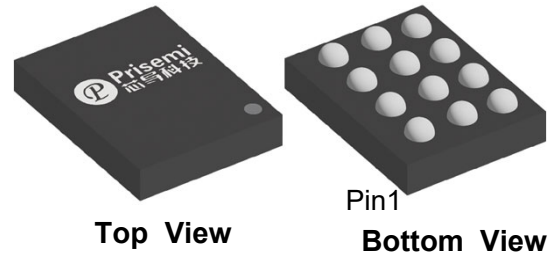
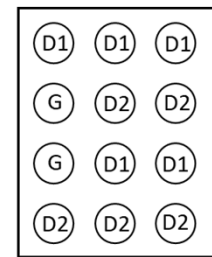


40V BiGaN Enhancement-mode FET
Description

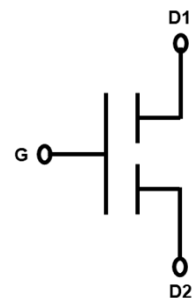
40V Normally-OFF GaN			
$V_{DS}(V)$	$R_{DD(on)}(m\Omega)$	$I_D(A)$	$Q_G(nC)$
40	12	10	6.3


Feature

- Bi-directional blocking capability
- GaN-on-Silicon E-mode HEMT technology
- Ultra-low on Resistance
- Package: WLCSP 1.2x1.7



Pin1

Bottom View

Circuit Diagram
Applications

- High side load switch
- OVP protection in smart phone USB port
- Switch circuits in multiple power suppliers system

Absolute maximum rating@25°C

Rating	Symbol	Value	Units
Drain1-Drain2 Voltage or Drain2-Drain1 Voltage	V_{DD}	40	V
Continuous Drain Current	I_D	10	A
Pulsed Drain Current ($T_c=25^\circ C$, t_p limited by T_{jmax})	$I_{D(pulse)}$	50	A
Power dissipation ($T_{c, board} = 25^\circ C$)	P_{tot}	11	W
Drain-Gate Voltage	V_{DG}	40	V
Gate-Drain Voltage	V_{GD}	6	V
Operating Temperature	T_J	-40 to 125	$^\circ C$
Storage Temperature	T_{STG}	-40 to 150	$^\circ C$

Thermal characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Thermal Resistance, Junction-to-Case (top)	$R_{\theta JC_top}$	-	1.44	-	$^\circ C/W$
Thermal Resistance, Junction-to-Case (bottom)	$R_{\theta JC_bot}$	-	8.98	-	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	-	65.74	-	$^\circ C/W$

Electrical characteristics per line@25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Drain1-Drain2 Breakdown Voltage	BV_{D1D2S}	$V_G = V_{D2} = 0V, I_{D1D2} = 500\mu A$	40	-	-	V
Drain1-Drain2 Breakdown Voltage	BV_{D2D1S}	$V_G = V_{D1} = 0V, I_{D2D1} = 500\mu A$	40	-	-	V
Gate Threshold Voltage	$V_{GD1(th)}$	$V_{D2} = V_G, V_{D1} = 0V, I_{D2D1} = 1mA$	0.8	-	2.4	V
Gate Threshold Voltage	$V_{GD2(th)}$	$V_{D1} = V_G, V_{D2} = 0V, I_{D1D2} = 1mA$	0.8	-	2.4	V
Zero Gate Voltage Drain Current	I_{D1D2S}	$V_{D1} = 40V, V_G = V_{D2} = 0V$	-	-	20	μA
Zero Gate Voltage Drain Current	I_{D2D1S}	$V_{D2} = 40V, V_G = V_{D1} = 0V$	-	-	20	μA
Gate-Source Leakage Current	I_{GDS}	$V_G = 5V, V_{D1} = V_{D2} = 0V$	-	-	5.0	μA
		$V_G = -5V, V_{D1} = V_{D2} = 0V$	-1.0	-	-	
Gate-Source Leakage Current	I_{GDS}	$V_G = 6V, V_{D1} = V_{D2} = 0V$	-	-	30	μA
		$V_G = -6V, V_{D1} = V_{D2} = 0V$	-1.0	-	-	
Drain1-Drain2 On-State Resistance	$R_{D1D2(ON)}$	$V_{GD2} = 5V, I_{D1D2} = 5A$	-	12	15	m Ω
Drain2-Drain1 On-State Resistance	$R_{D2D1(ON)}$	$V_{GD1} = 5V, I_{D2D1} = 5A$	-	12	15	m Ω
Input Capacitance	C_{iss}	$V_G = 0V, V_D = 20V$	-	306	-	pF
Output Capacitance	C_{oss}		-	162	-	
Reverse Transfer Capacitance	C_{rss}		-	87	-	
Total Gate Charge	Q_G	$V_G = 5V, V_D = 20V, I_D = 10A$	-	6.3	-	nC
Gate-Drain1 Charge	Q_{GD1}	$V_{D2D1} = 20V, I_D = 10A$	-	0.7	-	
Gate-Drain2 Charge	Q_{GD2}	$V_{D2D1} = 20V, I_D = 10A$	-	3.4	-	
Gate-Drain2 Charge	Q_{GD2}	$V_{D1D2} = 20V, I_D = 10A$	-	0.7	-	
Gate-Drain1 Charge	Q_{GD1}	$V_{D1D2} = 20V, I_D = 10A$	-	3.4	-	
Output Charge	Q_{OSS}	$V_G = 0V, V_D = 20V$	-	5.1	-	
Gate Resistance	R_G	f=1MHz	-	2.5	-	Ω

