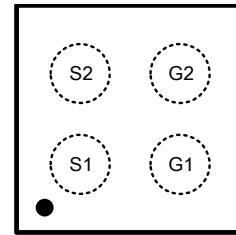


WNMD2171

Dual N-Channel, 20V, 6.0A, Power MOSFET

[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

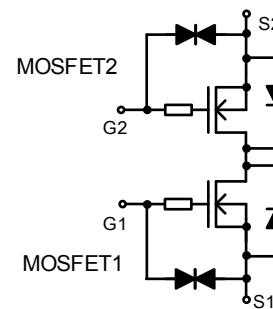
V _{SSS} (V)	Typ R _{SS(ON)} (mΩ)
20	38@ V _{GS} =4.5V
	39@ V _{GS} =4.0V
	42@ V _{GS} =3.1V
	46@ V _{GS} =2.5V
ESD Rating:2000V HBM	



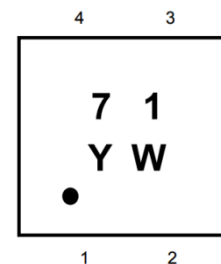
CSP-4L(Top view)

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.



Pin configuration



- 1: Source1 71 = Device Code
- 2: Gate1 Y = Year
- 3: Gate2 W = Week(A~z)
- 4: Source2

Marking

Order information

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

Features

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

Applications

- Lithium-Ion battery protection circuit

Absolute Maximum ratings

Parameter	Symbol	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	$^{\circ}\text{C}$

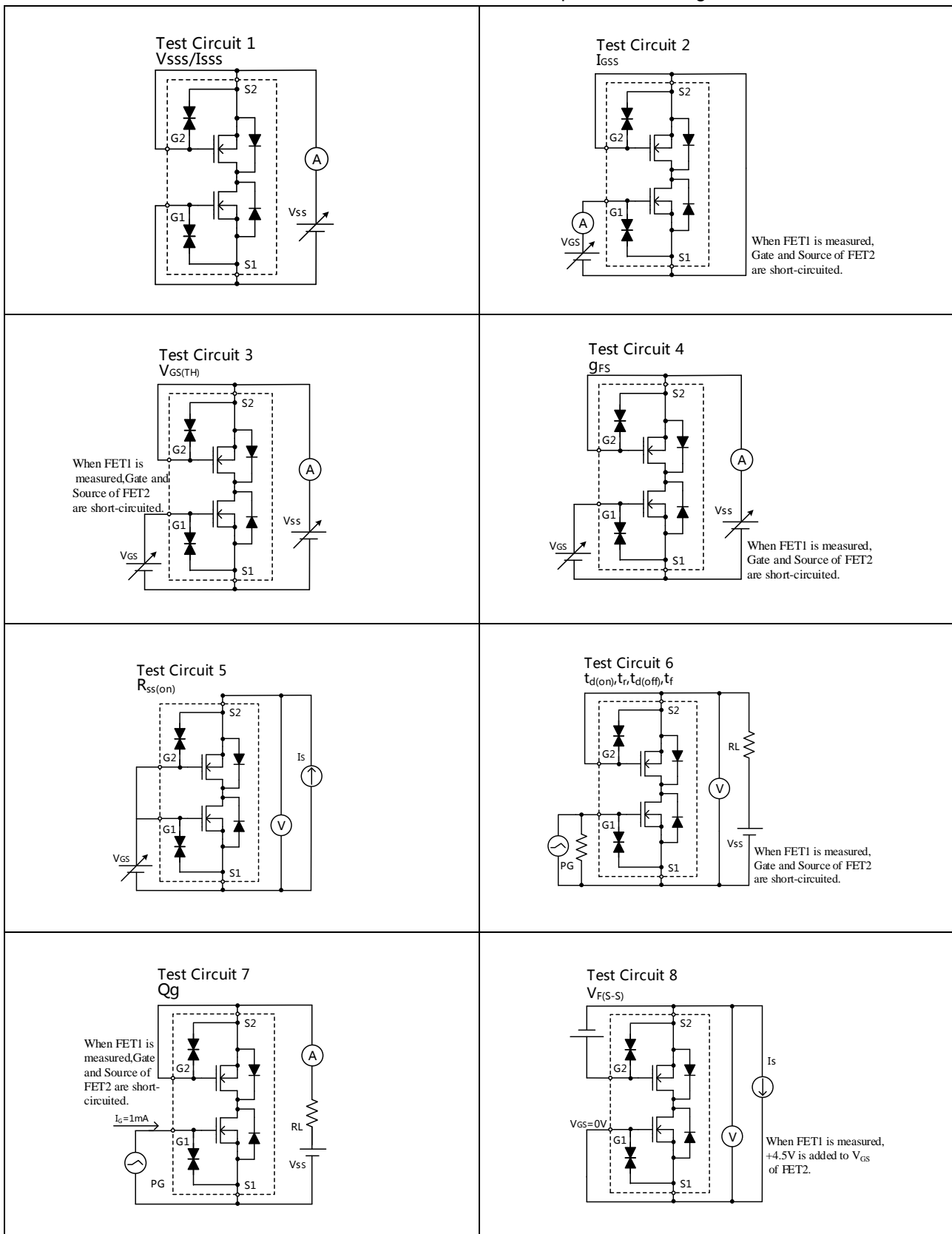
Note.c $PW \leq 10\mu\text{s}$, duty cycle $\leq 1\%$;

