Prisemi®

PGC8FN70R240BL

700V GaN Power Transistor

Description

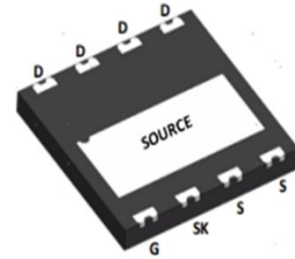| Product Summary		
$V_{DS}(V)$	$R_{DS(on)}(m\Omega)(Typ)$	$I_D(A)$
700	240	6.7

DFN8080-8L (Bottom View)

Feature
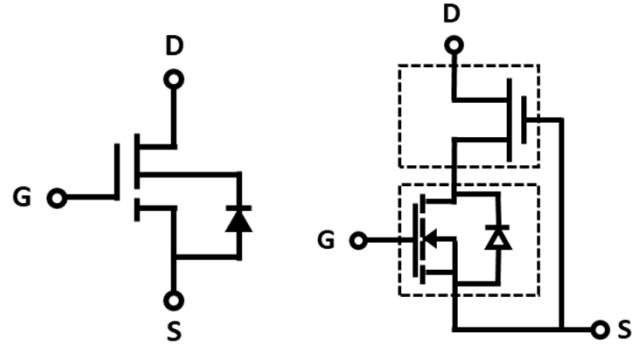
➤ Easy to use, compatible with standard gate drivers

➤ Excellent Q_G x $R_{DS(on)}$ figure of merit (FOM)

➤ Low Q_{RR}, no free-wheeling diode required

➤ Low switching loss

➤ RoHS compliant and Halogen-free

Applications

➤ High efficiency power supplies

➤ Telecom and datacom

➤ Automotive

➤ Servo motors

Schematic Symbol

Cascode Device Structure

Absolute maximum rating@25℃

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	700	V
Gate-Source Voltage		V_{GS}	±20	V
Transient Drain-Source Voltage[1]		V_{TDS}	800	V
Continuous Drain Current	T_C=25℃	I_D	6.7	A
	T_C=100℃		4.2	
Pulsed Drain Current (Pulse Width: 100µs)	T_C=25℃	I_{DM}	19	A
	T_C=150℃		15	
Power Dissipation		P_D	21	W
Soldering Peak Temperature		T_{CSOLD}	260	℃
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	℃

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	-	6.1	-	℃/W
Thermal Resistance, Junction-to-Ambient[2]	$R_{\theta JA}$	-	50	-	℃/W

Electrical characteristics per line@25℃ (unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
Statistic Characteristics							
Maximum Drain-Source Voltage	V_{DS-Max}	$V_{GS} = 0V$		700	-	-	V
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$		-	1000	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=700V,$ $V_{GS}=0V$	$T_J=25℃$	-	5	20	μA
			$T_J=150℃$	-	50	-	
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm20V, V_{DS} = 0V$		-	-	±150	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 500\mu A$		1.1	1.8	2.5	V
Drain-Source On-State Resistance[3]	$R_{DS(ON)}$	$V_{GS}=8V,$ $I_D=4A$	$T_J=25℃$	-	240	300	mΩ
			$T_J=150℃$	-	480	-	
Dynamic Characteristics							
Input Capacitance	C_{Iss}	$V_{DS} = 400V, V_{GS} = 0V,$ $f = 1MHz$		-	292	-	pF
Output Capacitance	C_{oss}			-	15	-	
Reverse Transfer Capacitance	C_{rss}			-	0.6	-	
Effective Output Capacitance, Energy Related	$C_{o(er)}$	$V_{GS} = 0V,$ $V_{DS} = 0-400V$		-	24	-	pF
Effective Output Capacitance, Time Related	$C_{o(tr)}$			-	65	-	
Output Charge	Q_{oss}			-	26	-	nC
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 400V, I_D = 4A,$ $V_{GS} = 0-8V, R_G=47\Omega$		-	28	-	ns
Turn-on Rise Time	t_r			-	14	-	
Turn-Off Delay Time	$t_{d(off)}$			-	108	-	
Turn-Off Fall Time	t_f			-	8	-	
Total Gate Charge	Q_g	$V_{DS} = 400V, I_D = 4.2A,$ $V_{GS} = 0-8V$		-	5.6	-	nC
Gate-Source Charge	Q_{gs}			-	1.5	-	
Gate-Drain Charge	Q_{gd}			-	2	-	
Reverse Diode Characteristics							
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=2A$		-	1.3	-	V
		$V_{GS}=0V,$ $I_S=4A$	$T_J=25℃$	-	1.8	-	
			$T_J=150℃$	-	2.7	-	
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_S=8A,$ $V_{DD}=400V,$ $di/dt=1000A/\mu s$		-	16	-	ns
Reverse Recovery Charge	Q_{rr}			-	26	-	μC

