JSMICRO SEMICONDUCTOR

Description

The JSM7409B uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V.
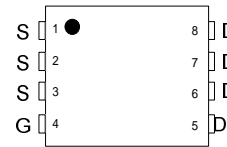
General Features

● V_{DS} = -30V, I_D = -25A

　$R_{DS(ON)}$ < 30mΩ @ V_{GS}=-4.5V

　$R_{DS(ON)}$ < 17mΩ @ V_{GS}=-10V

● High power and current handing capability
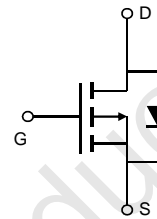
● Lead free product is acquired

● Surface mount package

Application
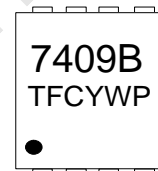
● Battery Switch

● Load switch

● Power management

PDFN3X3-8L

S 1	8 D
S 2	7 D
S 3	6 D
G 4	5 D

Equivalent Circuit

MARKING

7409B
TFCYWP

Y :year code　W :week code

Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (T_J =150℃)	T_A =25℃	I_D	-10	A
	T_A =70℃		-8.0	
Drain　Current-Pulsed [Note 1]		I_{DM}	-45	A
Maximum Power Dissipation		P_D	3.1	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 To 150	℃

Thermal Characteristic

	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient [Note 2]	$R_{\theta JA}$	40	℃/W

Plastic-Encapsulate MOSFETS

Electrical Characteristics (T$_A$=25℃ unless otherwise noted)

| Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV$_{DSS}$	V$_{GS}$=0V I$_D$=-250µA	-30	-33	-	V
Zero Gate Voltage Drain Current	I$_{DSS}$	V$_{DS}$=-30V,V$_{GS}$=0V	-	-	-1	µA
Gate-Body Leakage Current	I$_{GSS}$	V$_{GS}$=±20V,V$_{DS}$=0V	-	-	±100	nA
On Characteristics [Note 3]						
Gate Threshold Voltage	V$_{GS(th)}$	V$_{DS}$=V$_{GS}$,I$_D$=-250µA	1.0	1.7	3.0	V
Drain-Source On-State Resistance	R$_{DS(ON)}$	V$_{GS}$=-10V, I$_D$=-10A	-	14	17	mΩ
		V$_{GS}$=-4.5V, I$_D$=-10A	-	25	30	mΩ
Forward Transconductance	g$_{FS}$	V$_{DS}$=-15V,I$_D$=-10A	10	-	-	S
Dynamic Characteristics [Note4]						
Input Capacitance	C$_{Iss}$	V$_{DS}$=-15V,V$_{GS}$=0V, F=1.0MHz	-	1600	-	PF
Output Capacitance	C$_{oss}$		-	350	-	PF
Reverse Transfer Capacitance	C$_{rss}$		-	300	-	PF
Switching Characteristics [Note 4]						
Turn-on Delay Time	t$_{d(on)}$	V$_{DD}$=-15V, ID=-1A, V$_{GS}$=-10V,R$_{GEN}$=6Ω	-	10	-	nS
Turn-on Rise Time	t$_r$		-	15	-	nS
Turn-Off Delay Time	t$_{d(off)}$		-	110	-	nS
Turn-Off Fall Time	t$_f$			70	-	nS
Total Gate Charge	Q$_g$	V$_{DS}$=-15V,I$_D$=-10A V$_{GS}$=-10V	-	30	-	nC
Gate-Source Charge	Q$_{gs}$		-	5.5	-	nC
Gate-Drain Charge	Q$_{gd}$		-	8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage [Note 3]	V$_{SD}$	V$_{GS}$=0V,I$_S$=-10A	-	-	1.2	V

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. Surface Mounted on FR4 Board, t ≤ 10 sec.

