Ordering number : ENN6981

MOSFET : N-Channel Silicon MOSFET
SBD : Schottky Barrier Diode

CPH5805

DC / DC Converter Applications

Features

- Composite type with an N-Channel Sillicon MOSFET (MCH3412) and a Schottky Barrier Diode (SBS006) contained in one package facilitating high-density mounting.

[MOSFET]

- Low ON-resistance.
- Ultrahigh-speed switching.
- 4V drive.

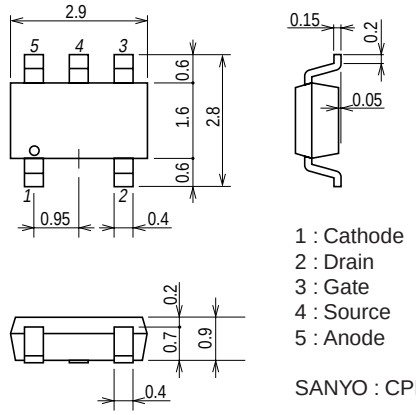
[SBD]

- Short reverse recovery time.
- Low forward voltage.

Package Dimensions

unit : mm
2171

[CPH5805]



1 : Cathode
2 : Drain
3 : Gate
4 : Source
5 : Anode

SANYO : CPH5

Specifications

Absolute Maximum Ratings at Ta=25°C

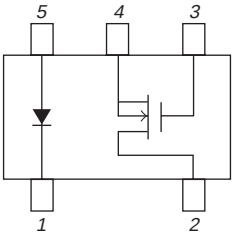
Parameter	Symbol	Conditions	Ratings	Unit
[MOSFET]				
Drain-to-Source Voltage	V_{DSS}		30	V
Gate-to-Source Voltage	V_{GSS}		±20	V
Drain Current (DC)	I_D		3	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	12	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (600mm²×0.8mm) 1unit	0.9	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		-55 to +125	°C
[SBD]				
Repetitive Peak Reverse Voltage	V_{RRM}		30	V
Nonrepetitive Peak Reverse Surge Voltage	V_{RSM}		30	V
Average Output Current	I_O		0.5	A
Surge Forward Current	I_{FSM}	50Hz sine wave, 1 cycle	10	A
Junction Temperature	Tj		-55 to +125	°C
Storage Temperature	Tstg		-55 to +125	°C

Marking : QF

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[MOSFET]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0	30			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	1.2		2.6	V
Forward Transfer Admittance	|yfs|	V_{DS}=10V, I_D=1.5A	2.1	3		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=1.5A, V_{GS}=10V		64	84	mΩ
	R_{DS}(on)2	I_D=1A, V_{GS}=4V		105	150	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		180		pF
Output Capacitance	Coss	V_{DS}=10V, f=1MHz		42		pF
Reverse Transfer Capacitance	Crss	V_{DS}=10V, f=1MHz		25		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit		7		ns
Rise Time	t_r	See specified Test Circuit		28		ns
Turn-OFF Delay Time	t_d(off)	See specified Test Circuit		18.5		ns
Fall Time	t_f	See specified Test Circuit		4.4		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=10V, I_D=3A		4.9		nC
Gate-to-Source Charge	Qgs	V_{DS}=10V, V_{GS}=10V, I_D=3A		0.93		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=10V, V_{GS}=10V, I_D=3A		0.63		nC
Diode Forward Voltage	V_{SD}	I_S=3A, V_{GS}=0		0.85	1.2	V
[SBD]						
Reverse Voltage	V_R	I_R=0.5mA	30			V
Forward Voltage	V_F1	I_F=0.3A		0.35	0.4	V
	V_F2	I_F=0.5A		0.42	0.47	V
Reverse Current	I_R	V_R=10V			200	μA
Interterminal Capacitance	C	V_R=10V, f=1MHz cycle		20		pF
Reverse Recovery Time	t_{rr}	I_F=I_R=100mA			10	ns

Electrical Connection (Top view)



