ECH8659

Power MOSFET
30V, 24mΩ, 7A, Dual N-Channel

ON Semiconductor®

www.onsemi.com

This Power MOSFET is produced using ON Semiconductor's trench technology, which is specifically designed to minimize gate charge and low on resistance. This device is suitable for applications with low gate charge driving or low on resistance requirements.

Features

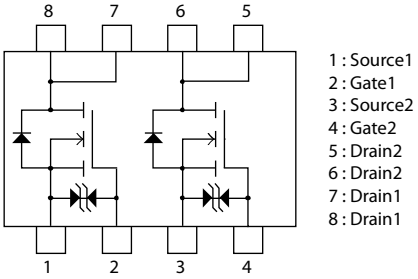
- 4V drive
- Composite type, Facilitating high-density mounting
- ESD Diode-Protected Gate
- Pb-Free, Halogen Free and RoHS compliance

Typical Applications

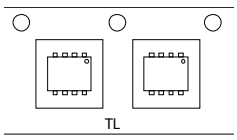
- LiB Protection Switch
- Motor Drive

V_{DSS}	R_{DS}(on) Max	I_D Max
30V	24mΩ@ 10V	7A
	41mΩ@ 4.5V	
	55mΩ@ 4V	

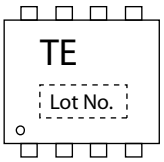
ELECTRICAL CONNECTION
N-Channel



PACKING TYPE : TL



MARKING



ORDERING INFORMATION
See detailed ordering and shipping information on page 5 of this data sheet.

SPECIFICATIONS
ABSOLUTE MAXIMUM RATING at Ta = 25°C (Note 1)

Parameter	Symbol	Value	Unit
Drain to Source Voltage	V_{DSS}	30	V
Gate to Source Voltage	V_{GSS}	±20	V
Drain Current (DC)	I_D	7	A
Drain Current (Pulse) PW ≤ 10μs, duty cycle ≤ 1%	I_{DP}	40	A
Power Dissipation When mounted on ceramic substrate (900mm^2 × 0.8mm) 1unit	P_D	1.3	W
Total Dissipation When mounted on ceramic substrate (900mm^2 × 0.8mm)	P_T	1.5	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55 to +150	°C

Note 1 : Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL RESISTANCE RATINGS

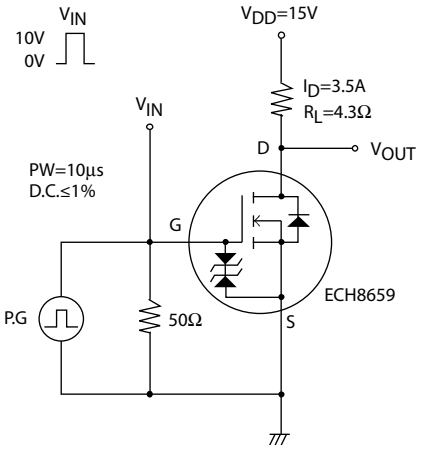
Parameter	Symbol	Value	Unit
Junction to Ambient When mounted on ceramic substrate (900mm^2 × 0.8mm) 1unit	$R_{\theta JA}$	96.1	°C/W

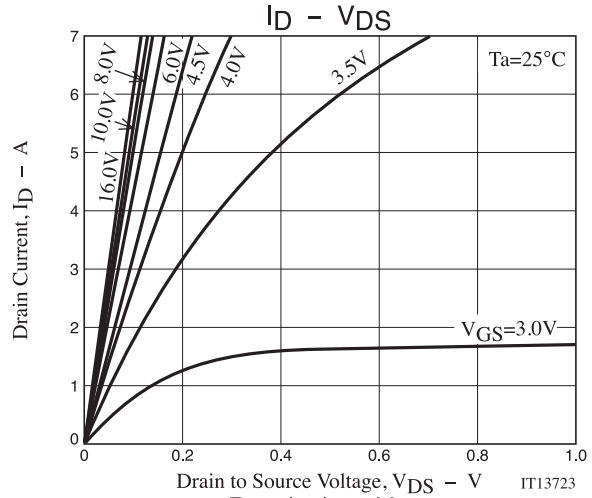
ELECTRICAL CHARACTERISTICS at Ta = 25°C (Note 2)

