

60V DUAL N-CANNEL ENHANCEMENT MODE MOSFET
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	I_D $T_A = +25^\circ C$
60V	66m Ω @ $V_{GS} = 10V$	4.4A
	97m Ω @ $V_{GS} = 4.5V$	3.6A

Features and Benefits

- Low on-resistance
- Fast switching speed
- 100% Unclamped Inductive Switch (UIS) test in production
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

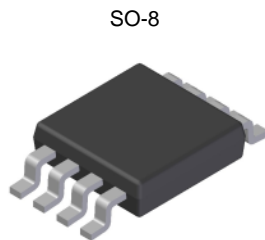
Description and Applications

This MOSFET is designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

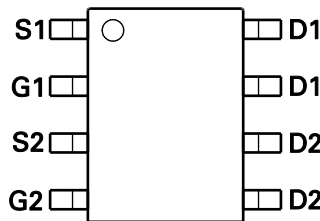
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

Mechanical Data

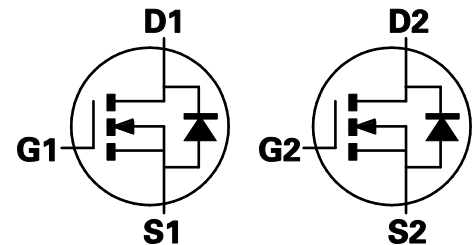
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.074 grams (Approximate)



Top View



Top View



Equivalent Circuit

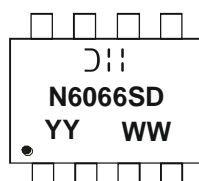
Ordering Information (Notes 4 & 5)

Part Number	Compliance	Case	Packaging
DMN6066SSD-13	Commercial	SO-8	2,500/Tape & Reel
DMN6066SSDQ-13	Automotive	SO-8	2,500/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

SO-8



= Manufacturer's Marking
 N6066SD = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 09 = 2009)