1 : Cathode
2 : Drain
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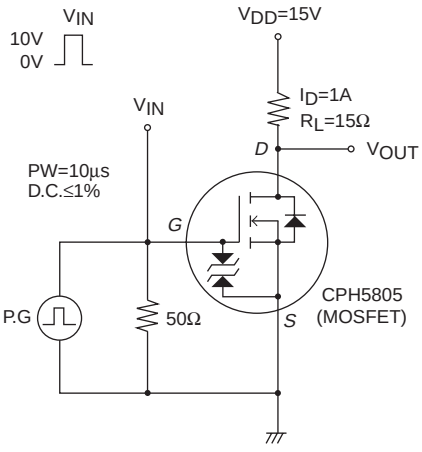
5 : Anode

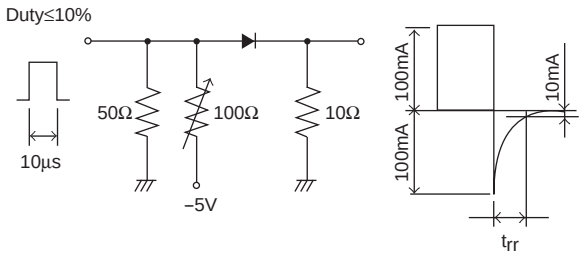
Switching Time Test Circuit

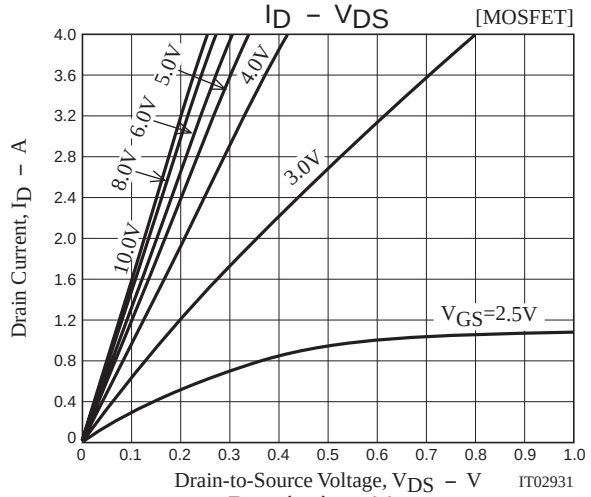
[MOSFET]