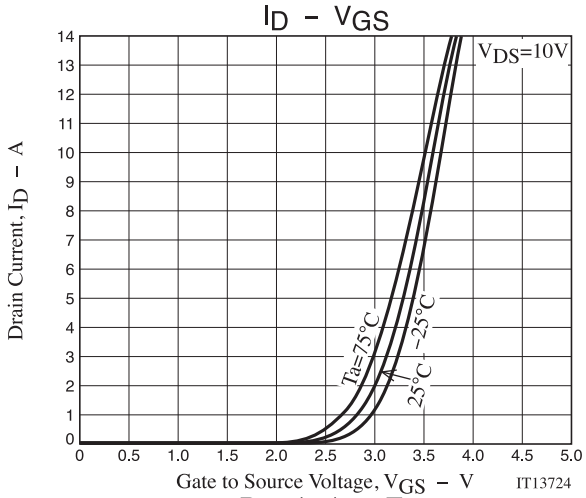
Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0V	30			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±10	μA
Gate Threshold Voltage	$V_{GS}(th)$	V_{DS}=10V, I_D=1mA	1.2		2.6	V
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=3.5A	2.2	3.7		S
Static Drain to Source On-State Resistance	$R_{DS}(on)1$	I_D=3.5A, V_{GS}=10V		18	24	mΩ
	$R_{DS}(on)2$	I_D=2A, V_{GS}=4.5V		29	41	mΩ
	$R_{DS}(on)3$	I_D=2A, V_{GS}=4V		39	55	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		710		pF
Output Capacitance	Coss			120		pF
Reverse Transfer Capacitance	Crss			72		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit		10		ns
Rise Time	t_r			25		ns
Turn-OFF Delay Time	$t_d(off)$			43		ns
Fall Time	t_f			25		ns
Total Gate Charge	Qg	V_{DS}=15V, V_{GS}=10V, I_D=3.5A		11.8		nC
Gate to Source Charge	Qgs			2.4		nC
Gate to Drain “Miller” Charge	Qgd			2.0		nC
Forward Diode Voltage	V_{SD}	I_S=7A, V_{GS}=0V		0.79	1.2	V

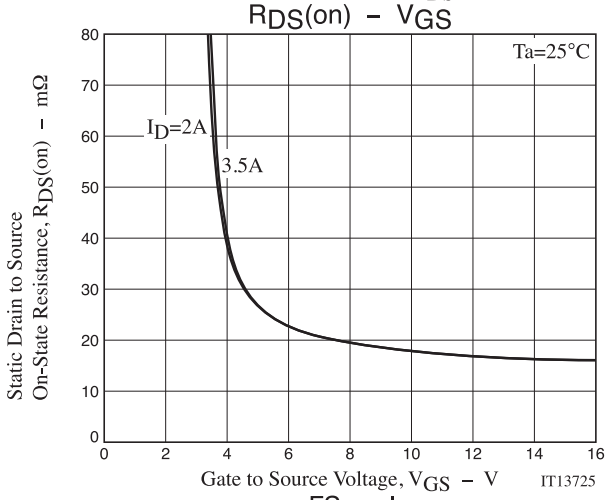
Note 2 : Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

