

FEATURES

$V_{DS} = -20V, I_D = -16A$

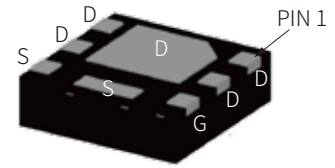
$R_{DS(ON)}$ (Typ.) = 16m Ω @ $V_{GS} = -2.5V$

$R_{DS(ON)}$ (Typ.) = 12m Ω @ $V_{GS} = -4.5V$

High power and current handling capability

Lead free product is acquired

Surface mount package



DFN2020-6L

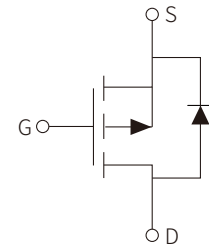
1216

Marking

APPLICATION

PWM applications

Load switch



Schematic Symbol

APPROVALS

RoHS Compliance with 2011/65/EU

HF Compliance with IEC61249-2-21:2003

ABSOLUTE MAXIMUM RATINGS($T_a = 25^\circ C$)

Parameter	Symbol	Value	Unit	
Drain-source voltage	V_{DS}	-20	V	
Gate-source voltage	V_{GS}	± 12	V	
Drain current-continuous	I_D	$T_c = 25^\circ C$	-16 ^a	A
		$T_c = 70^\circ C$	-16 ^a	A
		$T_A = 25^\circ C$	-16 ^{a,b,c}	A
		$T_A = 70^\circ C$	-12 ^{b,c}	A
Drain-source Diode forward current	I_S	$T_c = 25^\circ C$	-16 ^a	A
		$T_A = 25^\circ C$	-2.9 ^{b,c}	A
Maximum power dissipation	P_D	$T_c = 25^\circ C$	18	W
		$T_c = 70^\circ C$	12	W
		$T_A = 25^\circ C$	3.5 ^{b,c}	W
		$T_A = 70^\circ C$	2.2 ^{b,c}	W
Operating junction Temperature range	T_J	-55 to 175	$^\circ C$	
Maximum junction-to-ambient ^{b,d} $t \leq 5s$	R_{thJA}	36	$^\circ C/W$	
Maximum junction-to-case (drain) Steady state	R_{thJC}	6.5	$^\circ C/W$	

a. Package limited; b. Surface mounted on 1" x 1" FR4 board
c. $t = 5s$; d. Maximum under steady state conditions is 80 $^\circ C/W$

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Gate-body leakage	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$			± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-12V, V_{GS}=0V$			-1	μA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.7	-1.0	V
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-10A$		12	15	m Ω
		$V_{GS}=-2.5V, I_D=-5A$		16	20	m Ω
Forward transconductance	g_{fs}	$V_{DS}=-6V, I_D=-7A$		32		S
Dynamic Characteristics						
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=-10V,$ $f=1.0MHz$		1300		pF
Output capacitance	C_{oss}			380		pF
Reverse transfer capacitance	C_{rss}			280		pF
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS}=-6V, V_{GS}=-4.5V, I_D=-9A$		13		nC
Gate-Source Charge	Q_{gs}			3		nC
Gate-Drain Charge	Q_{gd}			5		nC
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-10V, I_D=-5A$ $V_{GEN}=-4.5V, R_L=1.2ohm$ $R_{GEN}=1ohm$		11		ns
Turn-on Rise Time	t_r			35		ns
Turn-Off Delay Time	$t_{d(off)}$			30		ns
Turn-Off Fall Time	t_f			10		ns
Drain-source Diode Characteristics						
Diode forward voltage	V_{SD}	$V_{GS}=0V, I_S=-1.25A$		-0.7	-1.2	V