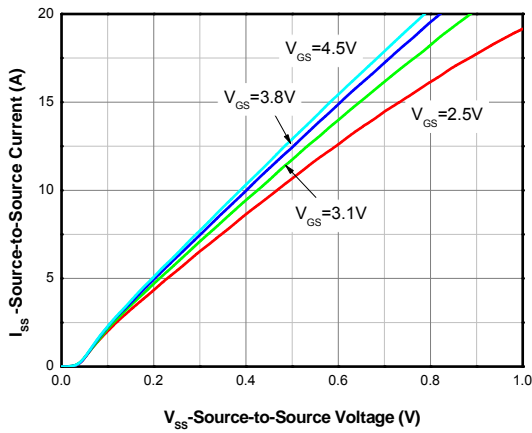
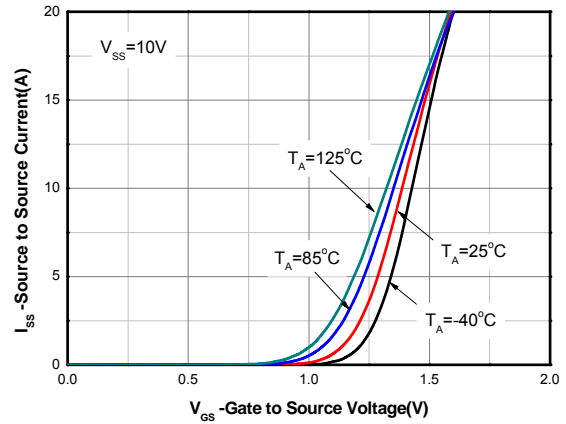
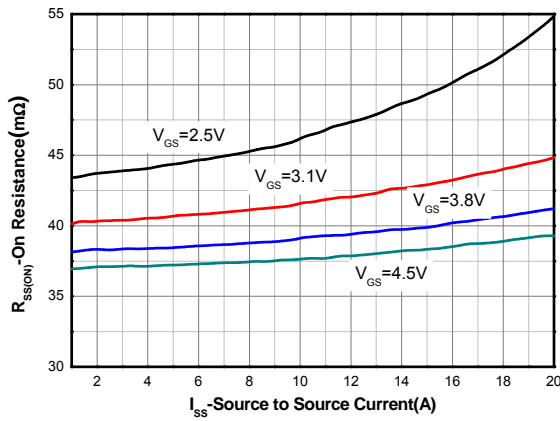
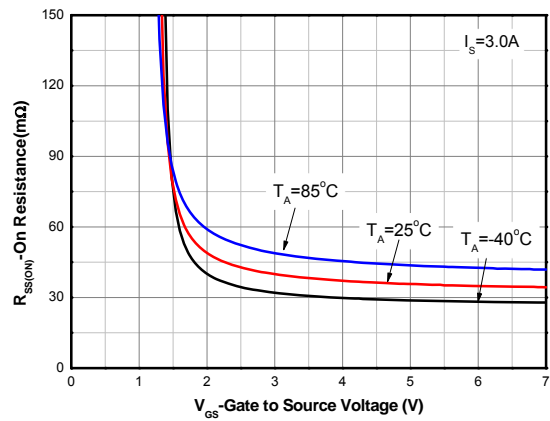
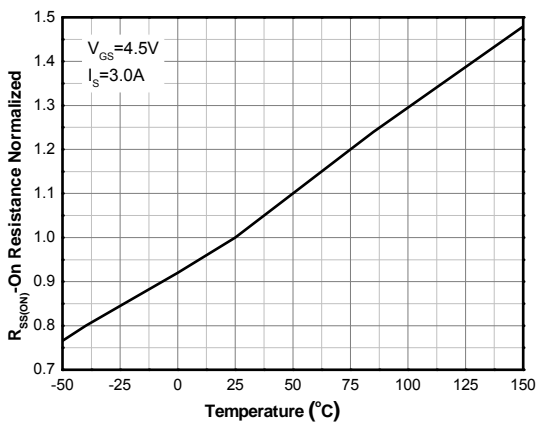
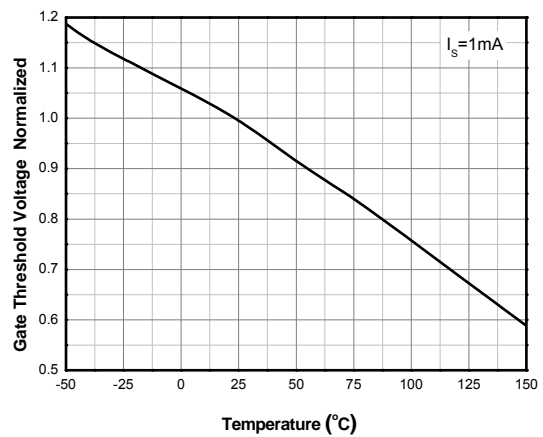
Electronics Characteristics (Ta=25°C, unless otherwise noted)

