N-Channel Enhancement Mode Power MOSFET

Description

The JSM2622 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V.
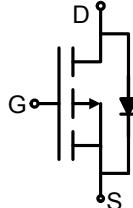
General Features

● V_{DS} = 20V, I_D = 50A

$R_{DS(ON)\ Typ}$ =4.5mΩ@ V_{GS}=10V

$R_{DS(ON)\ Typ}$ =5.0mΩ@ V_{GS}=4.5V

● High power and current handing capability

● Lead free product is acquired

● Surface mount package
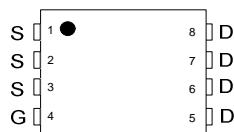
Application

● Battery Switch

● Load switch

● Power management

Schematic diagram

Pin assignment

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

PDFN3333-8 top view

Absolute Maximum Ratings (T$_A$=25℃ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current (T$_J$ =150℃)	T$_A$ =25℃	I_D	50	A
	T$_A$ =70℃		20	
Drain Current-Pulsed (Note 1)		I_{DM}	145	A
Maximum Power Dissipation		P_D	21	W
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	2.1	℃/W

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Electrical Characteristics ($T_C=25℃$ unless otherwise noted)

| Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V\ I_D=250\mu A$	20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V,V_{GS}=0V$	-	-	1	µA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm12V,V_{DS}=0V$	-	-	±100	nA
On Characteristics [Note 3]						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS},I_D=250\mu A$	0.5	0.75	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V,\ I_D=15\ A$	-	4.5	6.5	mΩ
		$V_{GS}=4.5V,\ I_D=10A$		5.0	8.5	mΩ
Forward Transconductance	g_{FS}	$V_{DS}=10V,I_D=15A$	10	-	-	S
Dynamic Characteristics [Note4]						
Input Capacitance	C_{Iss}	$V_{DS}=10V,V_{GS}=0V,$ F=1.0MHz	-	2000	-	PF
Output Capacitance	C_{oss}		-	500	-	PF
Reverse Transfer Capacitance	C_{rss}		-	200	-	PF
Switching Characteristics [Note 4]						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V,I_D=2A,R_L=1\Omega$ $V_{GS}=4.5V,R_G=3\Omega$	-	6.4	-	nS
Turn-on Rise Time	t_r		-	17.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	29.6	-	nS
Turn-Off Fall Time	t_f		-	16.8	-	nS
Total Gate Charge	Q_g	$V_{DS}=10V,I_D=15A,$ $V_{GS}=10V$	-	27		nC
Gate-Source Charge	Q_{gs}		-	6.5		nC
Gate-Drain Charge	Q_{gd}		-	6.4		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage [Note 3]	V_{SD}	$V_{GS}=0V,I_S=15A$	-		1.2	V
Diode Forward Current [Note 2]	I_S		-	-	50	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = 15A	-	25	-	nS
Reverse Recovery Charge	Q_{rr}	di/dt = 100A/µs [Note3]	-	24	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

