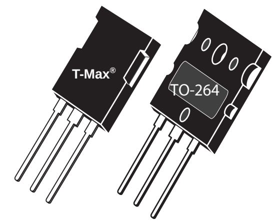
APT94N65B2C6
APT94N65LC6

650V 94A 0.035Ω

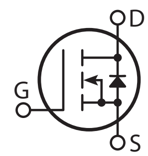
Super Junction MOSFET

APT94N65B2C6



APT94N65LC6

- **Ultra Low $R_{DS(ON)}$**
- **Low Miller Capacitance**
- **Ultra Low Gate Charge, Q_g**
- **Avalanche Energy Rated**
- **Extreme $^{dv}/_{dt}$ Rated**



Unless stated otherwise, Microsemi discrete MOSFETs contain a single MOSFET die. This device is made with two parallel MOSFET die. It is intended for switch-mode operation. It is not suitable for linear mode operation.

MAXIMUM RATINGS

All Ratings per die: T_C = 25°C unless otherwise specified.

Symbol	Parameter	APT94N65B2_LC6	UNIT
V_{DSS}	Drain-Source Voltage	650	Volts
I_D	Continuous Drain Current @ T_C = 25°C [1]	95	Amps
	Continuous Drain Current @ T_C = 100°C	61	
I_{DM}	Pulsed Drain Current [2]	282	
V_{GS}	Gate-Source Voltage Continuous	±20	Volts
P_D	Total Power Dissipation @ T_C = 25°C	833	Watts
T_J,T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	°C
T_L	Lead Temperature: 0.063" from Case for 10 Sec.	260	
I_{AR}	Avalanche Current [2]	9.3	Amps
E_{AR}	Repetitive Avalanche Energy [3] (Id = 9.3A, Vdd = 50V)	1.76	mJ
E_{AS}	Single Pulse Avalanche Energy (Id = 9.3A, Vdd = 50V)	1160	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$BV_{(DSS)}$	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 2.0mA)	650			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance [4] (V_{GS} = 10V, I_D = 35.2A)		0.03	0.035	Ohms
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 650V, V_{GS} = 0V)		1.0	50	μA
	Zero Gate Voltage Drain Current (V_{DS} = 650V, V_{GS} = 0V, T_C = 150°C)		100		
I_{GSS}	Gate-Source Leakage Current (V_{GS} = ±20V, V_{DS} = 0V)			±200	nA
$V_{GS(th)}$	Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 3.5mA)	2.5	3	3.5	Volts

CAUTION: These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		8140		pF
C_{oss}	Output Capacitance			5451		
C_{rss}	Reverse Transfer Capacitance			603		
Q_g	Total Gate Charge ⑤	V_{GS} = 10V V_{DD} = 300V I_D = 94A @ 25°C		320		nC
Q_{gs}	Gate-Source Charge			50		
Q_{gd}	Gate-Drain ("Miller") Charge			168		
$t_{d(on)}$	Turn-on Delay Time	**INDUCTIVE SWITCHING** V_{GS} = 15V V_{DD} = 400V I_D = 94A @ 25°C R_G = 4.3Ω		26		ns
t_r	Rise Time			59		
$t_{d(off)}$	Turn-off Delay Time			323		
t_f	Fall Time			172		
E_{on}	Turn-on Switching Energy ⑥	**INDUCTIVE SWITCHING @ 25°C** V_{DD} = 400V, V_{GS} = 15V I_D = 94A, R_G = 4.3Ω		2916		µJ
E_{off}	Turn-off Switching Energy			3257		
E_{on}	Turn-on Switching Energy ⑥	**INDUCTIVE SWITCHING @ 125°C** V_{DD} = 400V, V_{GS} = 15V I_D =94A, R_G = 4.3Ω		3947		
E_{off}	Turn-off Switching Energy			4034		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)				92.6	Amps
I_{SM}	Pulsed Source Current ② (Body Diode)				282	
V_{SD}	Diode Forward Voltage ④ (V_{GS} = 0V, I_S = -52.4A)			0.9	1.2	Volts
dv/dt	Peak Diode Recovery dv/dt ⑦				15	V/ns
t_{rr}	Reverse Recovery Time (I_S = -94A, di/dt = 100A/µs)	T_j = 25°C		1063		ns
Q_{rr}	Reverse Recovery Charge (I_S = -94A, di/dt = 100A/µs)	T_j = 25°C		39		µC
I_{RRM}	Peak Recovery Current (I_S = -94A, di/dt = 100A/µs)	T_j = 25°C		63		Amps

