

Product Summary

BV_{DSS}	$R_{DS(ON) \max}$	I_D $T_C = +25^\circ C$ (Note 9)
60V	3.65m Ω @ $V_{GS} = 10V$	100A

Description and Applications

This new generation MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

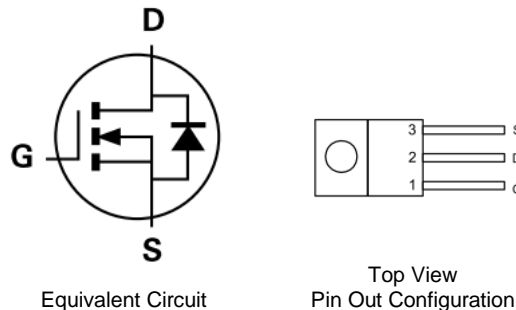
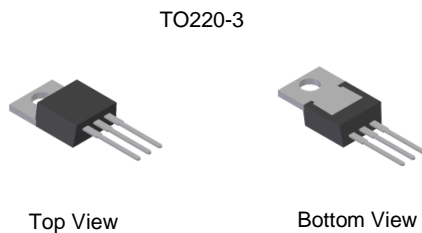
- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

Features

- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low Input Capacitance
- Low Input/Output Leakage
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: TO220-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 [Ⓔ]
- Terminal Connections: See Diagram Below
- Weight: 1.85 grams (Approximate)

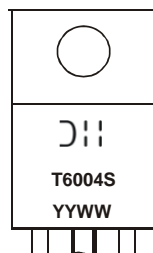


Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6004SCT	TO220-3	50 pieces/tube

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



= Manufacturer's Marking
 T6004S = Product Type Marking Code
 YYWW = Date Code Marking
 YY or YY = Last Two Digits of Year (ex: 15 = 2015)
 WW or WW = Week Code (01 to 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current (Note 6)	I_D	$T_C = +25^\circ\text{C}$ (Note 9)	100
		$T_C = +70^\circ\text{C}$	100
Maximum Continuous Body Diode Forward Current (Note 6)	I_S	100	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)	I_{DM}	180	A
Avalanche Current, $L=0.2\text{mH}$	I_{AS}	45	A
Avalanche Energy, $L=0.2\text{mH}$	E_{AS}	200	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	2.3	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	52.8	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	P_D	113	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	1.1	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	3.1	3.65	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 100\text{A}$
Diode Forward Voltage	V_{SD}	—	—	1.3	V	$V_{GS} = 0\text{V}, I_S = 100\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	4556	—	pF	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	1383	—		
Reverse Transfer Capacitance	C_{rss}	—	105	—		
Gate Resistance	R_G	—	0.7	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge	Q_g	—	95.4	—	nC	$V_{DD} = 30\text{V}, I_D = 90\text{A}, V_{GS} = 10\text{V}$
Gate-Source Charge	Q_{gs}	—	21.6	—		
Gate-Drain Charge	Q_{gd}	—	20.4	—		
Turn-On Delay Time	$t_{D(ON)}$	—	14.3	—	ns	$V_{DD} = 30\text{V}, V_{GS} = 10\text{V}, I_D = 90\text{A}, R_G = 3.5\Omega$
Turn-On Rise Time	t_R	—	99.1	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	40	—		
Turn-Off Fall Time	t_F	—	17.6	—		
Reverse Recovery Time	t_{RR}	—	50.5	—	ns	$I_F = 48\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	80.8	—	nC	

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on infinite heat sink.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.
 - Package limited.