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

5. E_{AS} condition : Tj=25℃,V_{DD}=10V,V_G=10V,L=0.5mH,Rg=25Ω，

Test circuit

1) E$_{AS}$ Test Circuit
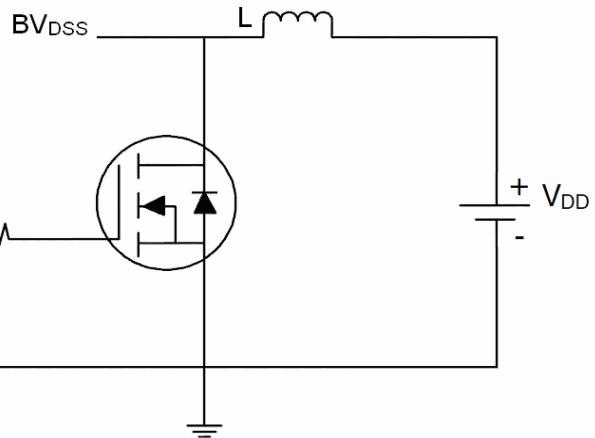
### 2) Gate Charge Test Circuit
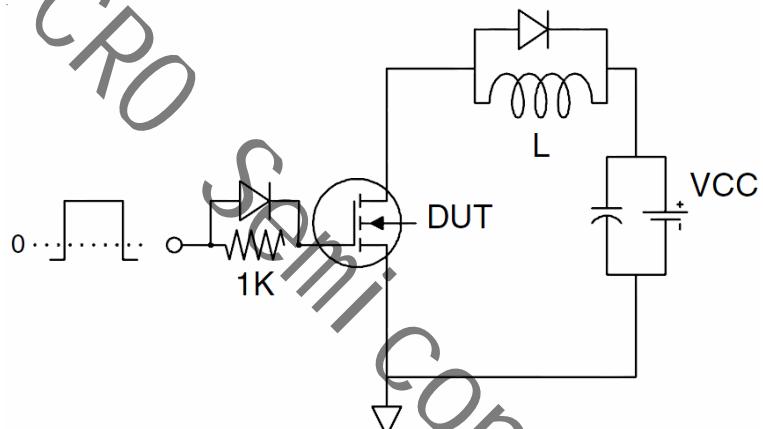
3) Switch Time Test Circuit