Typical Characteristics

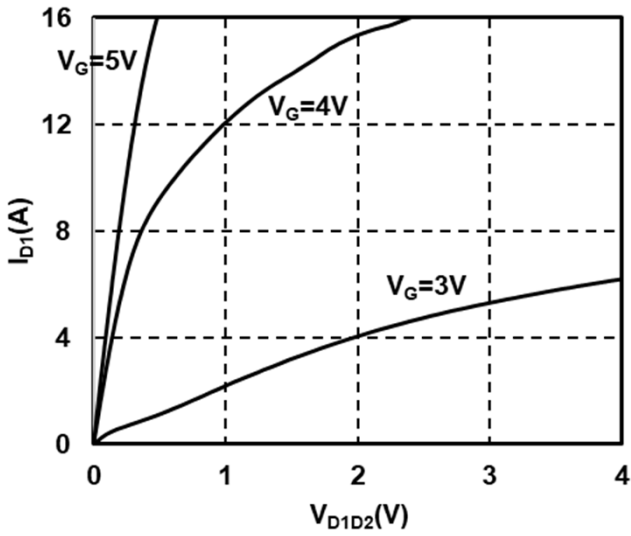


Fig.1 Output Characteristics ($T_J = 25\text{ }^\circ\text{C}$)

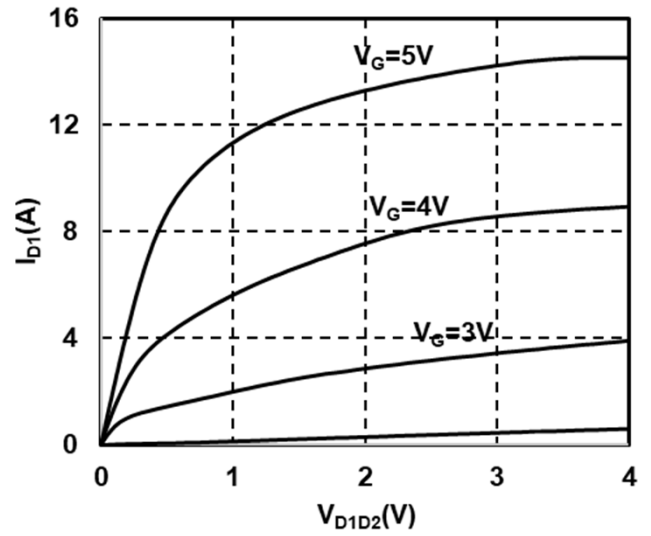


Fig.2 Output Characteristics ($T_J = 125\text{ }^\circ\text{C}$)