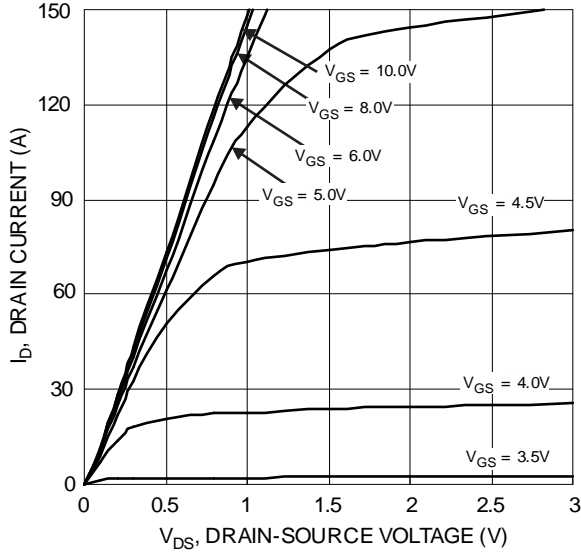


Figure 1 Typical Output Characteristic

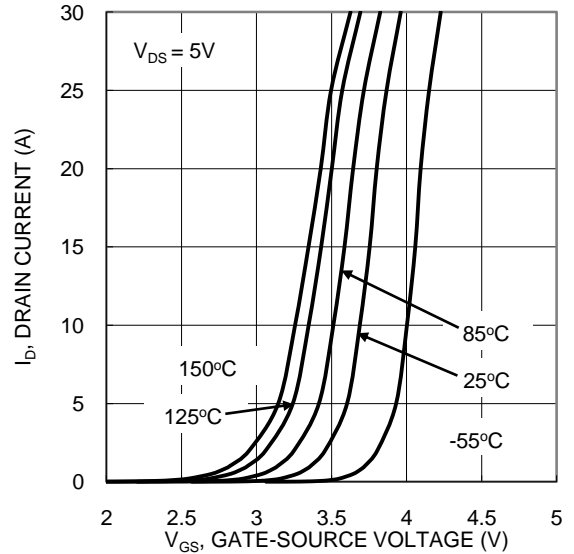


Figure 2 Typical Transfer Characteristic

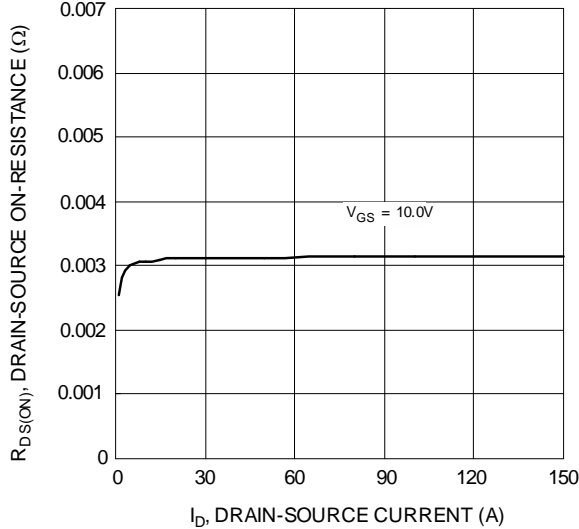


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

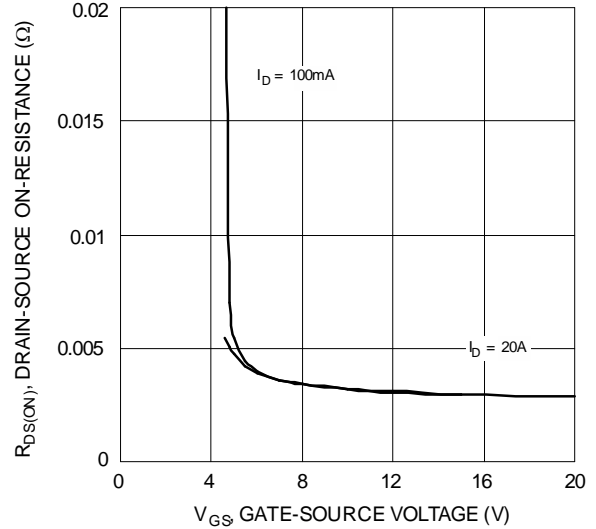


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

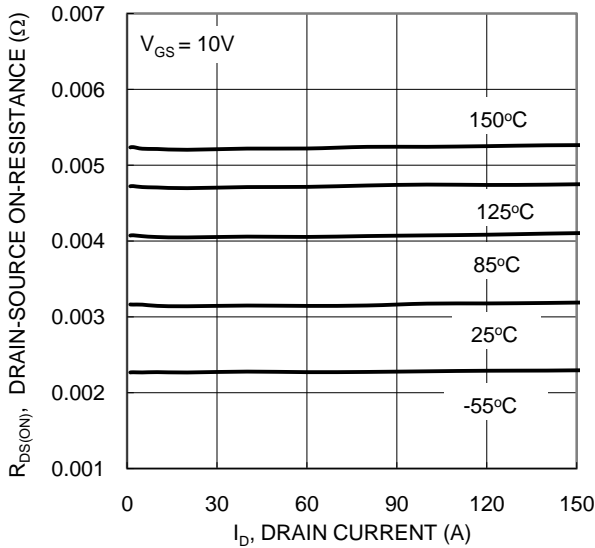


