

NTLUS3A39PZ

Power MOSFET

–20 V, –5.2 A, Single P–Channel, ESD,
1.6x1.6x0.55 mm UDFN μ Cool™ Package

Features

- UDFN Package with Exposed Drain Pads for Excellent Thermal Conduction
- Low Profile UDFN 1.6 x 1.6 x 0.55 mm for Board Space Saving
- Ultra Low $R_{DS(on)}$
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Optimized for Power Management Applications for Portable Products, Such as Cell Phones, PMP, Media Tablets, DSC, GPS, and Others
- Battery Switch
- High Side Load Switch

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V_{DSS}	−20	V
Gate-to-Source Voltage			V_{GS}	±8.0	V
Continuous Drain Current (Note 1)	Steady State	$T_A = 25^{\circ}\text{C}$	I_D	−5.2	A
		$T_A = 85^{\circ}\text{C}$		−3.7	
	Continuous Drain Current (Note 1)	$t \leq 5\text{ s}$		$T_A = 25^{\circ}\text{C}$	
Power Dissipation (Note 1)	Steady State	$T_A = 25^{\circ}\text{C}$	P_D	1.5	W
		$t \leq 5\text{ s}$		$T_A = 25^{\circ}\text{C}$	
Continuous Drain Current (Note 2)	Steady State	$T_A = 25^{\circ}\text{C}$	I_D	−3.4	A
		$T_A = 85^{\circ}\text{C}$		−2.4	
Power Dissipation (Note 2)		$T_A = 25^{\circ}\text{C}$	P_D	0.6	W
Pulsed Drain Current		$t_p = 10\text{ }\mu\text{s}$	I_{DM}	−17	A
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to 150	$^{\circ}\text{C}$
Source Current (Body Diode) (Note 2)			I_S	−1	A
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T_L	260	$^{\circ}\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Surface Mounted on FR4 Board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces).
2. Surface-mounted on FR4 board using the minimum recommended pad size of 30 mm², 2 oz. Cu.

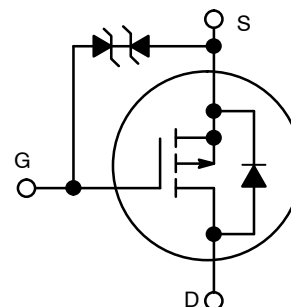


ON Semiconductor®

<http://onsemi.com>

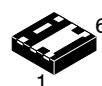
MOSFET

$V_{(BR)DSS}$	$R_{DS(on)} \text{ MAX}$	$I_D \text{ MAX}$
–20 V	39 m Ω @ –4.5 V	–5.2 A
	50 m Ω @ –2.5 V	
	81 m Ω @ –1.8 V	
	147 m Ω @ –1.5 V	

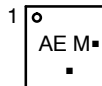


P–Channel MOSFET

MARKING DIAGRAM



UDFN6
(μ COOL™)
CASE 517AU



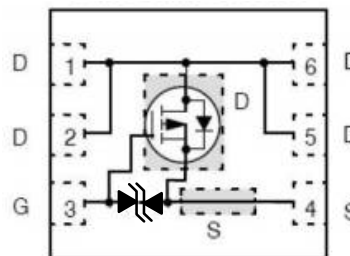
AE = Specific Device Code

M = Date Code

▪ = Pb–Free Package

(*Note: Microdot may be in either location)

PIN CONNECTIONS



(Top View)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

NTLUS3A39PZ

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	85	°C/W
Junction-to-Ambient – $t \leq 5$ s (Note 3)	$R_{\theta JA}$	55	
Junction-to-Ambient – Steady State min Pad (Note 4)	$R_{\theta JA}$	200	

3. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces).

4. Surface-mounted on FR4 board using the minimum recommended pad size of 30 mm², 2 oz. Cu.

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-20			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	$I_D = -250\text{ }\mu\text{A}$, ref to 25°C		13		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = -20\text{ V}$			-1.0	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8.0\text{ V}$			± 10	μA

ON CHARACTERISTICS (Note 5)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\text{ }\mu\text{A}$	-0.4		-1.0	V
Negative Threshold Temp. Coefficient	$V_{GS(TH)}/T_J$			3.0		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -4.0\text{ A}$		30	39	m Ω
		$V_{GS} = -2.5\text{ V}, I_D = -2.0\text{ A}$		40	50	
		$V_{GS} = -1.8\text{ V}, I_D = -1.2\text{ A}$		55	81	
		$V_{GS} = -1.5\text{ V}, I_D = -0.5\text{ A}$		75	147	
Forward Transconductance	g_{FS}	$V_{DS} = -5\text{ V}, I_D = -3.0\text{ A}$		25		S

CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = -15\text{ V}$		920		pF
Output Capacitance	C_{OSS}			85		
Reverse Transfer Capacitance	C_{RSS}			80		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = -4.5\text{ V}, V_{DS} = -15\text{ V}; I_D = -3.0\text{ A}$		10.4		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.5		
Gate-to-Source Charge	Q_{GS}			1.2		
Gate-to-Drain Charge	Q_{GD}			3.0		

SWITCHING CHARACTERISTICS, $V_{GS} = 4.5\text{ V}$ (Note 6)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = -4.5\text{ V}, V_{DD} = -15\text{ V}, I_D = -3.0\text{ A}, R_G = 1\text{ }\Omega$		7.2		ns
Rise Time	t_r			12.2		
Turn-Off Delay Time	$t_{d(OFF)}$			34.7		
Fall Time	t_f			34.8		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = -1.0\text{ A}$	$T_J = 25^\circ\text{C}$		0.67	1.0	V
			$T_J = 125^\circ\text{C}$		0.56		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, \text{dis}/\text{dt} = 100\text{ A}/\mu\text{s}, I_S = -1.0\text{ A}$			11.1		ns
Charge Time	t_a				5.8		
Discharge Time	t_b				5.3		
Reverse Recovery Charge	Q_{RR}				4		nC