Notes：
1. Off-state spike duty cycle < 0.01, spike duration < 2μs
2. Device on one layer epoxy PCB for drain connection (vertical and without air stream cooling, with 6cm²copper area and 70μm thickness)
3. Dynamic on-resistance; see Figure 19 and 20 for test circuit and configurations

Typical Characteristics
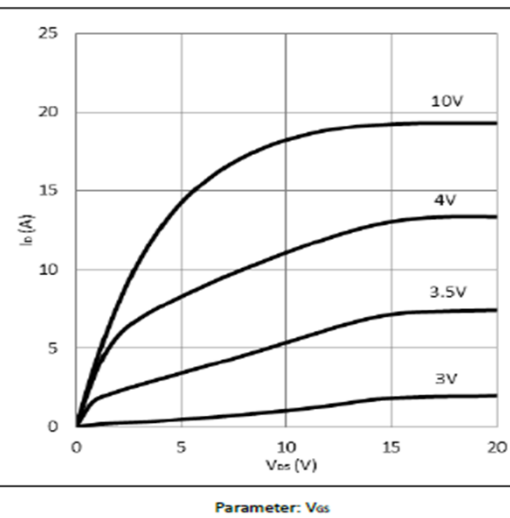
Figure 1. Typical Output Characteristics T_J=25℃
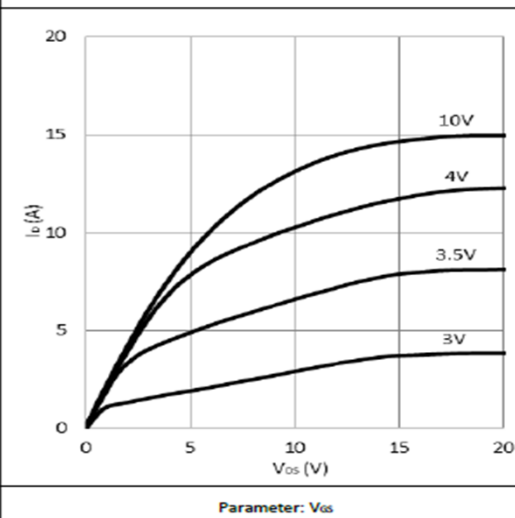
Figure 2. Typical Output Characteristics T_J=150℃

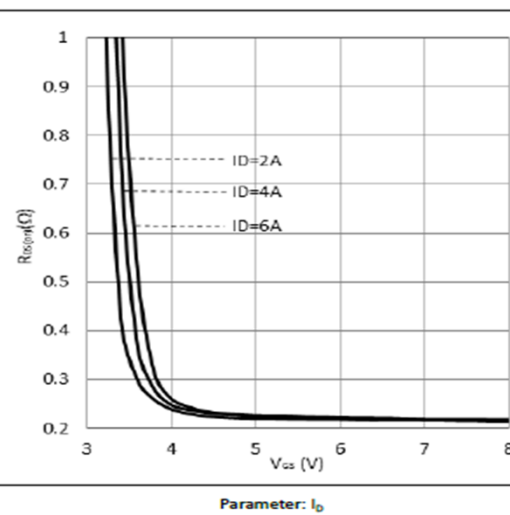**Figure 3.Typical Drain to Source On-resistance T_J= 25°C**