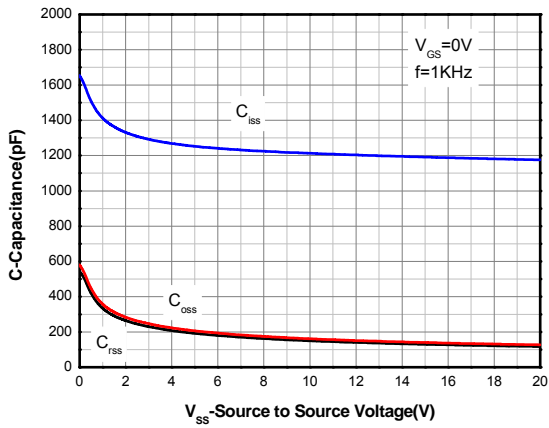
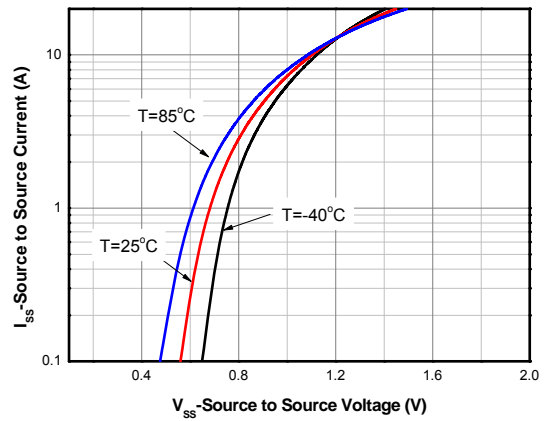
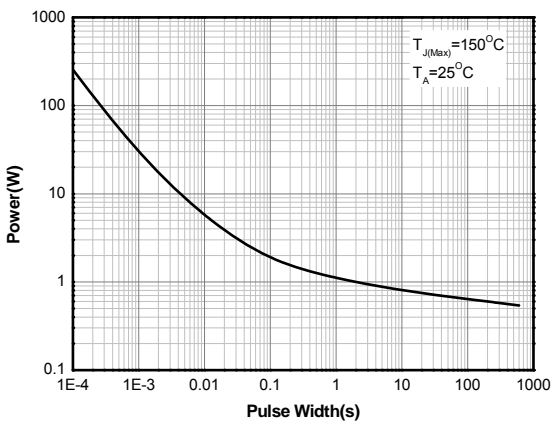
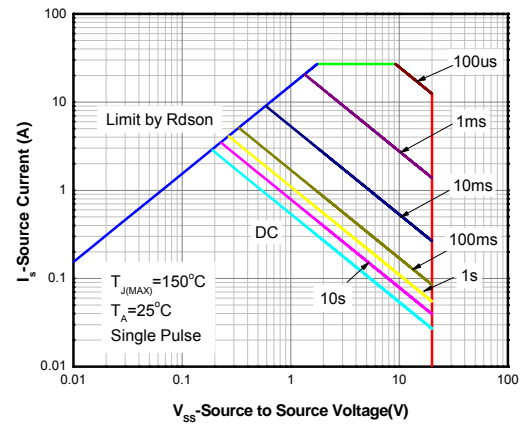
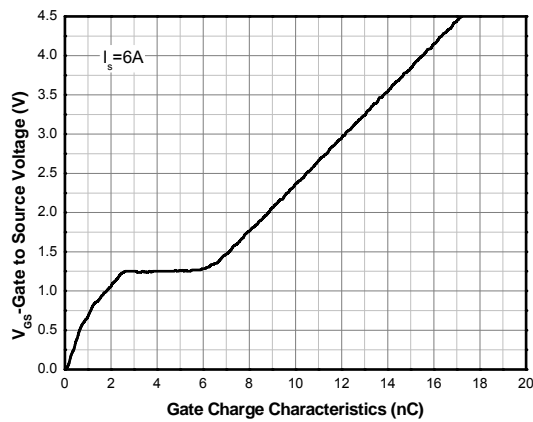
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Source to Source Voltage	BV_{SSS}	$V_{GS}=0V, I_S=1mA$	20			V
Zero Gate Voltage Drain Current	I_{SSS}	$V_{SS}=16V, V_{GS}=0V$ Test Circuit 1			1	μA
Gate Leakage Current	I_{GSS}	$V_{SS}=0V, V_{GS}=\pm 12V$ Test Circuit 2			± 10	μA
		$V_{SS}=0V, V_{GS}=\pm 5V$ Test Circuit 2			± 1	μA
ON CHARACTERISTICS						
Gate to Source Cut-off Voltage	$V_{GS(TH)}$	$V_{SS}=10V, I_S=1mA$ Test Circuit 3	0.4	0.75	1.0	V
Source to Source On-state Resistance	$R_{SS(ON)}$	$V_{GS}=4.5V, I_S=3.0A$ Test Circuit 5	26	38	48	m Ω
		$V_{GS}=4.0V, I_S=3.0A$ Test Circuit 5	27	39	49	
		$V_{GS}=3.1V, I_S=3.0A$ Test Circuit 5	29	42	56	
		$V_{GS}=2.5V, I_S=3.0A$ Test Circuit 5	31	46	66	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS}=0V, f=1kHz,$ $V_{SS}=10V$ Test Circuit 7		1210		pF
Output Capacitance	C_{OSS}			149		
Reverse Transfer Capacitance	C_{RSS}			135		
Total Gate Charge	$Q_{G(TOT)}$	$V_{G1S1}=4.5V, V_{SS}=10V, I_S=6A$		17.3		nC
Threshold Gate Charge	$Q_{G(TH)}$			1.10		
Gate-to-Source Charge	Q_{GS}			2.55		
Gate-to-Drain Charge	Q_{GD}			2.90		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=4.5V, V_{SS}=10V, R_L=3.3\Omega,$ $I_S=3A, R_G=6\Omega$ Test Circuit 8		500		ns
Rise Time	t_r			1310		
Turn-Off Delay Time	$t_{d(OFF)}$			8160		
Fall Time	t_f			3600		
BODY DIODE CHARACTERISTICS						
Forward Voltage	$V_{F(S-S)}$	$V_{GS}=0V, I_F=3.0A$ Test Circuit 6		0.8	1.2	V

