

● General Description

The TFD130N04N combines advanced trench MOSFET technology with a low resistance package to provide extremely low RDS(ON). This device is ideal for load switch and battery protection applications.

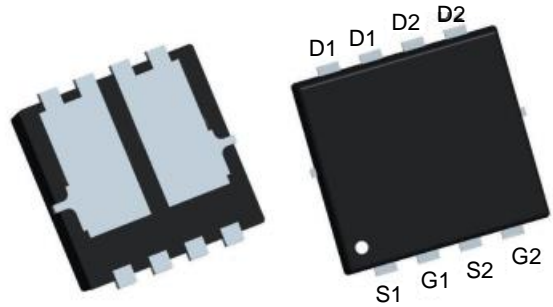
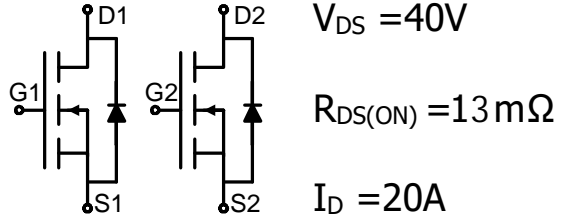
● Features

- Advance high cell density Trench technology
- Low RDS(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.	TFD130N04N
Marking	D130N04N
Packing Information	---
Basic ordering unit (pcs)	5000

● Absolute Maximum Ratings (T<sub>C</sub> = 25°C)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V <sub>DS</sub>	40	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current	I <sub>D@TC=25°C</sub>	20	A
	I <sub>D@TC=75°C</sub>	15	A
	I <sub>D@TC=100°C</sub>	12	A
Pulsed Drain Current ①	I <sub>DM</sub>	50	A
Total Power Dissipation	P <sub>D@TC=25°C</sub>	45	W
Total Power Dissipation	P <sub>D@TA=25°C</sub>	1.5	W
Operating Junction Temperature	T <sub>J</sub>	-55 to 150	°C
Storage Temperature	T <sub>STG</sub>	-55 to 150	°C
Single Pulse Avalanche Energy	E <sub>AS</sub>	50	mJ

●Thermal resistance

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

●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	$\mu A$
Gate- Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 100$	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 12A$	-	13	15	$m\Omega$
		$V_{GS} = 4.5V, I_D = 8A$	-	16	18	$m\Omega$
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	-	

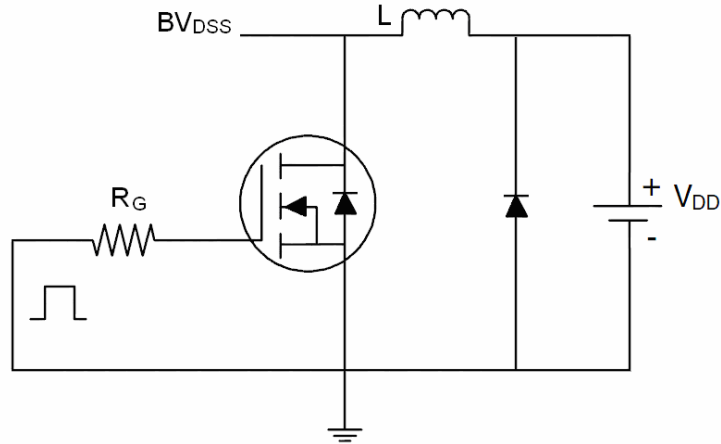
●Gate Charge characteristics( $T_a = 25^{\circ}C$ )

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	-	

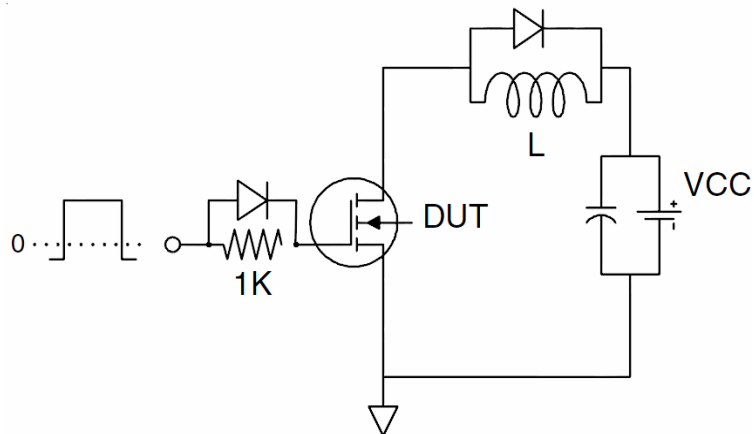
Note: ① Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$  ;