PARAMETER CHARACTERISTIC CURVE

Figure 1: On-Region Characteristics

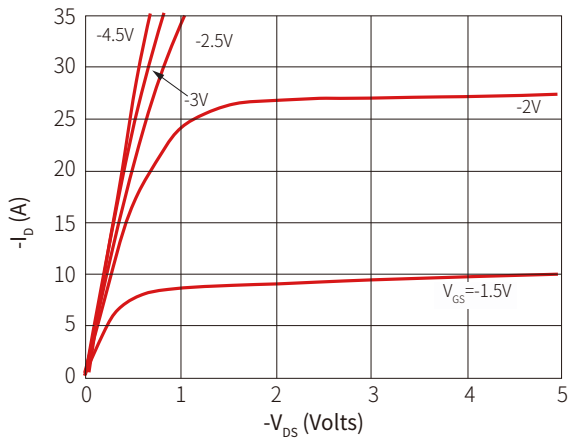


Figure 2: Transfer Characteristics

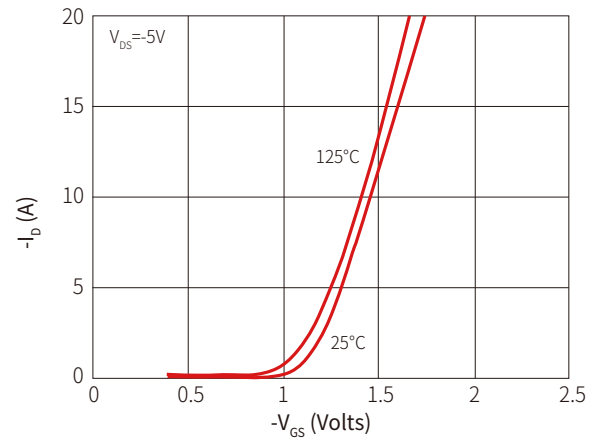


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

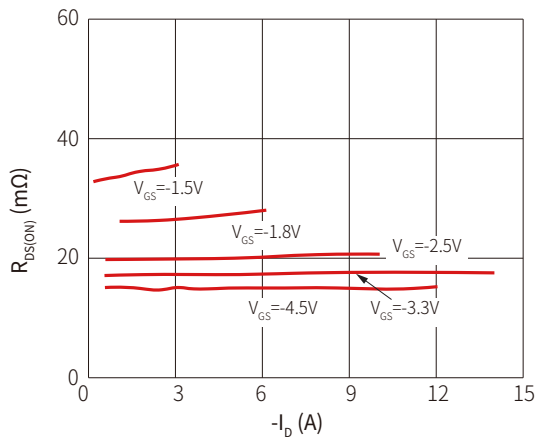


Figure 4: On-Resistance vs. Junction Temperature

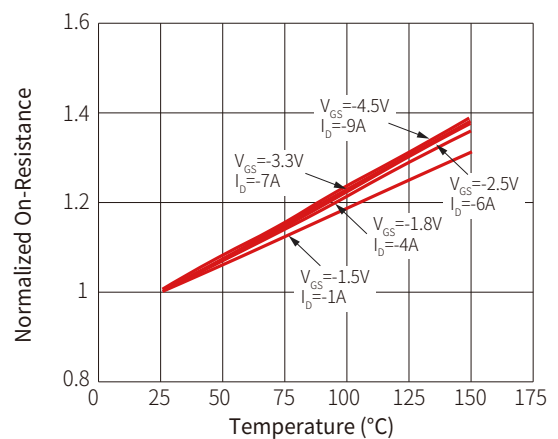


Figure 5: On-Resistance vs. Gate-Source Voltage

