

# GSM4228

## 20V N-Channel Enhancement Mode MOSFET

### Product Description

GSM4228, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent  $R_{DS(ON)}$ , low gate charge.

These devices are particularly suited for low voltage power management, and low in-line power loss are needed in commercial industrial surface mount applications.

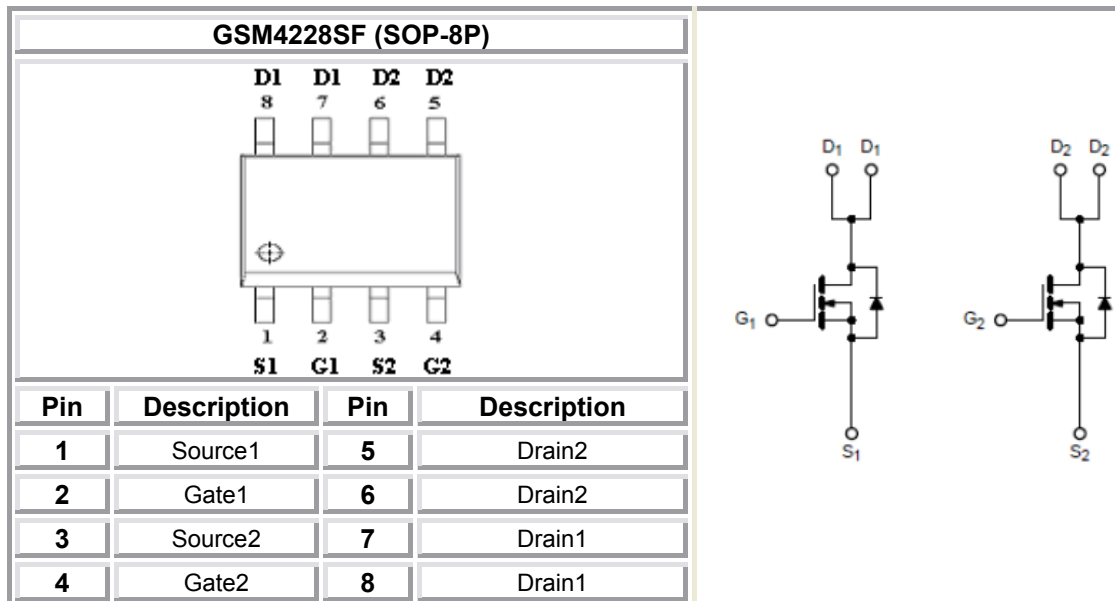
### Features

- 20V/8A,  $R_{DS(ON)}=12m\Omega@V_{GS}=4.5V$
- 20V/6A,  $R_{DS(ON)}=15m\Omega@V_{GS}=2.5V$
- 20V/5A,  $R_{DS(ON)}=20m\Omega@V_{GS}=1.8V$
- Super high density cell design for extremely low  $R_{DS(ON)}$
- SOP-8P package design

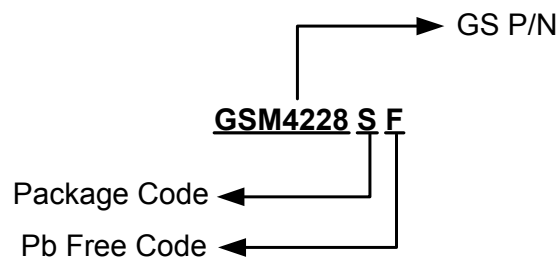
### Applications

- Low Current DC/DC Conversion
- Load Switch
- CCFL Inverter
- Power Management in Notebook Computer

### Packages & Pin Assignments

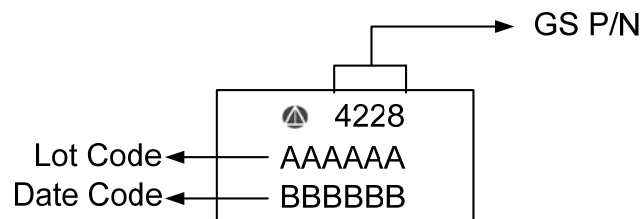


## Ordering Information



Part Number	Package	Quantity Reel
GSM4228SF	SOP-8P	3000 PCS

## Marking Information



## Absolute Maximum Ratings

(T<sub>A</sub>=25°C unless otherwise noted)