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.15	°C/W
$R_{\theta JA}$	Junction to Ambient			31	

1 Continuous current limited by package lead temperature.

2 Repetitive Rating: Pulse width limited by maximum junction temperature

3 Repetitive avalanche causes additional power losses that can be calculated as ***$P_{AV} = E_{AR}$*f . Pulse width tp limited by Tj max.***

4 Pulse Test: Pulse width < 380 µs, Duty Cycle < 2%

5 See MIL-STD-750 Method 3471

6 Eon includes diode reverse recovery.

7 Maximum diode commutation speed = di/dt 300A/µs

Microsemi reserves the right to change, without notice, the specifications and information contained herein.

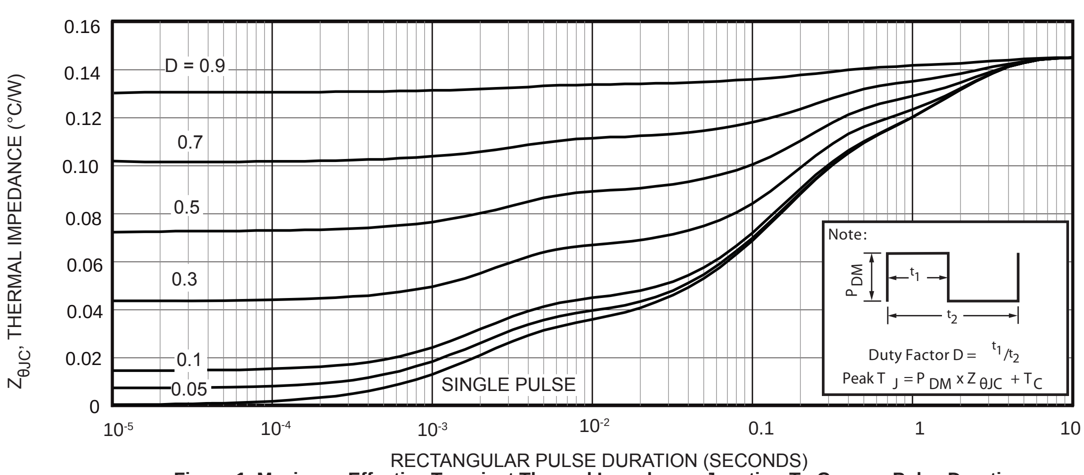


Figure 1, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

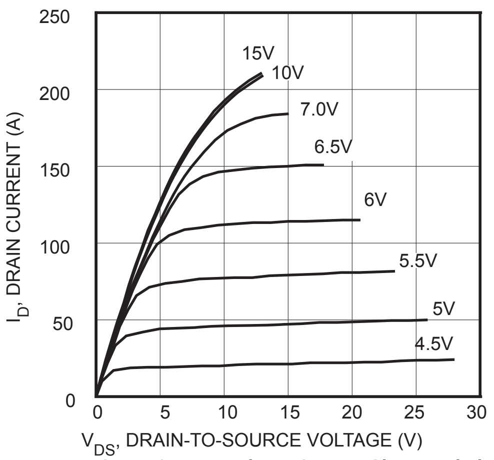


FIGURE 2, Low Voltage Output Characteristics

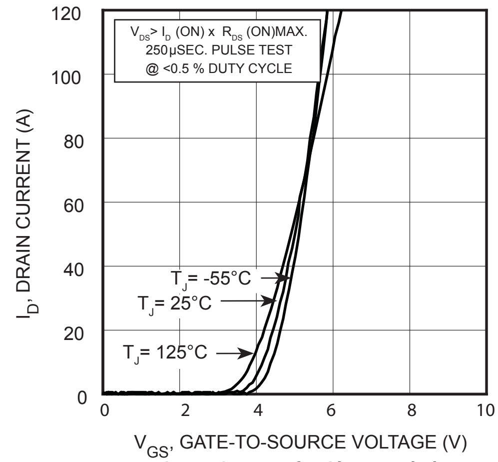


FIGURE 3, Transfer Characteristics

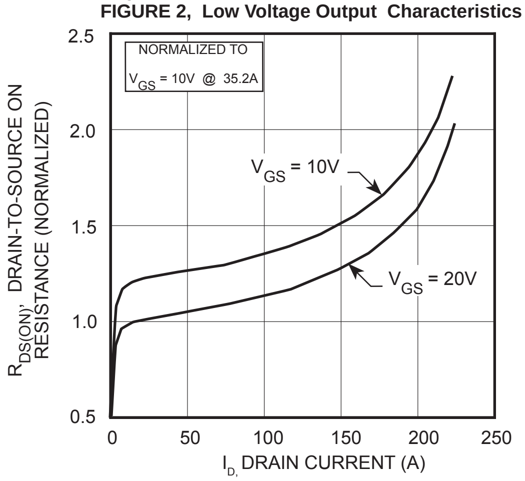


FIGURE 4, R_{DS}(ON) vs Drain Current

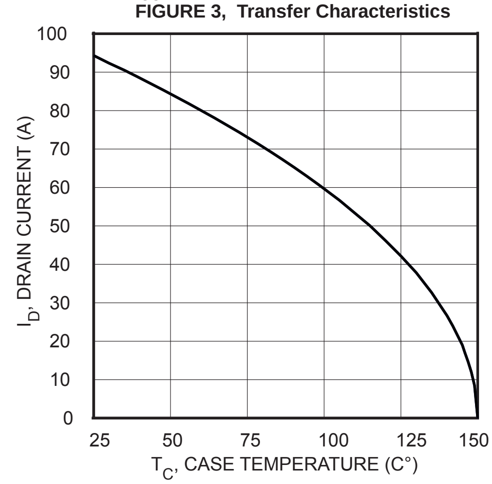


FIGURE 5, Maximum Drain Current vs Case Temperature

