

• General Description

The HM20DN04D combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

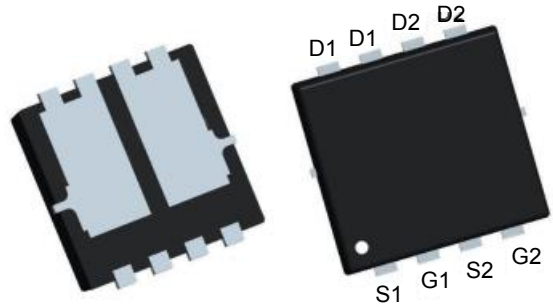
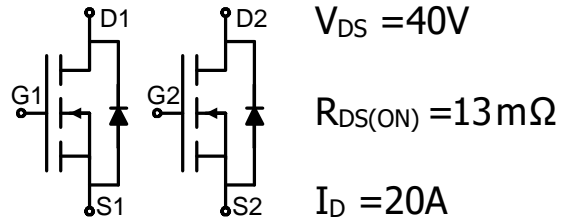
• Features

Advance high cell density Trench technology
Low $R_{DS(ON)}$ to minimize conductive loss
Low Gate Charge for fast switching
Dual DIE in one package

• Application

Power Management in Notebook Computer,
Portable Equipment and Battery
Powered Systems

• Product Summary



PDFNWB5x6-8L

• Package Marking and Ordering Information:

Part NO.	HM20DN04D
Marking	D130N04N
Packing Information	---
Basic ordering unit (pcs)	5000

• Absolute Maximum Ratings ($T_C = 25^\circ C$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_{D@TC=25^\circ C}$	20	A
	$I_{D@TC=75^\circ C}$	15	A
	$I_{D@TC=100^\circ C}$	12	A
Pulsed Drain Current ①	I_{DM}	50	A
Total Power Dissipation	$P_{D@TC=25^\circ C}$	45	W
Total Power Dissipation	$P_{D@TA=25^\circ C}$	1.5	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ C$
Storage Temperature	T_{STG}	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy	E_{AS}	50	mJ

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	2.5	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	75	° C/W
Soldering temperature, wavesoldering for 8 s	T_{sold}	-	-	265	° C

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.5	2.5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V$	-	-	1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=12A$	-	13	15	m Ω
		$V_{GS}=4.5V, I_D=8A$	-	16	18	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=25V, I_D=10A$	-	8	-	S
Source-drain voltage	V_{SD}	$I_S=10A$	-	-	1.20	V

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	f = 1MHz $V_{DS}=20V$ $V_{GS}=0V$	-	1137	-	pF
Output capacitance	C_{oss}		-	84	-	
Reverse transfer capacitance	C_{rss}		-	72	-	

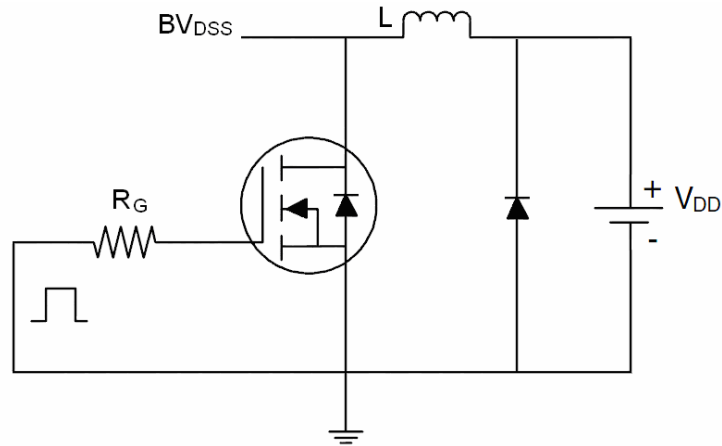
●Gate Charge characteristics($T_a = 25^\circ C$)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	$V_{DD} = 20V$	-	25	-	nC
Gate - Source charge	Q_{gs}	$I_D = 8A$	-	3.6	-	
Gate - Drain charge	Q_{gd}	$V_{GS} = 10V$	-	4.4	-	