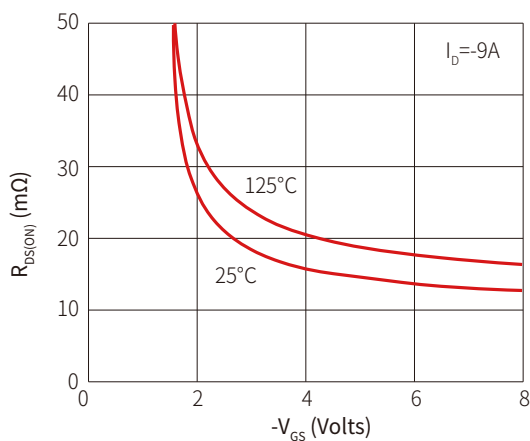


Figure 6: Body-Diode Characteristics

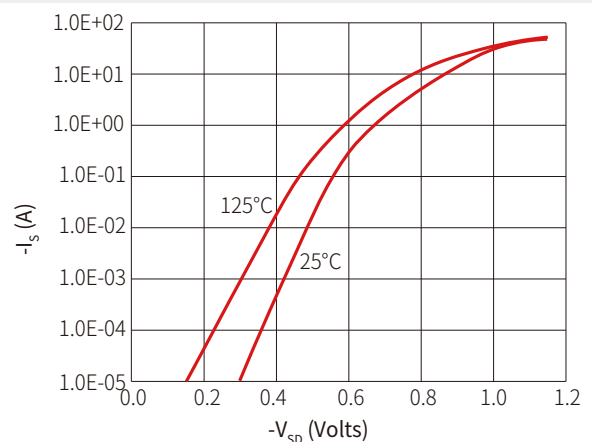


Figure 7: Gate-Charge Characteristics

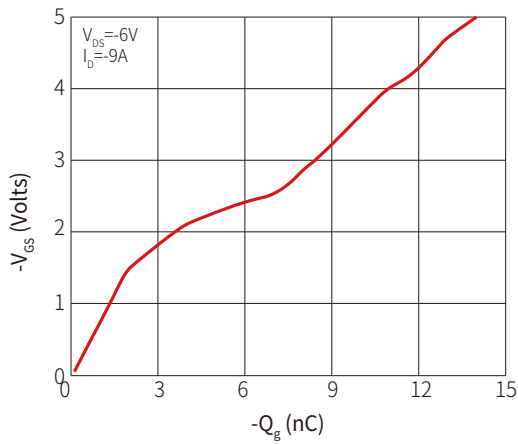


Figure 8: Capacitance Characteristics

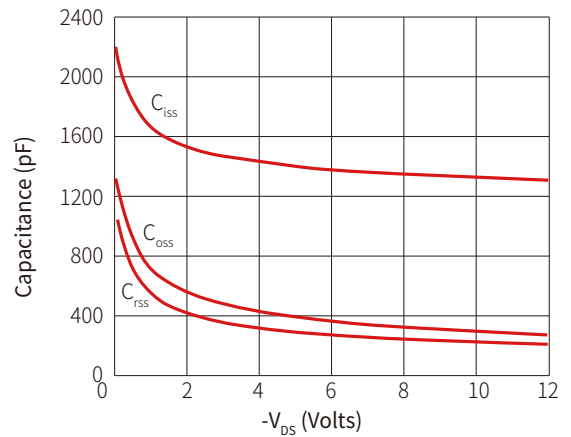


Figure 9: Single Pulse Avalanche Capability

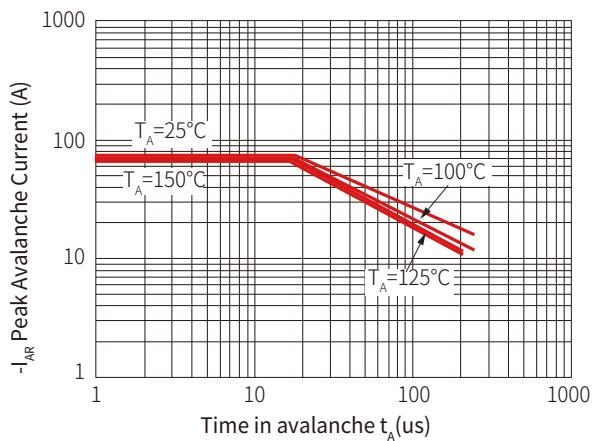


Figure 10: Maximum Forward Biased Safe Operating Area

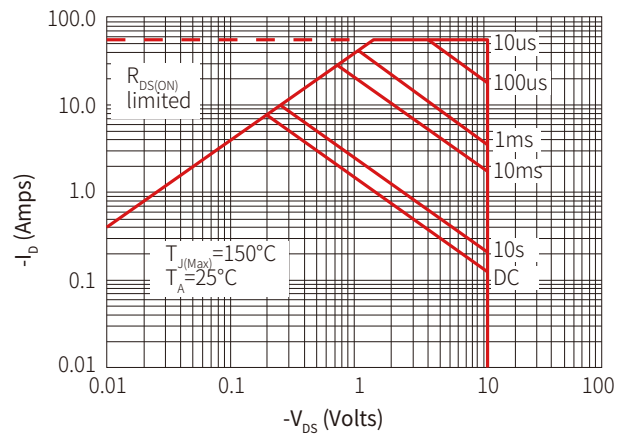