5. Pulse Test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

6. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

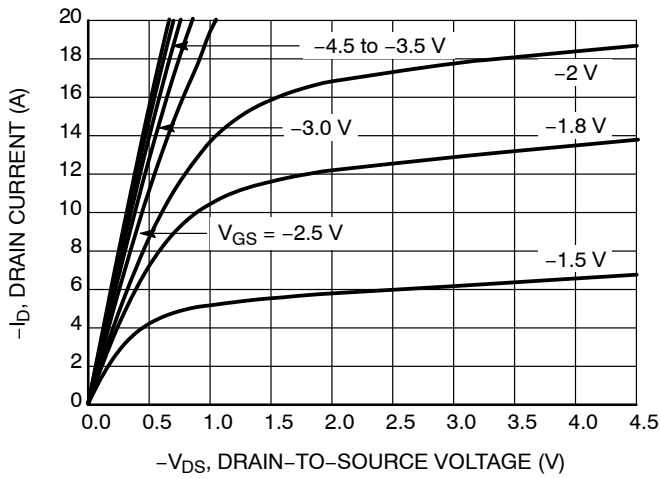


Figure 1. On-Region Characteristics

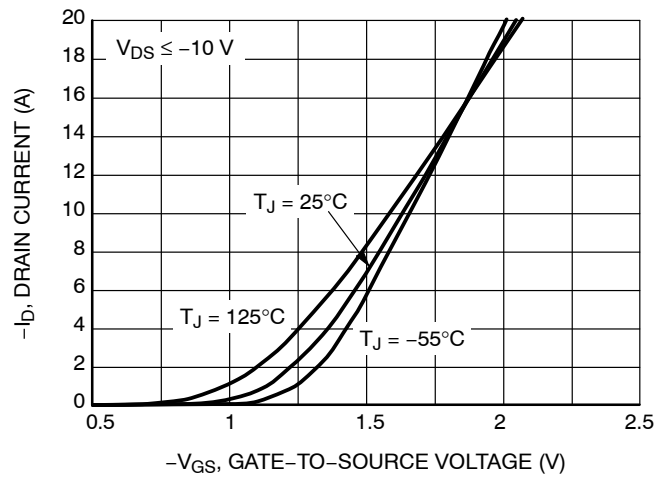


Figure 2. Transfer Characteristics

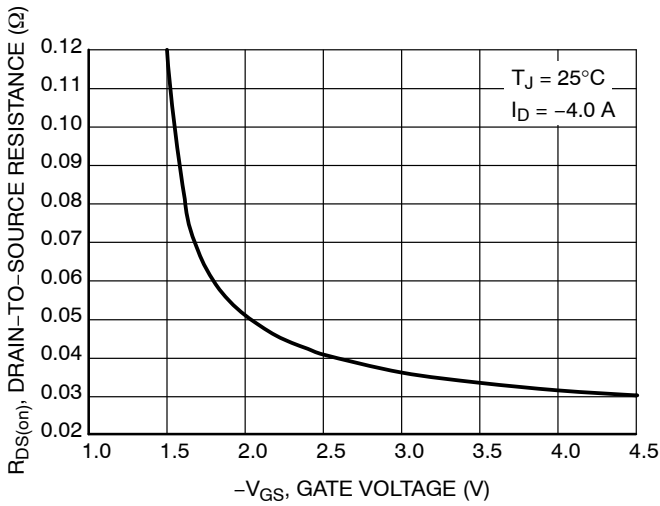


Figure 3. On-Resistance vs. Gate-to-Source Voltage

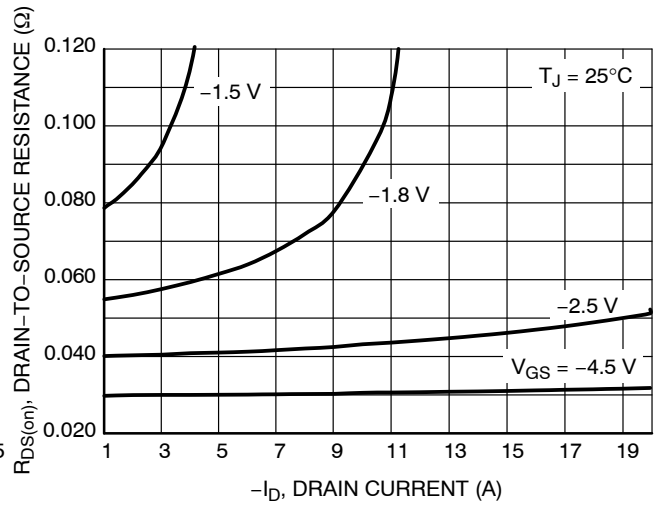


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

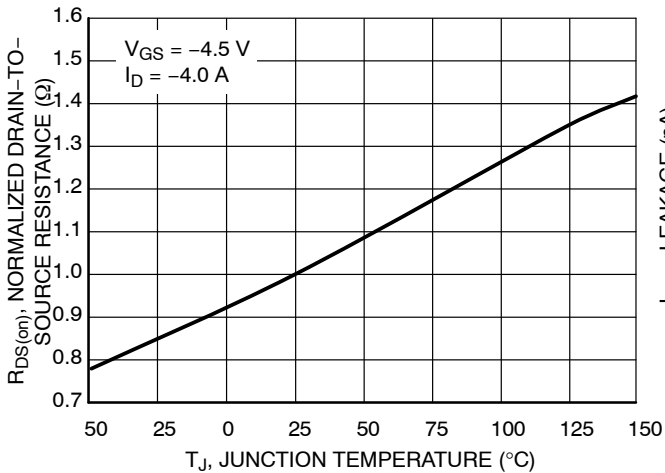


