

## General Description

The WSP6024 is the highest performance trench N-ch MOSFETs with extreme high cell density , which provide excellent R<sub>DS(on)</sub> and gate charge for most of the synchronous buck converter applications .

The WSP6024 meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

## Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

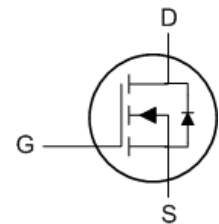
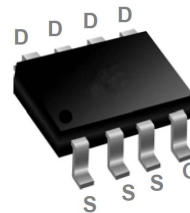
## Product Summary

BVDSS	R <sub>DS(on)</sub>	I <sub>D</sub>
60V	8mΩ	15A

## Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

## SOP-8 Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	60	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	15	A
I <sub>D</sub> @T <sub>C</sub> =70°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	9.6	A
I <sub>DM</sub> <sup>a</sup>	Pulsed Drain Current <sup>2</sup>	43	A
EAS <sup>b</sup>	Single Pulse Avalanche Energy <sup>3</sup>	81	mJ
I <sub>AS</sub> <sup>b</sup>	Avalanche Current	16	A
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>4</sup>	1.78	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	150	°C

## Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub> <sup>c</sup>	Thermal Resistance Junction-ambient <sup>1</sup>	---	72	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	---	1.2	°C/W

Note a : Pulse width limited by max. junction temperature.

Note b : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T<sub>J</sub>=25°C).

Note c : Surface Mounted on 1in<sup>2</sup> pad area.

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	60	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BVDSS Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.044	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =13A	---	8	10	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A	---	11	13.7	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.0	2.0	3.0	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-4.6	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =60V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	100	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
Q <sub>g</sub>	Total Gate Charge (10V)	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =6A	---	25.4	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	4.6	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	3.8	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =30V, V <sub>GEN</sub> =10V, R <sub>G</sub> =6Ω, I <sub>D</sub> =1A, R <sub>L</sub> =30Ω	---	15	---	ns
T <sub>r</sub>	Rise Time		---	7	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	34	---	
T <sub>f</sub>	Fall Time		---	30	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz	---	1500	---	pF
C <sub>oss</sub>	Output Capacitance		---	280	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	40	---	

**Diode Characteristics**

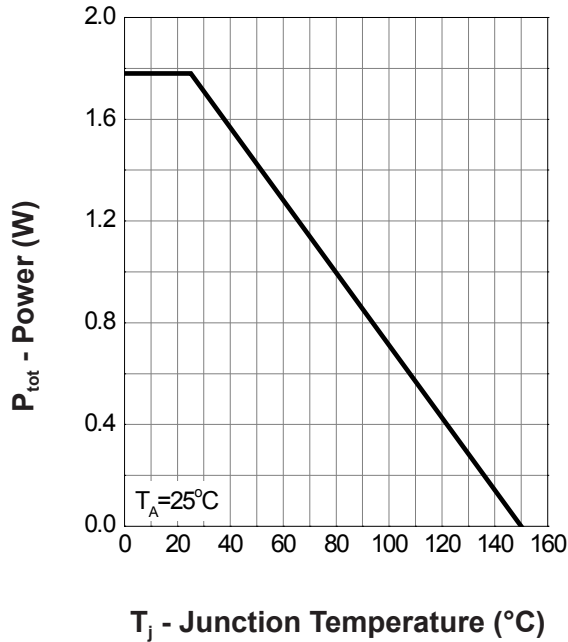
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>r</sub> =6.0A, dI/dt=100A/μs, T <sub>J</sub> =25°C	---	30	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge		---	29	---	nC

Note d : Pulse test ; pulse width≤300ms, duty cycle≤2%.

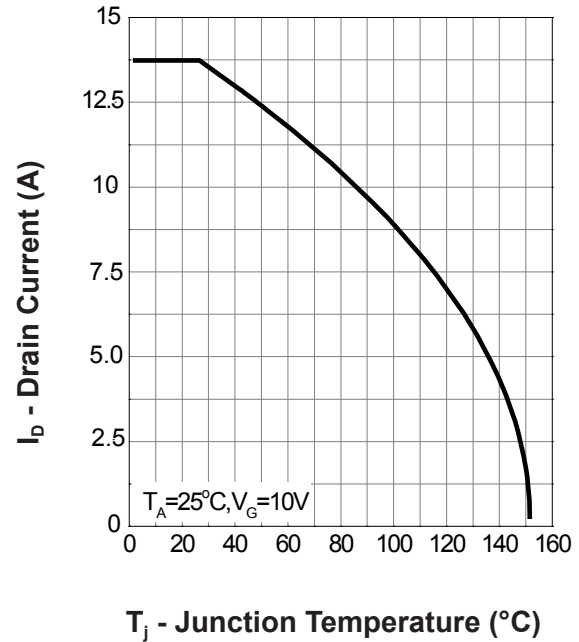
Note e : Guaranteed by design, not subject to production testing.