Figure 11: Single Pulse Power Rating Junction-to-Ambient

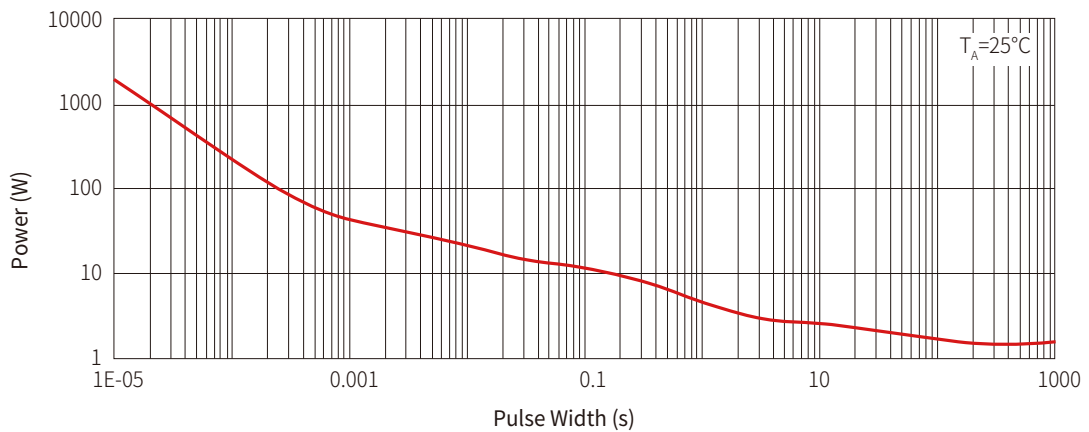


Figure 12: Normalized Maximum Transient Thermal Impedance

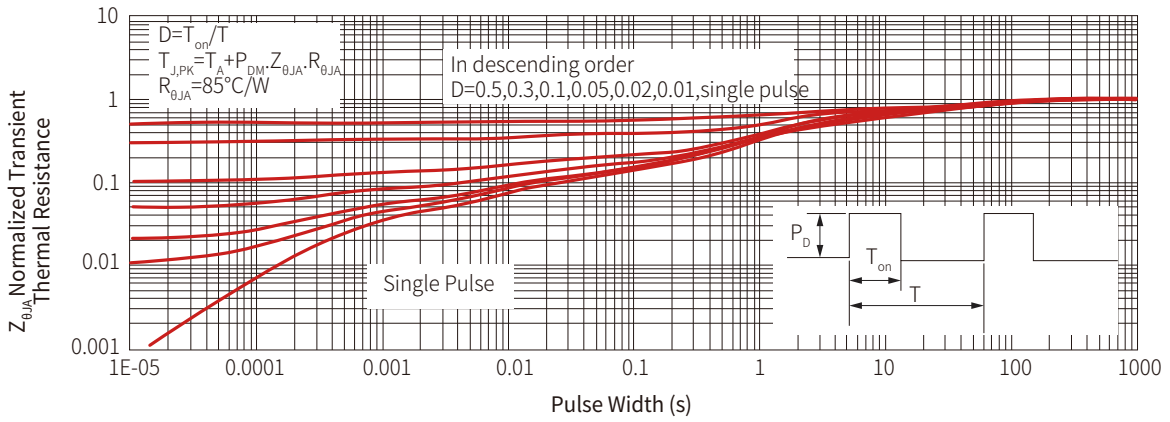


Fig 13: Gate Charge Test Circuit & Waveforms

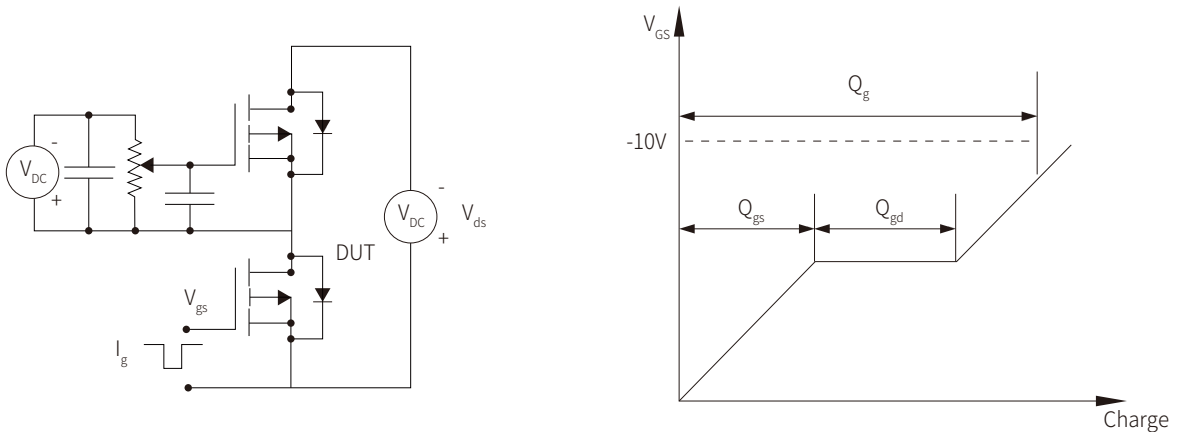


Figure 14: Resistive Switching Test Circuit & Waveforms

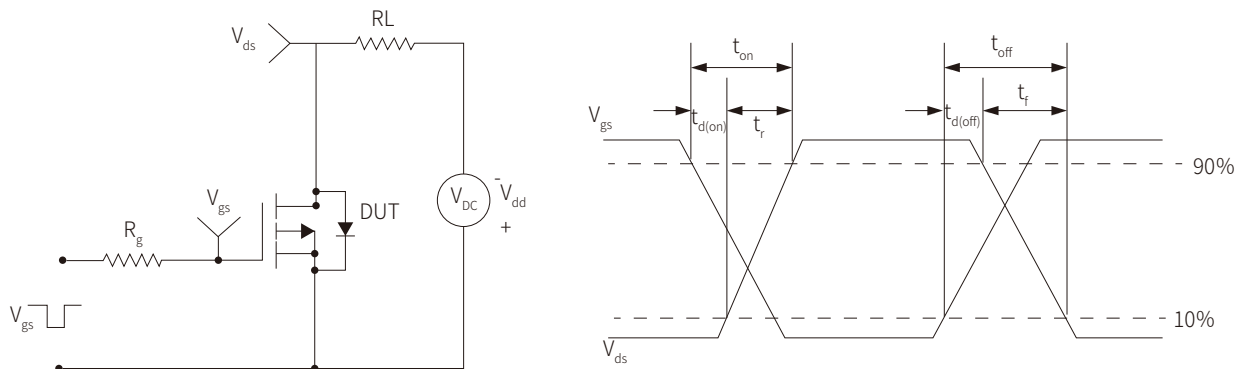


Fig 15: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

