

N-Channel Enhancement Mode Power MOSFET

Description

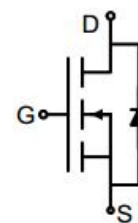
The G020N03T uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

- V_{DS} 30V
- I_D (at $V_{GS} = 10V$) 168A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 2.3m Ω
- $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) < 3.5m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-220

Ordering Information

Device	Package	Marking	Packaging
G020N03T	TO-220	G020N03	50pcs/Tube

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Continuous Drain Current	$T_C=25^\circ\text{C}$	168	A
	$T_C=100^\circ\text{C}$	124	
Pulsed Drain Current (note1)	I_{DM}	672	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	140	W
Single pulse avalanche energy (note2)	E_{AS}	900	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ\text{C}$

Thermal Resistance

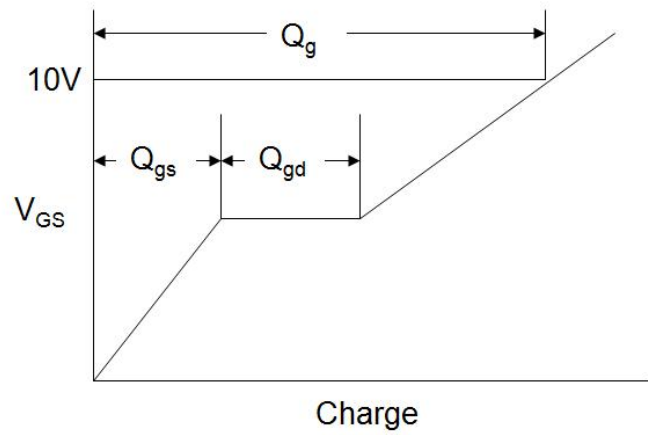
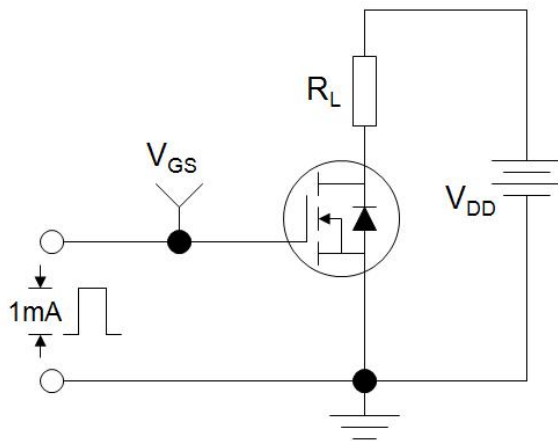
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	$^\circ\text{C/W}$
Maximum Junction-to-Case	R_{thJC}	0.89	$^\circ\text{C/W}$

Specifications T _J = 25°C, 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 = 50A	--	1.9	2.3	mΩ
		V _{GS} = 4.5V, I _D = 50A	--	2.8	3.5	
Forward Transconductance	g _{FS}	V _{GS} = 5V, I _D = 50A	--	69	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 15V, f = 1.0MHz	--	6005	--	pF
Output Capacitance	C _{oss}		--	995	--	
Reverse Transfer Capacitance	C _{rss}		--	964	--	
Total Gate Charge	Q _g	V _{DD} = 15V, I _D = 50A, V _{GS} = 10V	--	110	--	nC
Gate-Source Charge	Q _{gs}		--	14	--	
Gate-Drain Charge	Q _{gd}		--	26	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15V, I _D = 50A, R _G = 2.5Ω	--	24	--	ns
Turn-on Rise Time	t _r		--	23	--	
Turn-off Delay Time	t _{d(off)}		--	87	--	
Turn-off Fall Time	t _f		--	37	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	168	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 50A, V _{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = 50A, V _{GS} = 0V di/dt=100A/us	--	114	--	nC
Reverse Recovery Time	T _{rr}		--	57	--	ns