 WW = Week (01 - 53)

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

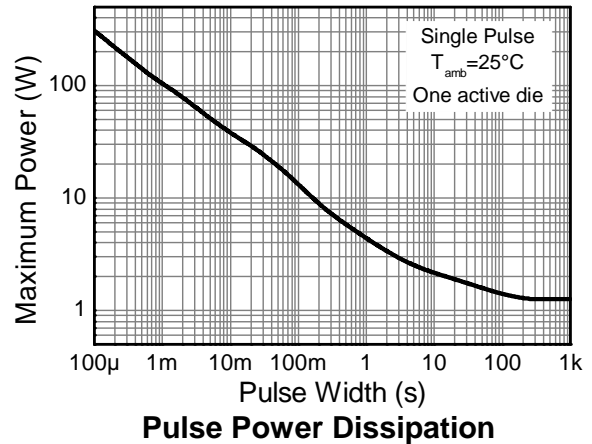
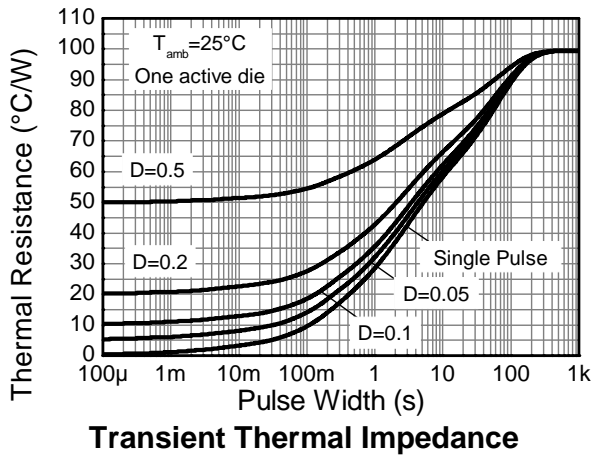
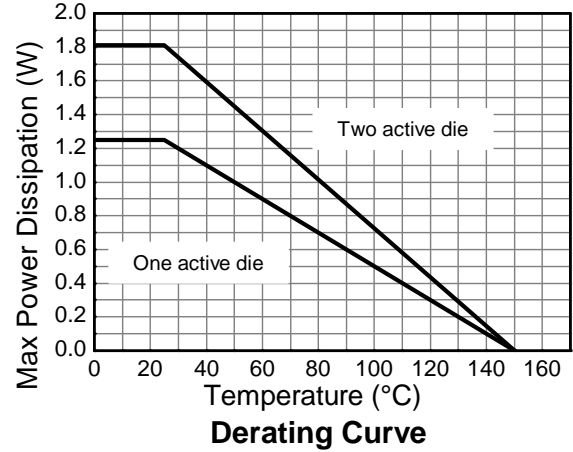
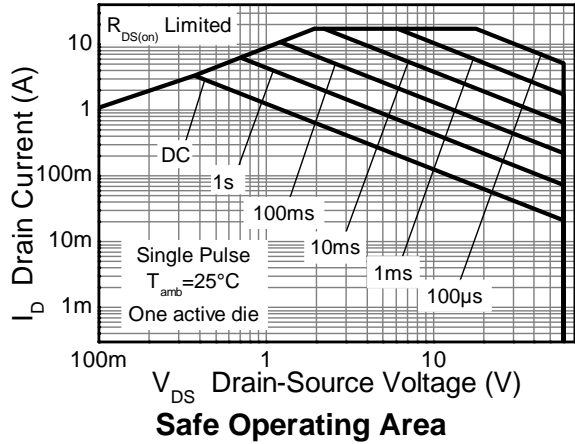
Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V _{DSS}	60	V
Gate-Source Voltage	(Note 6)	V _{GS}	±20	V
Single Pulsed Avalanche Energy	(Note 13)	E _{AS}	37.5	mJ
Single Pulsed Avalanche Current	(Note 13)	I _{AS}	5.0	A
Continuous Drain Current	V _{GS} = 10V	(Note 8)	4.4	A
		T _A = +70°C (Note 8)	3.5	
		(Note 7)	3.3	
Pulsed Drain Current	V _{GS} = 10V	I _{DM}	17.0	A
Continuous Source Current (Body diode)	(Note 8)	I _S	3.2	A
Pulsed Source Current (Body diode)	(Note 9)	I _{SM}	17.0	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Notes 7 & 10)	P _D	1.25	W mW/°C
			10	
	(Notes 7 & 11)		1.8	
			14.3	
Thermal Resistance, Junction to Ambient	(Notes 8 & 10)	R _{θJA}	2.14	°C/W
	(Notes 7 & 10)		100	
	(Notes 7 & 11)		70	
Thermal Resistance, Junction to Lead	(Notes 8 & 10)	R _{θJL}	58	°C/W
	(Notes 10 & 12)		55	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to 150	°C