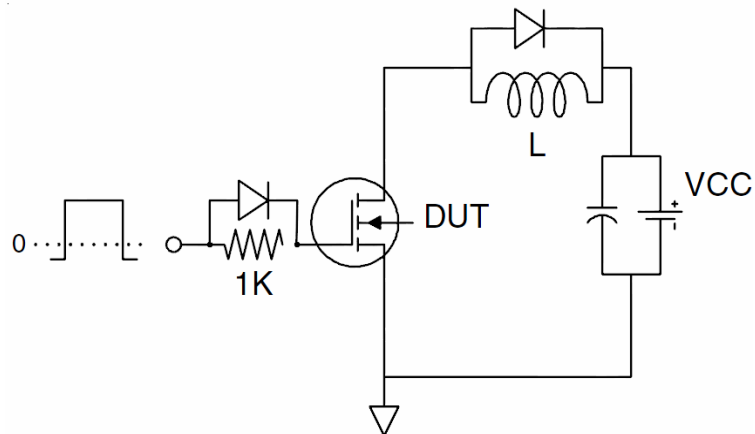
Note: ① Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;

Test Circuit

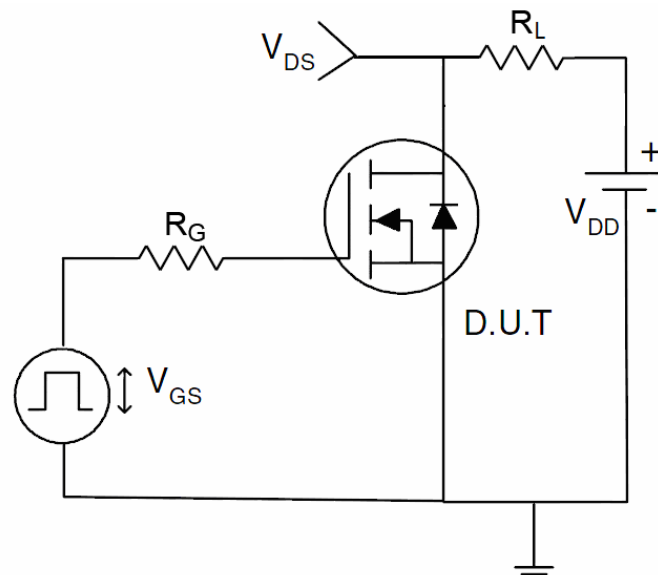
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics