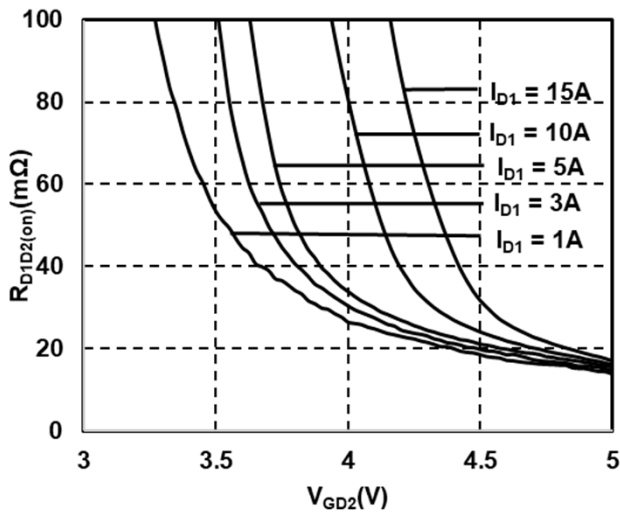


Fig.3 Typical Drain On-state Resistance

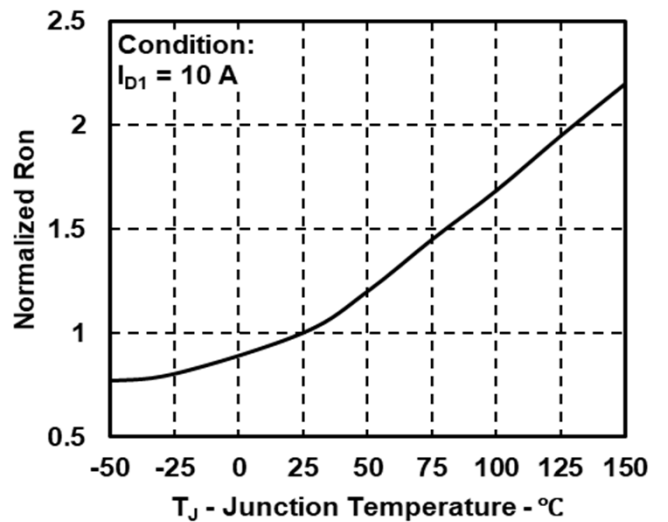


Fig.4 Normalized On Resistance vs. Temperature

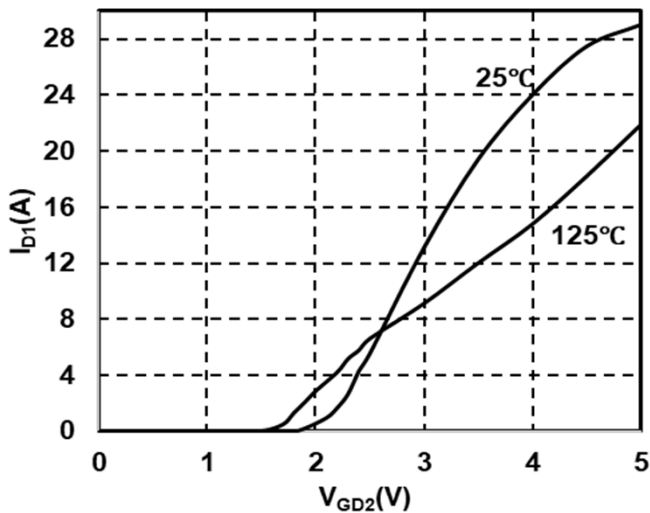


Fig.5 Typical Transfer Characteristics