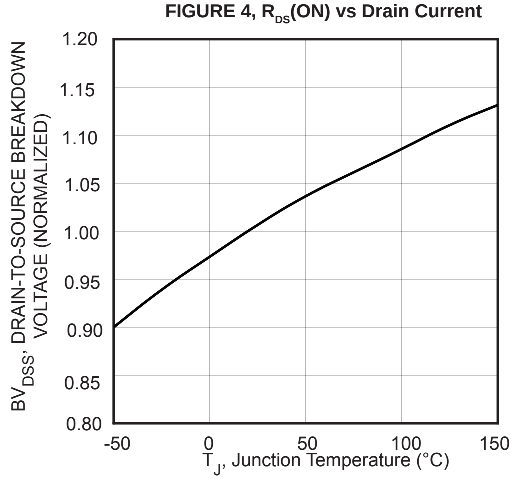


FIGURE 6, Breakdown Voltage vs Temperature

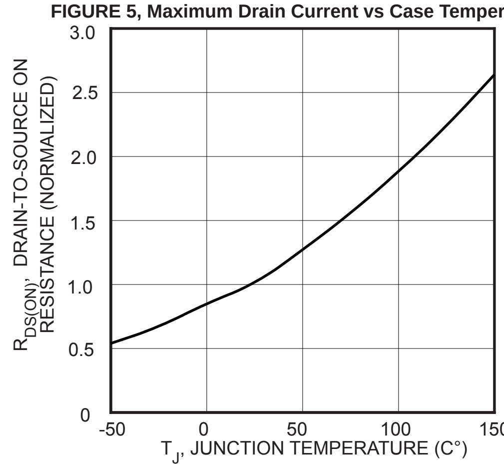


FIGURE 7, On-Resistance vs Temperature

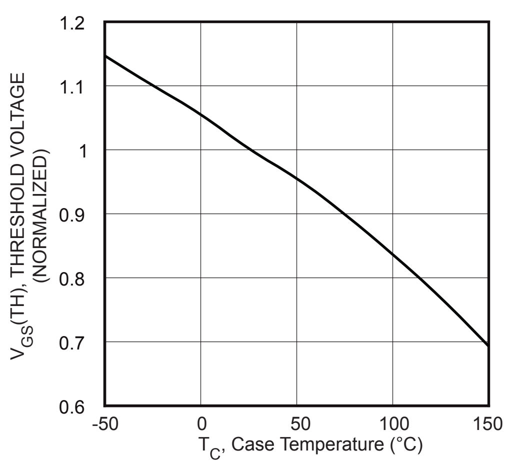


FIGURE 8, Threshold Voltage vs Temperature

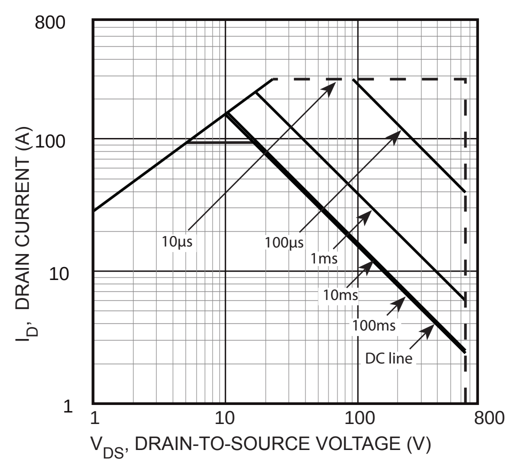


FIGURE 9, Maximum Safe Operating Area

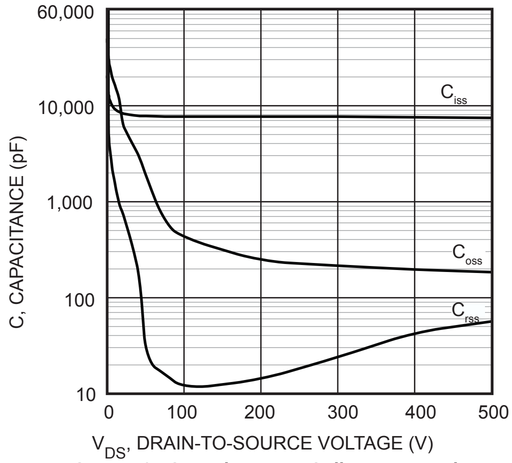


FIGURE 10, Capacitance vs Collector-To-Emitter Voltage

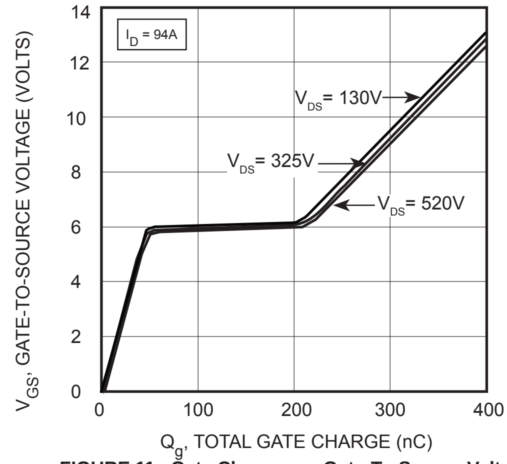


FIGURE 11, Gate Charges vs Gate-To-Source Voltage