**Test Circuit**

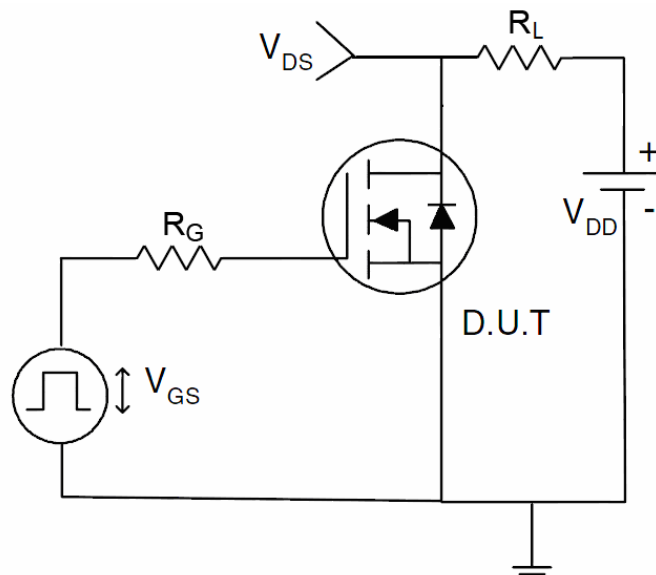
**1)  $E_{AS}$  test Circuit**



**2) Gate charge test Circuit**



**3) Switch Time Test Circuit**



Typical Electrical and Thermal Characteristics

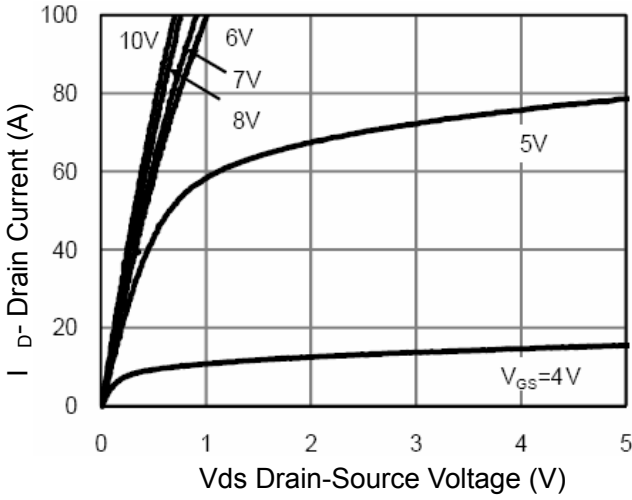


Figure 1 Output Characteristics

