N-Channel Enhancement Mode Power MOSFET

Description

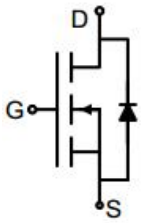
The G025N03T uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

- V_{DS} 30V
- I_D (at V_{GS} = 10V) 160A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 2.8mΩ
- $R_{DS(ON)}$ (at V_{GS} = 4.5V) < 3.8mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-220

Ordering Information

Device	Package	Marking	Packaging
G025N03T	TO-220	G025N03	50pcs/Tube

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Continuous Drain Current	T_C=25°C	I_D	160	A
	T_C=100°C		102	
Pulsed Drain Current (note1)		I_{DM}	640	A
Gate-Source Voltage		V_{GS}	±20	V
Power Dissipation		P_D	130	W
Single pulse avalanche energy （note2）		E_{AS}	702	mJ
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 To 150	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	ºC/W
Maximum Junction-to-Case	R_{thJC}	0.96	ºC/W

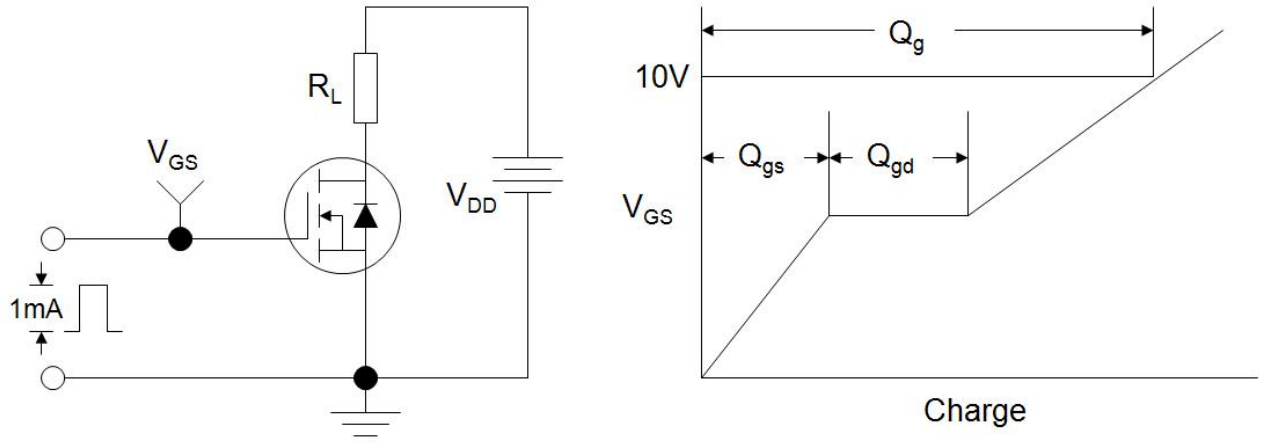
Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	30	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.5	2.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 30A	--	2.3	2.8	mΩ
		V_{GS} = 4.5V, I_D = 30A	--	3.1	3.8	
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 30A	--	55	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1.0MHz	--	4223	--	pF
Output Capacitance	C_{oss}		--	673	--	
Reverse Transfer Capacitance	C_{rss}		--	667	--	
Total Gate Charge	Q_g	V_{DD} = 15V, I_D = 30A, V_{GS} = 10V	--	89	--	nC
Gate-Source Charge	Q_{gs}		--	14	--	
Gate-Drain Charge	Q_{gd}		--	20	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 15V, I_D = 30A, R_G = 3Ω	--	13	--	ns
Turn-on Rise Time	t_r		--	18	--	
Turn-off Delay Time	$t_{d(off)}$		--	47	--	
Turn-off Fall Time	t_f		--	13	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	160	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 30A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 30A, V_{GS} = 0V di/dt=500A/us	--	128	--	nC
Reverse Recovery Time	Trr		--	65	--	ns