- Notes:
6. AEC-Q101 V_{GS} maximum is ±16V.
 7. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 8. Same as note (3), except the device is measured at t ≤ 10 sec.
 9. Same as note (3), except the device is pulsed with D = 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.
 10. For a dual device with one active die.
 11. For a device with two active die running at equal power.
 12. Thermal resistance from junction to solder-point (at the end of the drain lead).
 13. UIS in production with L = 3.0mH, I_{AS} = 5.0A, R_G = 25Ω, V_{DD} = 50V, starting T_J = +25°C.

Thermal Characteristics

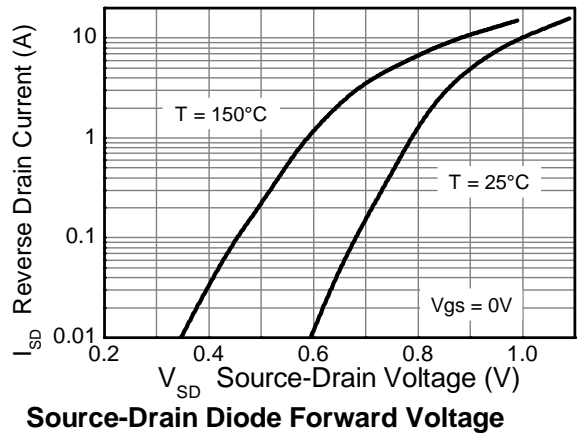
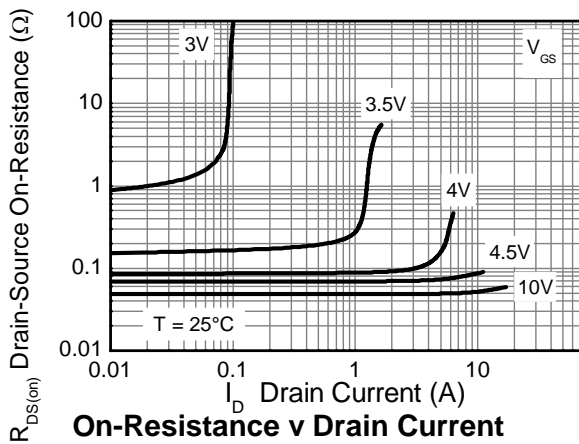
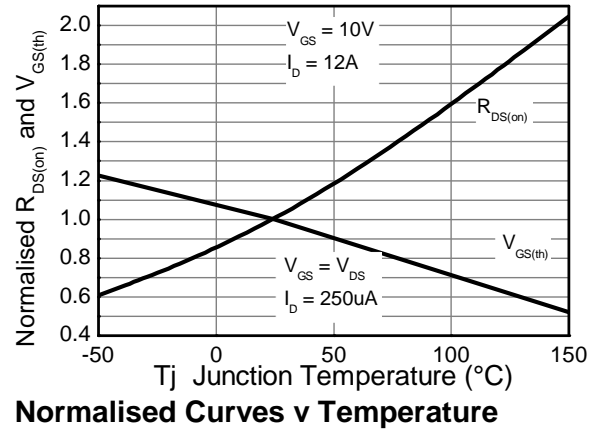
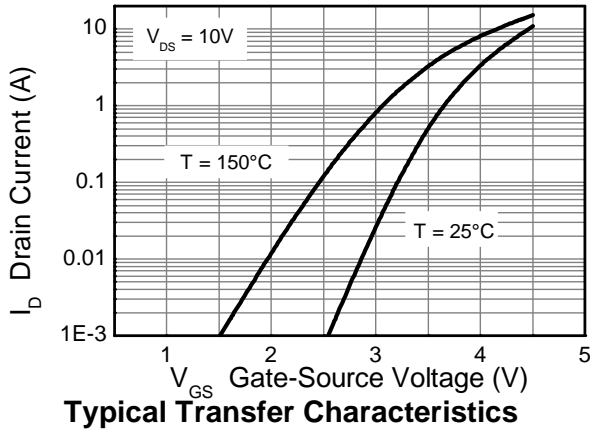
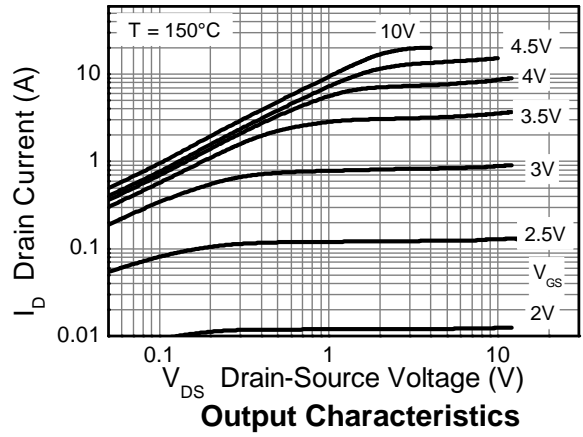
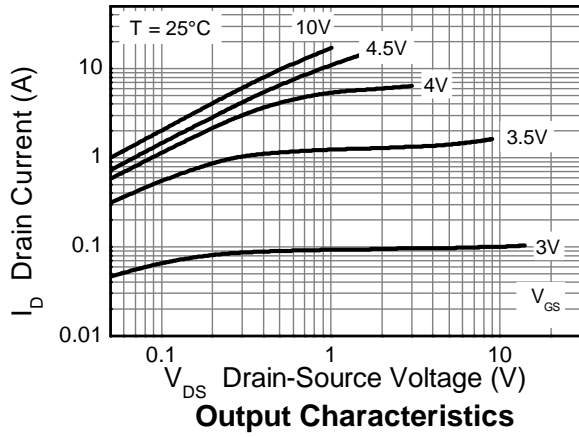