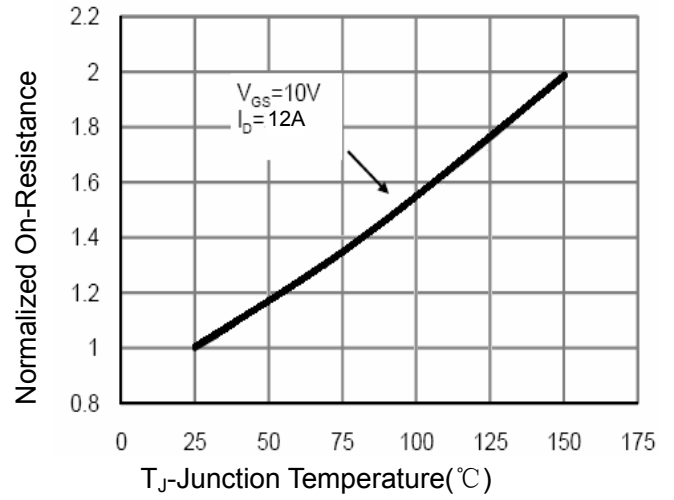


Figure 4 Rdson-Junction Temperature

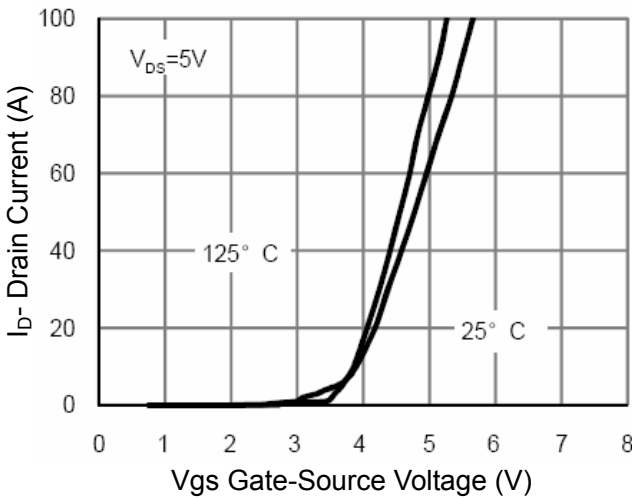


Figure 2 Transfer Characteristics

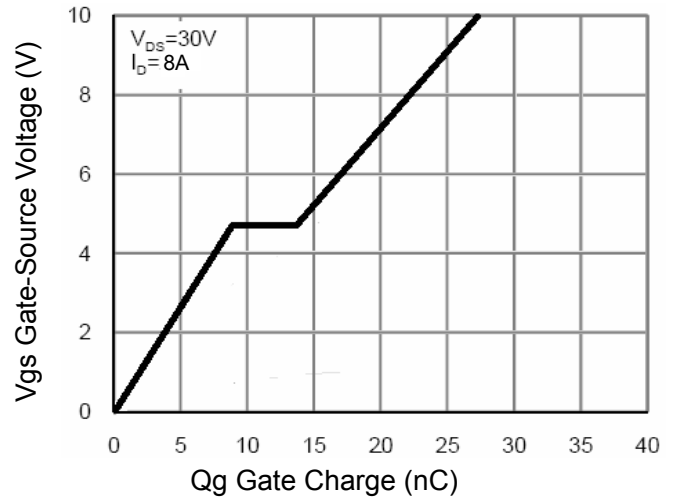


Figure 5 Gate Charge

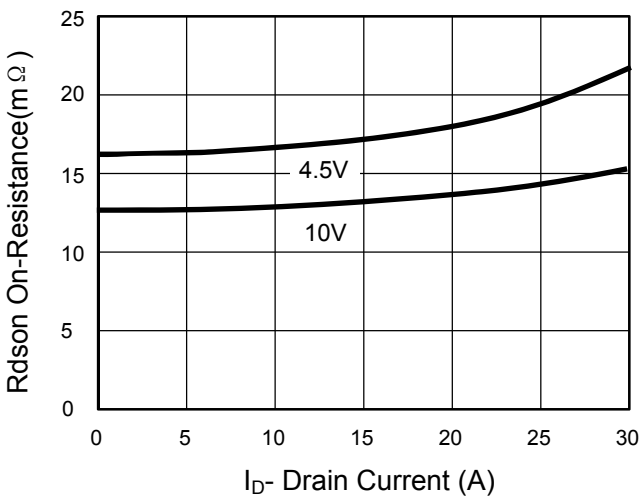


Figure 3 Rdson- Drain Current