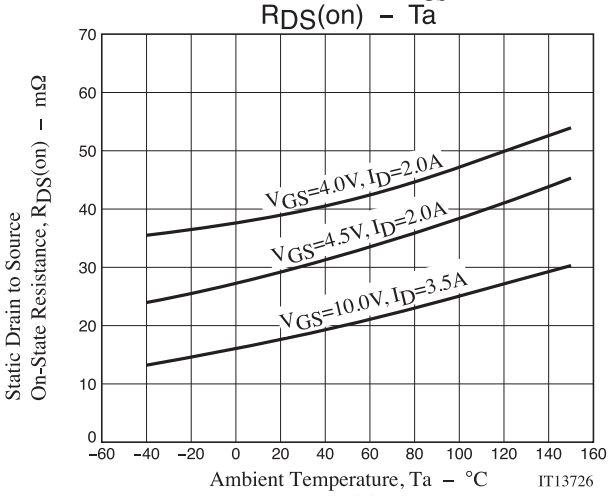
Switching Time Test Circuit

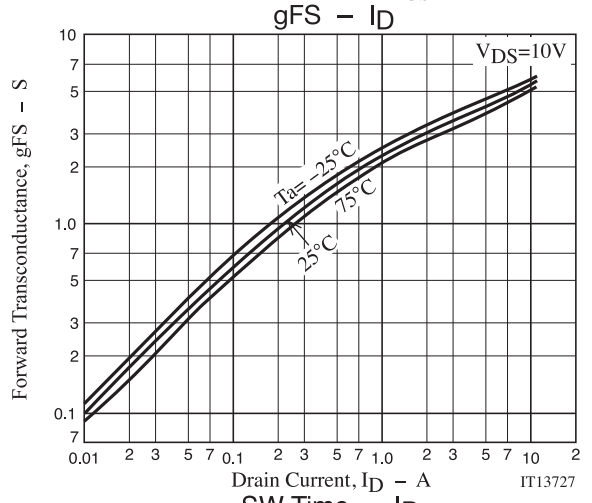


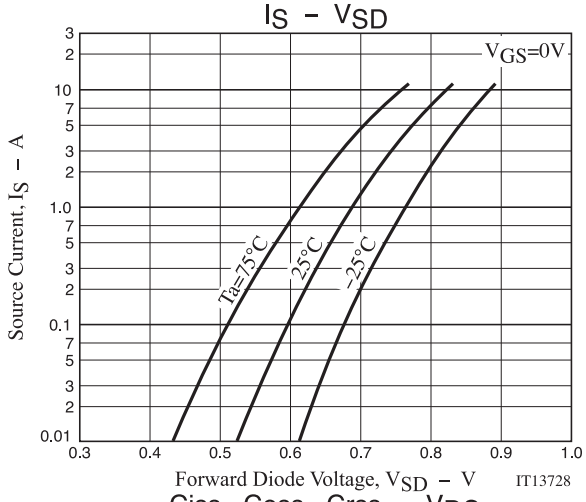

ID – VDS
Ta=25°C
8.0V
10.0V
16.0V
6.0V
4.5V
4.0V
3.5V
VGS=3.0V
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT13723

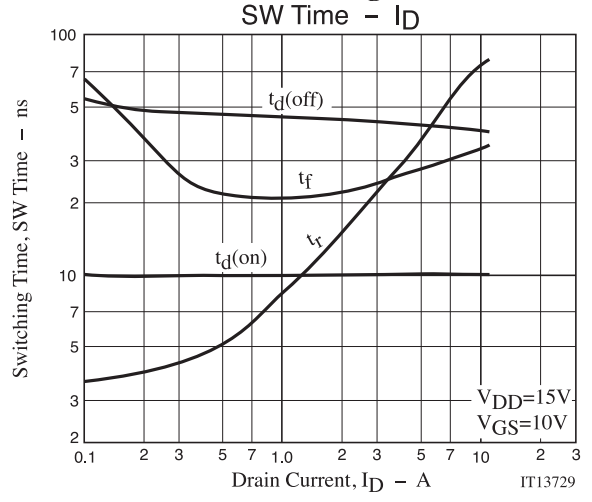

ID – VGS
VDS=10V
Ta=75°C
25°C
–25°C
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT13724

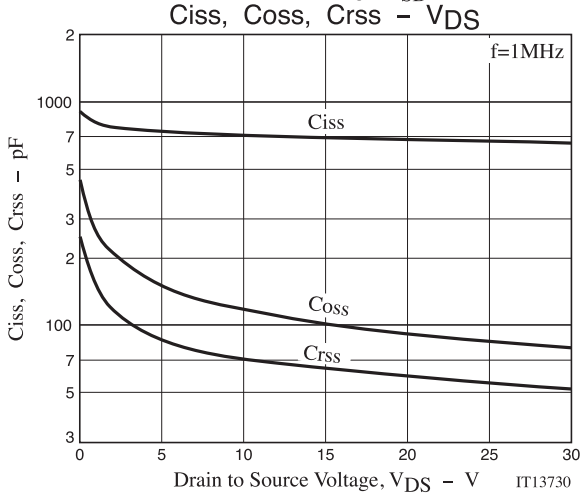

RDS(on) – VGS
Ta=25°C
ID=2A
3.5A
Static Drain to Source
On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT13725

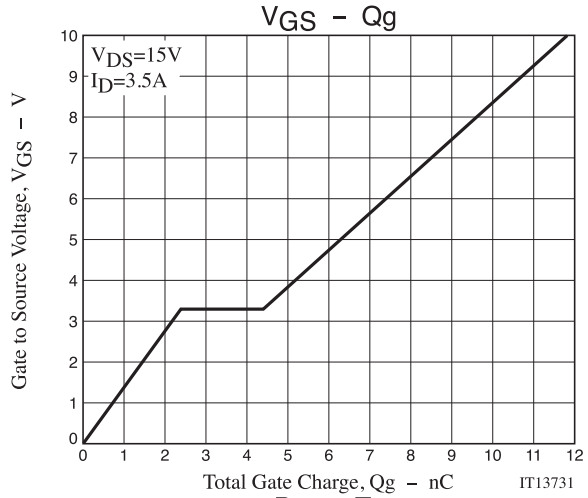

RDS(on) – Ta
VGS=4.0V, ID=2.0A
VGS=4.5V, ID=2.0A
VGS=10.0V, ID=3.5A
Static Drain to Source
On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT13726