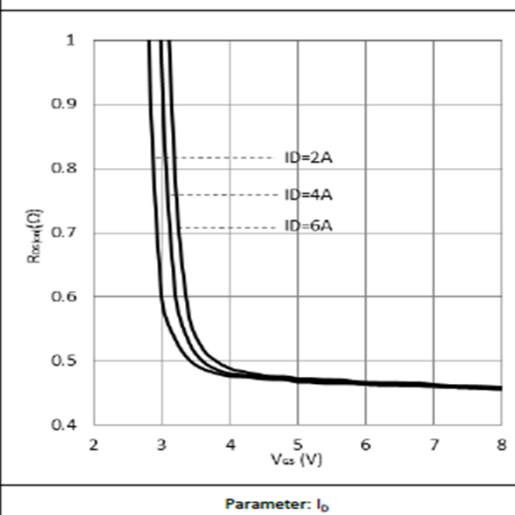**Figure 4. Typical Drain to Source On-resistance T_J= 150°C**
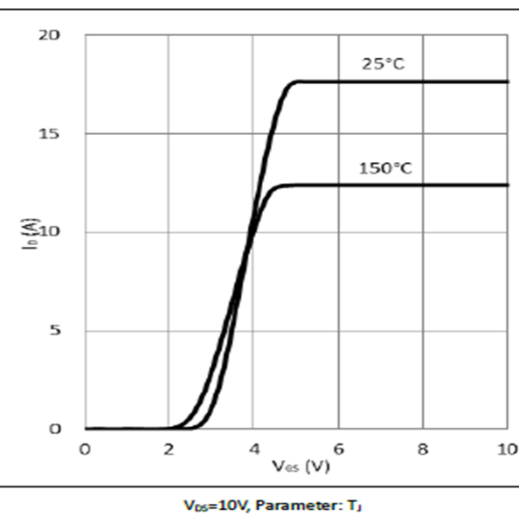
Figure 5. Typical Transfer Characteristics
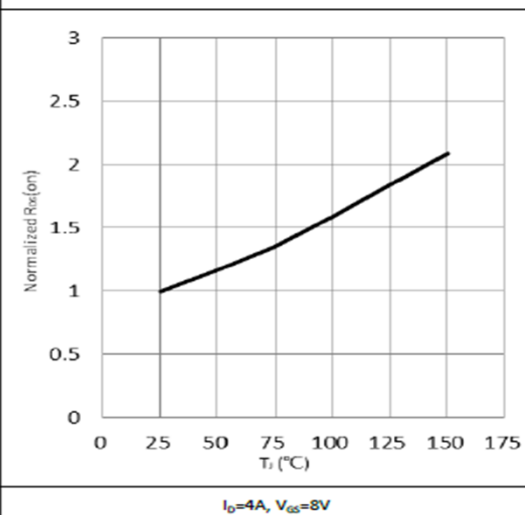
Figure 6. Normalized On-resistance
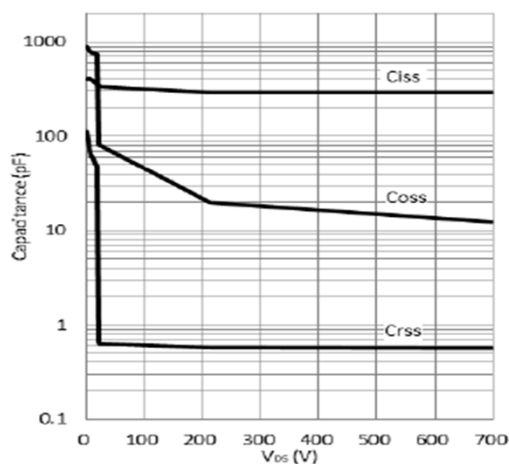
Figure 7. Typical Capacitance