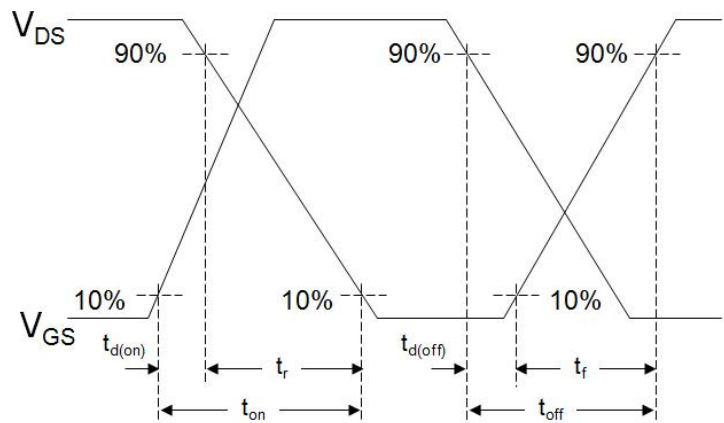
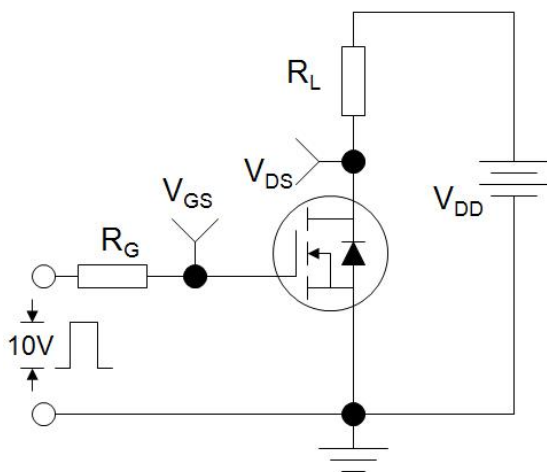
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : $T_J = 25^{\circ}\text{C}$, $V_{DD} = 30V$, $V_{GS} = 10V$, $L = 0.5mH$, $R_G = 25\Omega$
3. Identical low side and high side switch with identical R_G

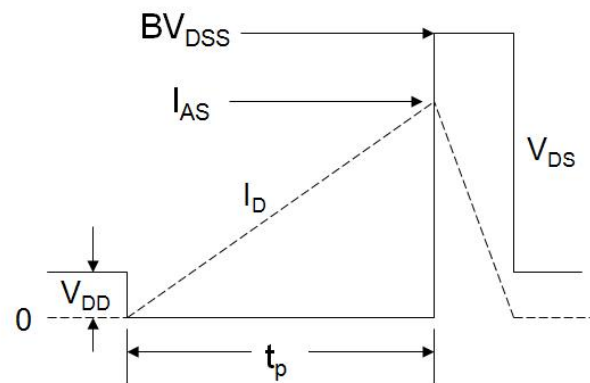
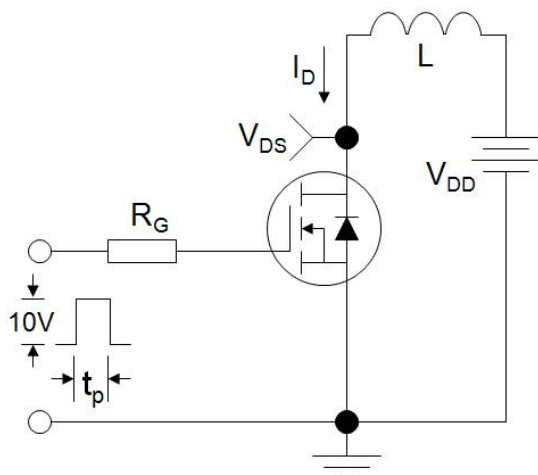
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