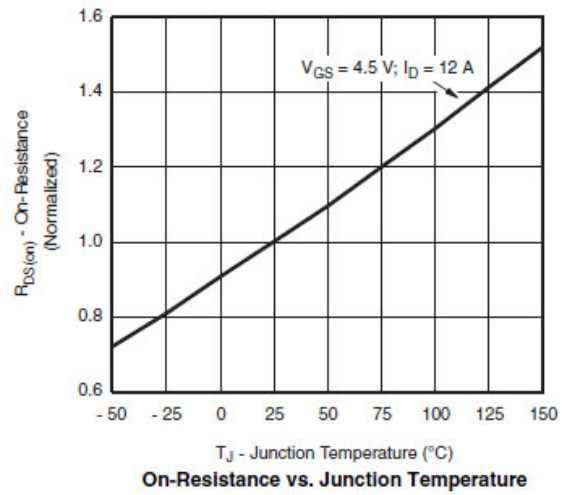
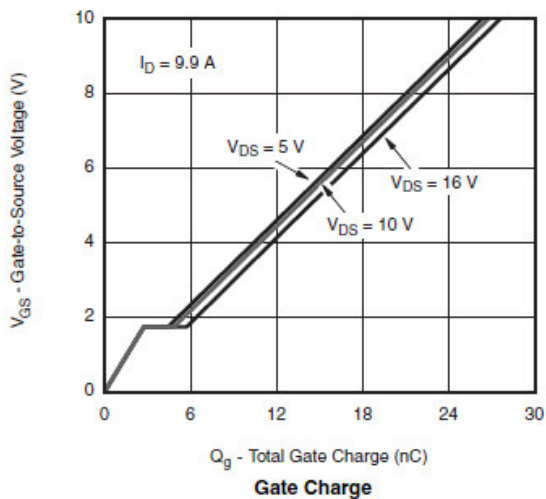
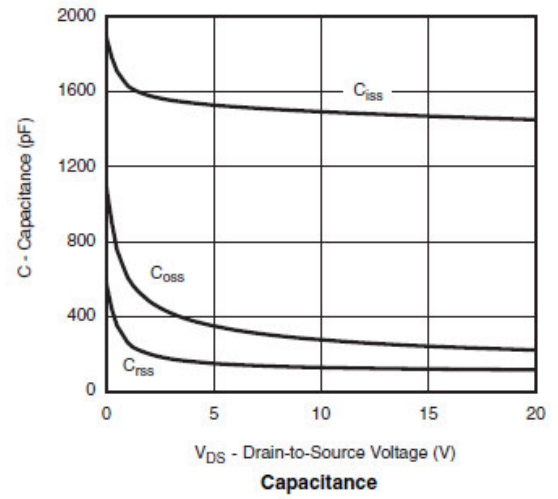
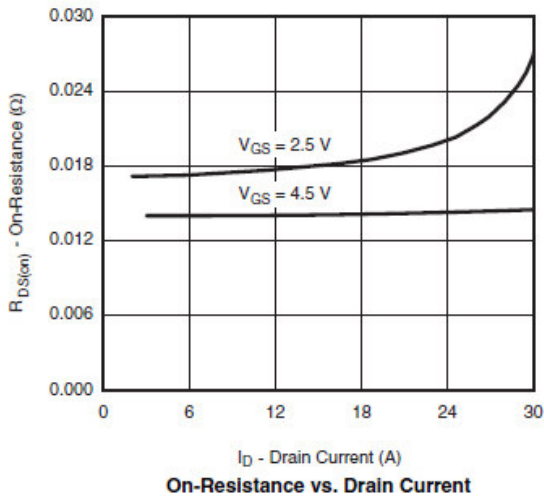
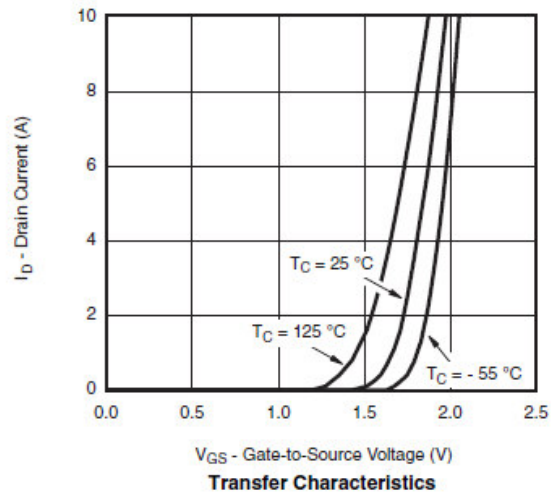
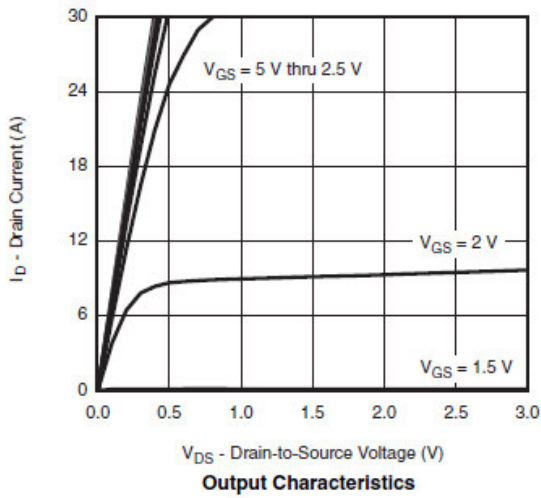
Symbol	Parameter	Typical	Unit
V <sub>DSS</sub>	Drain-Source Voltage	20	V
V <sub>GSS</sub>	Gate -Source Voltage	±12	V
I <sub>D</sub>	Continuous Drain Current(T <sub>J</sub> =150°C)	T <sub>A</sub> =25°C	8.0
		T <sub>A</sub> =70°C	6.0
I <sub>DM</sub>	Pulsed Drain Current	20	A
I <sub>S</sub>	Continuous Source Current(Diode Conduction)	1.5	A
P <sub>D</sub>	Power Dissipation	T <sub>A</sub> =25°C	2.8
		T <sub>A</sub> =70°C	1.8
T <sub>J</sub>	Operating Junction Temperature	150	°C
T <sub>STG</sub>	Storage Temperature Range	-55/150	°C
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient	62.5	°C/ W