Figure 5. On-Resistance Variation with Temperature

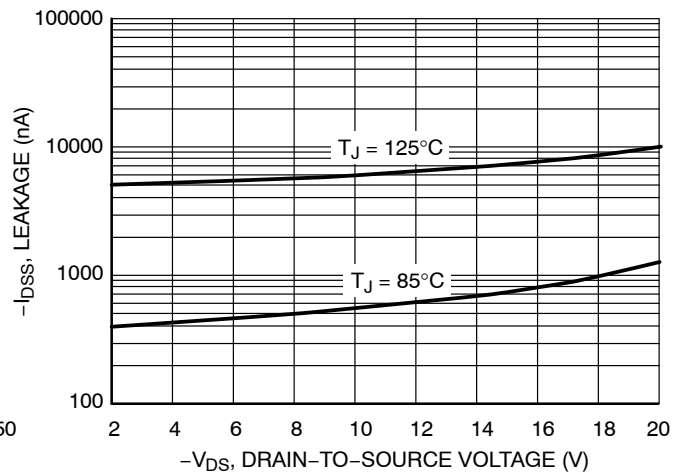


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

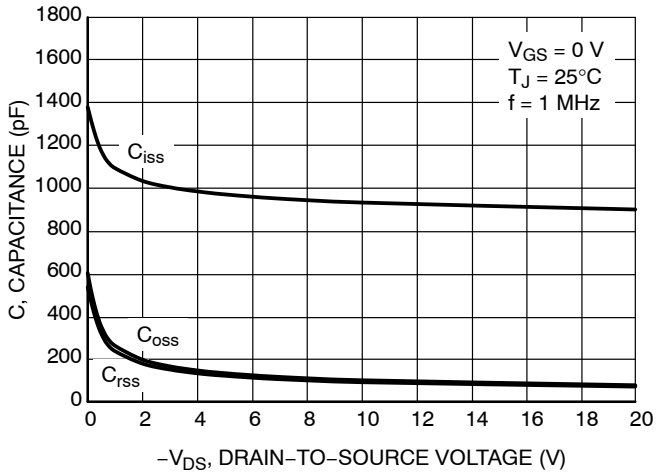


Figure 7. Capacitance Variation

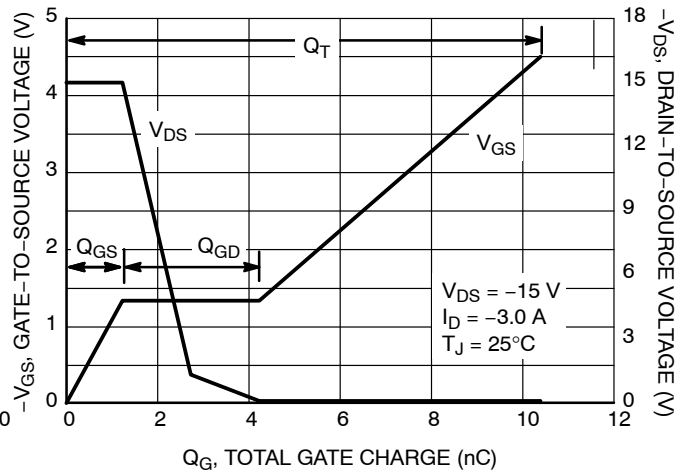


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

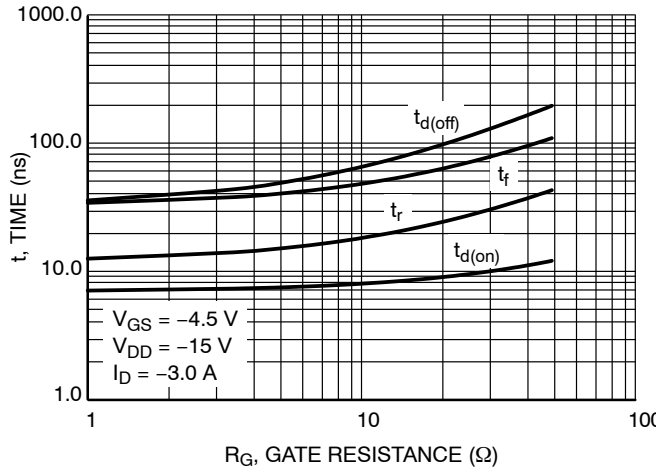


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

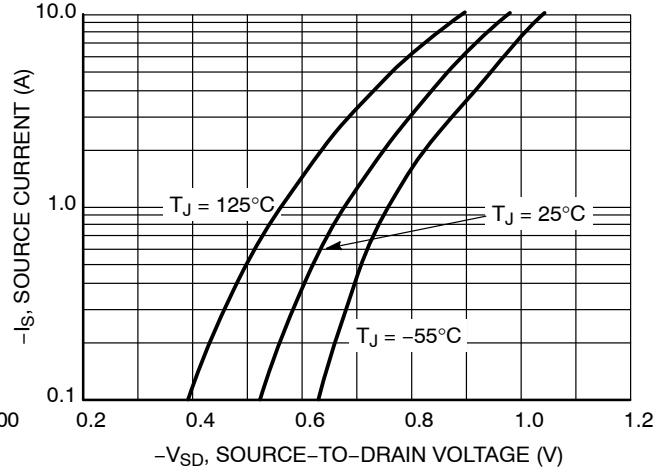


Figure 10. Diode Forward Voltage vs. Current

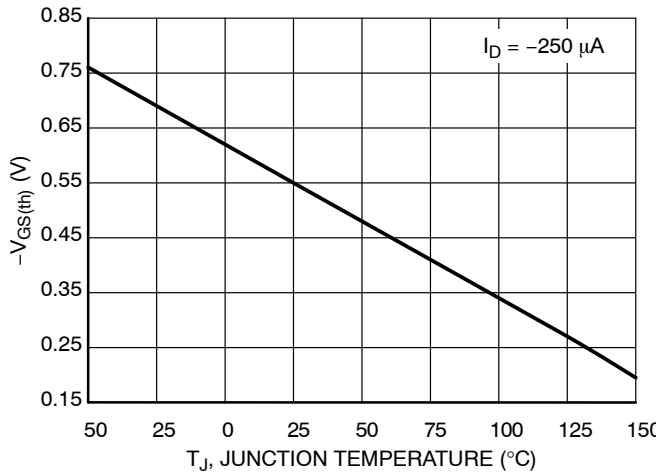