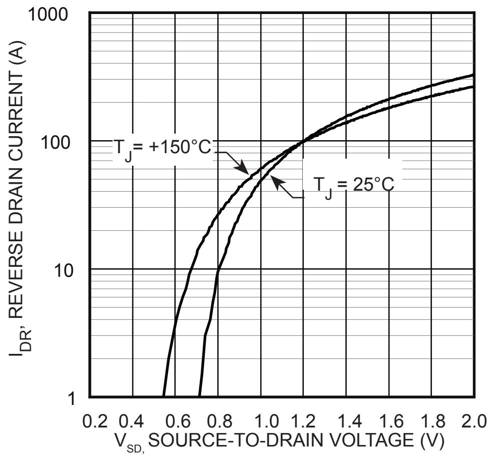


FIGURE 12, Source-Drain Diode Forward Voltage

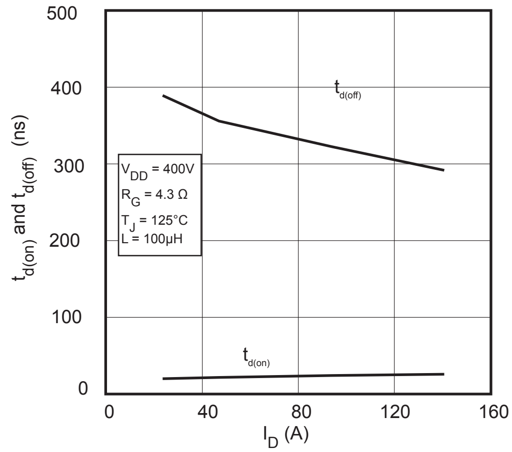


FIGURE 13, Delay Times vs Current

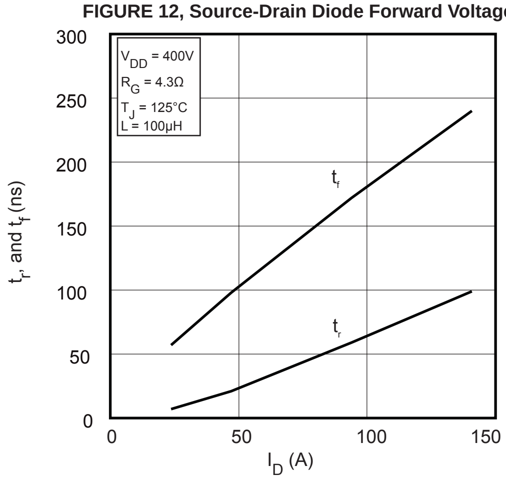


FIGURE 14 , Rise and Fall Times vs Current

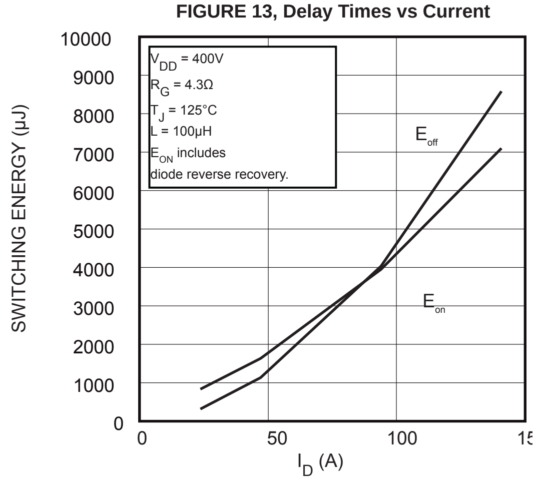


FIGURE 15, Switching Energy vs Current

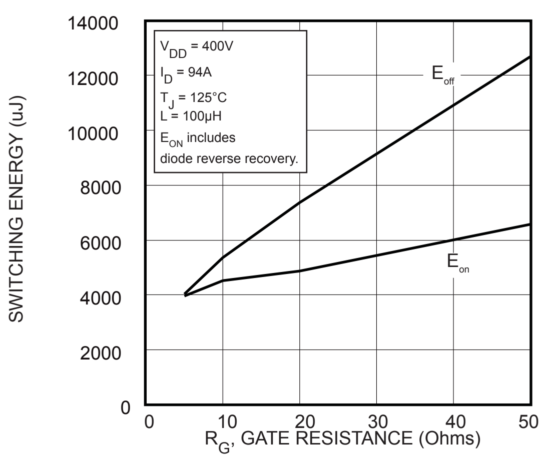


FIGURE 16, Switching Energy vs Gate Resistance

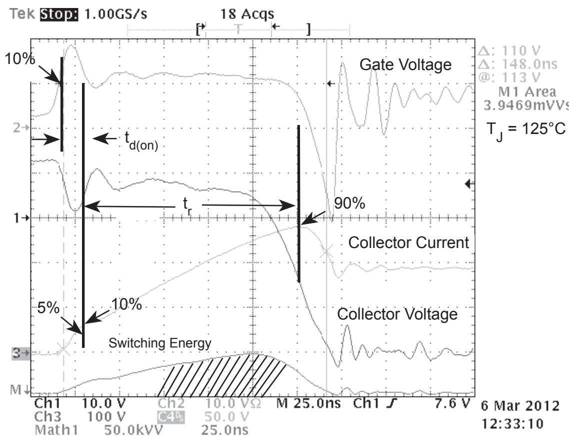


Figure 17, Turn-on Switching Waveforms and Definitions

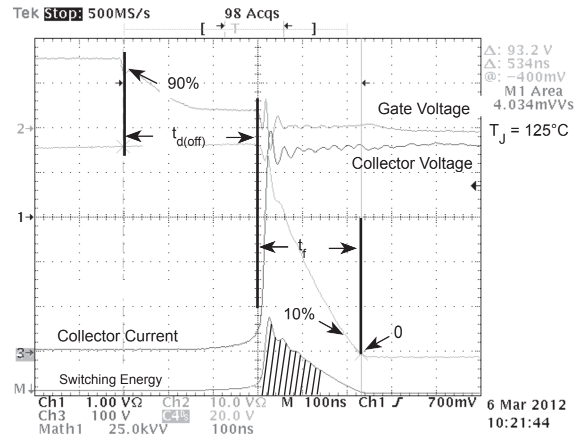