3. Pulse Test: Pulse Width ≤ 300µs, Duty Cycle ≤ 2%.

4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics
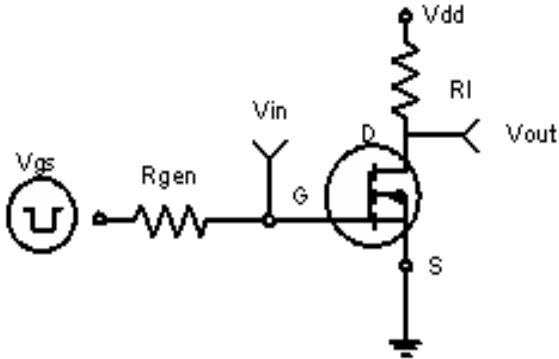
Figure 1:Switching Test Circuit
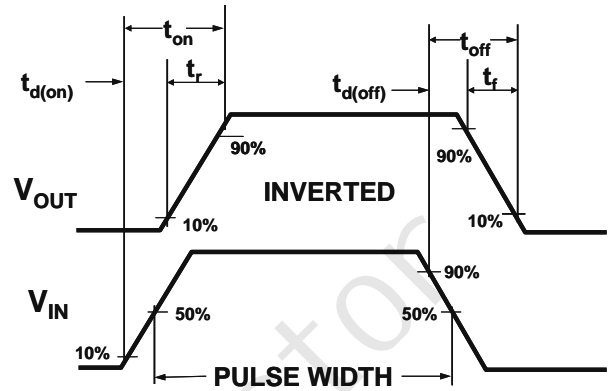
Figure 2:Switching Waveforms
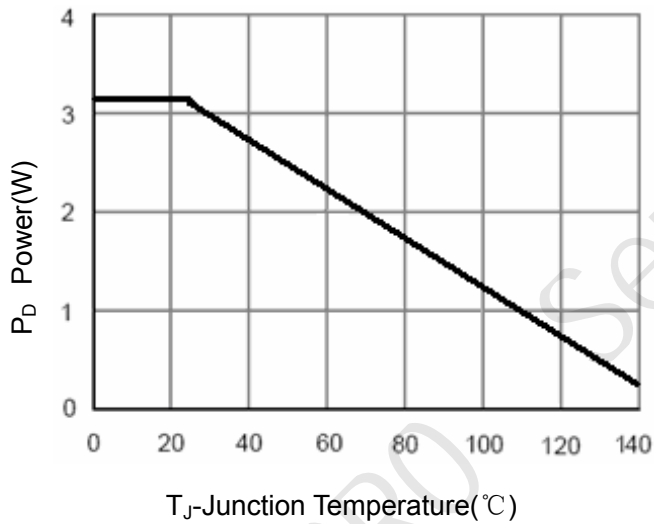
Figure 3 Power Dissipation
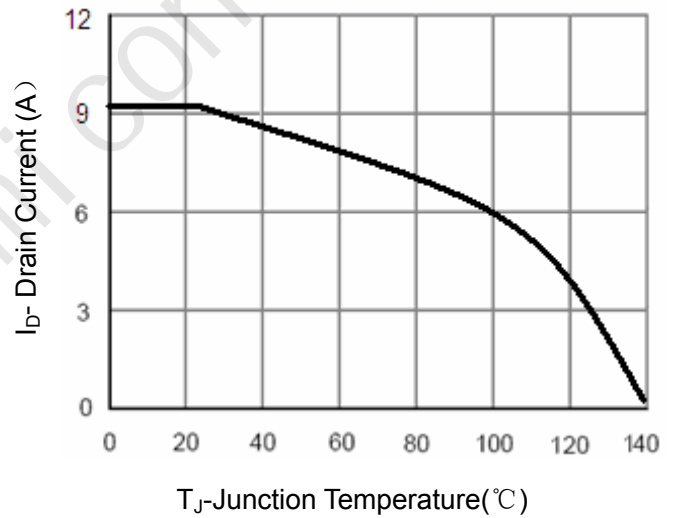
Figure 4 Drain Current
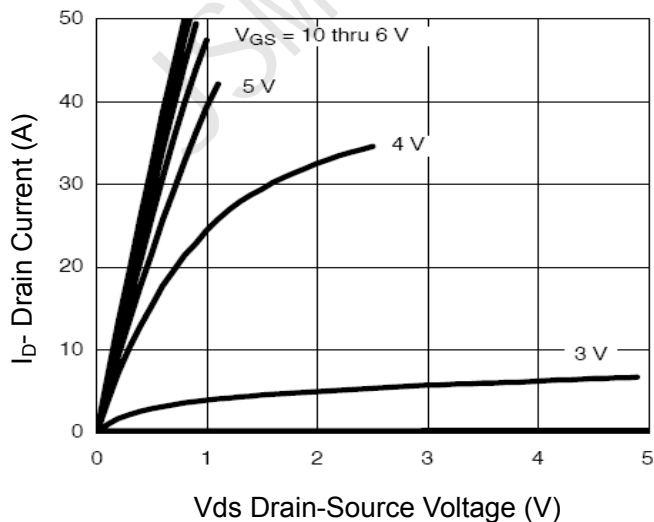
Figure 5 Output Characteristics
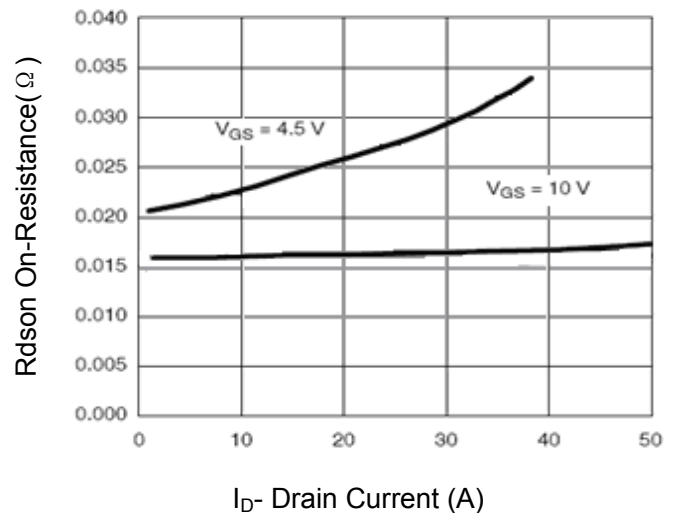
Figure 6 Drain-Source On-Resistance