## Electrical Characteristics

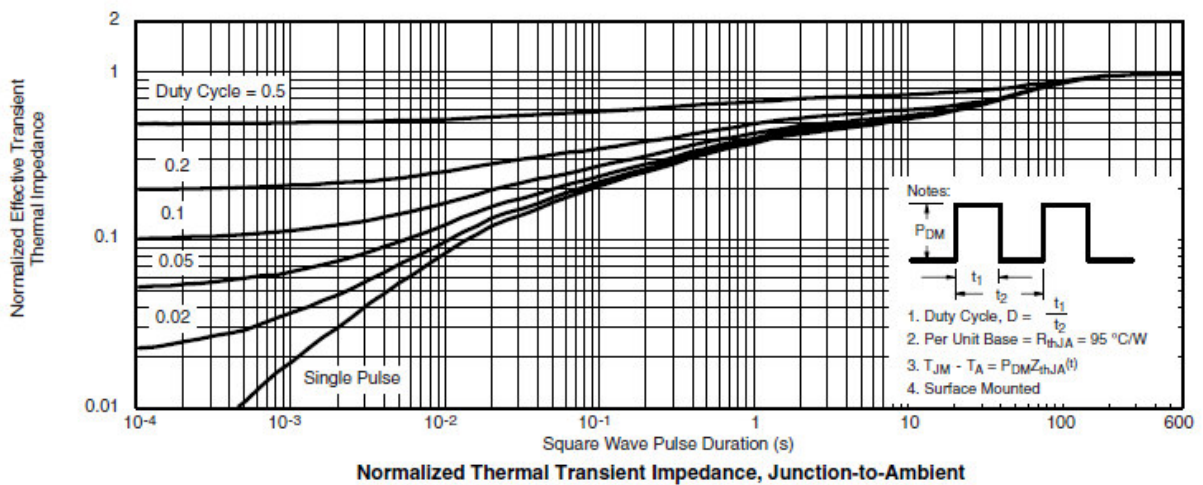
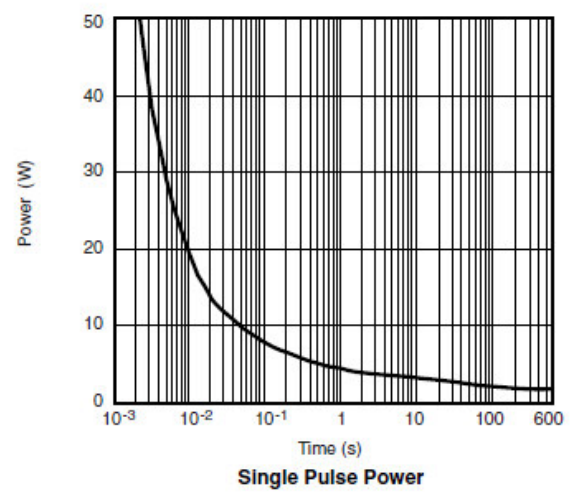
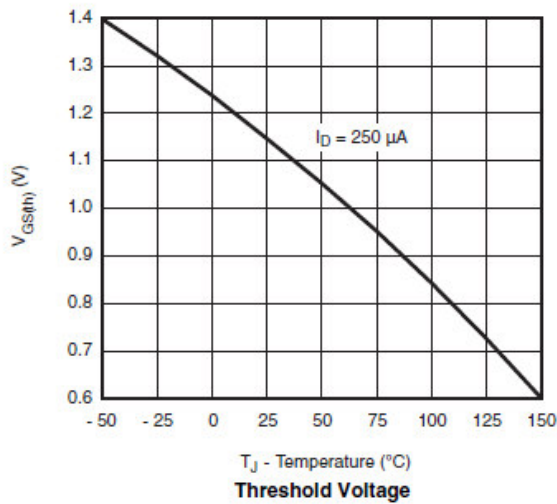
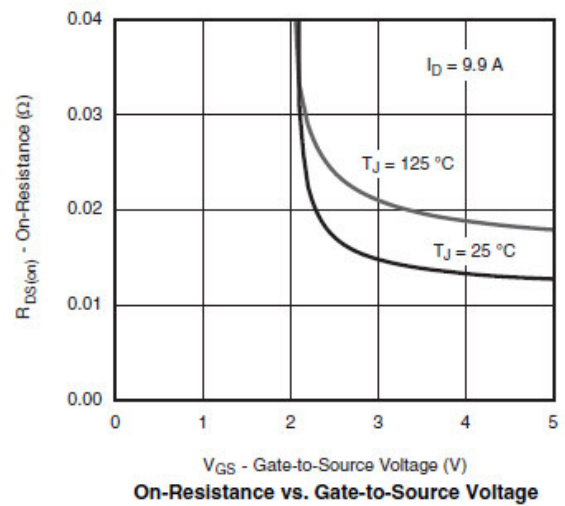
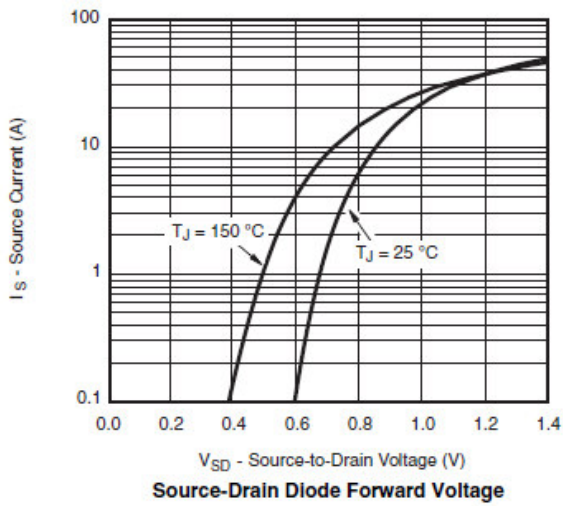
( $T_A=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4		1.0	V
$I_{GSS}$	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$			$\pm 100$	nA
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V$			1	uA
		$V_{DS}=20V, V_{GS}=0V, T_J=85^\circ\text{C}$			10	
$I_{D(on)}$	On-State Drain Current	$V_{DS}\geq 5V, V_{GS}=4.5V$	30			A
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=8A$		9	12	m $\Omega$
		$V_{GS}=2.5V, I_D=6A$		10	15	
		$V_{GS}=1.8V, I_D=5A$		14	20	
$g_{FS}$	Forward Transconductance	$V_{DS}=10V, I_D=7.0A$		40		S
$V_{SD}$	Diode Forward Voltage	$I_S=1.6A, V_{GS}=0V$		0.8	1.3	V
<b>Dynamic</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1\text{MHz}$		1450		pF
$C_{oss}$	Output Capacitance			285		
$C_{rSS}$	Reverse Transfer Capacitance			145		
$Q_g$	Total Gate Charge	$V_{DS}=10V, V_{GS}=4.5V, I_D=6.0A$		13	19	nC
$Q_{gs}$	Gate-Source Charge			2.8		
$Q_{gd}$	Gate-Drain Charge			2.0		
$t_{d(on)}$	Turn-On Time	$V_{DD}=10V, R_L=1.3\Omega, I_D=6A, V_{GEN}=10V, R_G=1\Omega$		10	20	ns
$t_r$				10	20	
$t_{d(off)}$	Turn-Off Time			25	40	
$t_f$				10	20	