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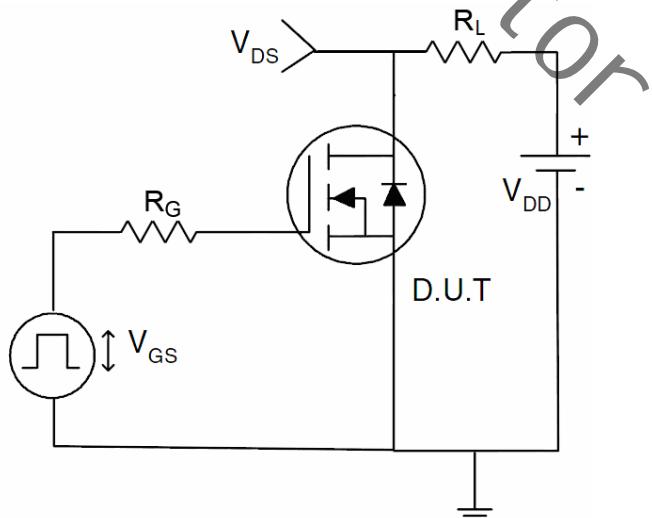
Typical Electrical and Thermal Characteristics (Curves)
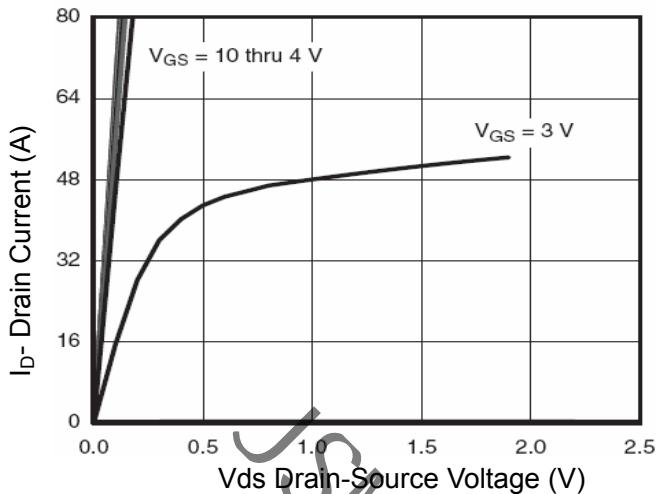
Figure 1 Output Characteristics
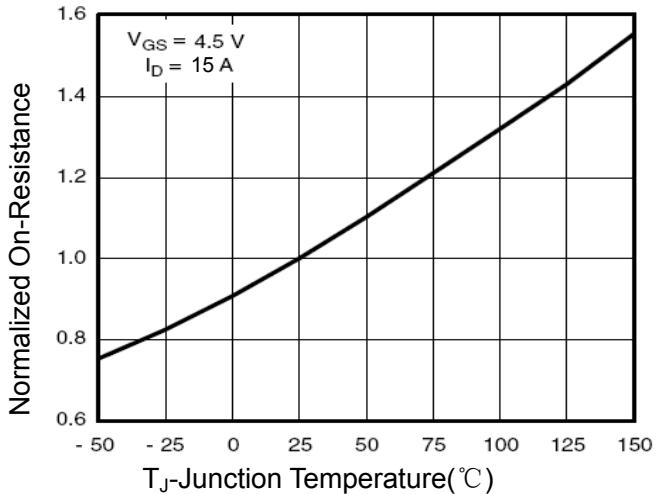
Figure 4 Rdson-JunctionTemperature
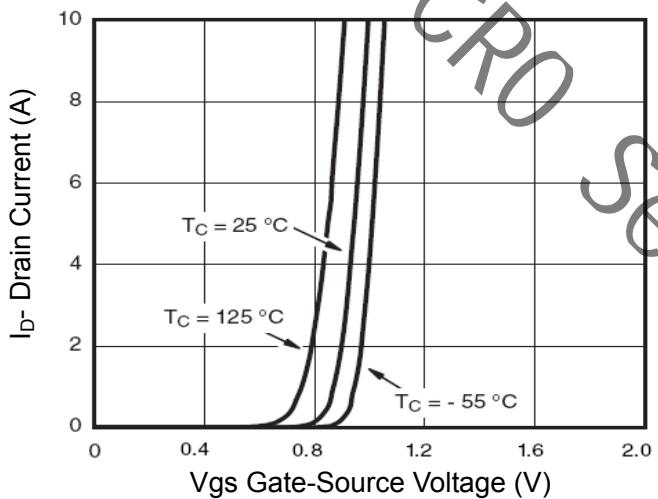
Figure 2 Transfer Characteristics
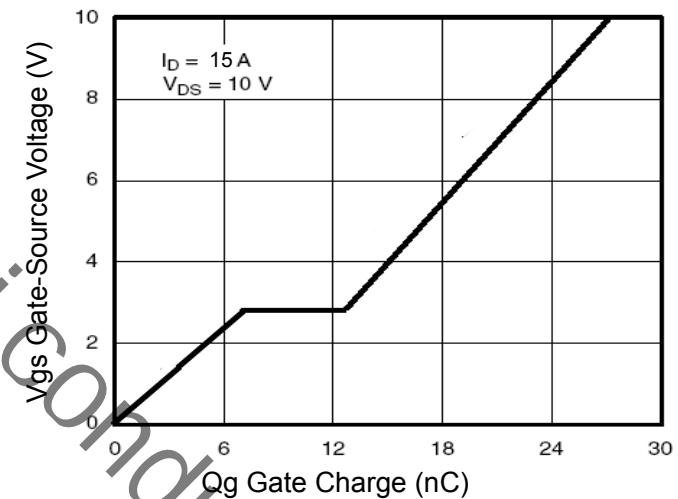
Figure 5 Gate Charge
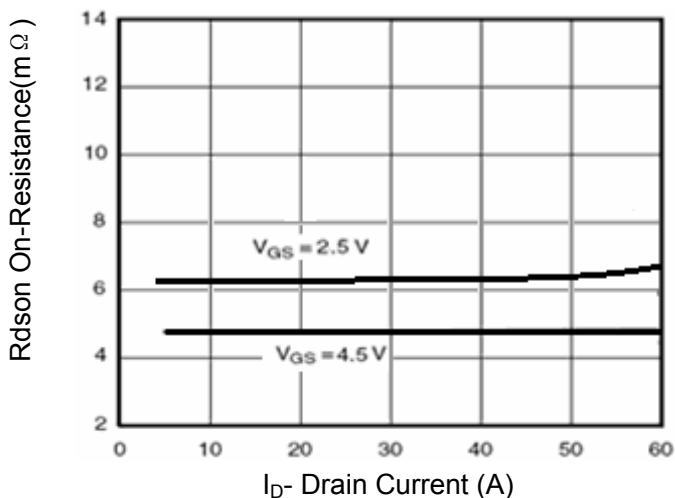
Figure 3 Rdson- Drain Current
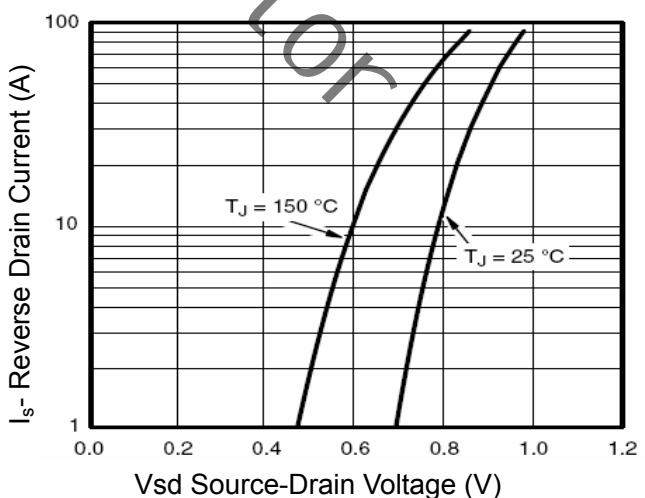