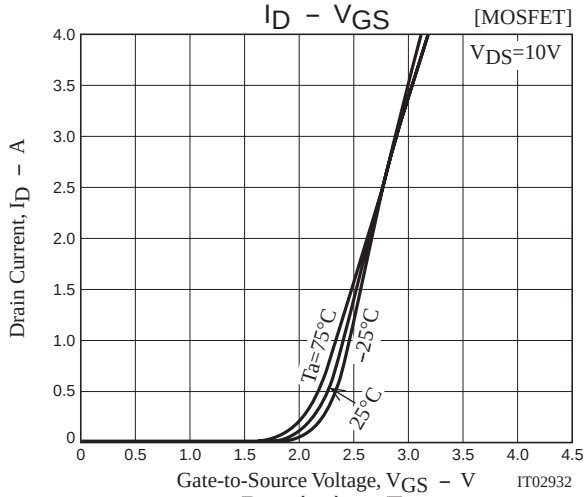


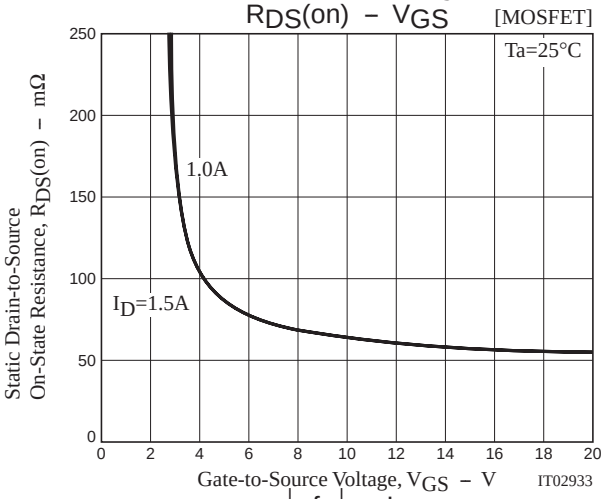
t_{rr} Test Circuit

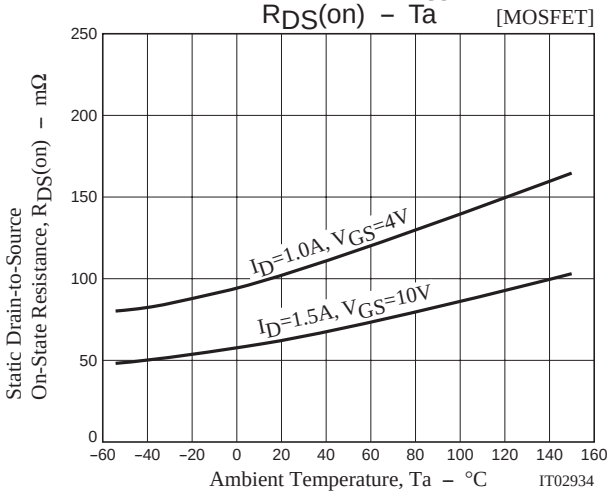
[SBD]

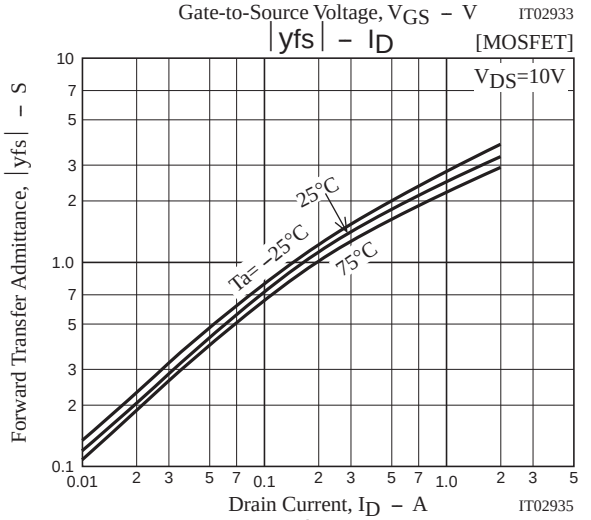


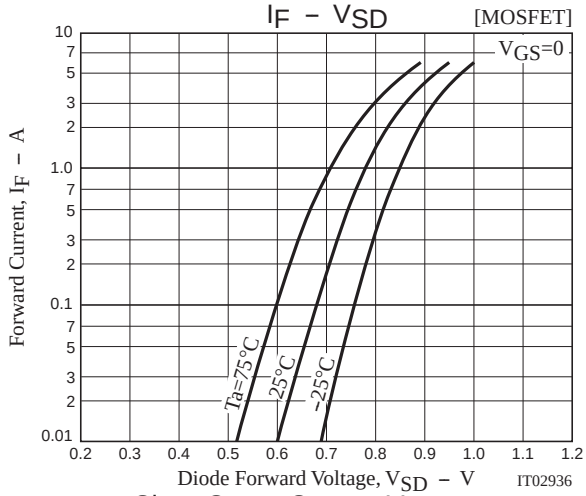

I_D – V_{DS} [MOSFET]
Drain Current, I_D – A
Drain-to-Source Voltage, V_{DS} – V
IT02931
5.0V
4.0V
6.0V
8.0V
10.0V
3.0V
V_{GS}=2.5V