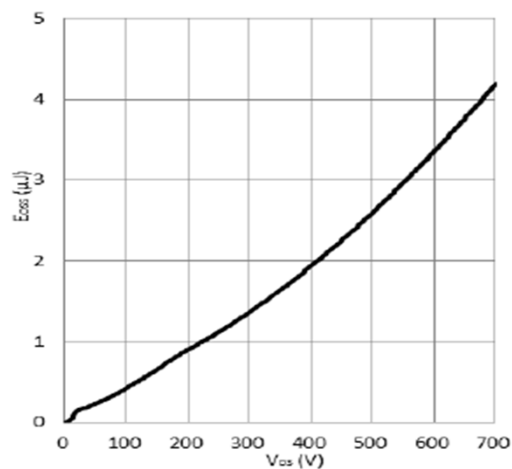$V_{GS}=0V$, f=1MHz

Figure 8. Typical Coss Stored Energy

$V_{GS}=0V$, f=1MHz

Figure 9. Typical Qoss
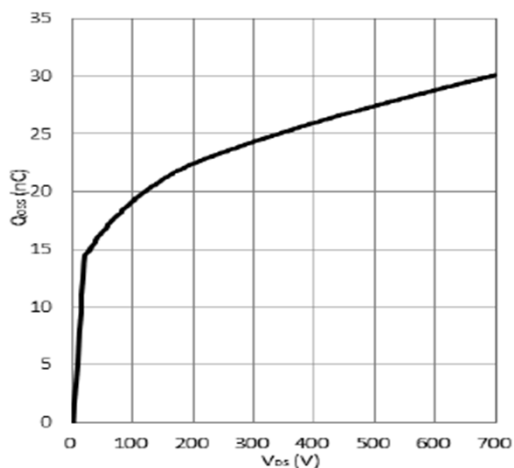
$V_{GS}=0V$, f=1MHz

Figure 10. Forward Characteristic of Rev. Diode
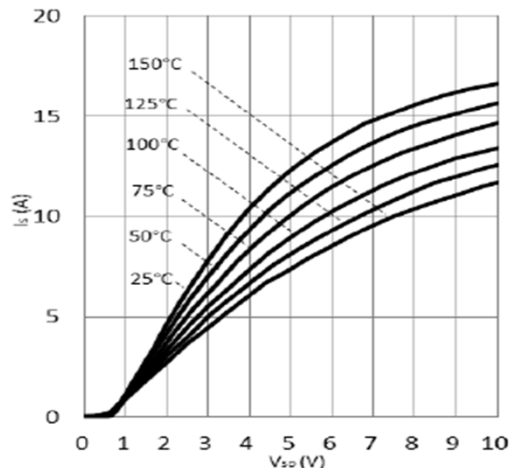
$I_S=f(V_{SD})$, Parameter T_J