Figure 18, Turn-off Switching Waveforms and Definitions

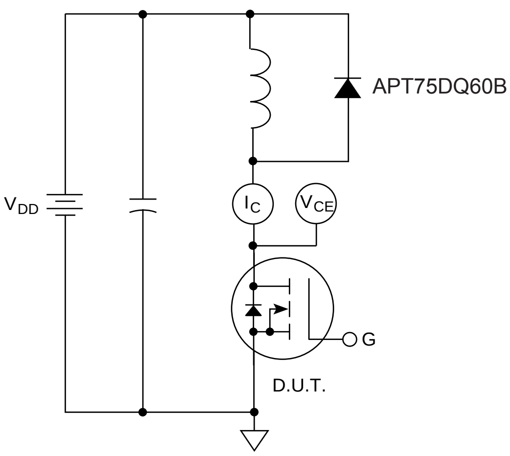
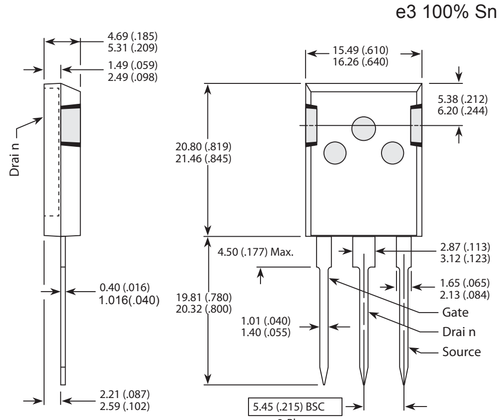


Figure 19, Inductive Switching Test Circuit

T-MAX® (B2) Package Outline

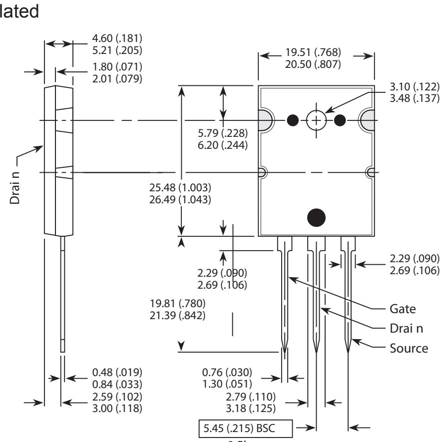
TO-264 (L) Package Outline

e3 100% Sn Plated



These dimensions are equal to the TO-247 without the mounting hole.

Dimensions in Millimeters and (Inches)



Dimensions in Millimeters and (Inches)

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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