Plastic-Encapsulate MOSFETS
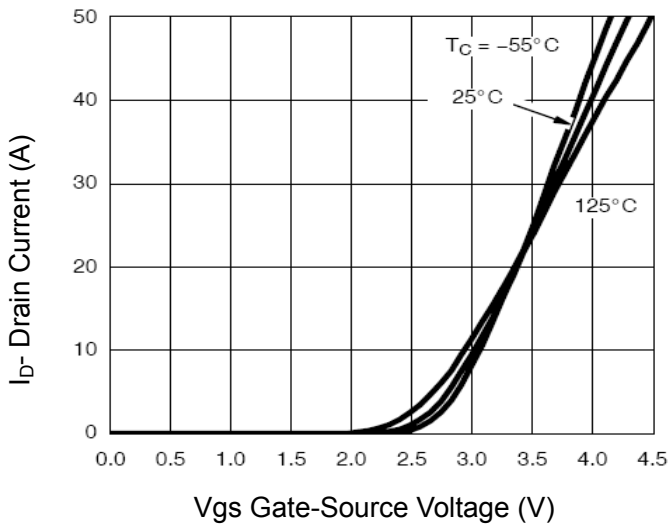
Figure 7 Transfer Characteristics
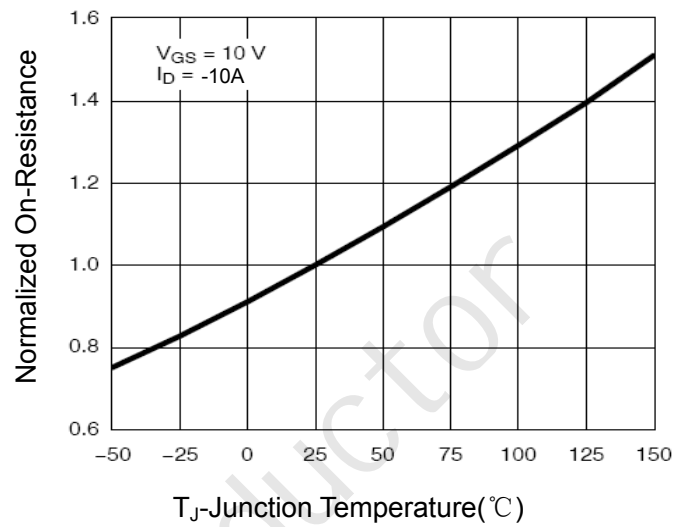
Figure 8 Drain-Source On-Resistance
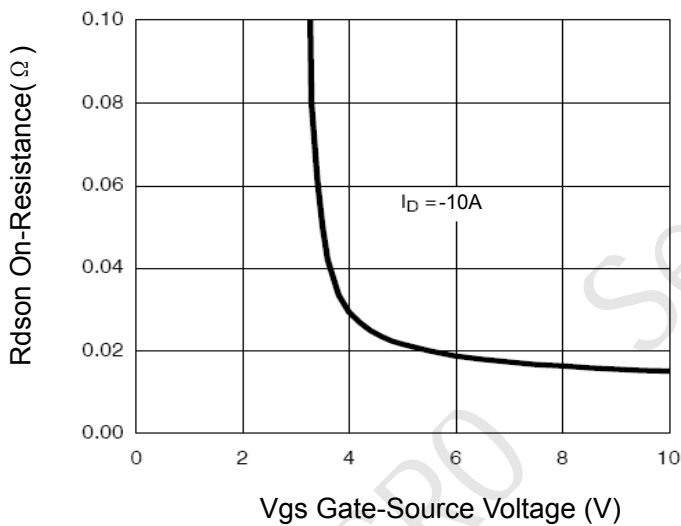
