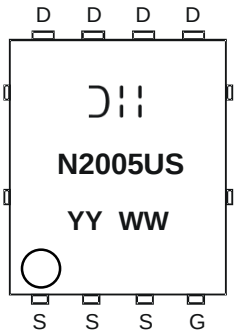
Marking Information



= Manufacturer's Marking
N2005US = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 20 = 2020)
WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	20 15	A
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_C = +25°C T_C = +70°C	I_D	100 88	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)			I_{DM}	150	A
Maximum Continuous Body Diode Forward Current (Mounted on Infinite Heatsink)			I_S	150	A
Avalanche Current (Note 7) L=0.2mH			I_{AS}	36	A
Avalanche Energy (Note 7) L=0.2mH			E_{AS}	133	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	$R_{\theta JA}$	98	°C/W
	t<10s		83	
Total Power Dissipation (Note 6)		P_D	2.5	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	$R_{\theta JA}$	51	°C/W
	t<10s		43	
Thermal Resistance, Junction to Case		$R_{\theta JC}$	1.5	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
7. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1	μA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.4	0.7	1.2	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	—	4.6	mΩ	V_{GS} = 4.5V, I_D = 13.5A
		—	—	8.7		V_{GS} = 2.5V, I_D = 13.5A
Diode Forward Voltage	V_{SD}	—	0.8	1.1	V	V_{GS} = 0V, I_S = 27A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	5337	—	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	560	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	505	—	pF	
Gate Resistance	R_g	—	0.7	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	60	—	nC	V_{DS} = 16V, I_D = 27A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	142	—	nC	
Gate-Source Charge	Q_{gs}	—	7	—	nC	
Gate-Drain Charge	Q_{gd}	—	11	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	12.4	—	ns	V_{GS} = 5V, V_{DS} = 10V, R_G = 4.7Ω, I_D = 13.5A
Turn-On Rise Time	t_R	—	29.8	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	117	—	ns	
Turn-Off Fall Time	t_F	—	52	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	17.8	—	ns	I_F = 13.5A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q_{RR}	—	8.6	—	nC	I_F = 13.5A, di/dt = 100A/μs