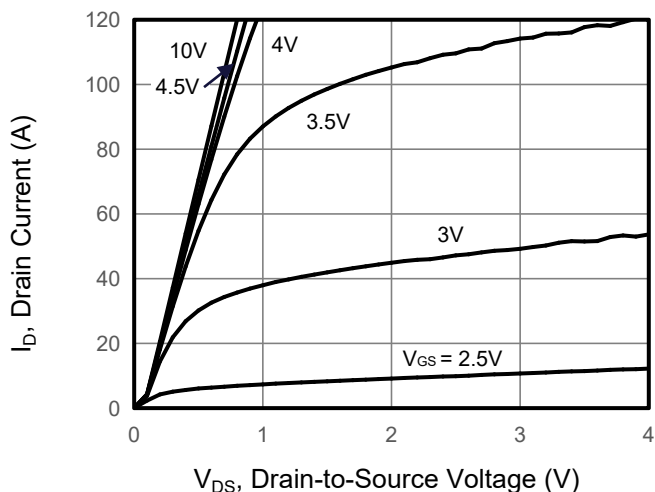


Figure 2. Transfer Characteristics

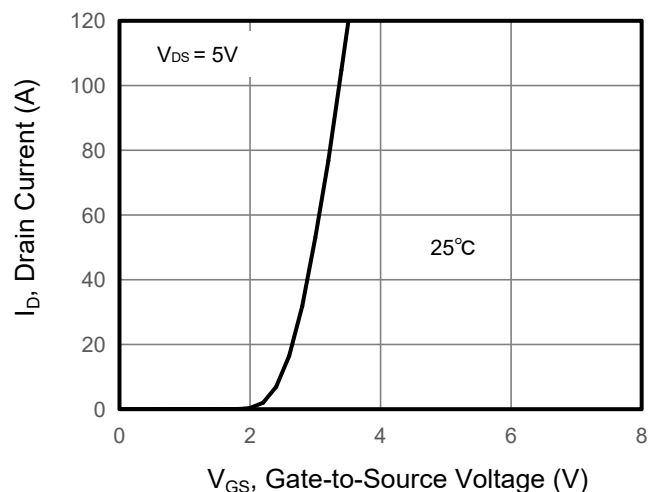


Figure 3. Drain Source On Resistance

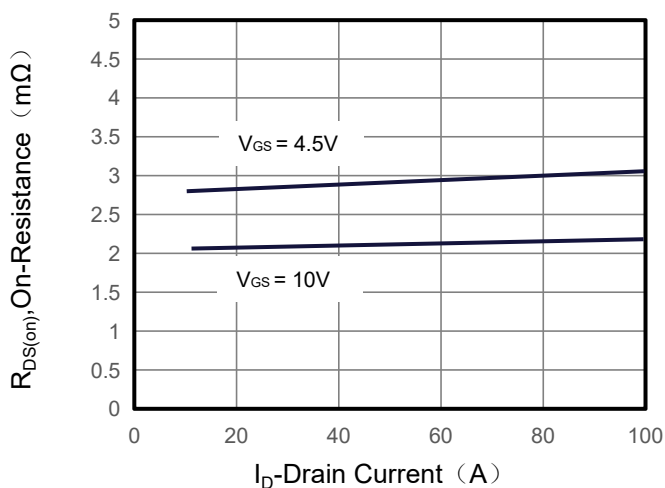