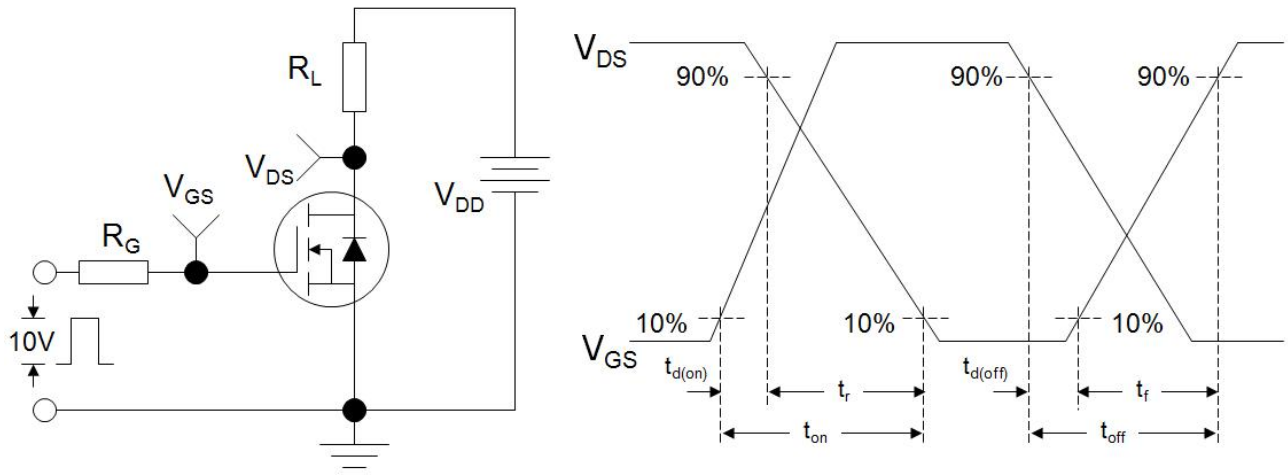
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=24V,VGS=10V,L=0.5mH,Rg=25Ω
3. Identical low side and high side switch with identical R_G

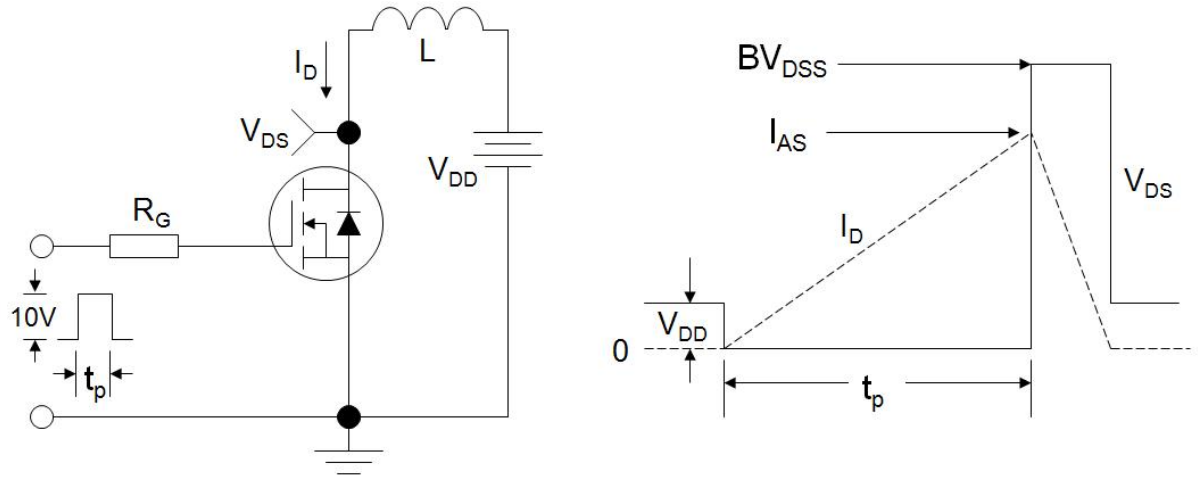
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