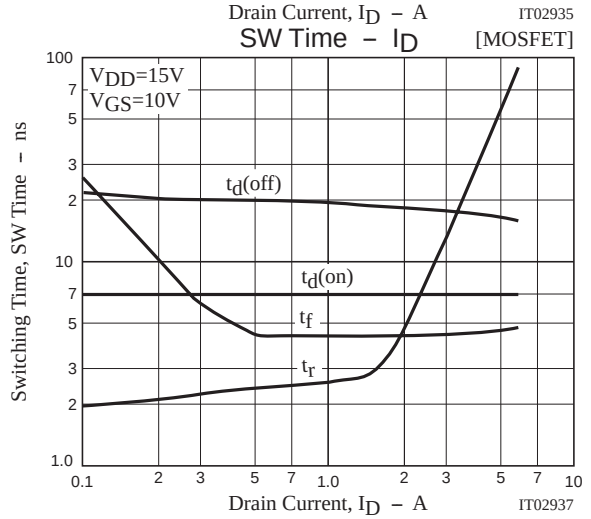

I_D – V_{GS} [MOSFET]
V_{DS}=10V
Drain Current, I_D – A
Gate-to-Source Voltage, V_{GS} – V
IT02932
Ta=75°C
25°C
–25°C

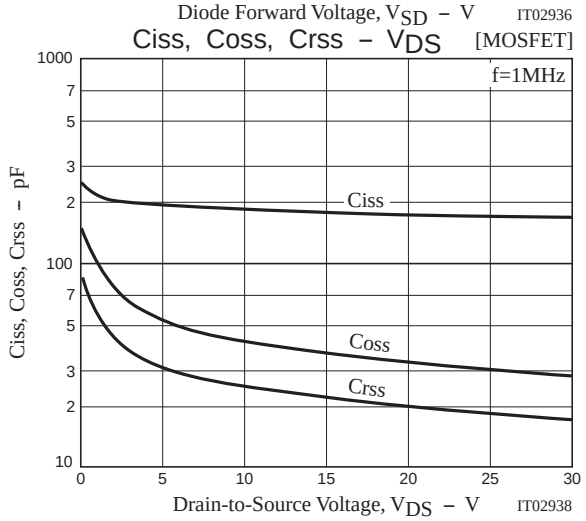

R_{DS}(on) – V_{GS} [MOSFET]
Ta=25°C
Static Drain-to-Source On-State Resistance, R_{DS}(on) – mΩ
1.0A
I_D=1.5A
Gate-to-Source Voltage, V_{GS} – V
IT02933

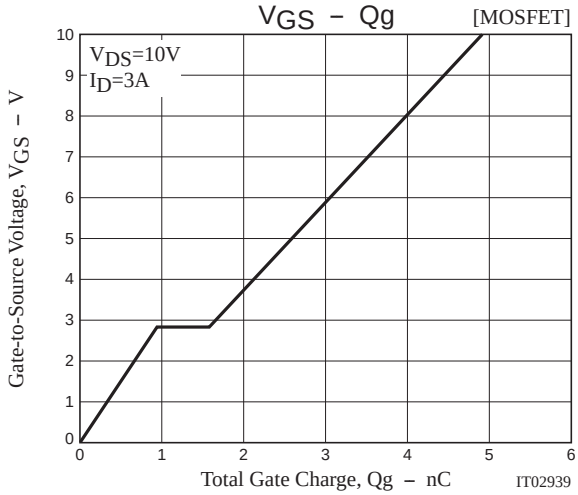

R_{DS}(on) – Ta [MOSFET]
Static Drain-to-Source On-State Resistance, R_{DS}(on) – mΩ
I_D=1.0A, V_{GS}=4V
I_D=1.5A, V_{GS}=10V
Ambient Temperature, Ta – °C
IT02934

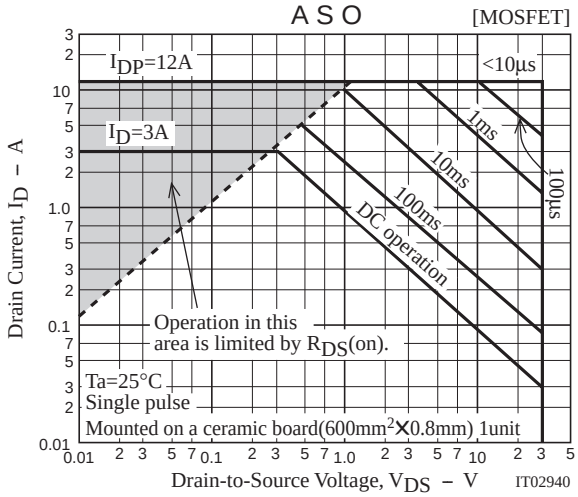

|yfs| – I_D [MOSFET]
V_{DS}=10V
Forward Transfer Admittance, |yfs| – S
25°C
Ta= –25°C
75°C
Drain Current, I_D – A
IT02935