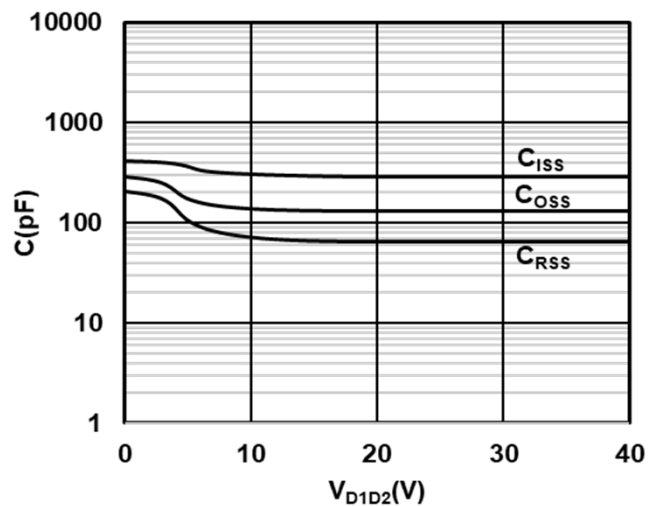


Fig.6 Typical Junction Capacitance

Typical Characteristics

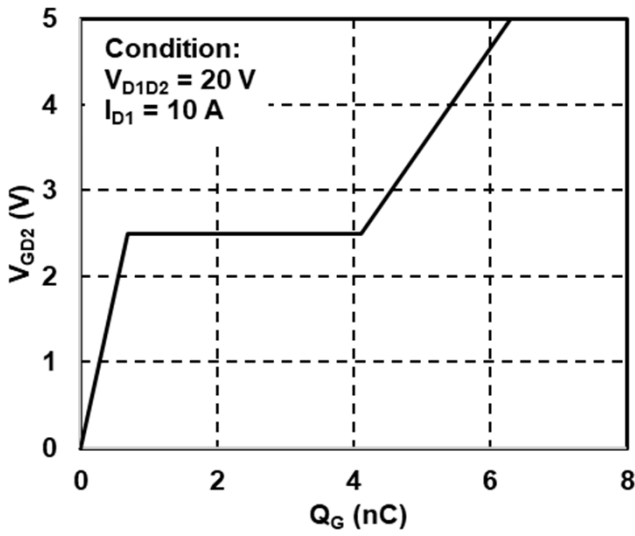


Fig.7 Typ. Gate Charge

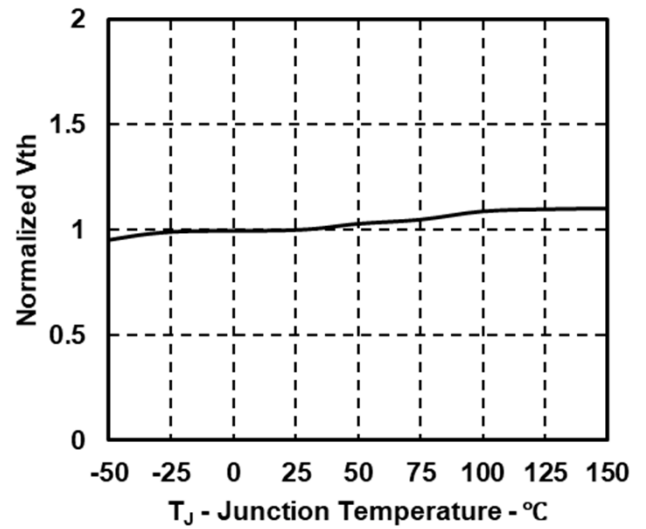


Fig.8 Normalized Threshold Voltage vs. Temp.