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

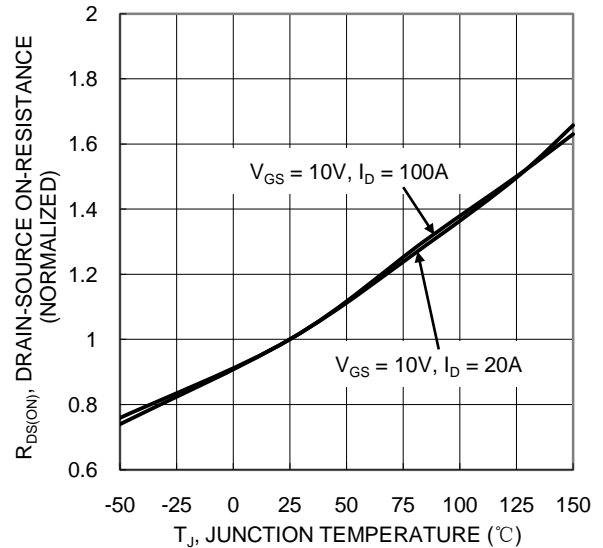


Figure 6 On-Resistance Variation with Temperature

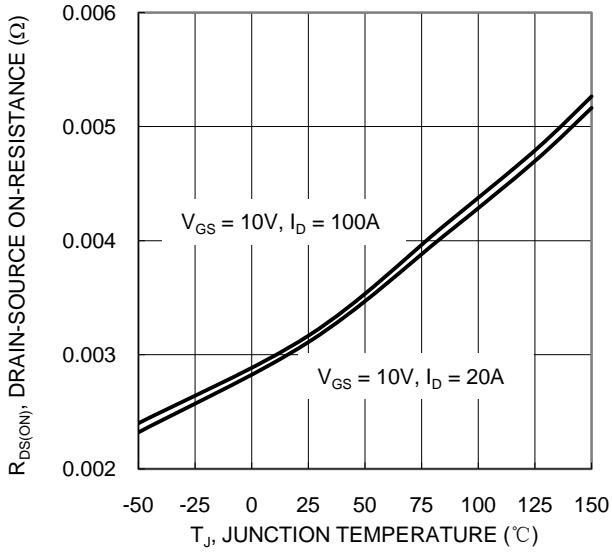


Figure 7 On-Resistance Variation with Temperature

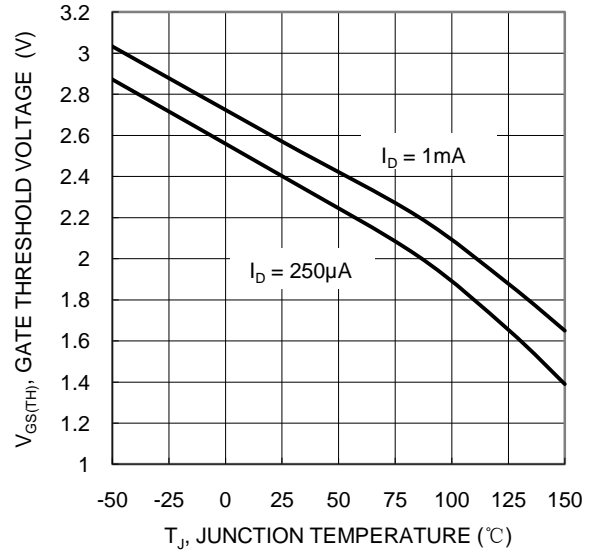


Figure 8 Gate Threshold Variation vs. Temperature

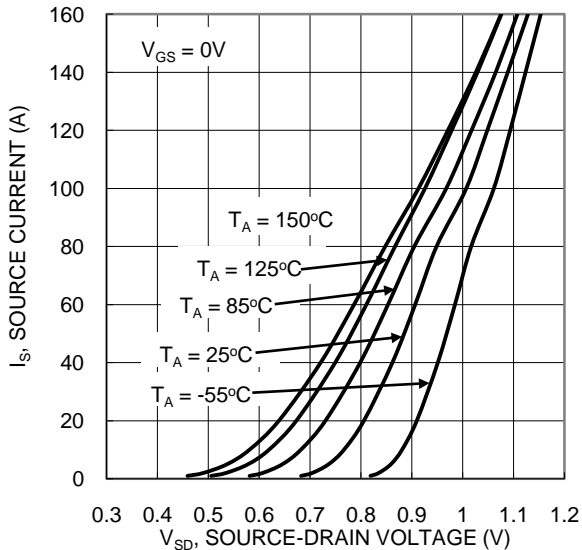