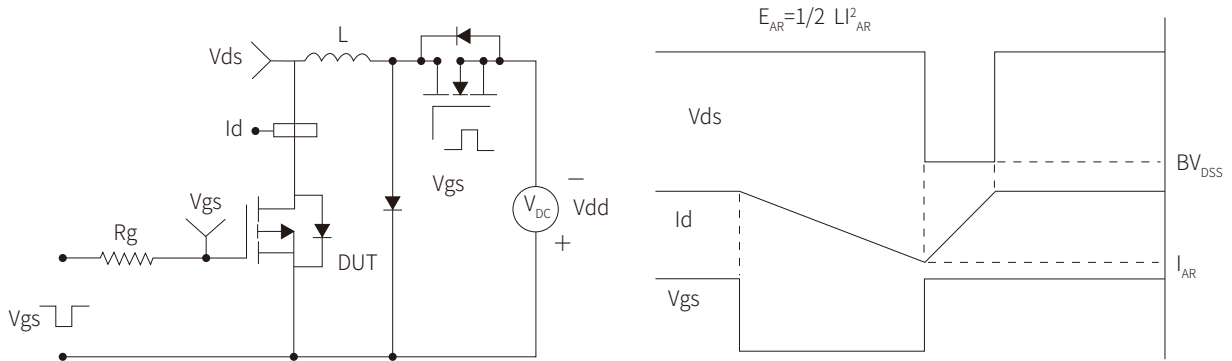
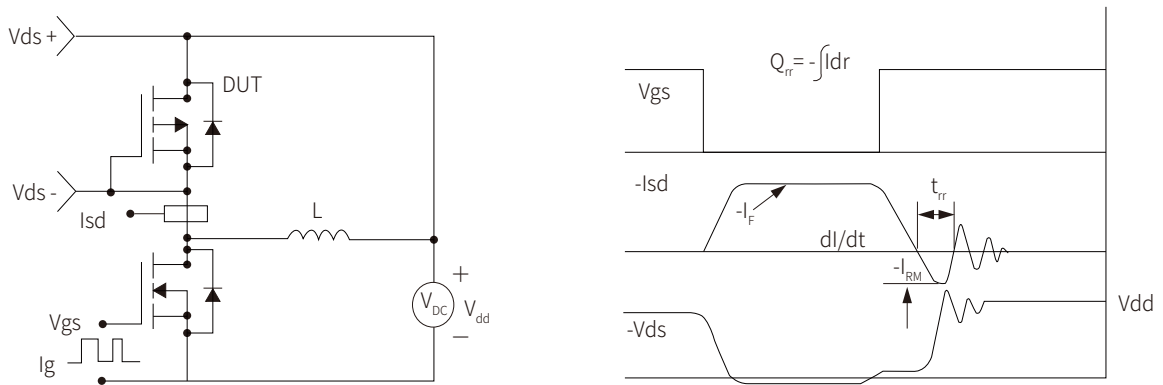
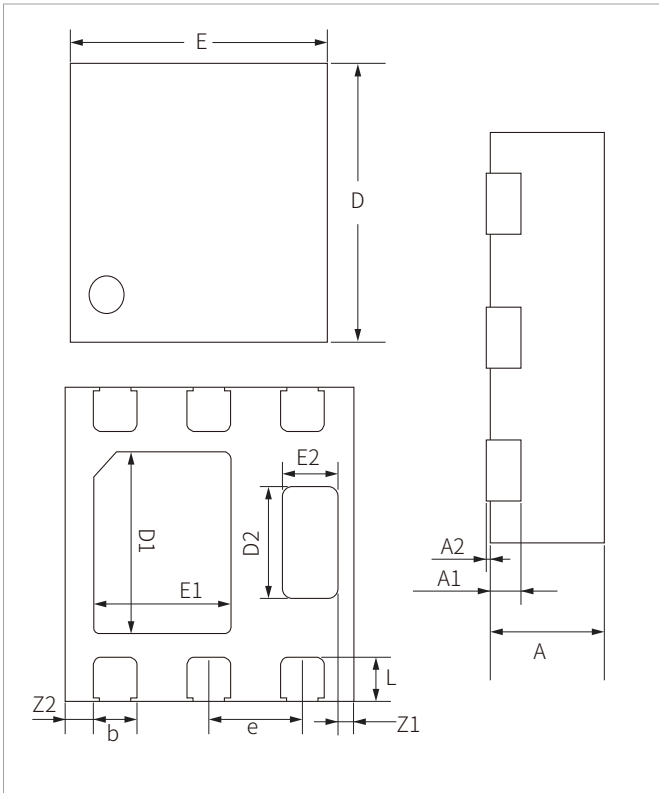


Figure 16: Diode Recovery Test Circuit & Waveforms



DFN2020-6L PACKAGE INFORMATION



Ref.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
D	1.95	2.00	2.05	0.077	0.079	0.081
E	1.95	2.00	2.05	0.077	0.079	0.081
D1	1.10	1.15	1.20	0.043	0.045	0.047
E1	0.90	0.95	1.00	0.035	0.037	0.039
D2	0.65	0.70	0.75	0.026	0.028	0.030
E2	0.33	0.38	0.43	0.013	0.015	0.017
L	0.23	0.275	0.33	0.009	0.011	0.013
b	0.25	0.30	0.35	0.010	0.012	0.014
e	0.65BSC			0.026BSC		
A	0.40	0.50	0.60	0.016	0.020	0.024
A1	0.150REF			0.006REF		
A2	0.00	-	0.05	0.00	-	0.002
Z1	0.06	0.11	0.16	0.002	0.004	0.006
Z2	0.15	0.20	0.25	0.006	0.008	0.010

ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SPM1216	DFN2020-6L	3000PCS	7"

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