Figure 11. Threshold Voltage

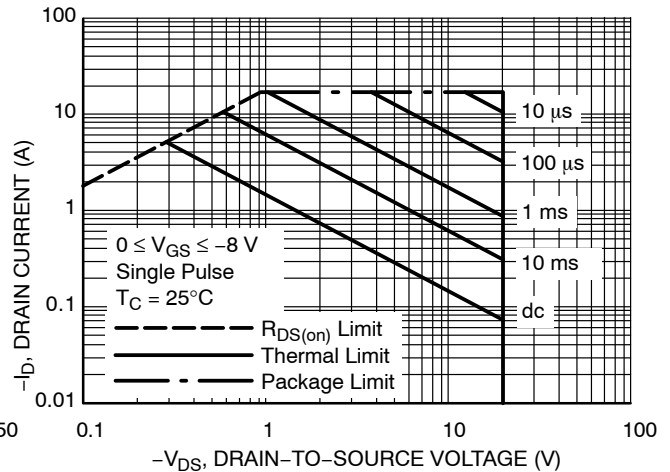


Figure 12. Maximum Rated Forward Biased Safe Operating Area

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TYPICAL CHARACTERISTICS

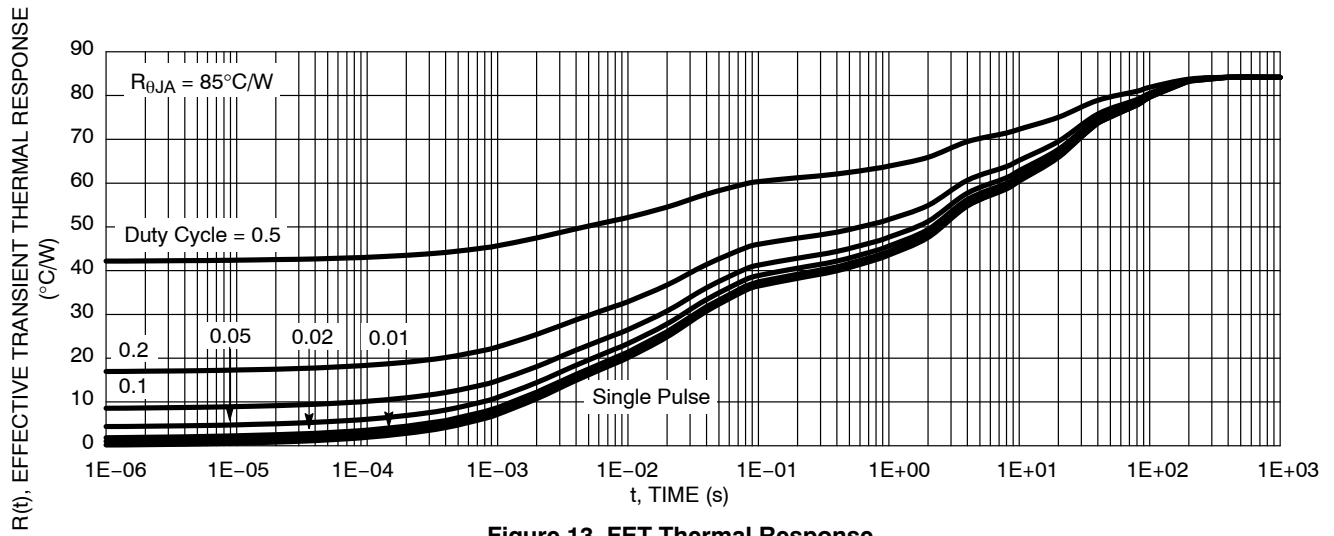


Figure 13. FET Thermal Response

DEVICE ORDERING INFORMATION

Device	Package	Shipping [†]
NTLUS3A39PZTAG	UDFN6 (Pb-Free)	3000 / Tape & Reel
NTLUS3A39PZTBG	UDFN6 (Pb-Free)	3000 / Tape & Reel

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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