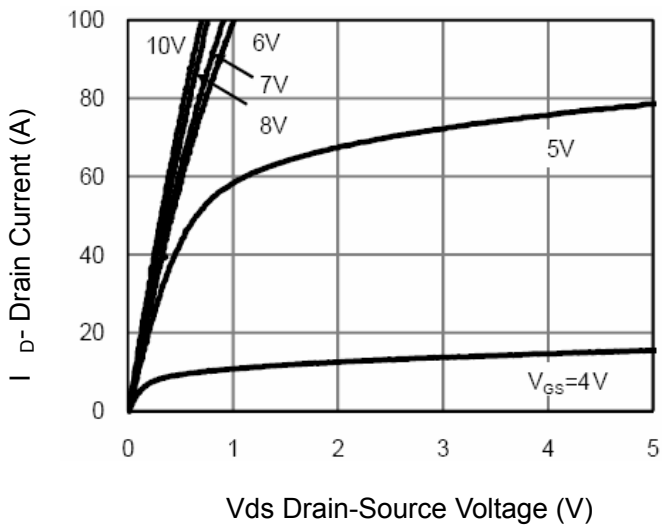


Figure 1 Output Characteristics

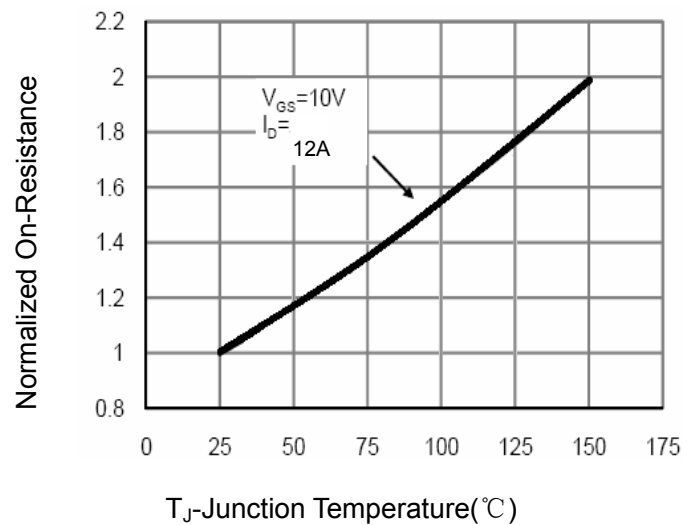


Figure 4 Rdson-Junction Temperature

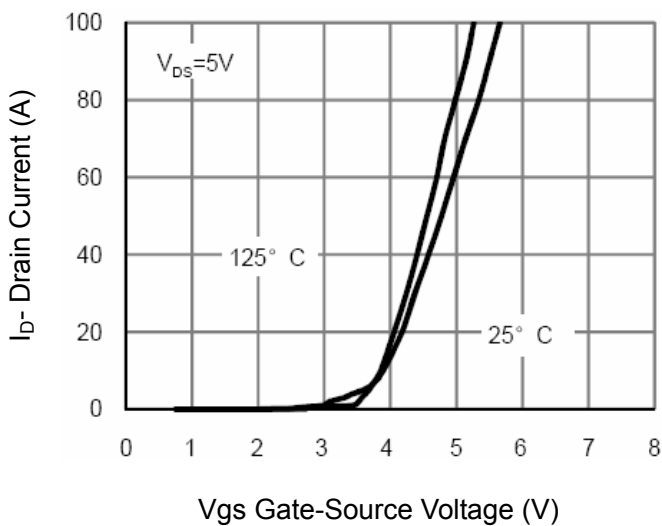


Figure 2 Transfer Characteristics

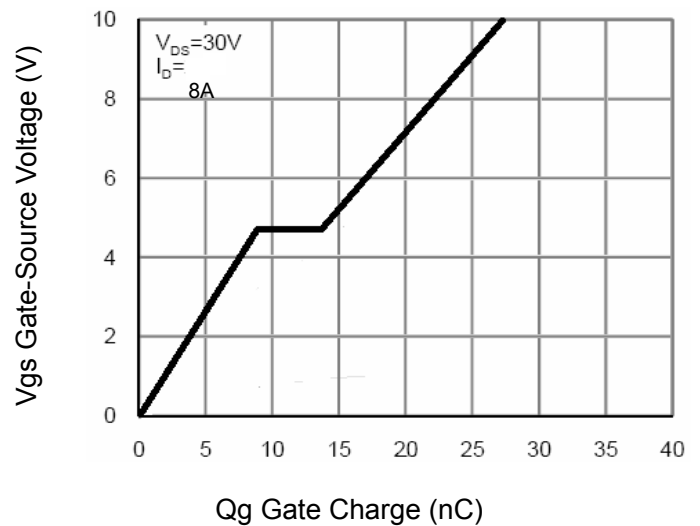


Figure 5 Gate Charge

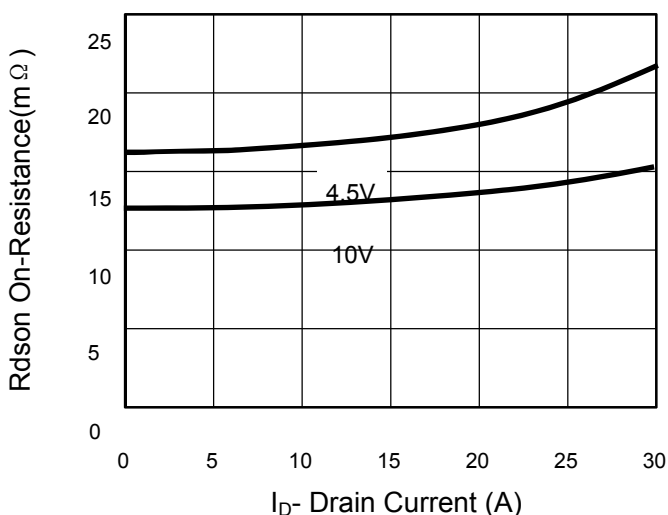