Typical Characteristics

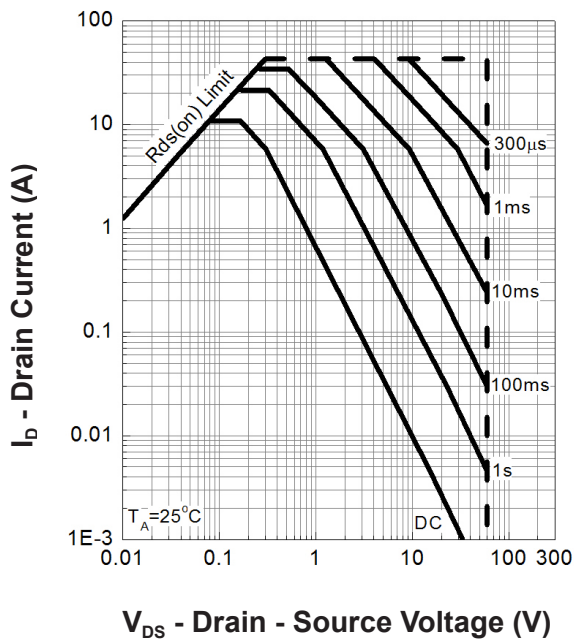
Power Dissipation



Drain Current



Safe Operation Area



Thermal Transient Impedance

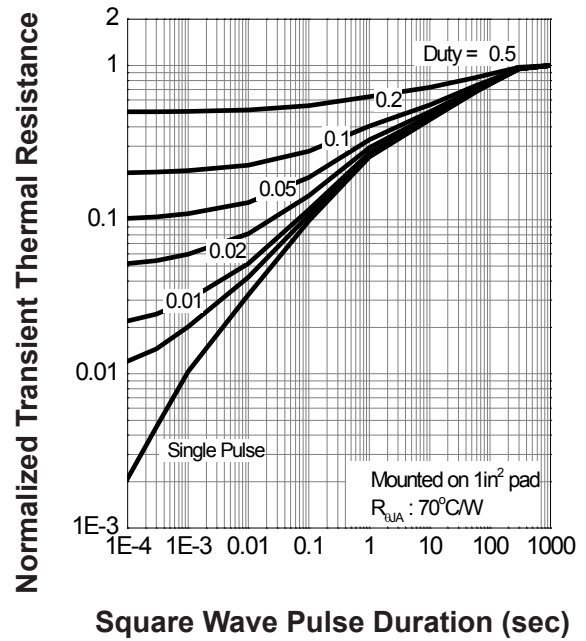
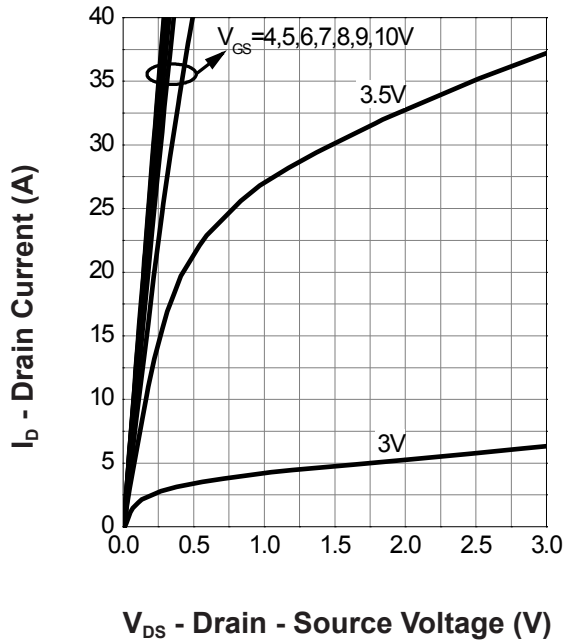
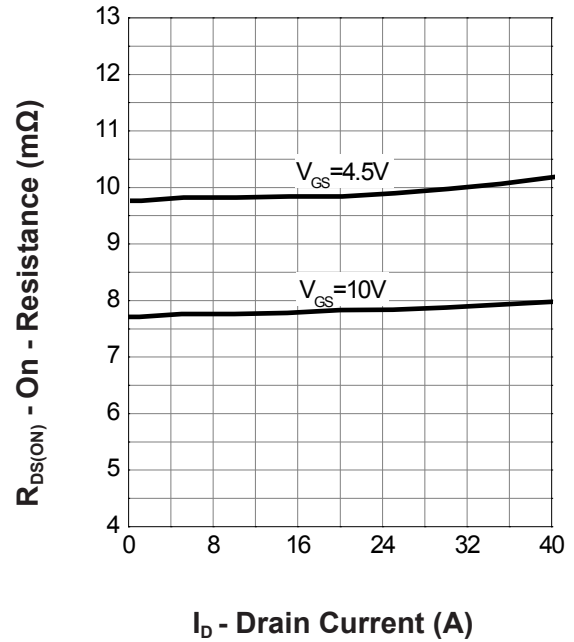