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

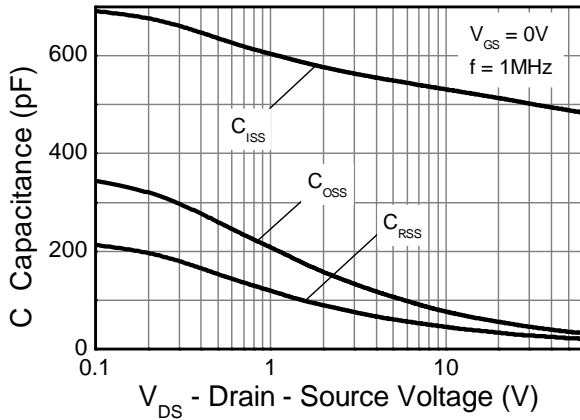
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	I _D = 250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	0.5	μA	V _{DS} = 60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	1.0	—	3.0	V	I _D = 250μA, V _{DS} = V _{GS}
Static Drain-Source On-Resistance (Note 14)	R _{DS(on)}	—	0.048	0.066	Ω	V _{GS} = 10V, I _D = 4.5A
			0.068	0.097		V _{GS} = 4.5V, I _D = 3.5A
Forward Transconductance (Notes 14 & 15)	g _{fs}	—	19.2	—	S	V _{DS} = 15V, I _D = 6A
Diode Forward Voltage (Note 14)	V _{SD}	—	0.89	1.15	V	I _S = 4.5A, V _{GS} = 0V
Reverse recovery time (Note 15)	t _{rr}	—	22.2	—	ns	I _S = 1.9A, di/dt = 100A/μs
Reverse recovery charge (Note 15)	Q _{rr}	—	16.9	—	nC	
DYNAMIC CHARACTERISTICS (Note 15)						
Input Capacitance	C _{iss}	—	502	—	pF	V _{DS} = 30V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	45.7	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	27.1	—	pF	
Total Gate Charge (Note 16)	Q _g	—	5.4	—	nC	V _{GS} = 4.5V
Total Gate Charge (Note 16)	Q _g	—	10.3	—	nC	V _{GS} = 10V
Gate-Source Charge (Note 16)	Q _{gs}	—	1.7	—	nC	
Gate-Drain Charge (Note 16)	Q _{gd}	—	3.2	—	nC	
Turn-On Delay Time (Note 16)	t _{D(on)}	—	2.7	—	ns	V _{DD} = 30V, V _{GS} = 10V I _D = 1A, R _G = 6.0Ω
Turn-On Rise Time (Note 16)	t _r	—	2.4	—	ns	
Turn-Off Delay Time (Note 16)	t _{D(off)}	—	14.7	—	ns	
Turn-Off Fall Time (Note 16)	t _f	—	5.4	—	ns	

- Notes:
14. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
 15. For design aid only, not subject to production testing.
 16. Switching characteristics are independent of operating junction temperatures.

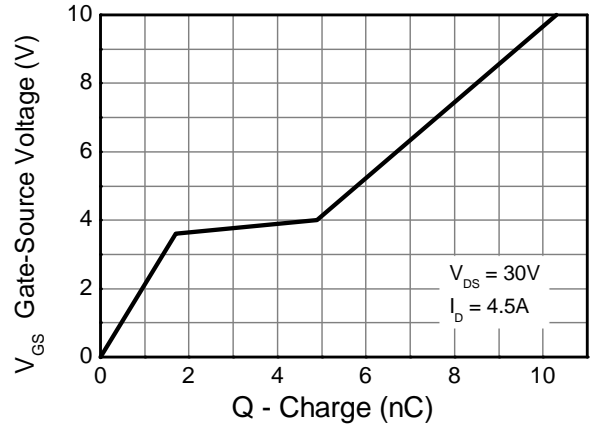
Typical Characteristics



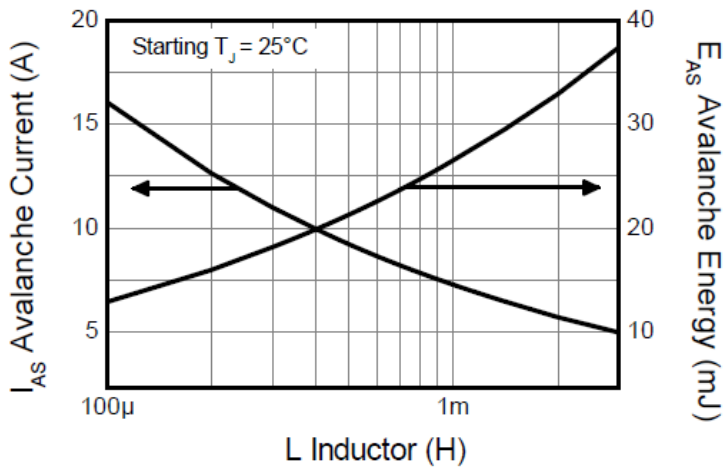
Typical Characteristics (continued)