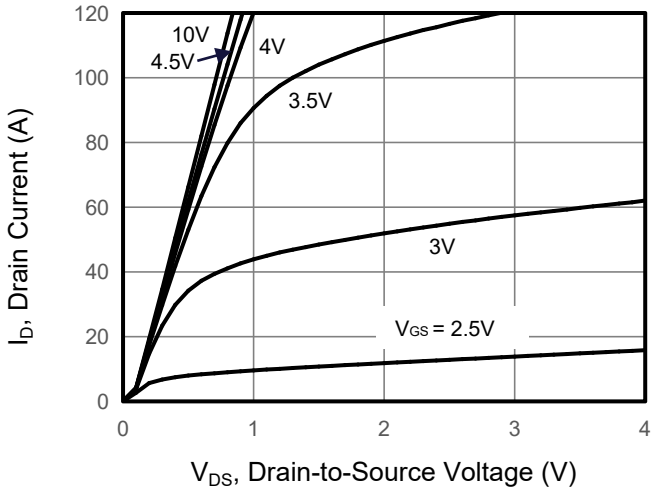


Figure 2. Transfer Characteristics

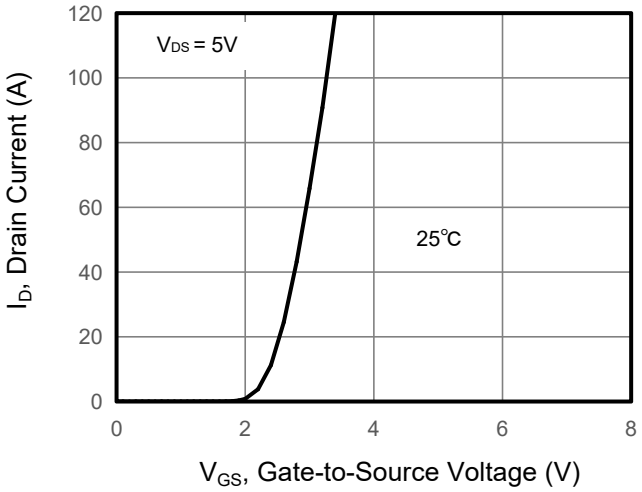


Figure 3. Drain Source On Resistance

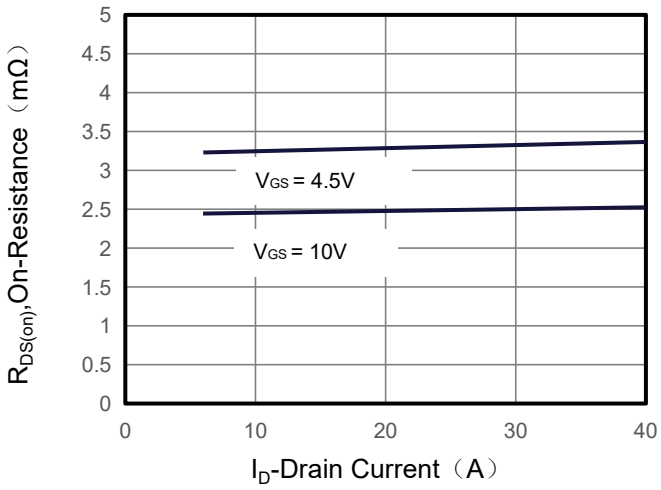