Figure 6 Source- Drain Diode Forward
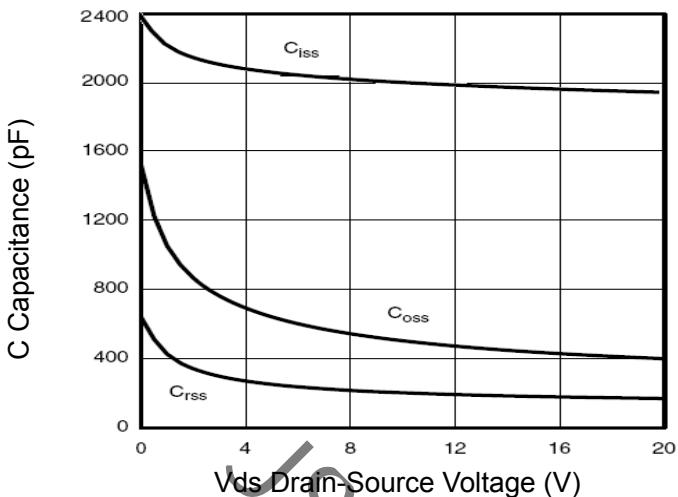
**Figure 7 Capacitance vs Vds**
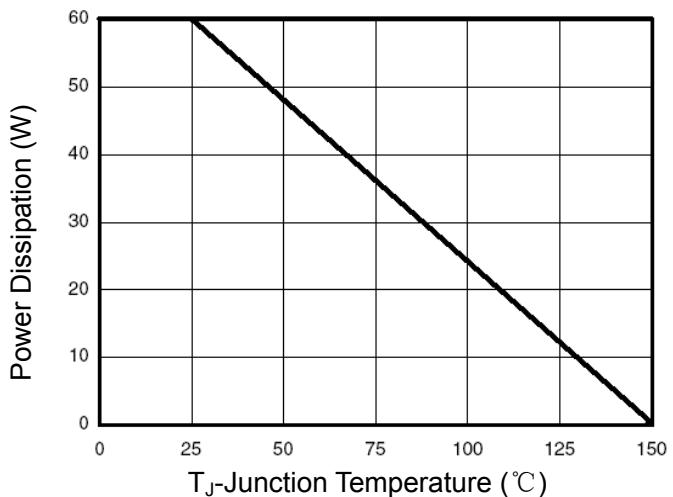