Figure 9 Rdson vs Vgs
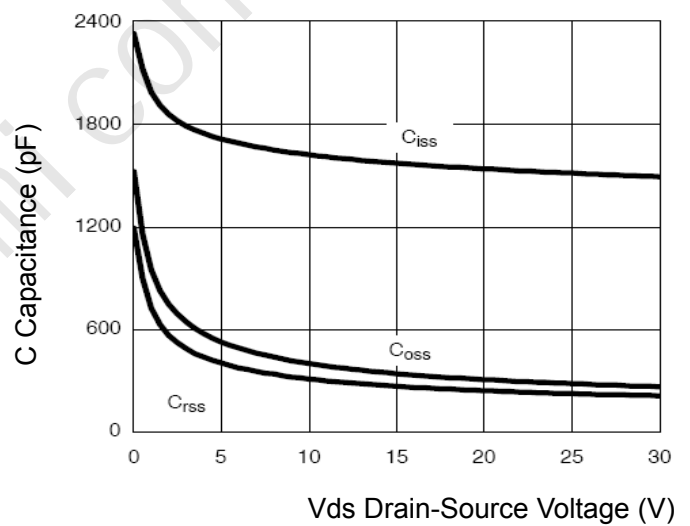
Figure 10 Capacitance vs Vds
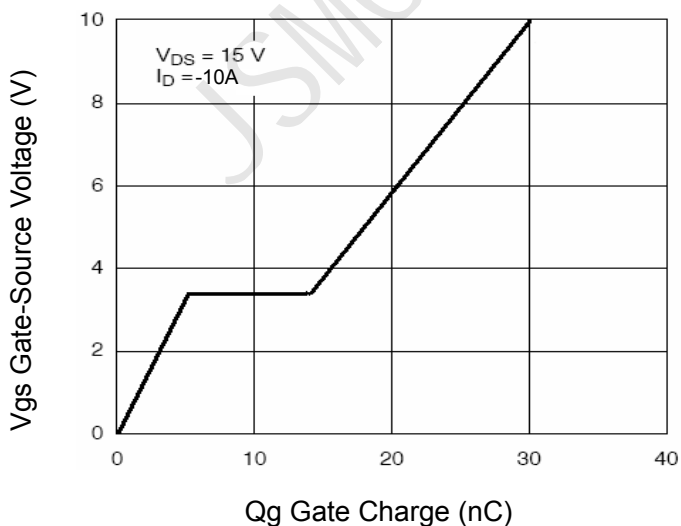
Figure 11 Gate Charge
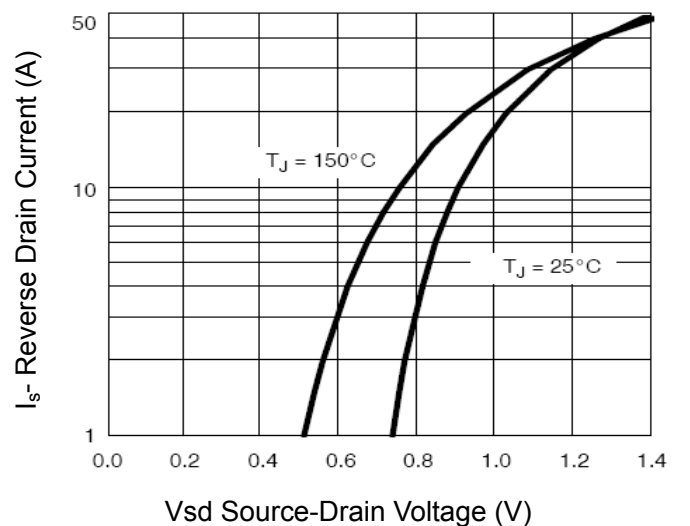