Figure 4. Gate Charge

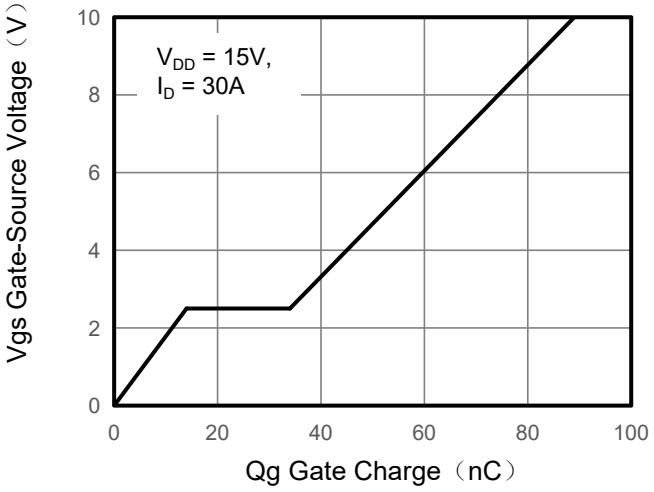


Figure 5. Capacitance

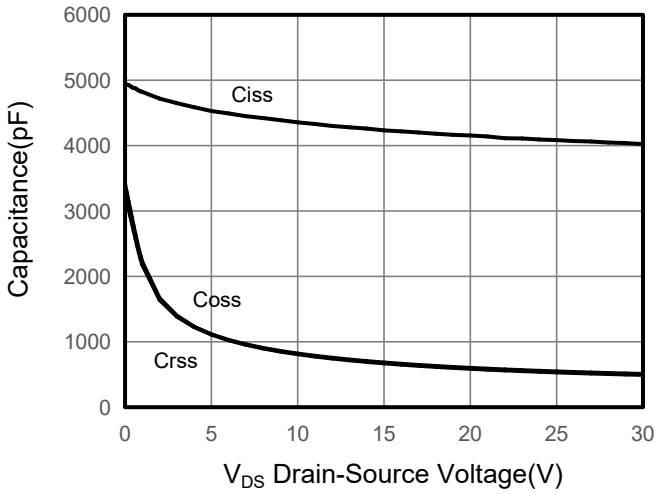
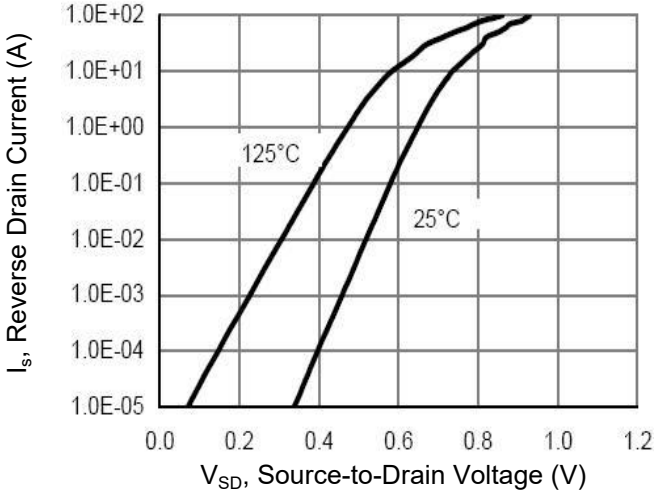