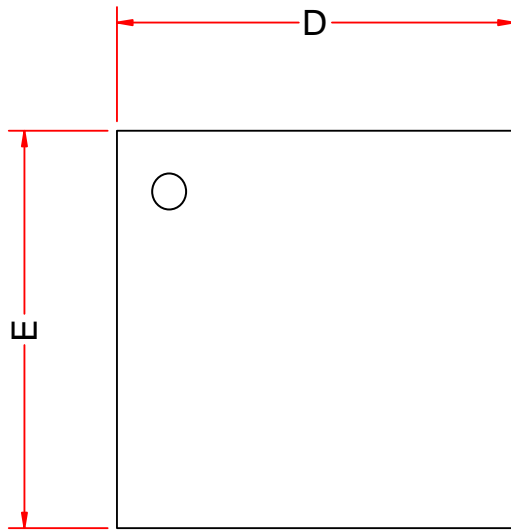
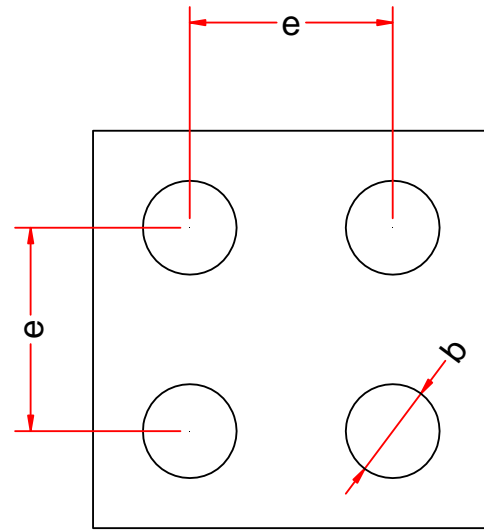
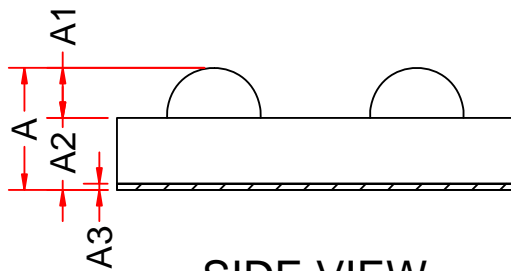
Test Circuit