Fig5. Typical Source-Drain Diode Forward Voltage

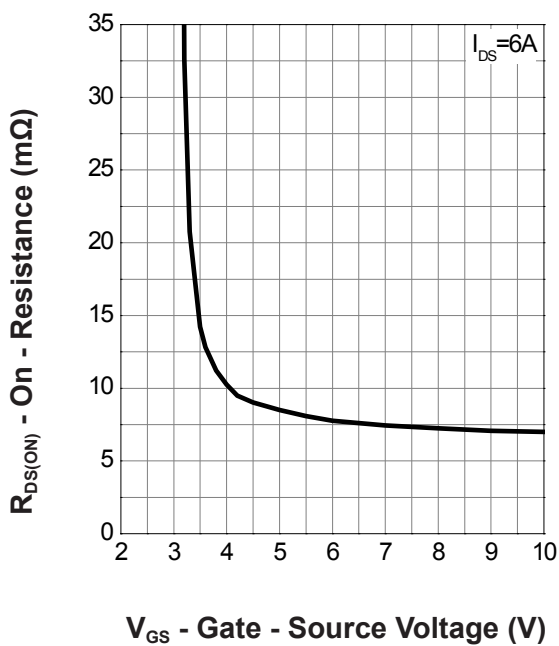
**Output Characteristics**



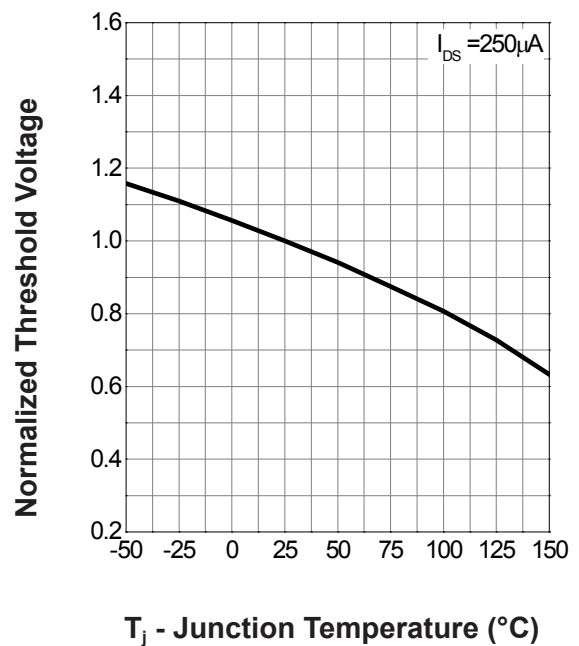
**Drain-Source On Resistance**



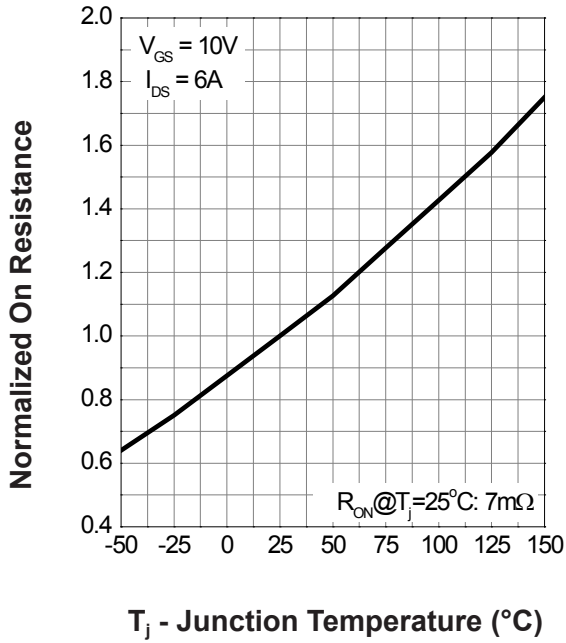
**Gate-Source On Resistance**



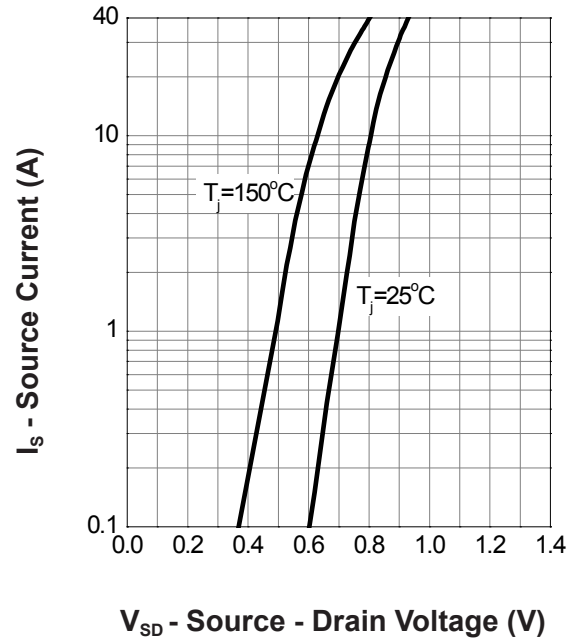
**Gate Threshold Voltage**



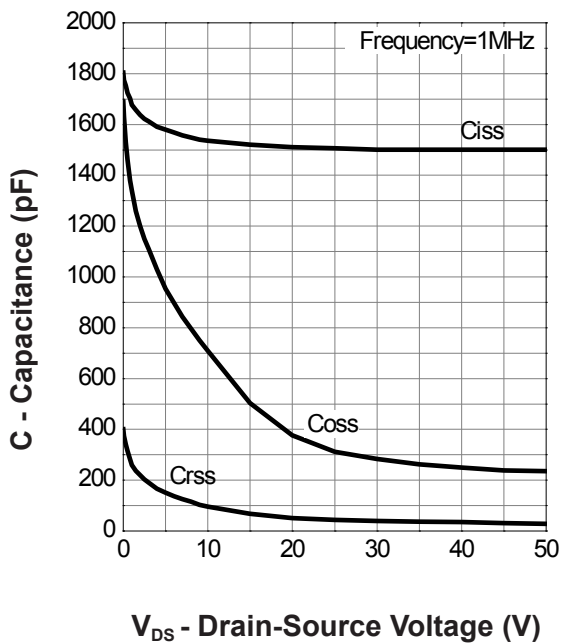