Figure 12 Source- Drain Diode Forward
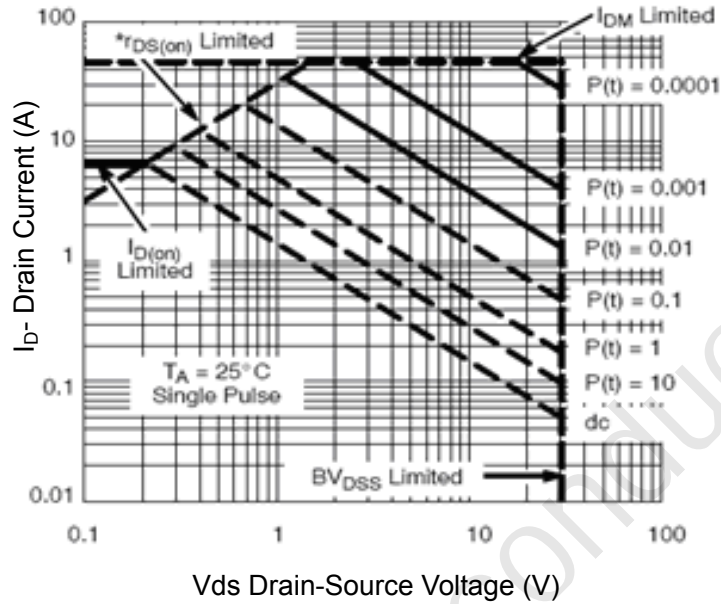
Figure 13 Safe Operation Area
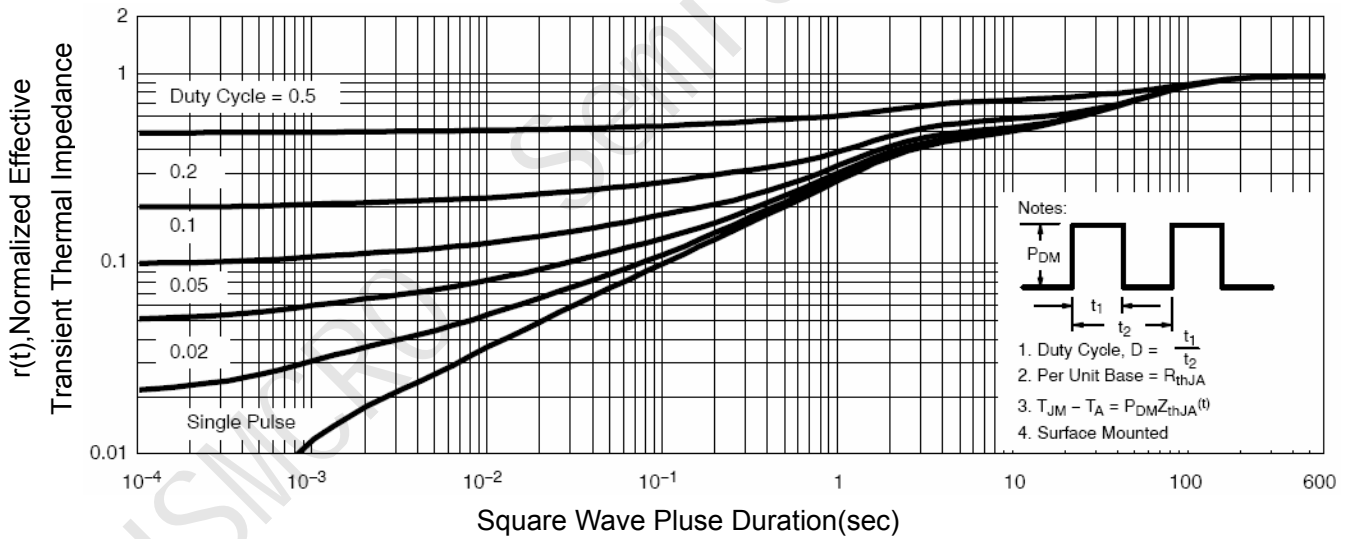
Figure 14 Normalized Maximum Transient Thermal Impedance