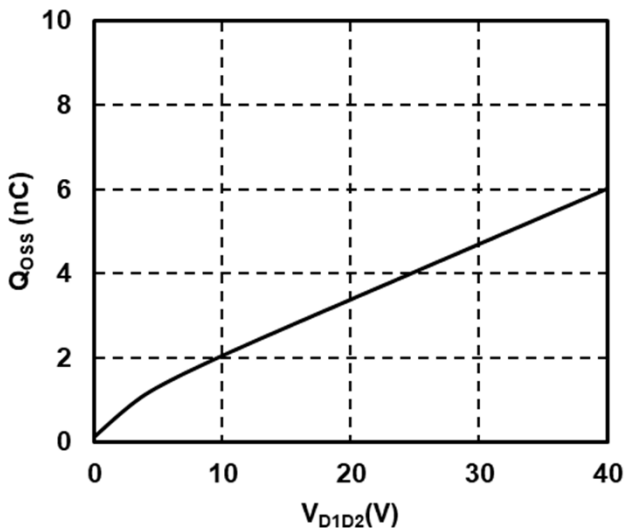


Fig.9 Output Capacitance Stored Energy

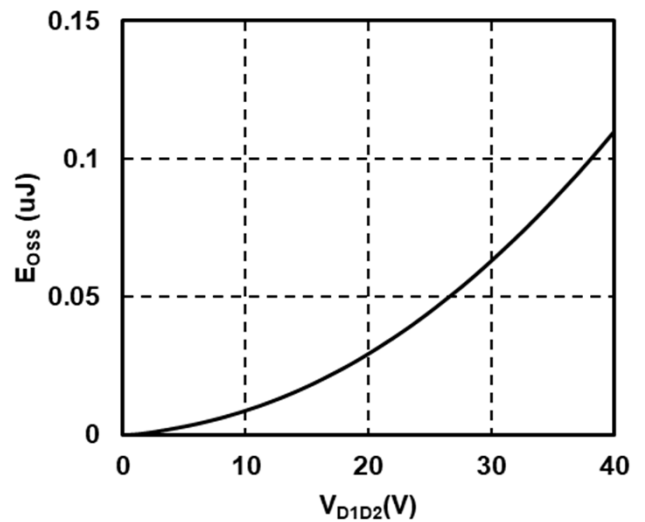


Fig.10 Output Capacitance Stored Energy

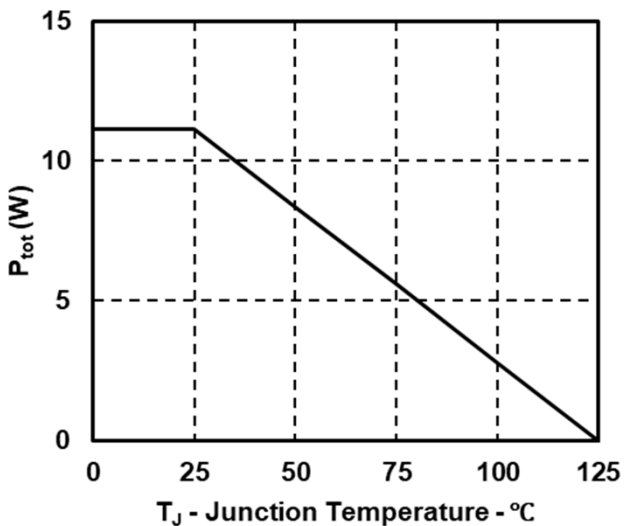


Fig.11 Output Capacitance Stored Energy

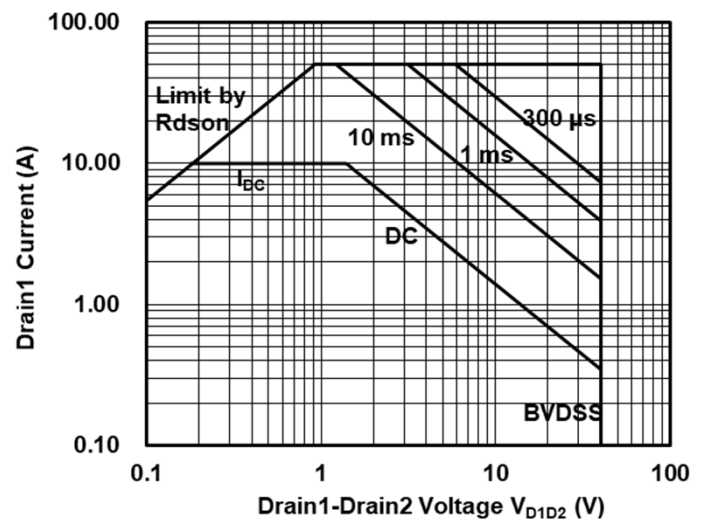