Figure 3 Rdson- Drain Current

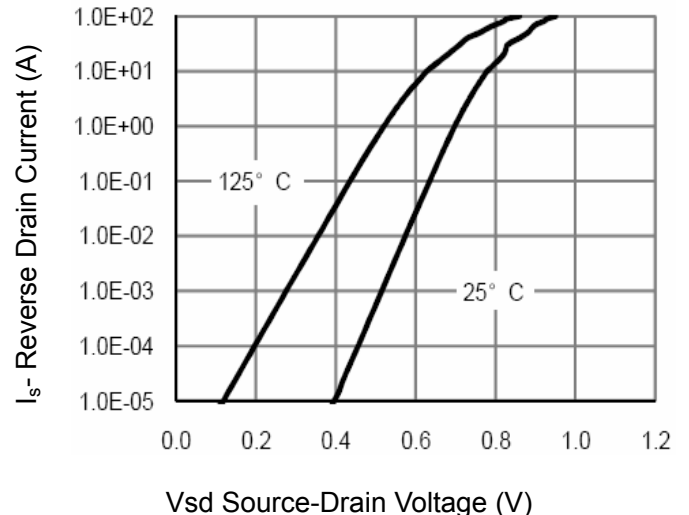


Figure 6 Source- Drain Diode Forward

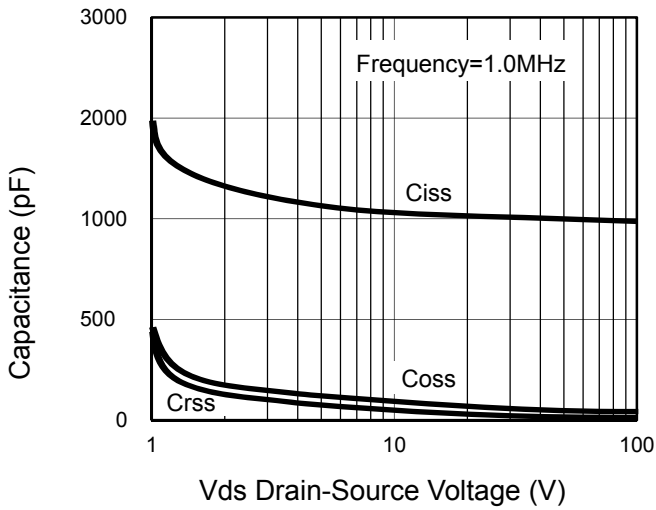


Figure 7 Capacitance vs Vds

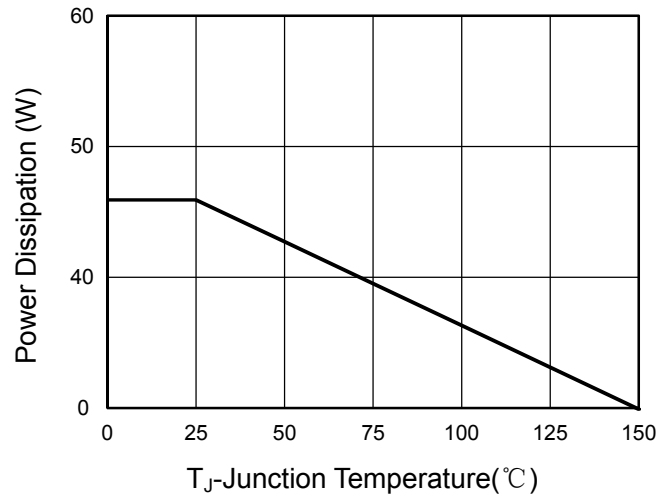


Figure 9 Power De-rating

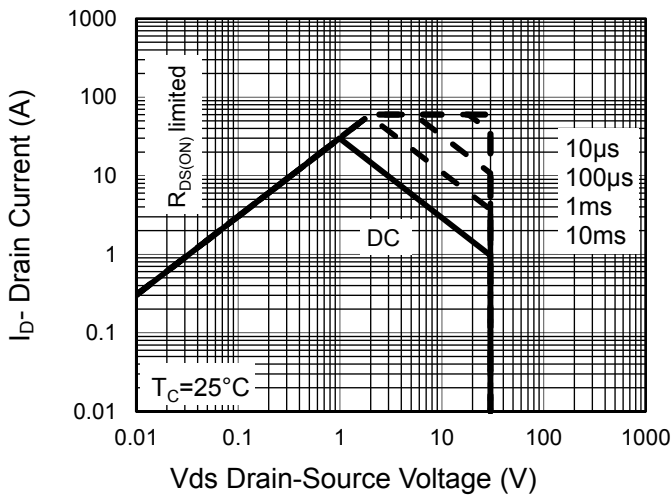


Figure 8 Safe Operation Area