Figure 9 Power De-rating
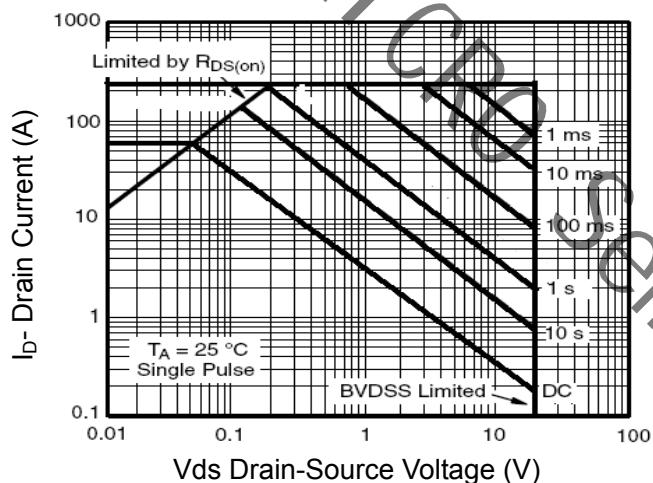
Figure 8 Safe Operation Area
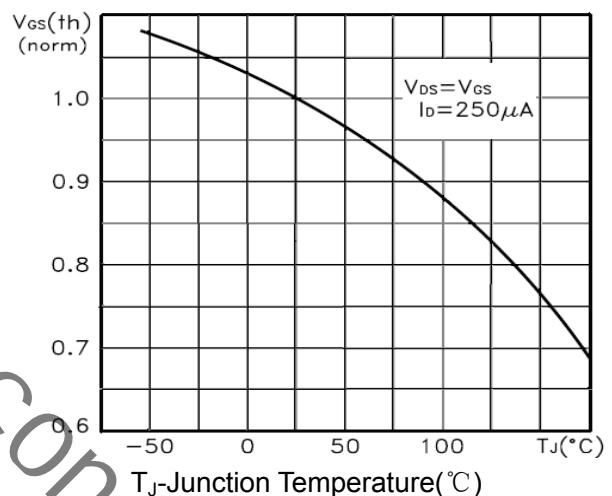
Figure 10 $V_{GS(th)}$ vs Junction Temperature

Square Wave Pluse Duration(sec)
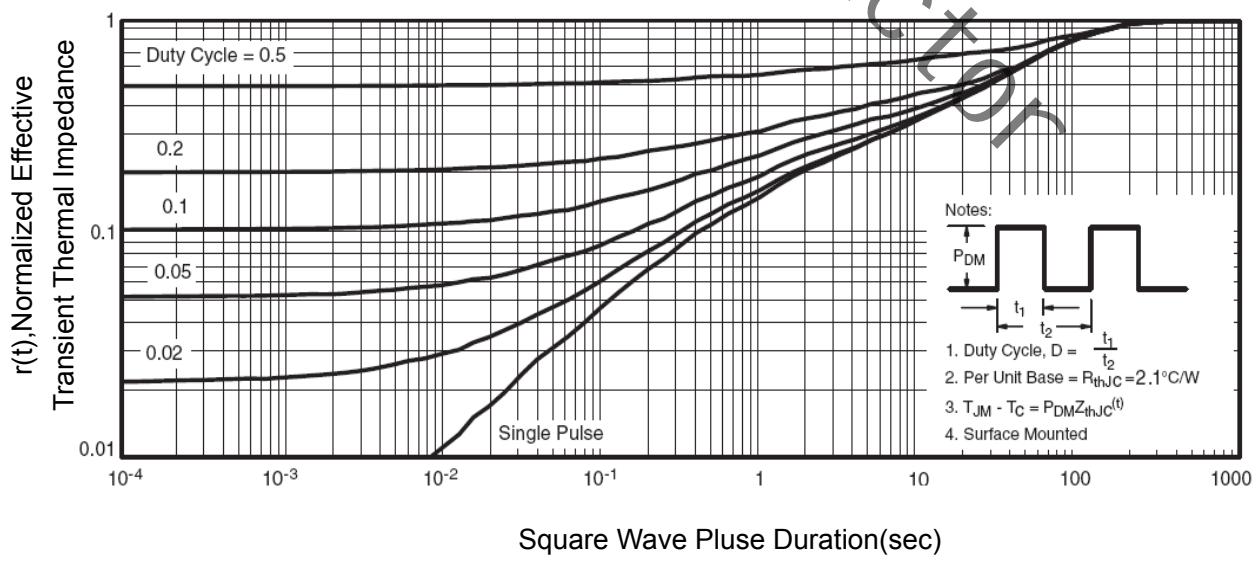
Figure 11 Normalized Maximum Transient Thermal Impedance