Figure 4. Gate Charge

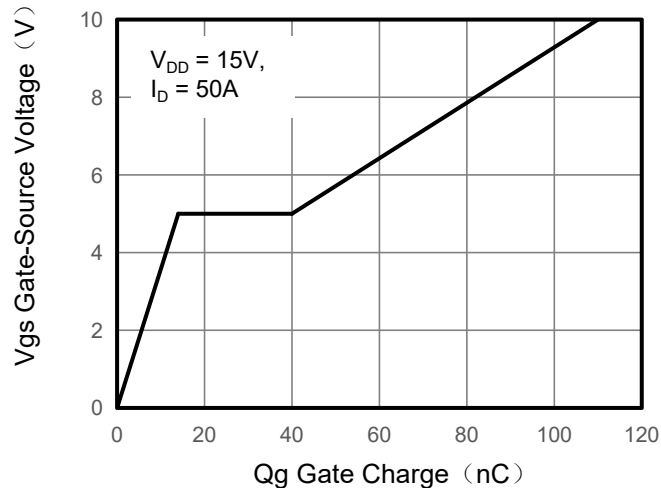


Figure 5. Capacitance

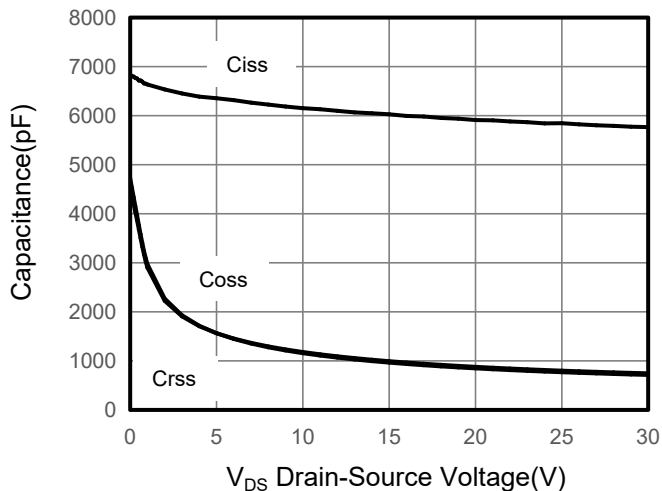
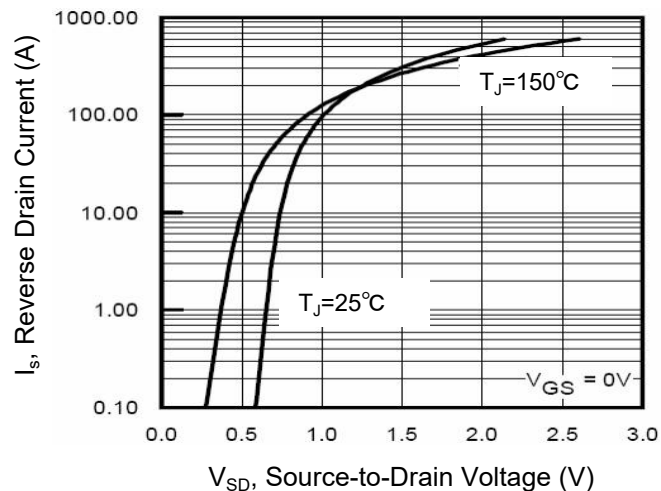