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

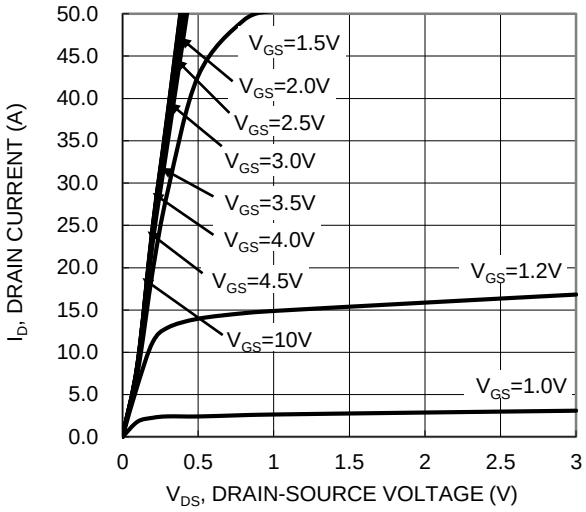


Figure 1. Typical Output Characteristic

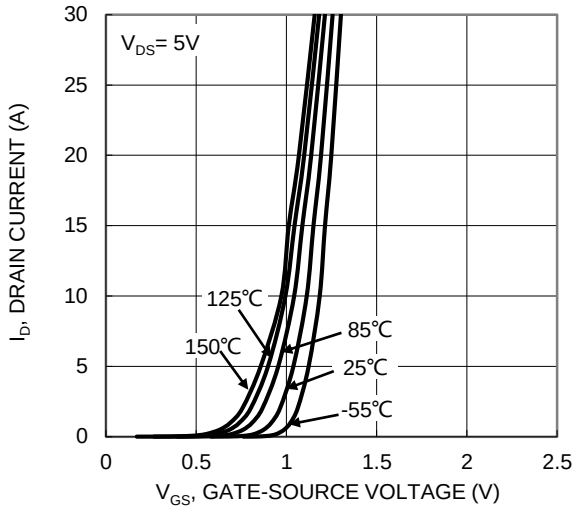


Figure 2. Typical Transfer Characteristic

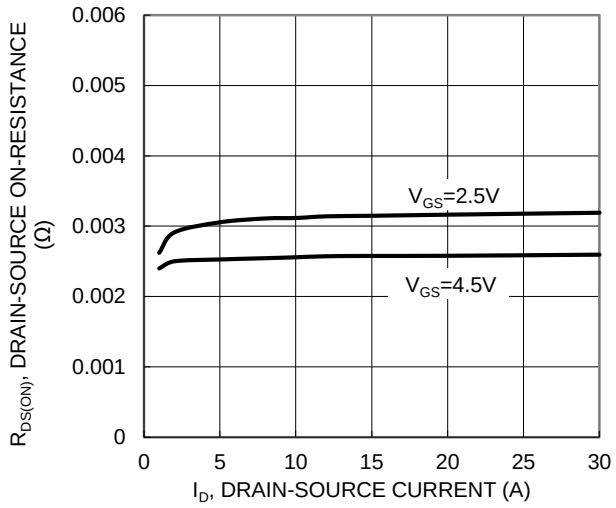


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

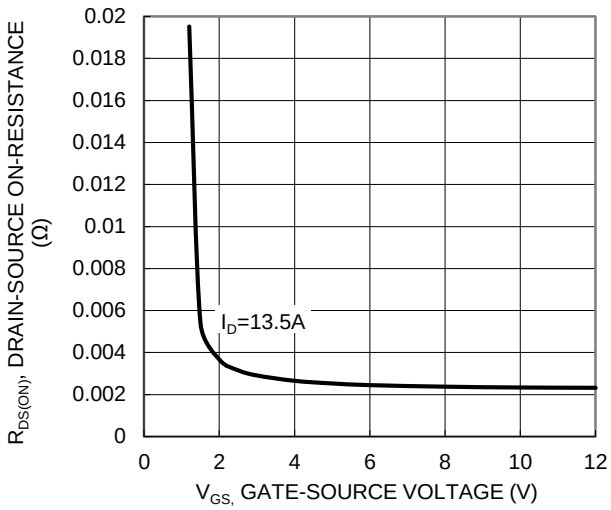


Figure 4. Typical Transfer Characteristic

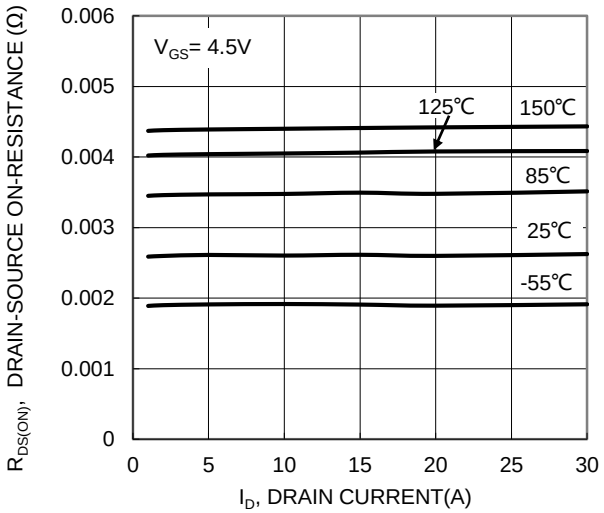


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