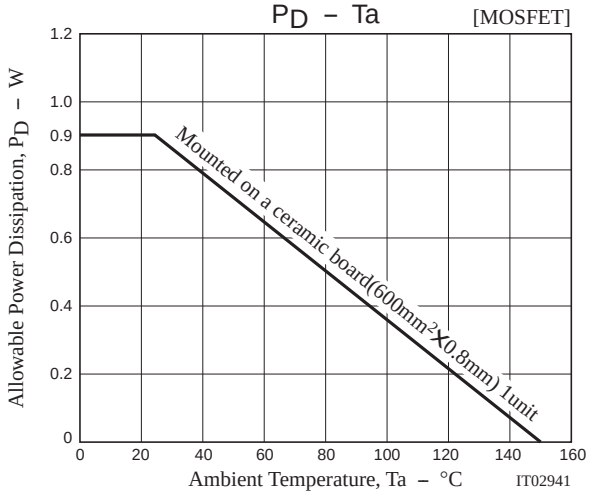

I_F – V_{SD} [MOSFET]
V_{GS}=0
Forward Current, I_F – A
Ta=75°C
25°C
–25°C
Diode Forward Voltage, V_{SD} – V
IT02936

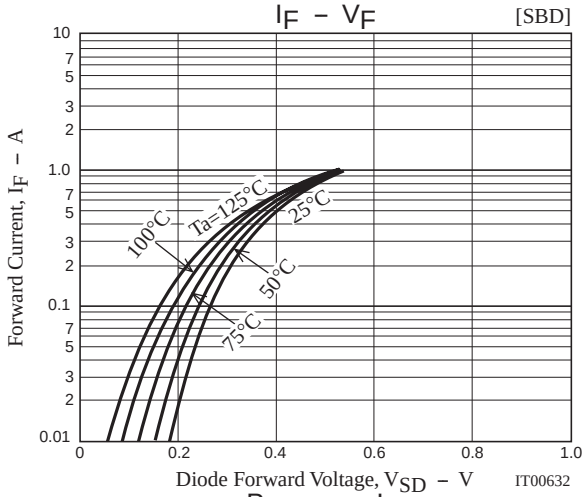

SW Time – I_D [MOSFET]
V_{DD}=15V
V_{GS}=10V
Switching Time, SW Time – ns
t_d(off)
t_d(on)
t_f
t_r
Drain Current, I_D – A
IT02937

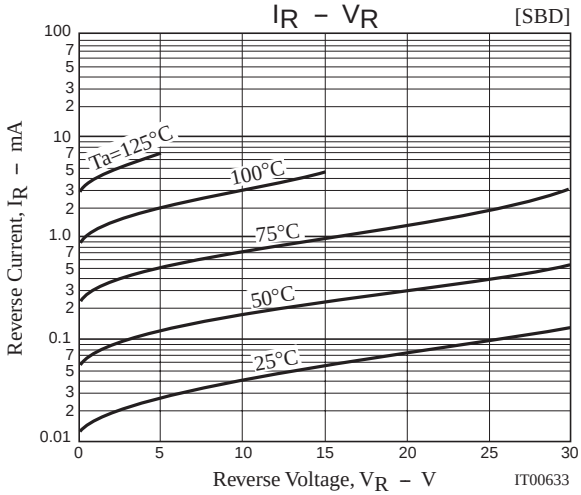

Ciss, Coss, Crss – V_{DS} [MOSFET]
f=1MHz
Ciss, Coss, Crss – pF
Ciss
Coss
Crss
Drain-to-Source Voltage, V_{DS} – V
IT02938