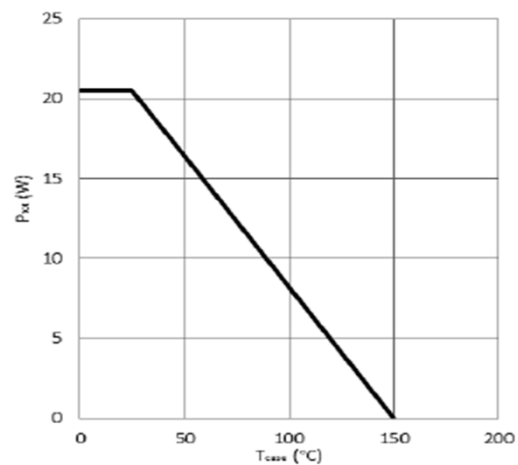**Figure 11. Typical Gate Charge**
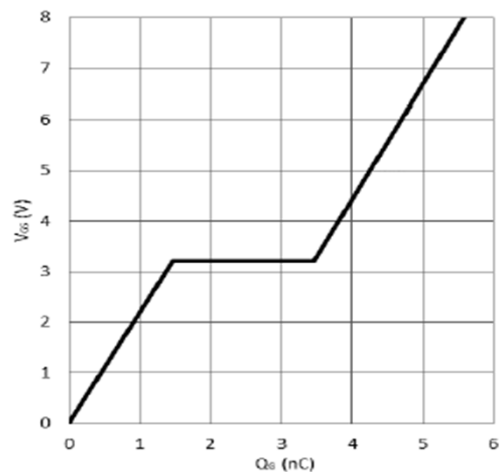
$I_{DS}=4.2A$, $V_{DS}=400V$
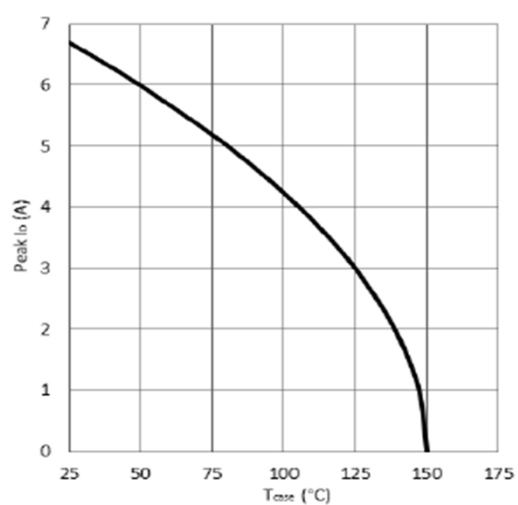
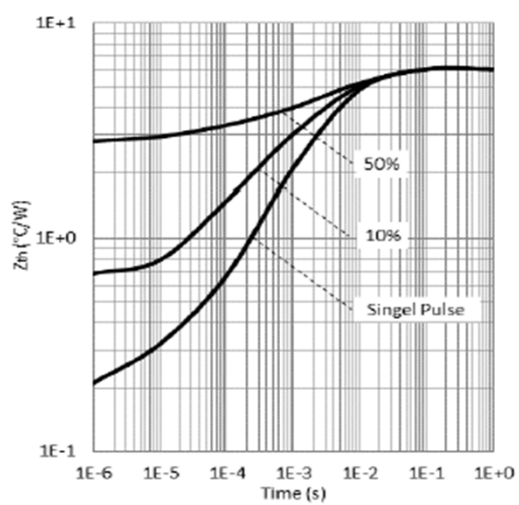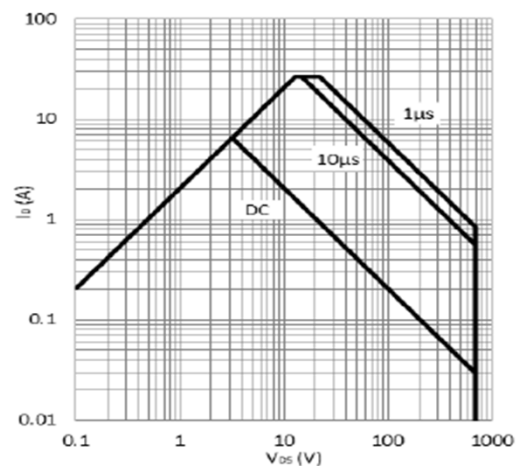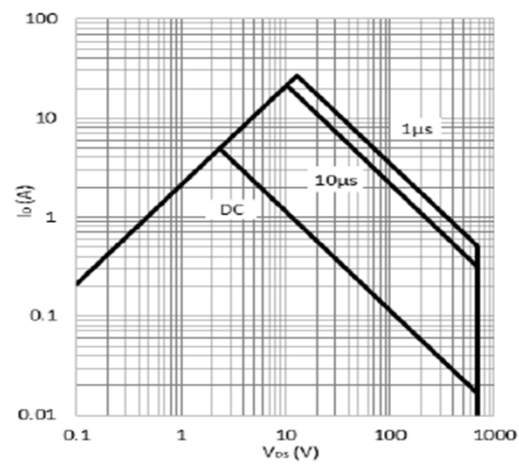**Figure 12. Power Dissipation**