Capacitance v Drain-Source Voltage

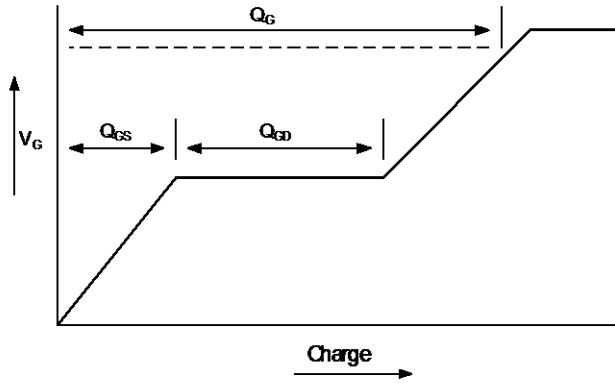


Gate-Source Voltage v Gate Charge

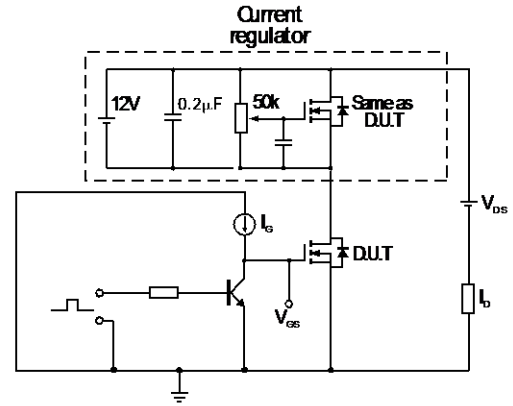


Single-Pulsed Avalanche Rating

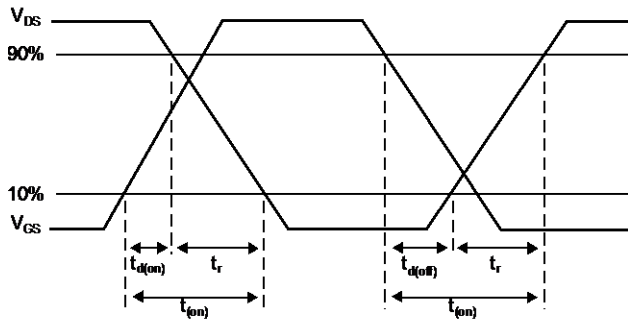
Test Circuits



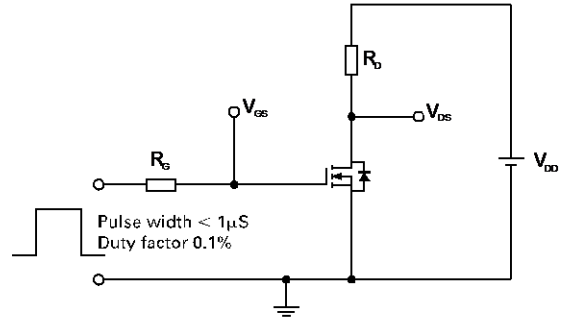
Basic gate charge waveform



Gate charge test circuit



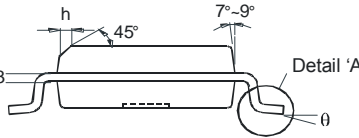
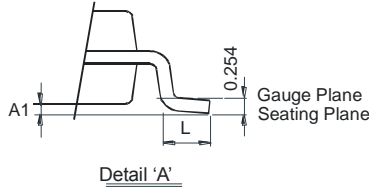
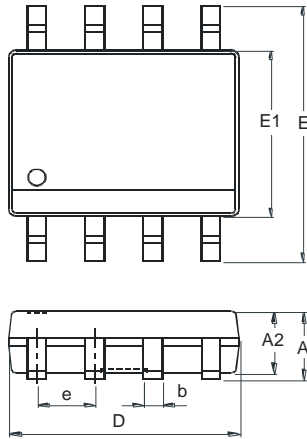
Switching time waveforms



Switching time test circuit

Package Outline Dimensions

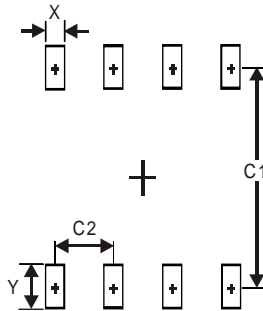
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SO-8		
Dim	Min	Max
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
All Dimensions in mm		

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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