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Package Information　　PDFN3333
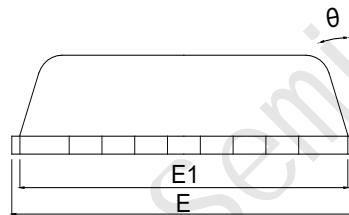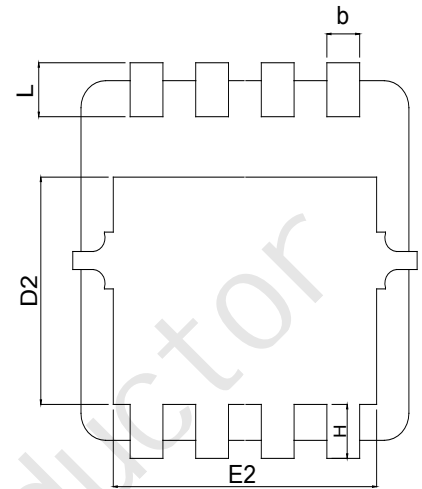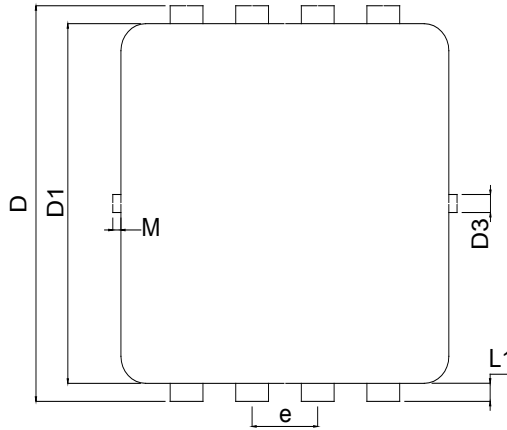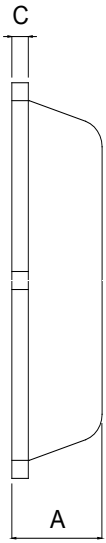
Land Pattern
(Only for Reference)
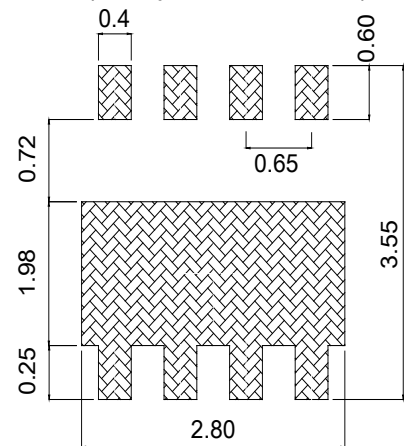
SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031	E1	3.00	3.15	3.20	0.118	0.122	0.126
b	0.25	0.30	0.35	0.010	0.012	0.014	E2	2.39	2.49	2.59	0.094	0.098	0.102
c	0.10	0.15	0.25	0.004	0.007	0.010	e	0.65BSC			0.026BSC		
D	3.25	3.35	3.45	0.128	0.132	0.136	H	0.30	0.40	0.50	0.012	0.016	0.020
D1	3.00	3.10	3.20	0.118	0.122	0.126	L	0.30	0.40	0.50	0.012	0.016	0.020
D2	1.78	1.88	1.98	0.070	0.074	0.078	L1	*	0.13	*	*	0.005	*
D3	*	0.13	*	*	0.005	*	θ	*	10°	12°	*	10°	12°
E	3.20	3.30	3.40	0.126	0.130	0.134	M	*	*	0.15	*	*	0.006