Package Information   PDFN3333

Land Pattern
(Only for Reference)
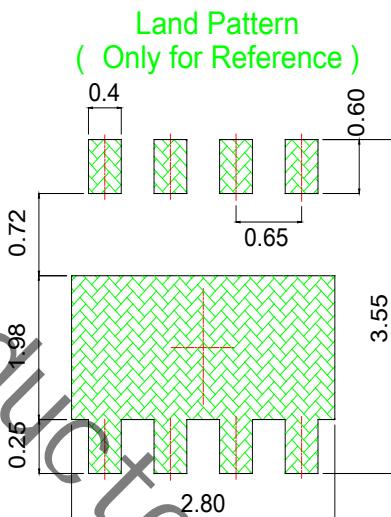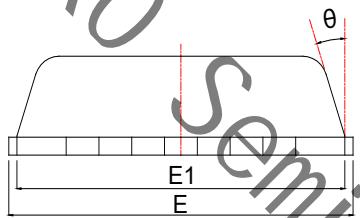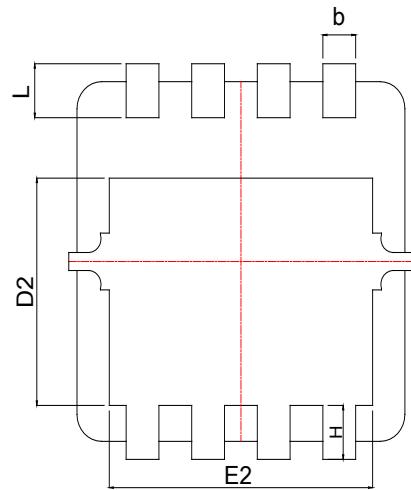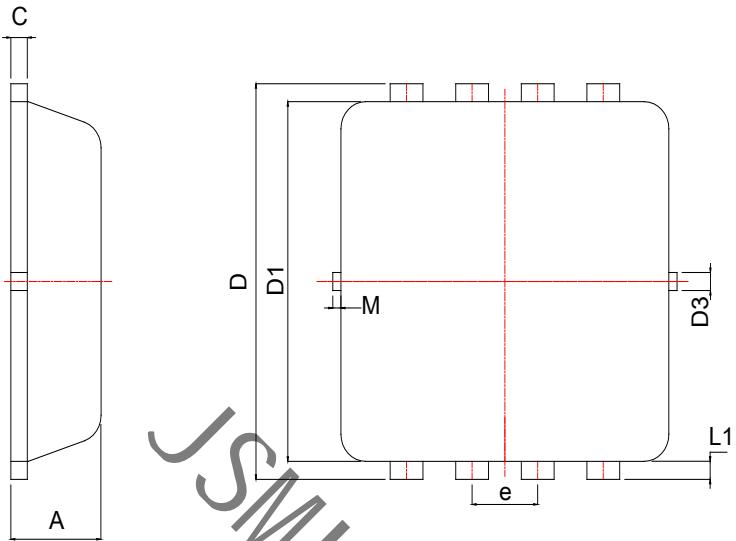
SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031	E1	3.00	3.15	3.20	0.118	0.122	0.126
b	0.25	0.30	0.35	0.010	0.012	0.014	E2	2.39	2.49	2.59	0.094	0.098	0.102
c	0.10	0.15	0.25	0.004	0.007	0.010	e	0.65BSC			0.026BSC		
D	3.25	3.35	3.45	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

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