Fig.12 Safe Operating Area

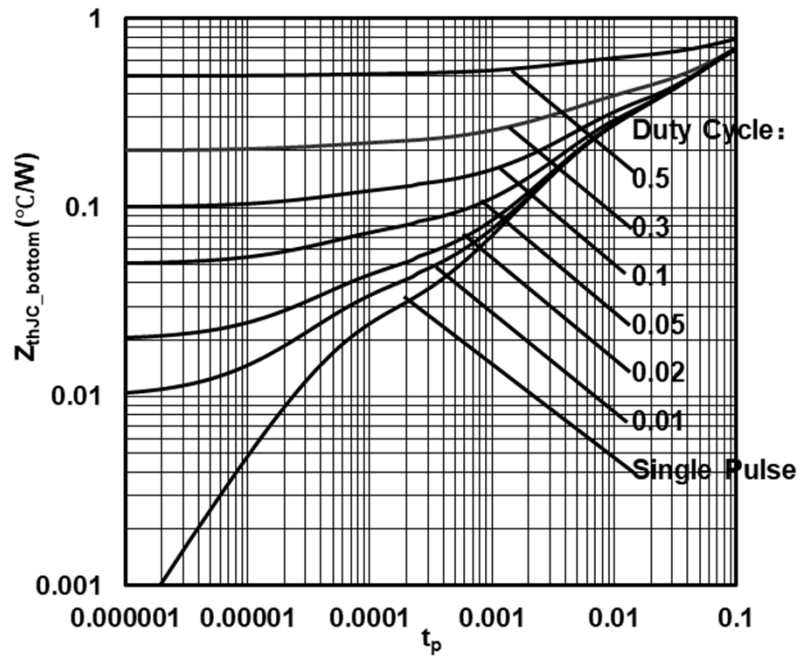
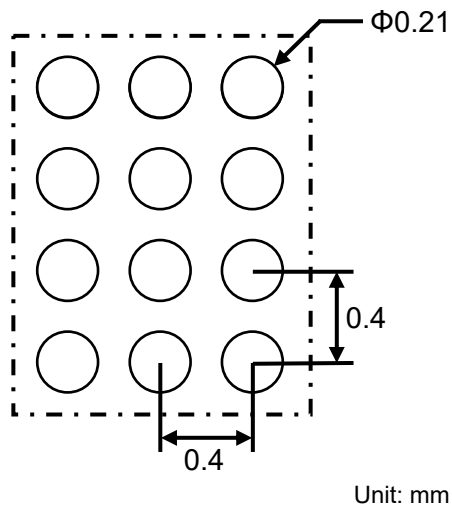
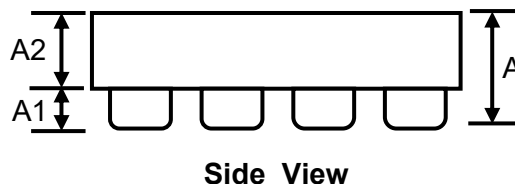
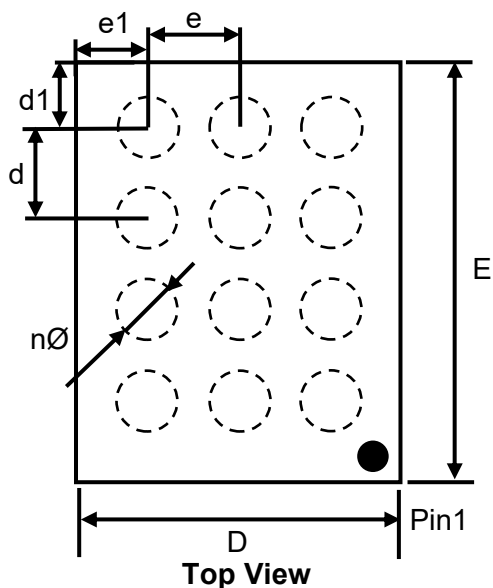


Fig.13 Max. Transient Thermal Impedance

Product Dimension (WLCSP 1.2x1.7)