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

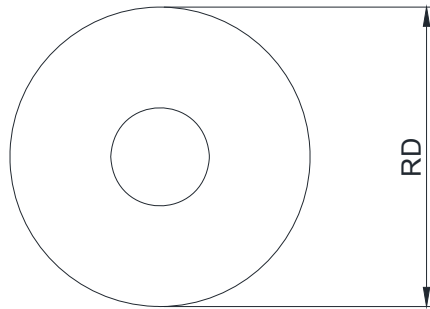
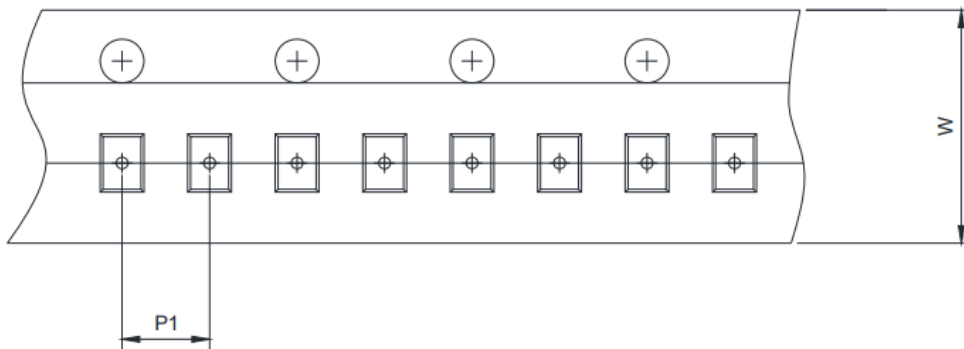
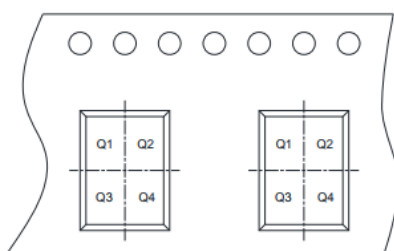


Typical Characteristics ($T_A=25^\circ\text{C}$, unless otherwise noted)

Output Characteristics ^d

Transfer Characteristics ^d

On-Resistance vs. Source Current ^d

On-Resistance vs. Gate-to-Source Voltage ^d

On-Resistance vs. Junction Temperature ^d

Threshold Voltage vs. Temperature


Capacitance

Body Diode Forward Voltage^d

Single Pulse power

Safe Operating Power

Gate Charge Characteristics

Package Outline Dimensions
CSP-4L

TOP VIEW

BOTTOM VIEW

SIDE VIEW

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.27	0.32	0.37
A1	0.06	0.09	0.11
A2	0.21	0.23	0.26
A3	0.025 Typ.		
D	1.44	1.47	1.50
E	1.44	1.47	1.50
e1	0.65 Typ.		
e2	0.65 Typ.		
b	0.28	0.30	0.32

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