Figure 6. Source-Drain Diode Forward



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

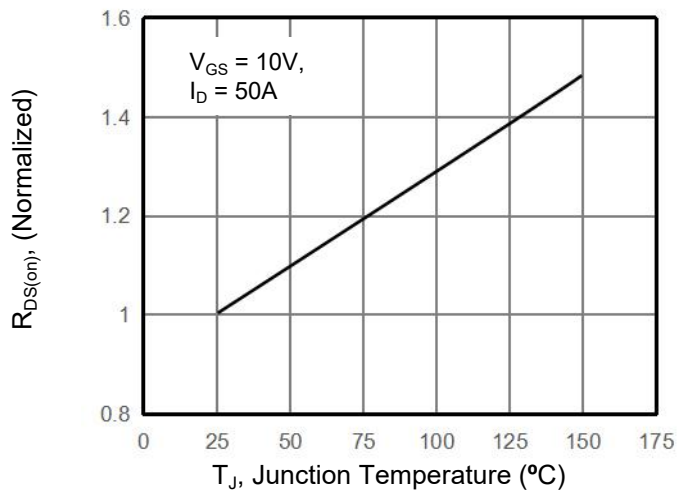


Figure 8. Safe Operation Area

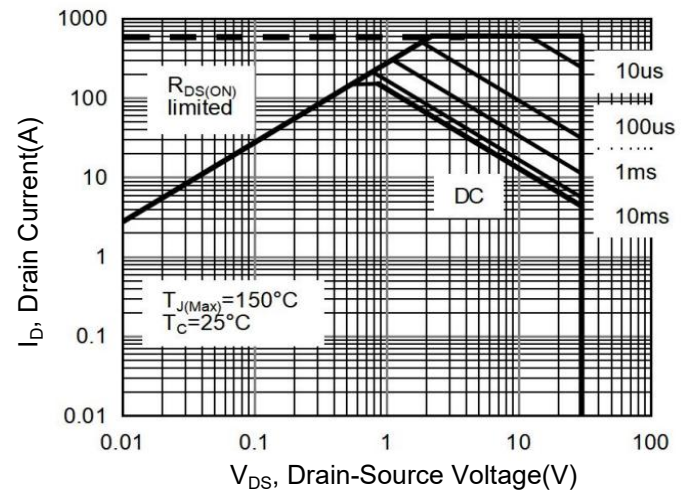
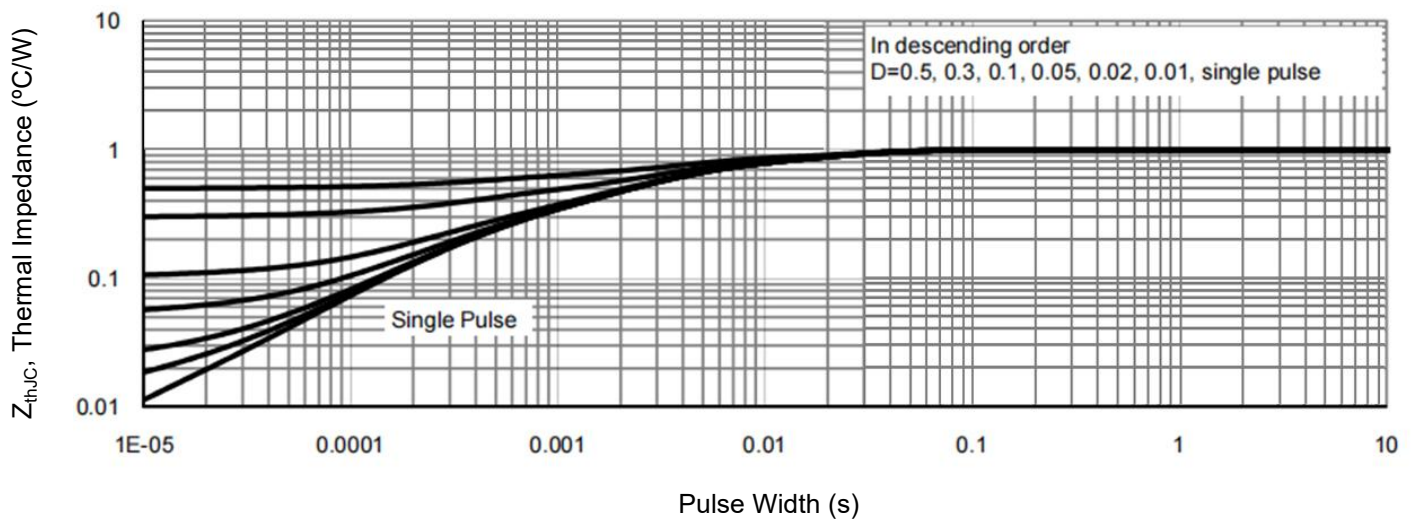
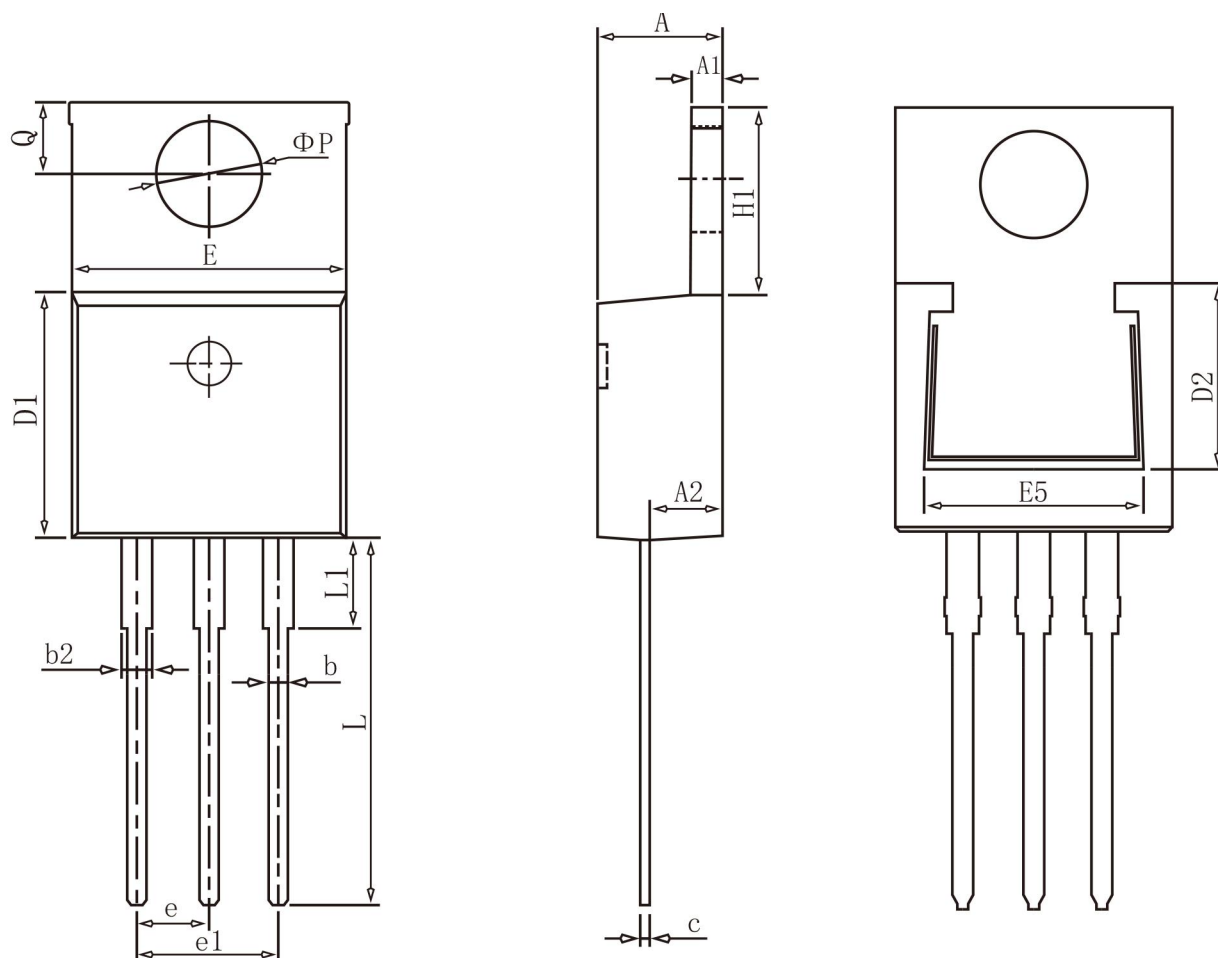


Figure 9. Normalized Maximum Transient Thermal Impedance



TO-220 Package Information



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
b	0.75	0.81	0.96
b2	1.22	1.27	1.47
c	0.30	0.38	0.48
D1	8.50	8.70	8.90
D2	5.20	—	—
E	9.86	10.16	10.36
E5	7.06	—	—
e	2.54BSC		
e1	5.08BSC		
H1	6.10	6.30	6.50
L	13.10	13.40	13.70
L1	—	3.75	4.10
ΦP	3.70	3.84	3.99
Q	2.54	2.74	2.94