Suggested PCB Layout

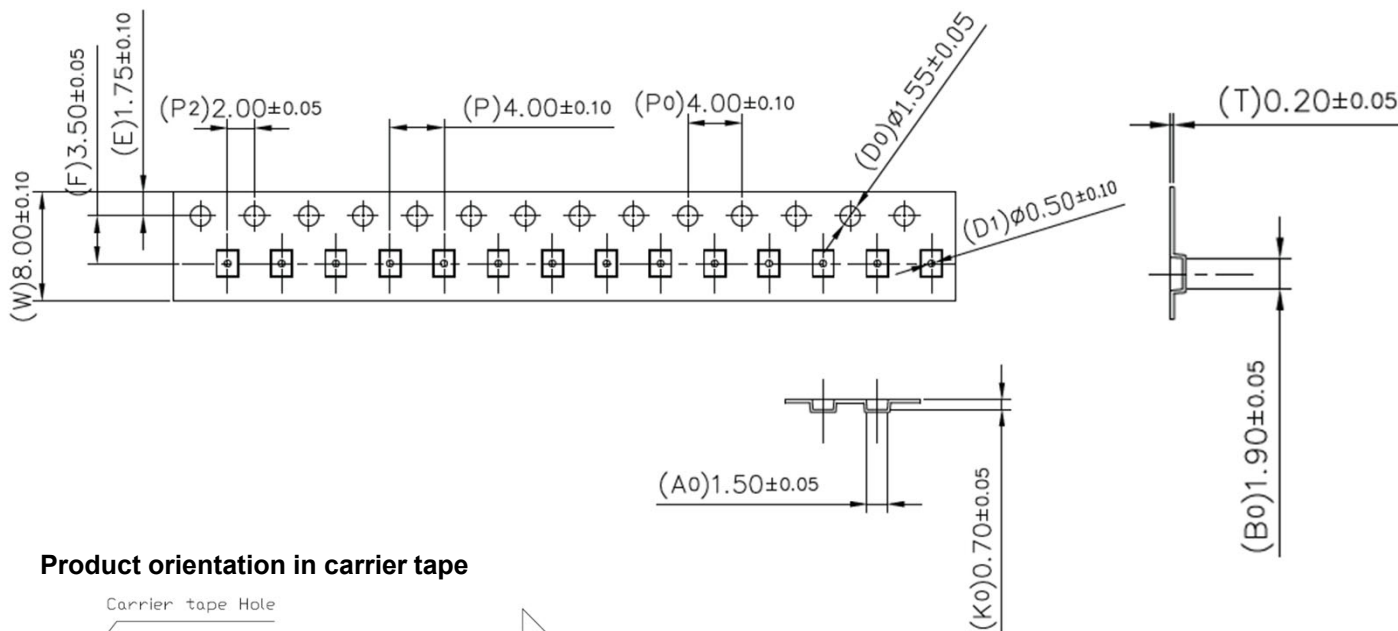
Unit: mm

Dim	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A	0.518	0.564	0.611	0.0204	0.0222	0.0241
A1	0.193	0.215	0.237	0.0076	0.00846	0.00933
A2	0.325	0.349	0.374	0.0128	0.0137	0.0147
Ø	0.235	0.261	0.287	0.00925	0.0103	0.0113
E	1.68	1.7	1.72	0.0661	0.0669	0.0677
D	1.18	1.2	1.22	0.0465	0.0472	0.048
d	0.4 Ref.			0.0157 Ref.		
d1	0.27 Ref.			0.0106 Ref.		
e	0.4 Ref.			0.0157Ref.		
e1	0.22 Ref.			0.00866 Ref.		

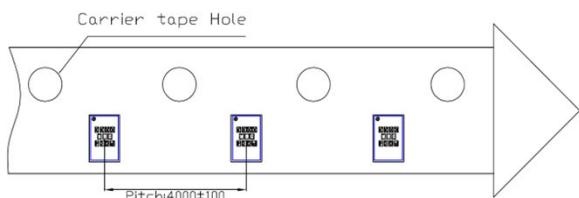
Ordering Information

Device	Package	Reel	Shipping
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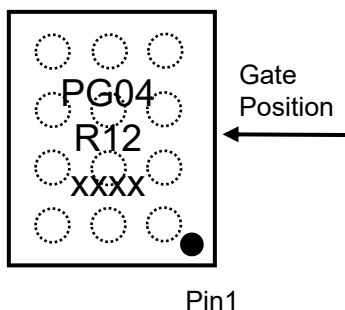
Load With Information




Product orientation in carrier tape



Marking Information




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