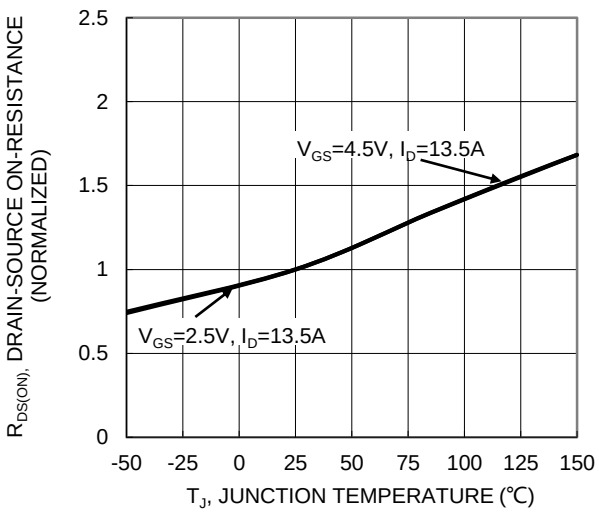


Figure 6. On-Resistance Variation with Junction Temperature

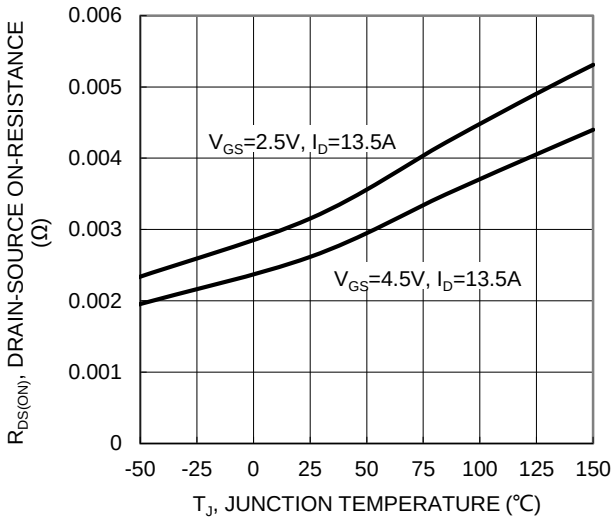


Figure 7. On-Resistance Variation with Junction Temperature

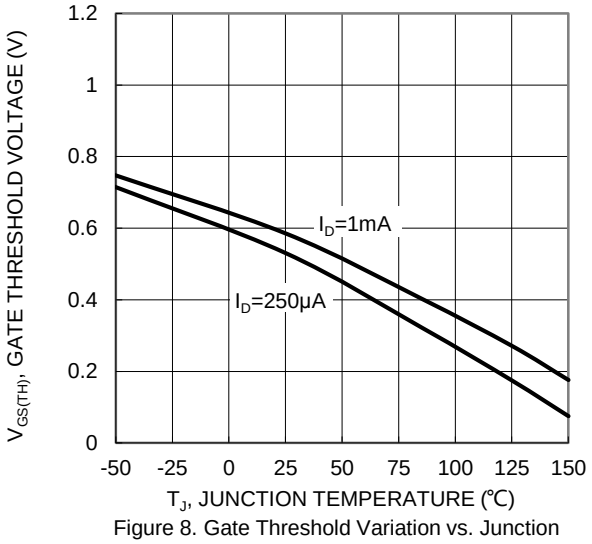


Figure 8. Gate Threshold Variation vs. Junction Temperature

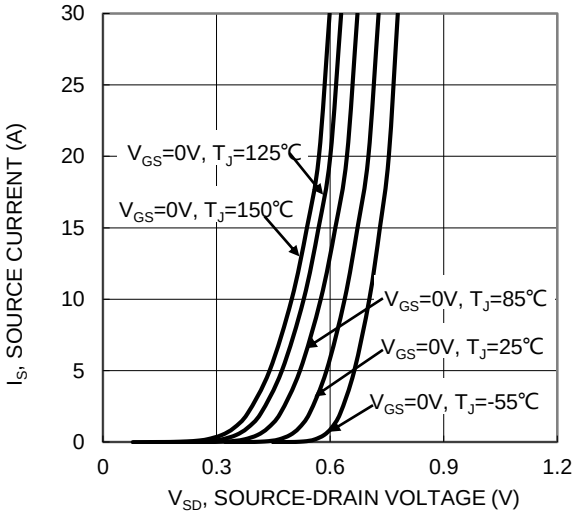


Figure 9. Diode Forward Voltage vs. Current

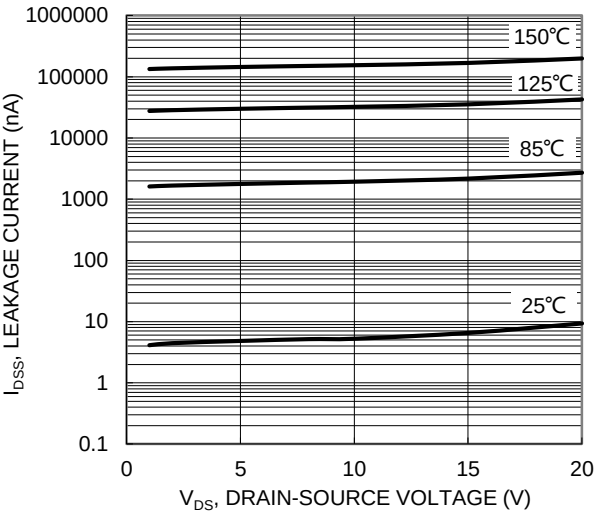


Figure 10 .Typical Drain-Source Leakage Current vs. Voltage

