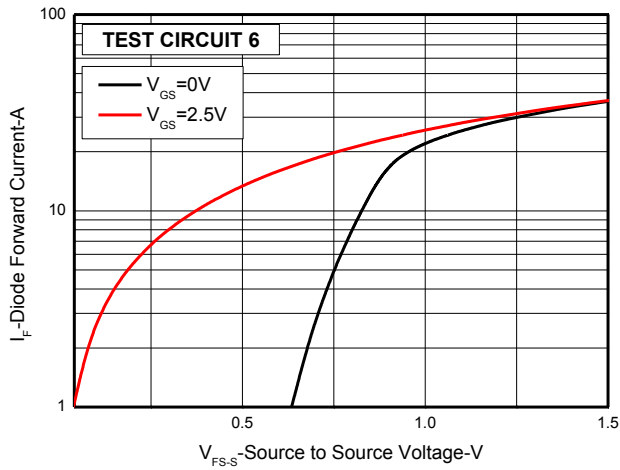
**GATE TO SOURCE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE**



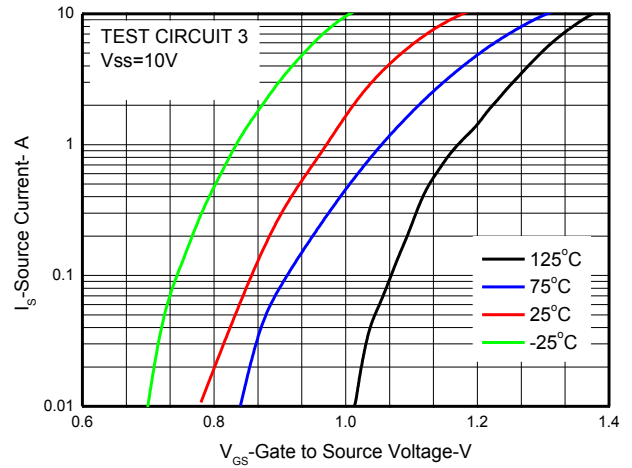
**SOURCE TO SOURCE ON-STATE RESISTANCE vs.
CHANNEL TEMPERATURE**



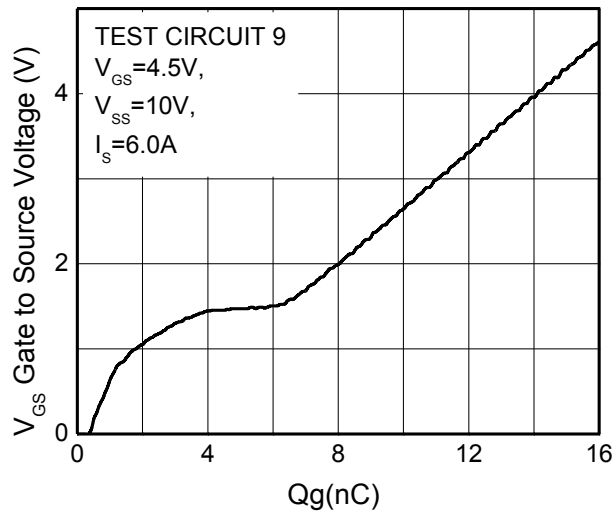
CAPACITANCE vs. SOURCE TO SOURCE VOLTAGE



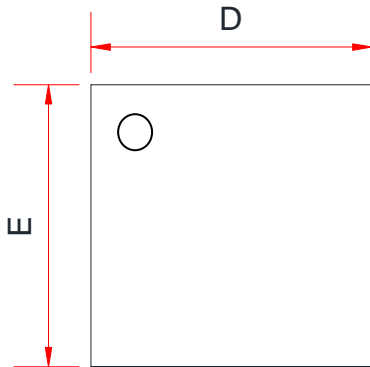
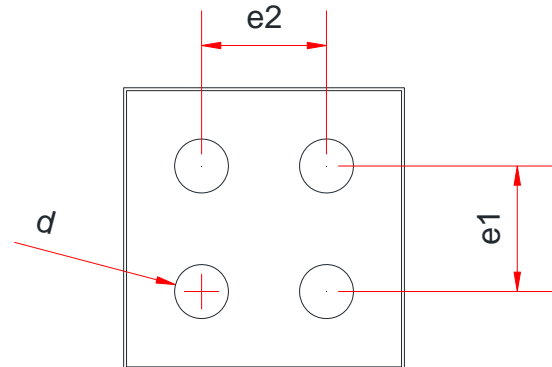
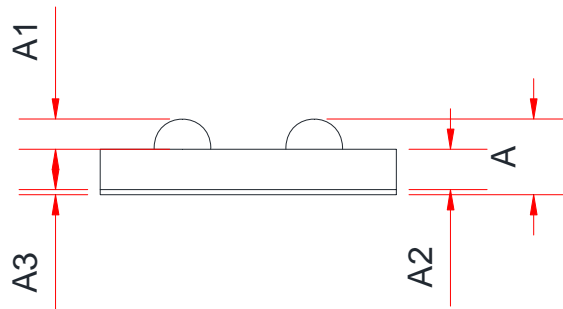
SOURCE TO SOURCE DIODE FORWARD VOLTAGE