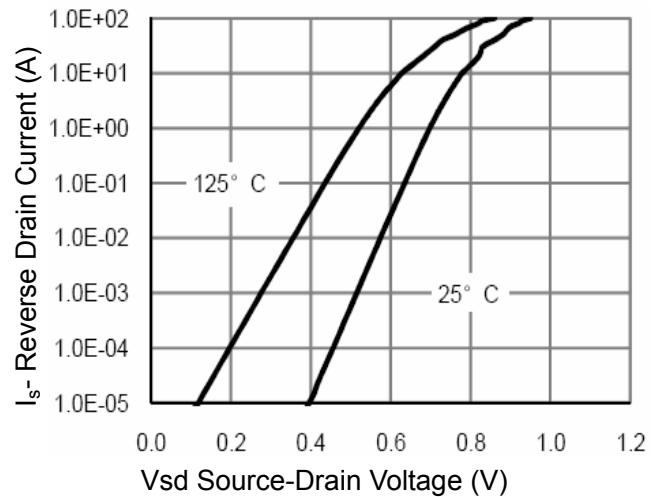


Figure 6 Source- Drain Diode Forward

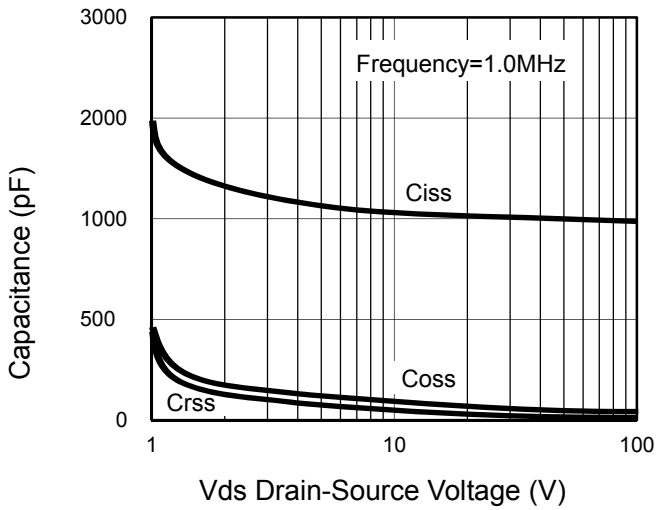


Figure 7 Capacitance vs Vds

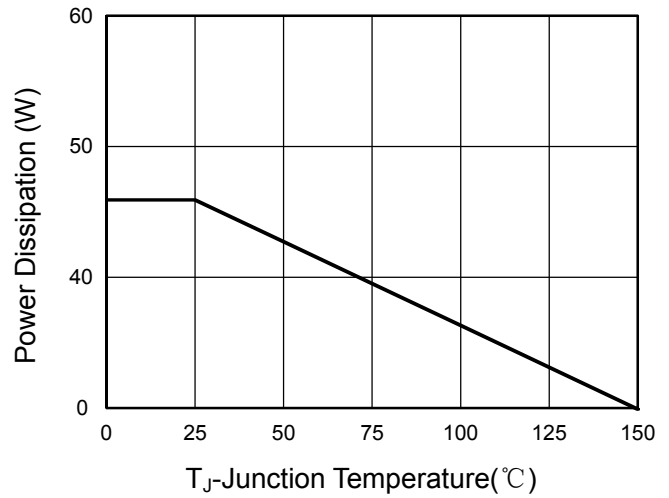


Figure 9 Power De-rating

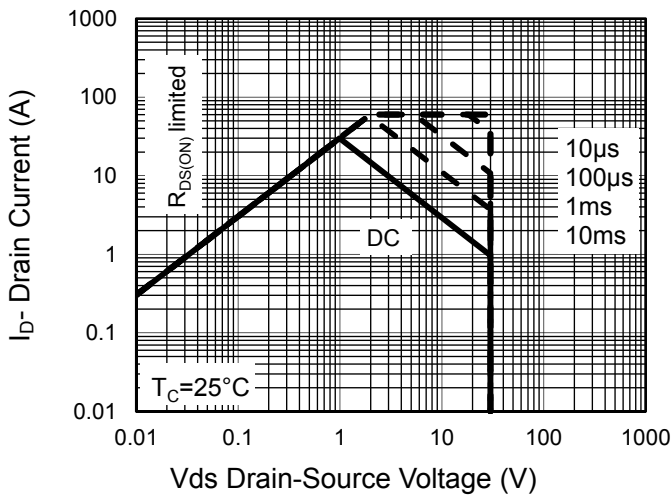


Figure 8 Safe Operation Area

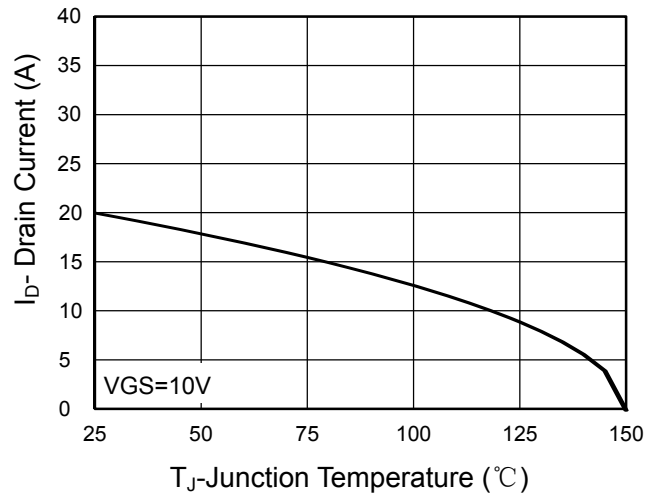