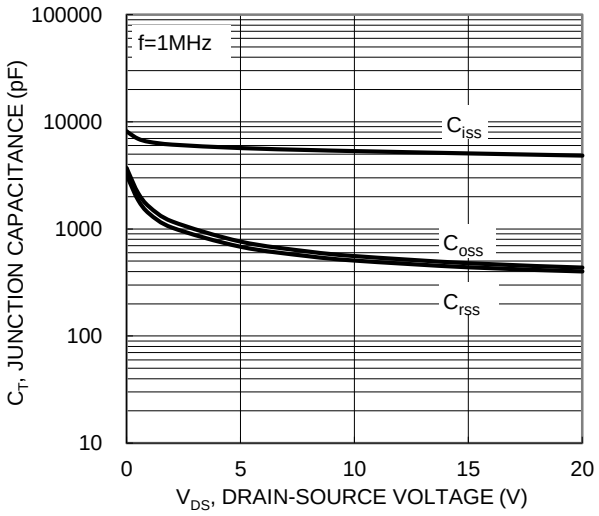


Figure 11. Typical Junction Capacitance

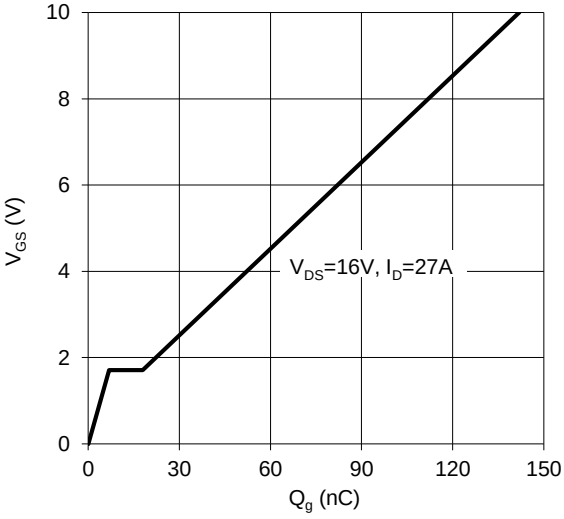


Figure 12. Gate Charge

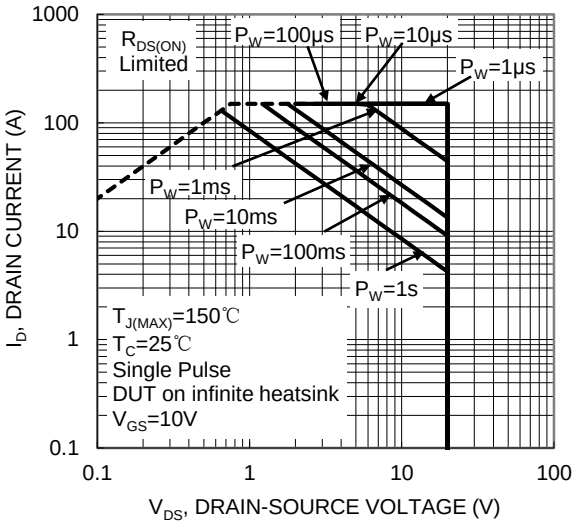


Figure 13. SOA, Safe Operation Area

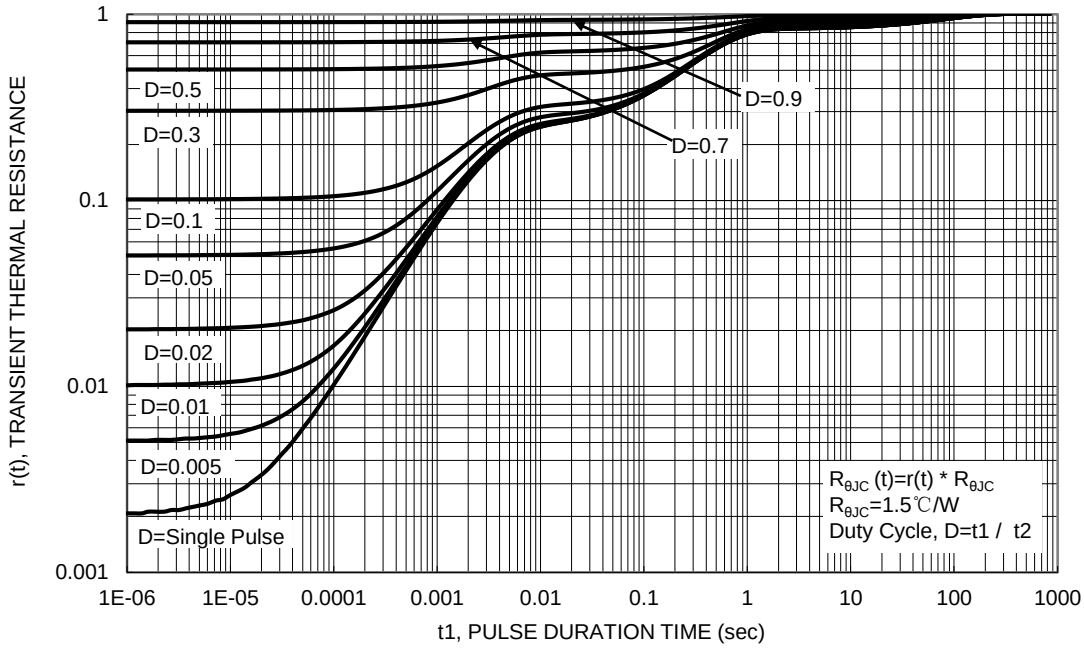
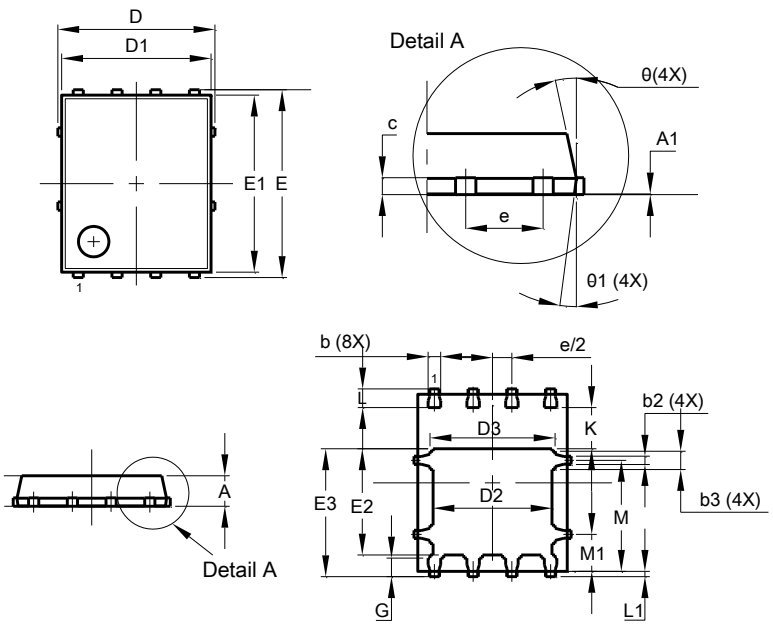


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

PowerDI5060-8

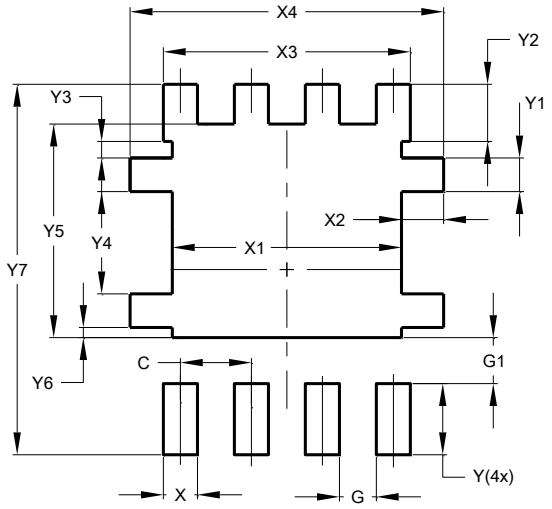


PowerDI5060-8			
Dim	**Min**	**Max**	**Typ**
A	0.90	1.10	1.00
A1	0.00	0.05	–
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
K	0.51	–	–
L	0.51	0.71	0.61
L1	0.100	0.200	0.175
M	3.235	4.035	3.635
M1	1.00	1.40	1.21
Θ	10°	12°	11°
Θ1	6°	8°	7°
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

PowerDI5060-8



Dimensions	Value (in mm)
C	1.270
G	0.660
G1	0.820
X	0.610
X1	4.100
X2	0.755
X3	4.420
X4	5.610
Y	1.270
Y1	0.600
Y2	1.020
Y3	0.295
Y4	1.825
Y5	3.810
Y6	0.180
Y7	6.610

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