## Typical Performance Characteristics

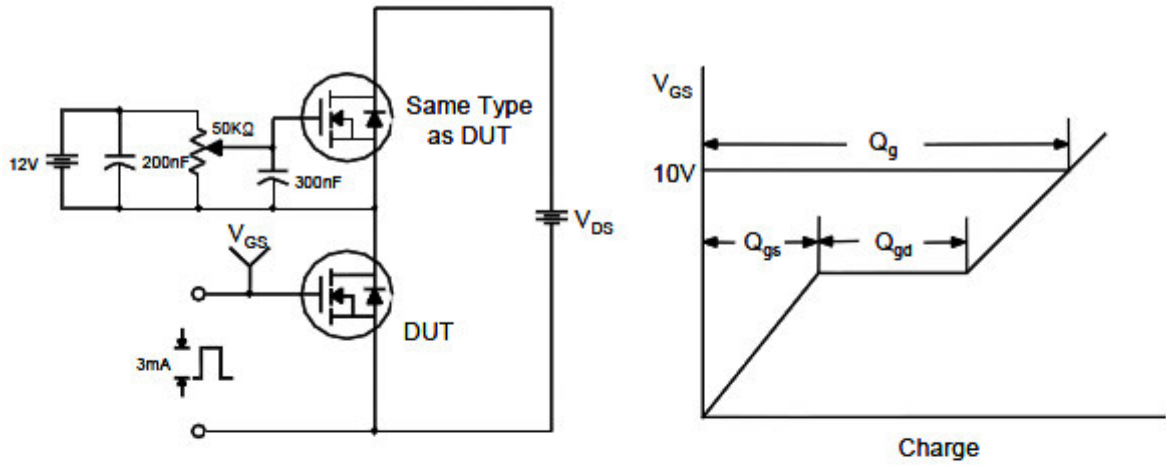


## Typical Performance Characteristics (continue)

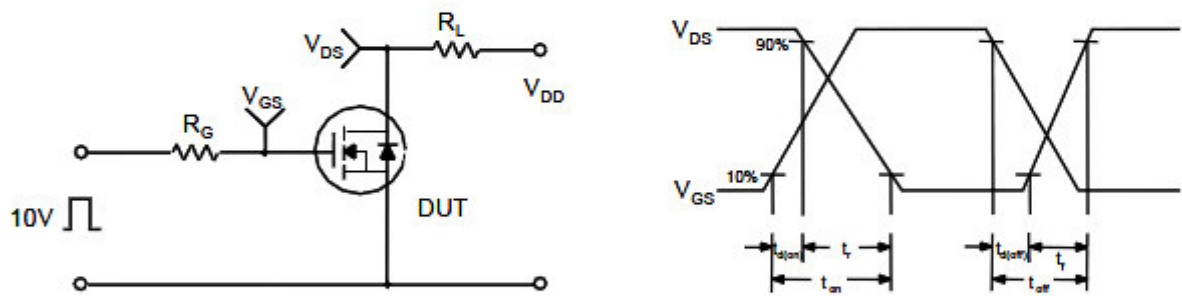


## Typical Characteristics

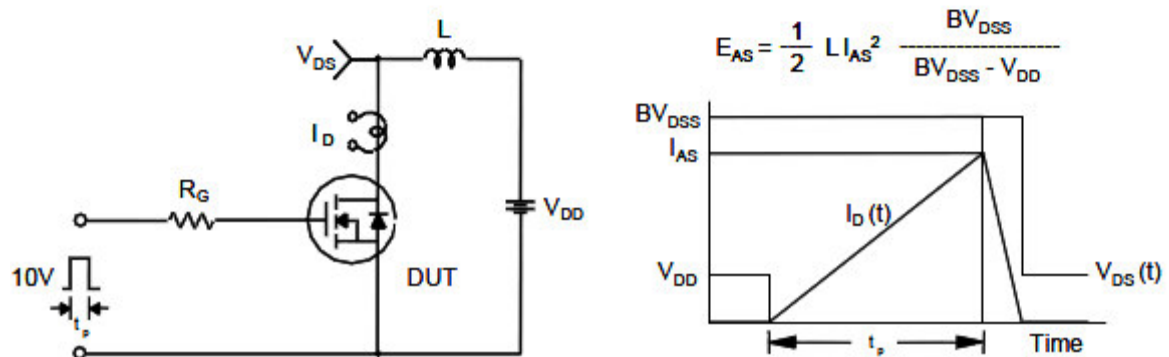
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

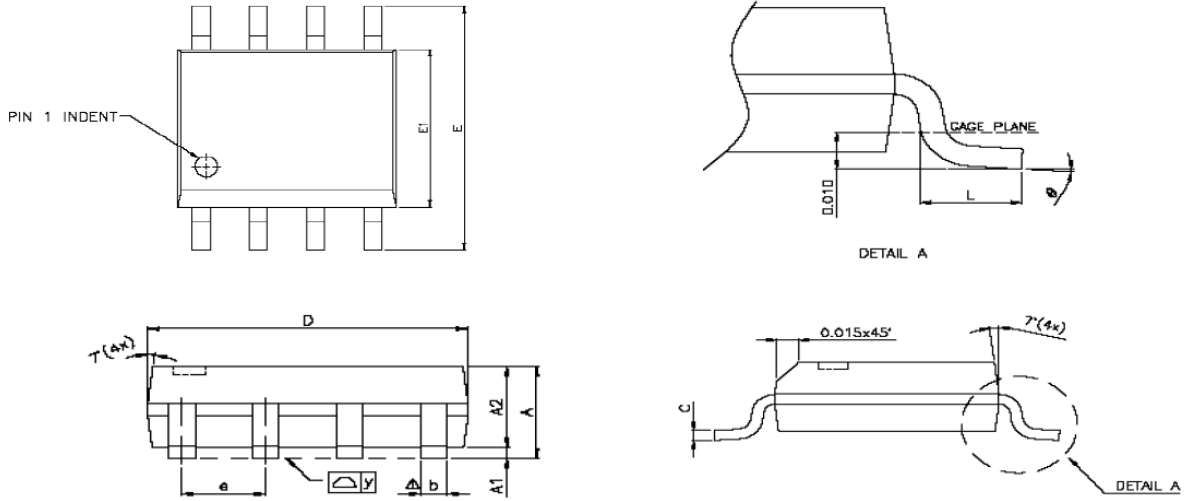


Unclamped Inductive Switching Test Circuit & Waveforms



## Package Dimension

### SOP-8P







### Dimensions

Symbol	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
<b>A</b>	1.47	1.60	1.73	0.058	0.063	0.068
<b>A1</b>	0.10	-	0.25	0.004	-	0.010
<b>A2</b>	-	1.45	-	-	0.057	-
<b>b</b>	0.33	0.41	0.51	0.013	0.016	0.020
<b>C</b>	0.19	0.20	0.25	0.0075	0.008	0.0098
<b>D</b>	4.80	4.85	4.95	0.189	0.191	0.195
<b>E</b>	5.80	6.00	6.20	0.228	0.236	0.244
<b>E1</b>	3.80	3.90	4.00	0.150	0.154	0.157
<b>e</b>	-	1.27	-	-	0.050	-
<b>L</b>	0.38	0.71	1.27	0.015	0.028	0.050
$\Delta y$	-	-	0.076	-	-	0.003
$\theta$	0°	-	8°	0°	-	8°





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