Figure 9 Diode Forward Voltage vs. Current

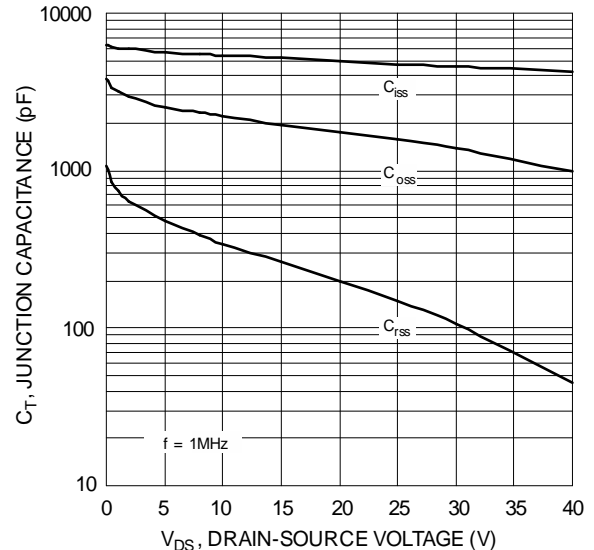


Figure 10 Typical Junction Capacitance

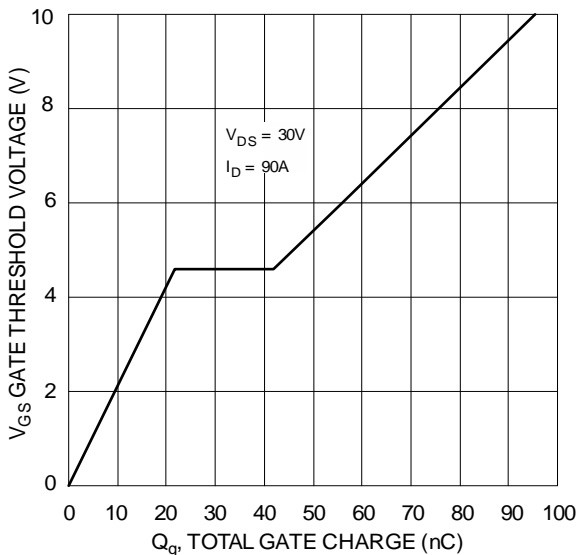


Figure 11 Gate Charge

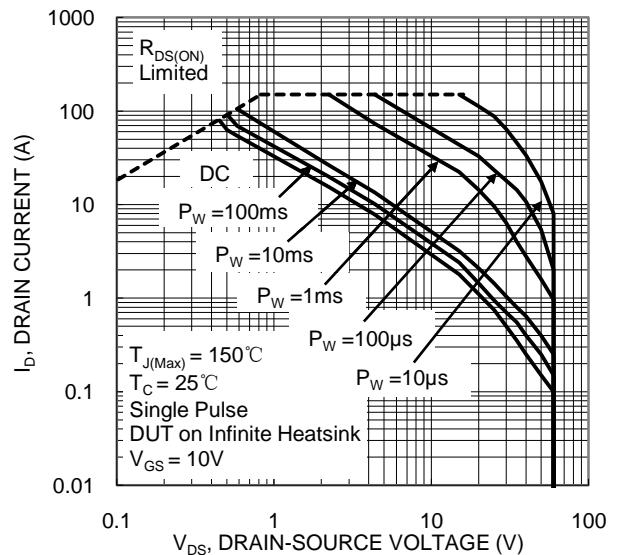


Figure 12 SOA, Safe Operation Area

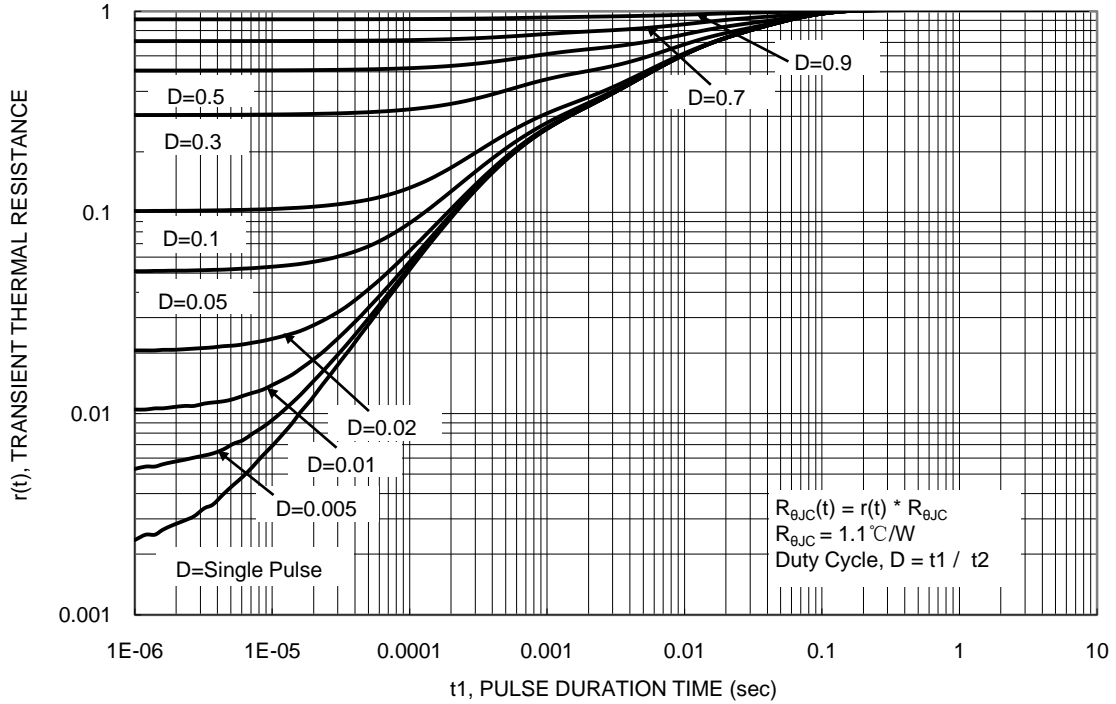
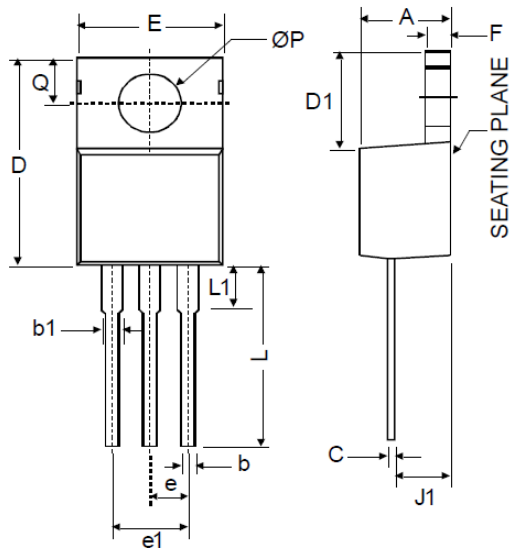


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

TO220-3



TO220-3		
Dim	Min	Max
A	3.55	4.85
b	0.51	1.14
b1	1.14	1.78
C	0.31	1.14
D	14.20	16.50
D1	5.84	6.86
E	9.70	10.70
e	2.79	2.99
e1	4.83	5.33
F	0.51	1.40
J1	2.03	2.92
L	12.72	14.72
L1	3.66	6.35
P	3.53	4.09
Q	2.54	3.43
All Dimensions in mm		

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Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.