**Drain-Source On Resistance**



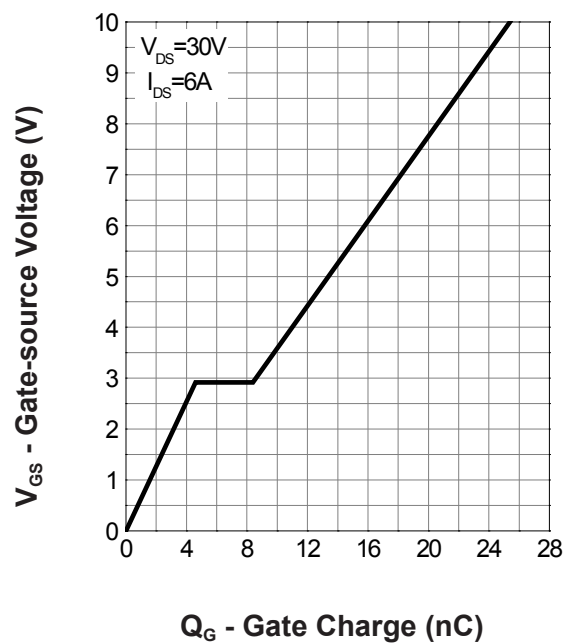
**Source-Drain Diode Forward**



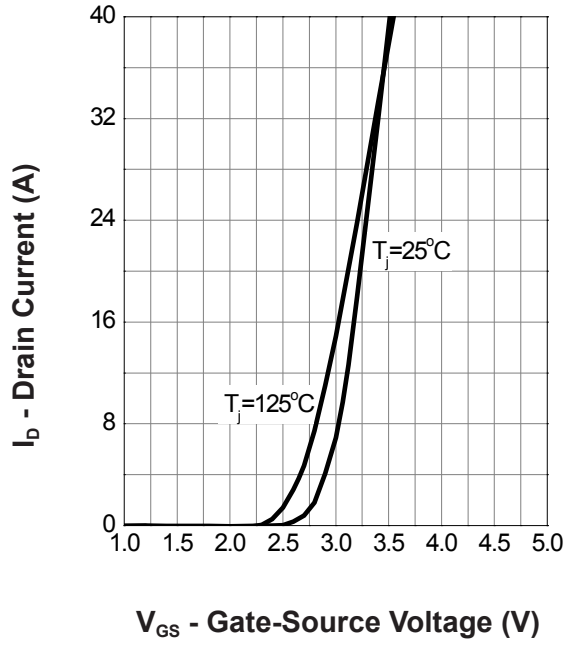
**Capacitance**



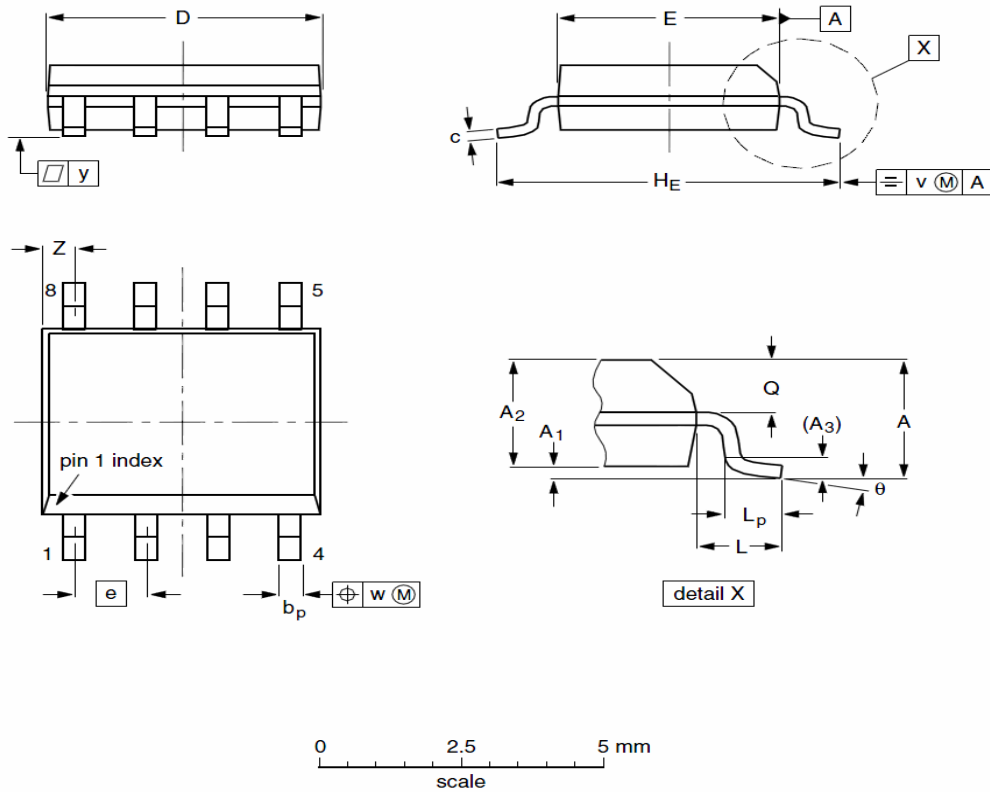
**Gate Charge**



**Transfer Characteristics**



**SOP8 Package Outline Data**



**DIMENSIONS ( unit : mm )**

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	--	1.75	--	A <sub>1</sub>	0.10	0.18	0.25
A <sub>2</sub>	1.25	1.35	1.45	A <sub>3</sub>	--	0.25	--
b <sub>p</sub>	0.36	0.42	0.49	c	0.19	0.22	0.25
D	4.80	4.92	5.00	E	3.80	3.90	4.00
e	--	1.27	--	H <sub>E</sub>	5.80	5.98	6.20
L	--	1.05	--	L <sub>p</sub>	0.40	0.68	1.00
Q	0.60	0.65	0.70	v	--	0.25	--
w	--	0.25	--	y	--	0.10	--
Z	0.30	0.50	0.70	θ	0°		8°

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