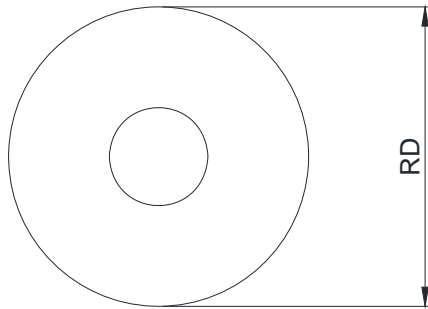
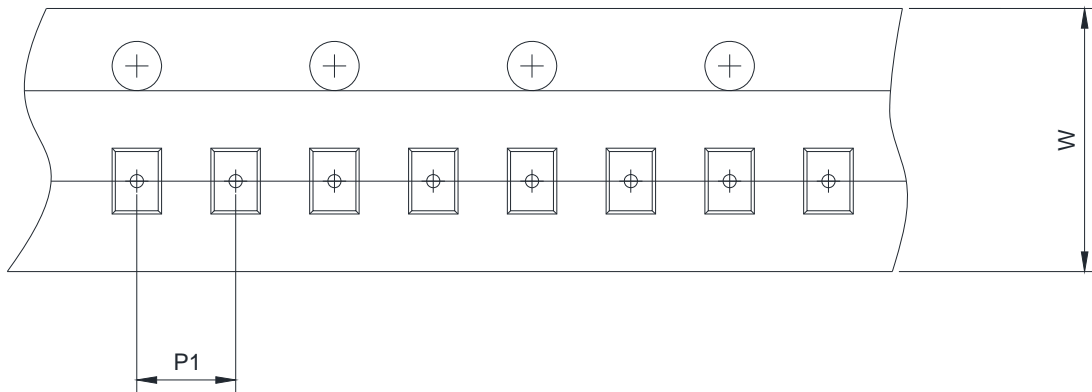
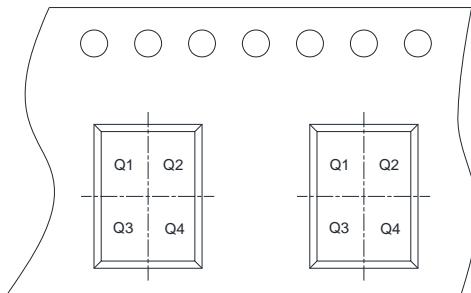
FORWARD TRANSFER CHARACTERISTICS



DYNAMIC INPUT CHARACTERISTICS

PACKAGE OUTLINE DIMENSIONS
WLCSP-4L

TOP VIEW

BOTTOM VIEW

SIDE VIEW

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.282	0.315	0.348
A1	0.075	0.090	0.105
A2	0.187	0.200	0.213
A3	0.020	0.025	0.030
D	1.450	1.470	1.490
E	1.450	1.470	1.490
e1	0.650 Typ.		
e2	0.650 Typ.		
d	0.280	0.300	0.320

TAPE AND REEL INFORMATION
Reel Dimensions

Tape Dimensions

Quadrant Assignments For PIN1 Orientation In Tape



 User Direction of Feed

RD	Reel Dimension	<input checked="" type="checkbox"/> 7inch	<input type="checkbox"/> 13inch
W	Overall width of the carrier tape	<input checked="" type="checkbox"/> 8mm	<input type="checkbox"/> 12mm <input type="checkbox"/> 16mm
P1	Pitch between successive cavity centers	<input type="checkbox"/> 2mm	<input checked="" type="checkbox"/> 4mm <input type="checkbox"/> 8mm
Pin1	Pin1 Quadrant	<input checked="" type="checkbox"/> Q1	<input type="checkbox"/> Q2 <input type="checkbox"/> Q3 <input type="checkbox"/> Q4