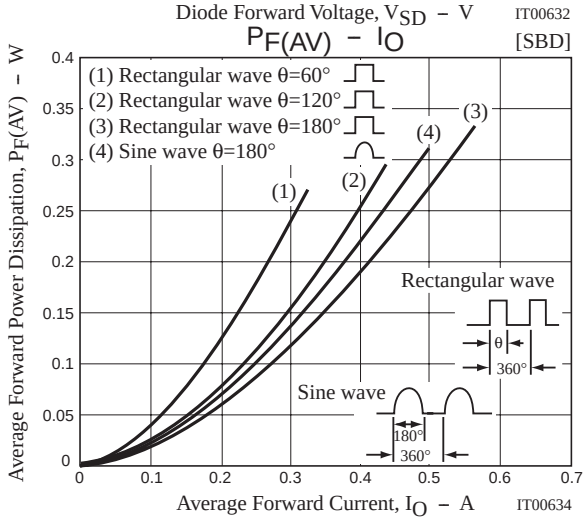

VGS – Qg
[MOSFET]
VDS=10V
ID=3A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT02939

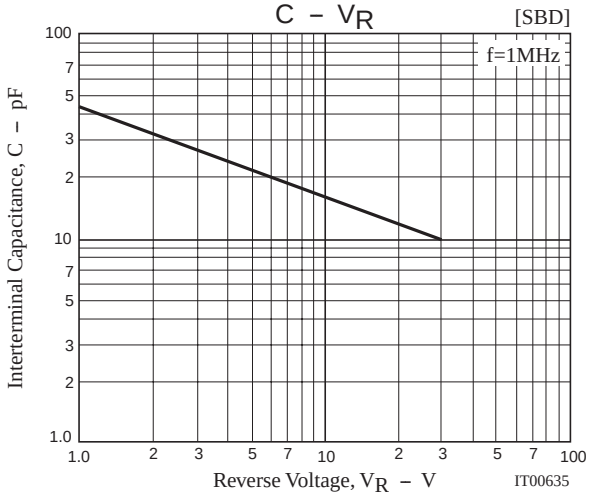

A S O
[MOSFET]
IDP=12A
ID=3A
<10μs
1ms
10ms
100ms
DC operation
100μs
Operation in this
area is limited by RDS(on).
Ta=25°C
Single pulse
Mounted on a ceramic board(600mm2X0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT02940

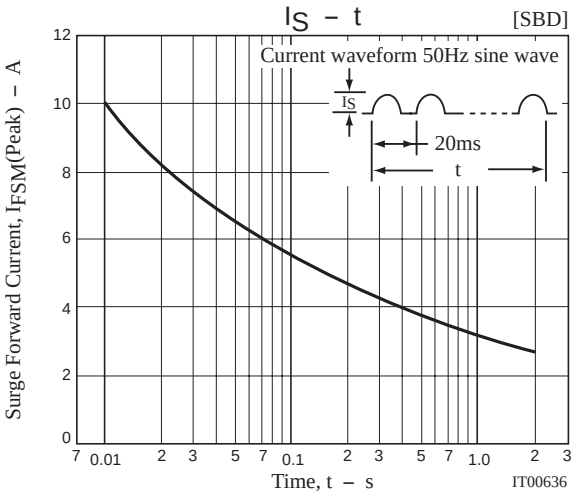

PD – Ta
[MOSFET]
Mounted on a ceramic board(600mm2X0.8mm) 1unit
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT02941


IF – VF
[SBD]
100°C
Ta=125°C
25°C
50°C
75°C
Forward Current, IF – A
Diode Forward Voltage, VSD – V
IT00632


IR – VR
[SBD]
Ta=125°C
100°C
75°C
50°C
25°C
Reverse Current, IR – mA
Reverse Voltage, VR – V
IT00633


PF(AV) – IO
[SBD]
(1) Rectangular wave θ=60°
(2) Rectangular wave θ=120°
(3) Rectangular wave θ=180°
(4) Sine wave θ=180°
Rectangular wave
θ
360°
Sine wave
180°
360°
Average Forward Power Dissipation, PF(AV) – W
Average Forward Current, IO – A
IT00634


C – VR
[SBD]
f=1MHz
Interterminal Capacitance, C – pF
Reverse Voltage, VR – V
IT00635



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