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

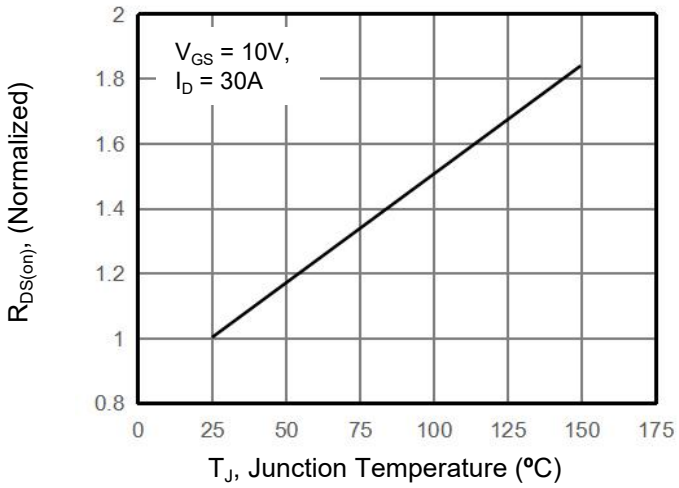


Figure 8. Safe Operation Area

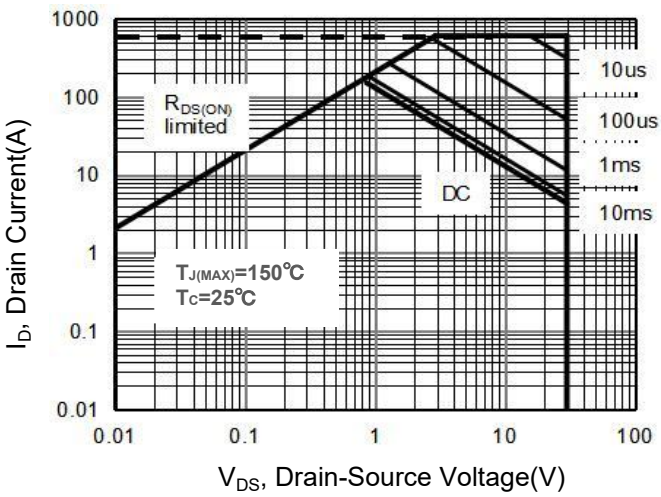
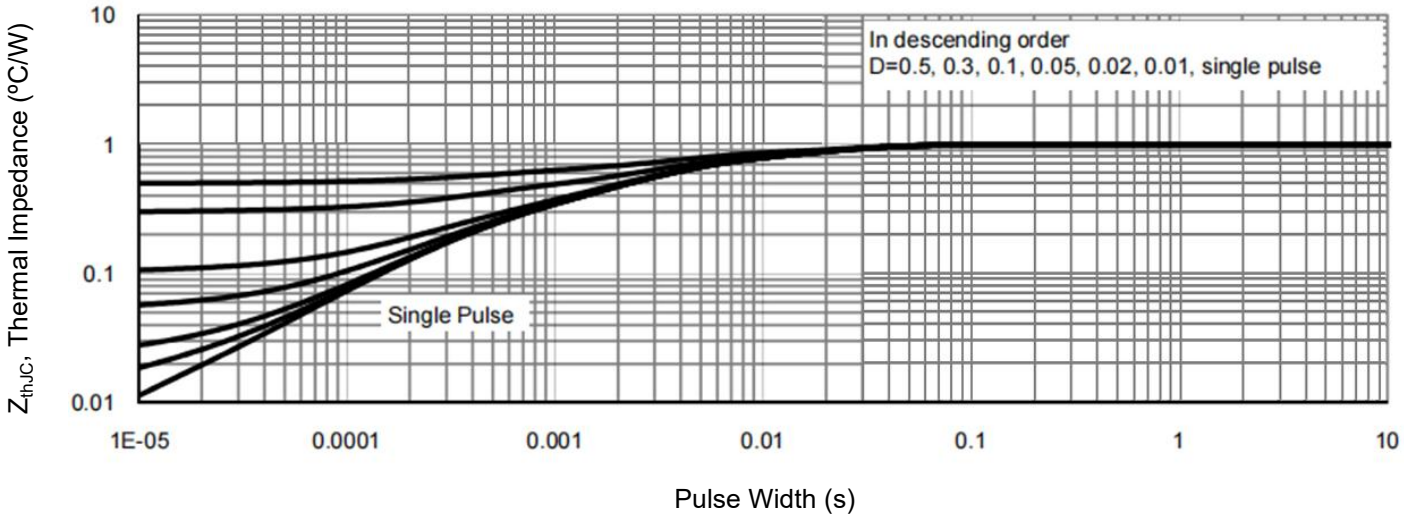
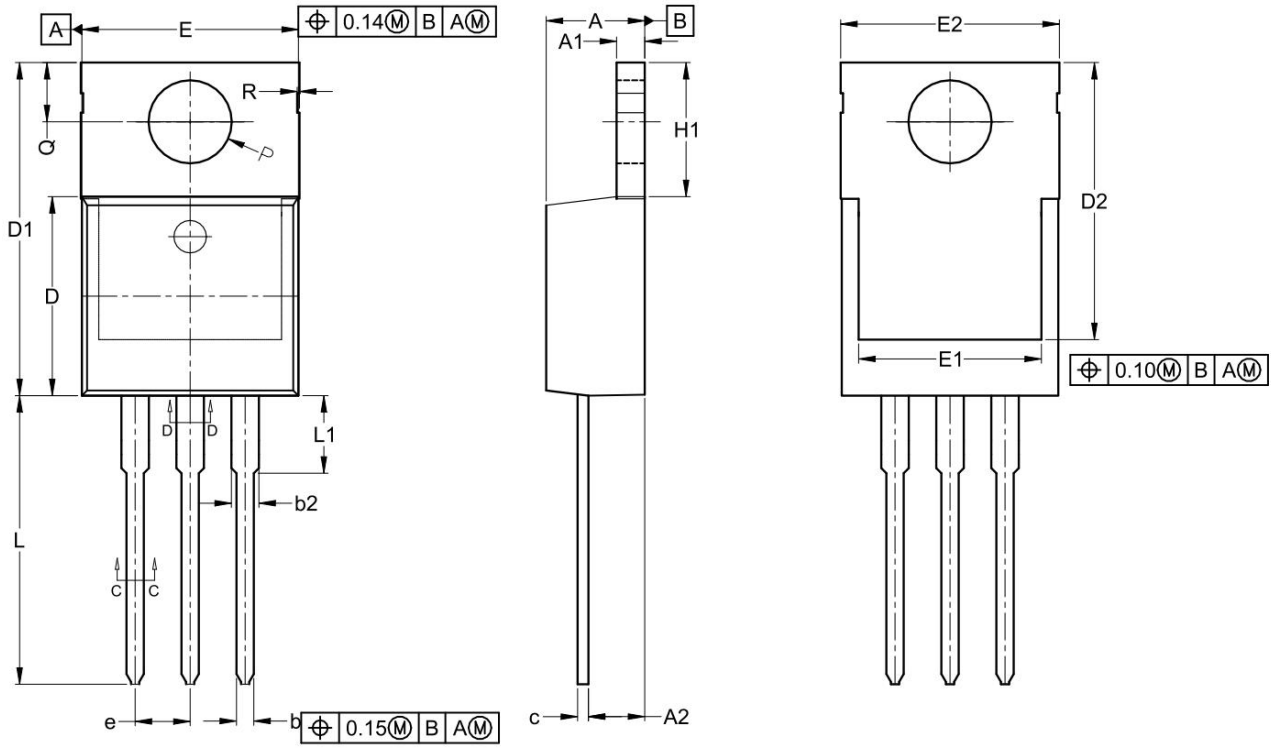
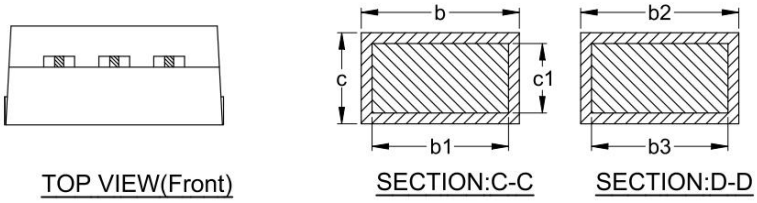


Figure 9. Normalized Maximum Transient Thermal Impedance



TO-220 Package Information





DIM / SYMBOL	MIN.	NOM.	MAX.	DIM / SYMBOL	MIN.	NOM.	MAX.
A	4.450	4.550	4.650	D2	12.610	12.810	13.010
A1	1.240	1.340	1.440	E	9.900	10.000	10.100
A2	2.500	2.600	2.700	E1	8.240	8.440	8.640
b	0.740	0.840	0.940	E2	9.900	10.100	10.300
b1	0.700	0.800	0.900	e	2.540 BSC.		
b2	1.210	1.310	1.410	H1	6.000	6.200	6.400
b3	1.170	1.270	1.370	L	13.140	13.340	13.540
c	0.440	0.540	0.640	L1	3.385	3.585	3.785
c1	0.400	0.500	0.600	ØP	3.740	3.840	3.940
D	9.100	9.200	9.300	Q	2.600	2.740	2.940
D1	15.200	15.400	15.600	R	0.108 REF.		