Figure 13. Current Derating

Figure 14. Transient Thermal Resistance

Figure 15. Safe Operating Area T$_C$=25℃

calculated based on thermal limit

Figure 16. Safe Operating Area T$_C$=80℃

calculated based on thermal limit

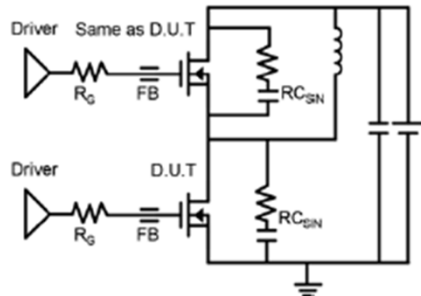## Test Circuits and Waveforms

Figure 17. Switching Time Test Circuit
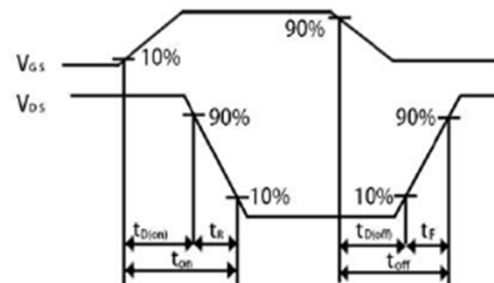

Figure 18. Switching Time Waveform
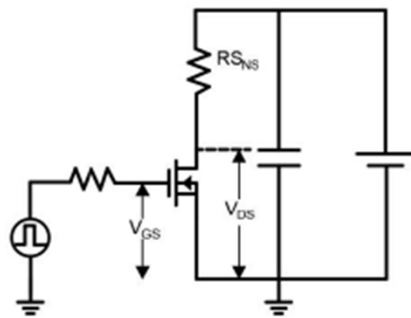

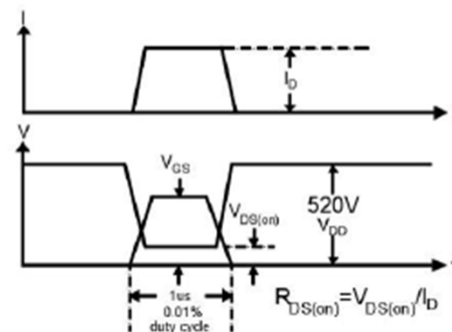**Figure 19. Dynamic R$_{DS(on)}$ Test Circuit**

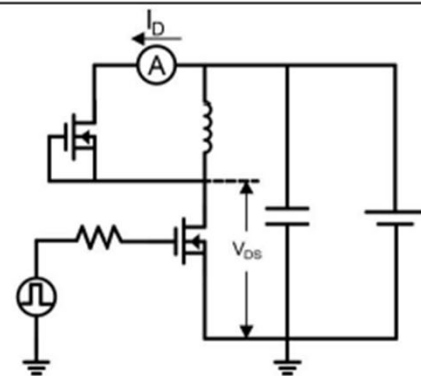
Figure 20. Dynamic R$_{DS(on)}$ Waveform

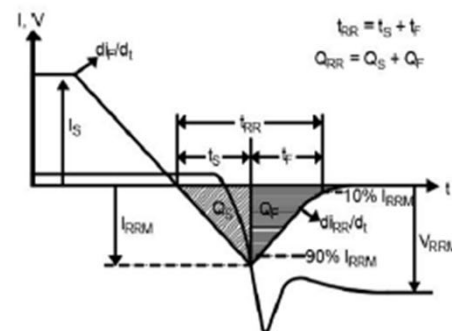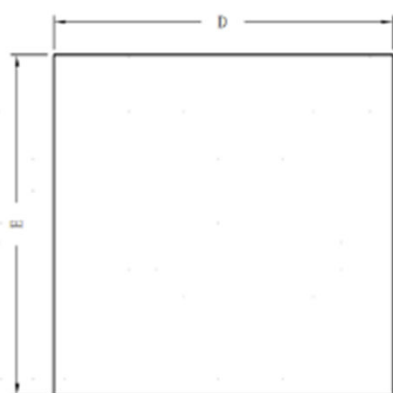**Figure 21. Diode Characteristic Test Circuits**

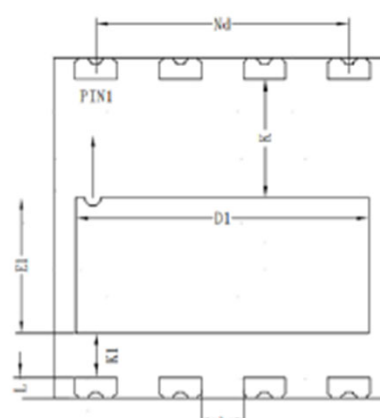**Figure 22. Diode Recovery Waveform**

Product Dimension (DFN8080-8L)

TOP VIEW

BOTTOM VIEW
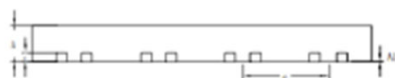
SIDE VIEW

SYMBOL	Millimeter		
	Min	Nom	Max
A	0.80	0.90	1.15
A1	0	0.02	0.05
c	—	0.20	—
b	0.90	1.00	1.10
D	7.90	8.00	8.10
D1	6.85	6.95	7.05
E	7.90	8.00	8.10
E1	3.10	3.20	3.30
e	2.00BSC		
Nd	6.00BSC		
K	2.70	2.80	2.90
K1	0.90	1.00	1.10
L	0.40	0.50	0.60

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