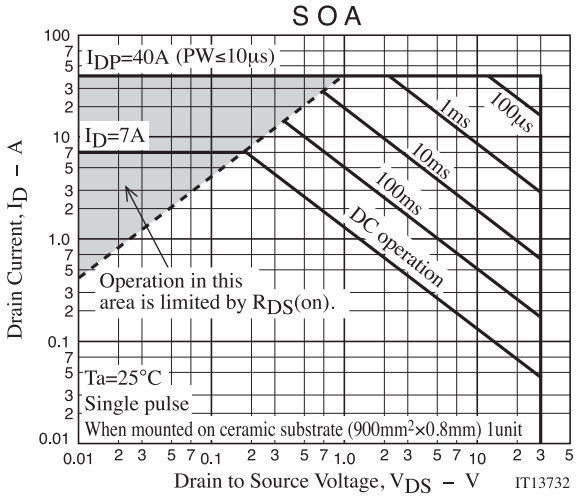

gFS – ID
VDS=10V
Ta= –25°C
75°C
25°C
Forward Transconductance, gFS – S
Drain Current, ID – A
IT13727

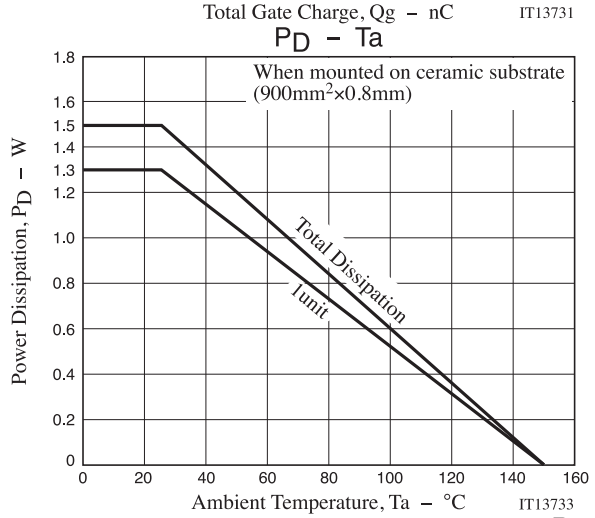

IS – VSD
VGS=0V
Ta=75°C
25°C
–25°C
Source Current, IS – A
Forward Diode Voltage, VSD – V
IT13728

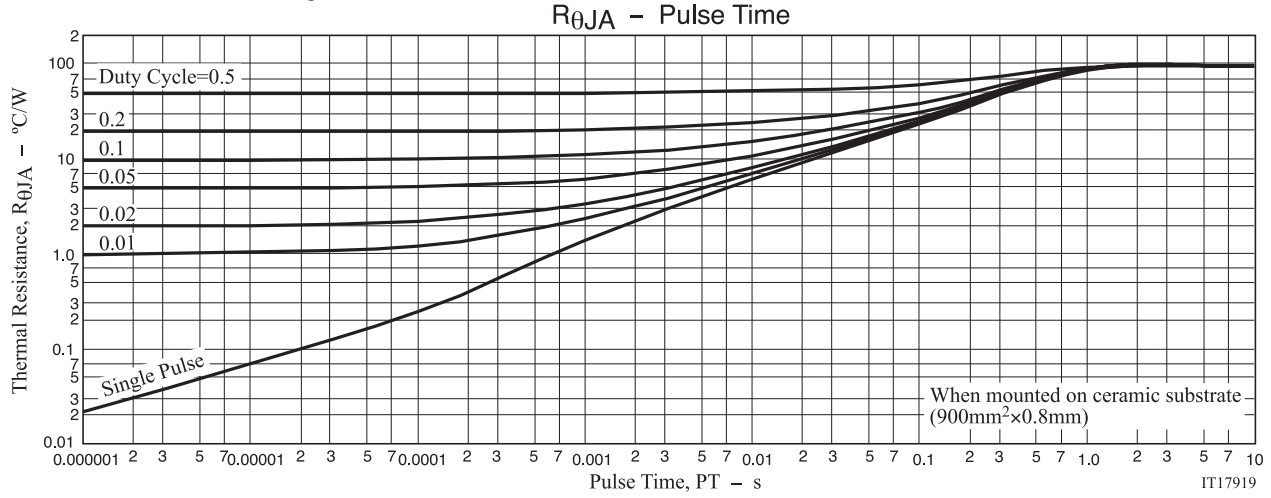

SW Time – ID
td(off)
tf
tr
td(on)
VDD=15V
VGS=10V
Switching Time, SW Time – ns
Drain Current, ID – A
IT13729


Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT13730


VGS – Qg
VDS=15V
ID=3.5A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT13731


S O A
IDP=40A (PW≤10μs)
ID=7A
1ms
100μs
10ms
100ms
DC operation
Operation in this
area is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (900mm2×0.8mm) 1unit
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT13732

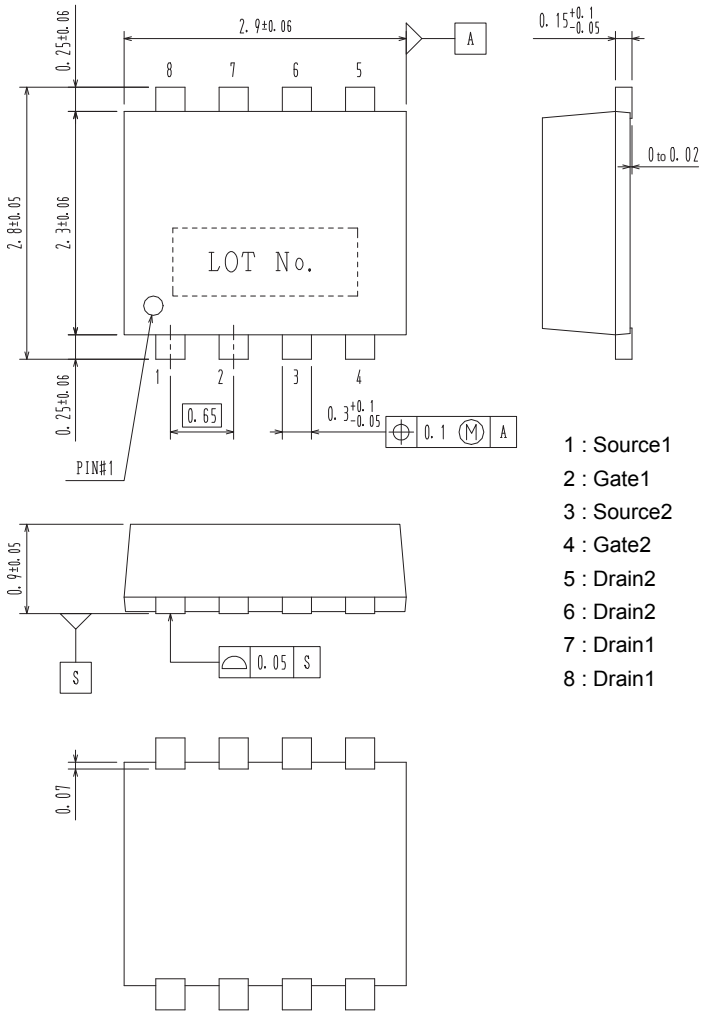

PD – Ta
When mounted on ceramic substrate
(900mm2×0.8mm)
Total Dissipation
1unit
Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT13733


RθJA – Pulse Time
Duty Cycle=0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
When mounted on ceramic substrate
(900mm2×0.8mm)
Thermal Resistance, RθJA – °C/W
Pulse Time, PT – s
IT17919

PACKAGE DIMENSIONS

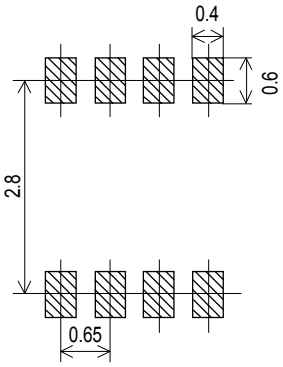
unit : mm

SOT-28FL / ECH8
CASE 318BF
ISSUE O



1 : Source1
2 : Gate1
3 : Source2
4 : Gate2
5 : Drain2
6 : Drain2
7 : Drain1
8 : Drain1

Recommended Soldering Footprint



ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
ECH8659-TL-H	TE	SOT-28FL / ECH8 (Pb-Free / Halogen Free)	3,000 / Tape & Reel
ECH8659-TL-W			

† 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. http://www.onsemi.com/pub_link/Collateral/BRD8011-D.PDF

Note on usage : Since the ECH8659 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

ON Semiconductor:

ECH8659-M-TL-H ECH8659-TL-HX ECH8659-TL-W

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- 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;
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- 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.);

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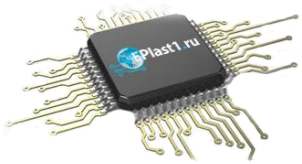
- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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