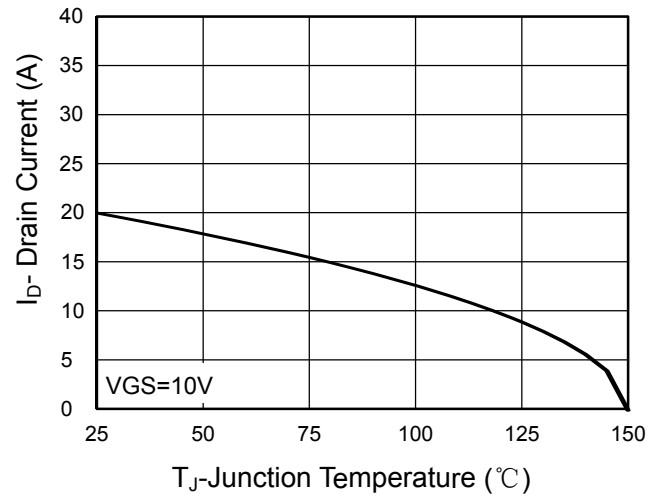


Figure 10 Current De-rating

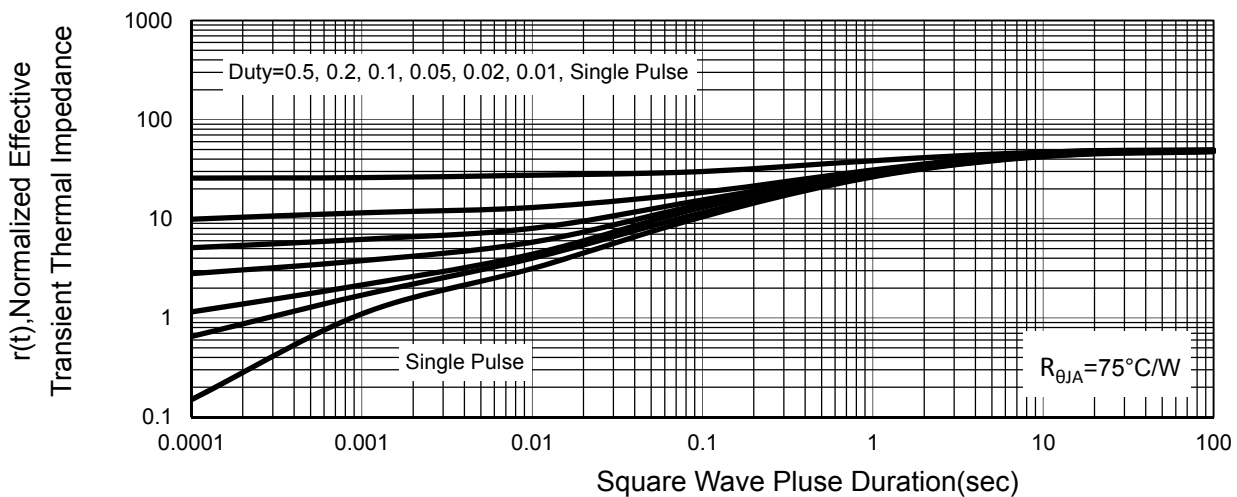
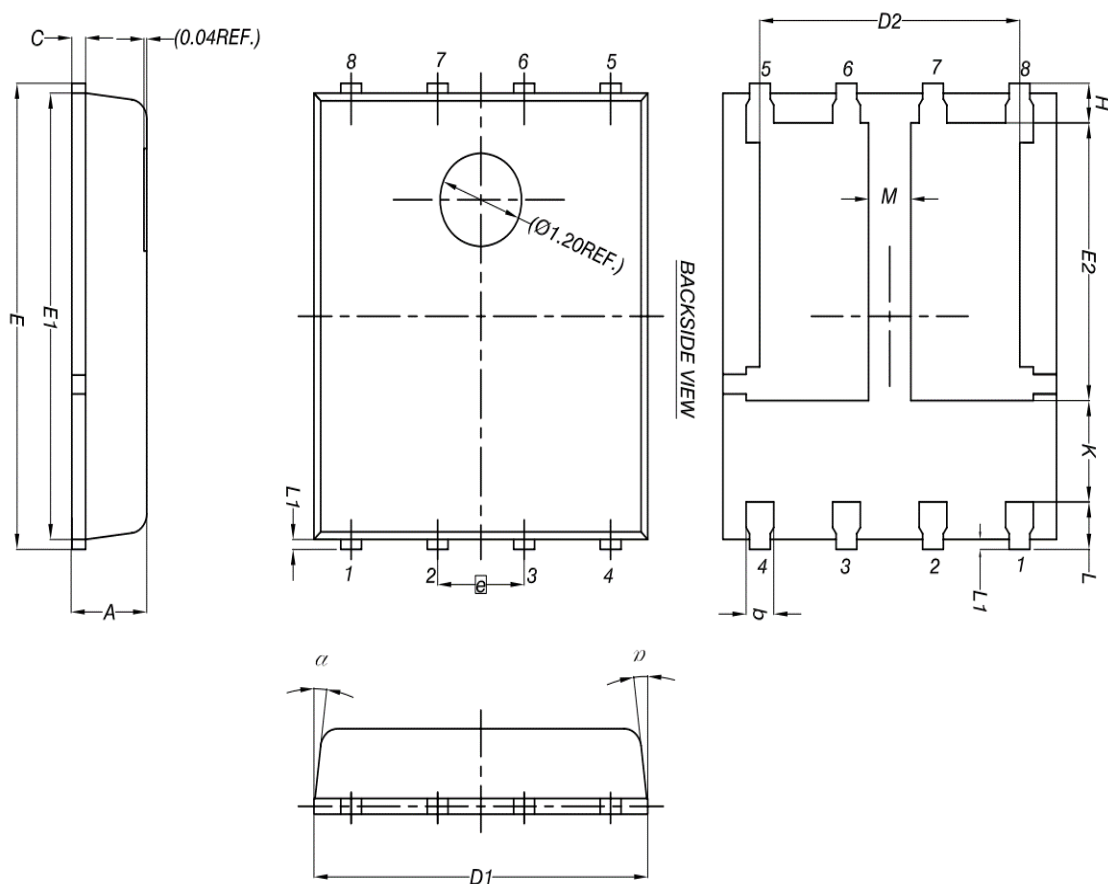


Figure 11 Normalized Maximum Transient Thermal Impedance

PDFNWB5x6-8L Package Outline Dimensions



Symbol	DIMENSIONS (unit : mm)		
	Min	Typ	Max
A	0.9	1	1.1
b	0.33	0.41	0.51
C	0.2	0.25	0.3
D1	4.8	4.9	5
D2	3.61	3.81	3.96
E	5.9	6	6.1
E1	5.7	5.75	5.8
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.1	--	--
L	0.51	0.61	0.71
L1	0.06	0.13	0.2
M	0.5	--	--
α	0°	--	12°

Note:
 1. Controlling dimension: in millimeters.
 2. General tolerance: ± 0.05 mm.
 3. The pad layout is for reference purposes only.