Figure 10 Current De-rating

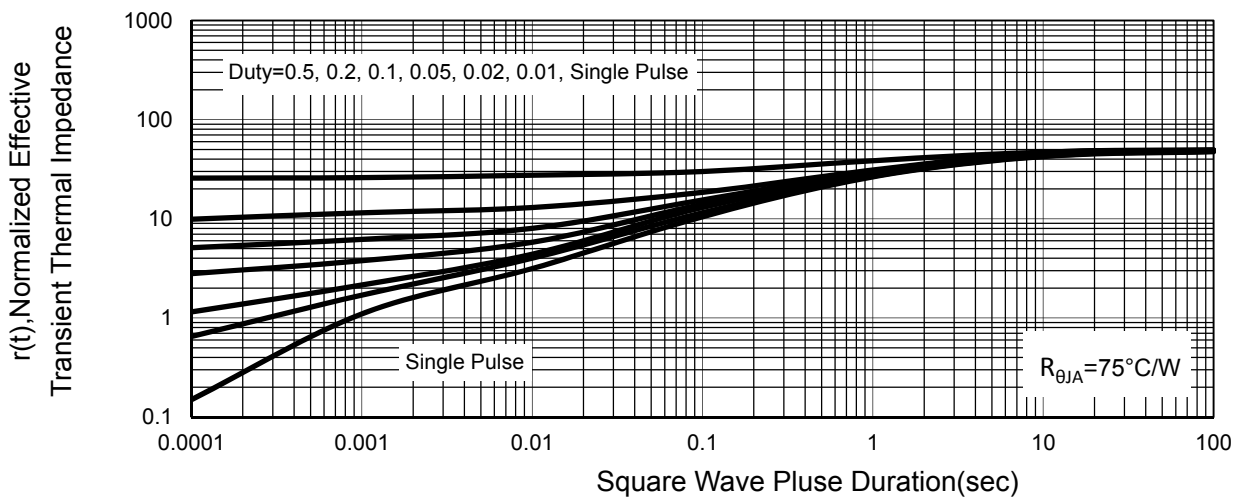
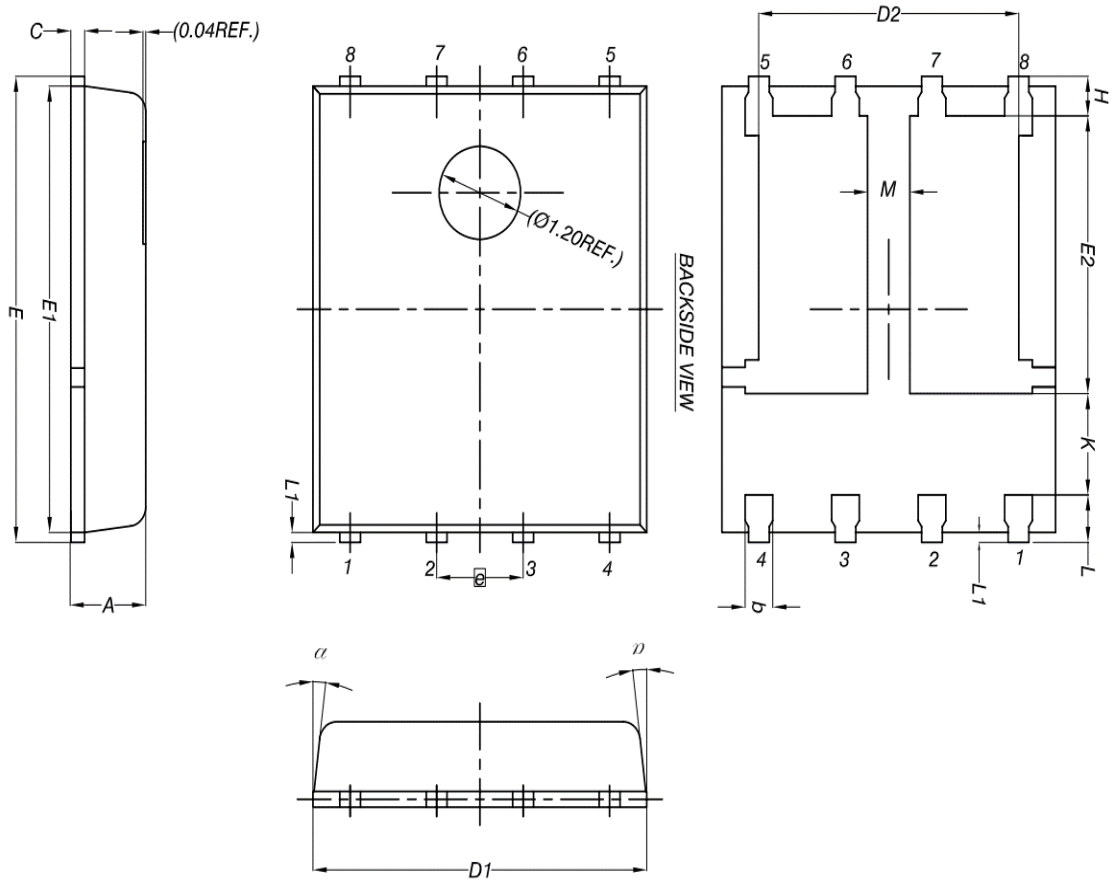


Figure 11 Normalized Maximum Transient Thermal Impedance

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: ±0.05mm.  
 3. The pad layout is for reference purposes only.