Ordering number : ENN6942

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

MCH5804

DC / DC Converter Applications

Features

- Composite type with an N-Channel Sillicon MOSFET (MCH3408) and a Schottky Barrier Diode (SBS007M) contained in one package facilitating high-density mounting.

[MOSFET]

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

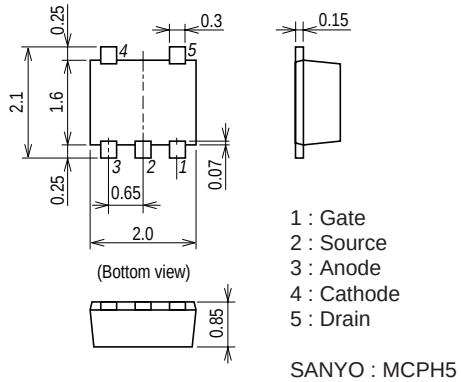
[SBD]

- Short reverse recovery time.
- Low forward voltage.

Package Dimensions

unit : mm
2195

[MCH5804]



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

SANYO : MCPH5

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		1.4	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	5.6	A
Allowable Power Dissipation	P_D	Mounted on a ceramic board (600mm²×0.8mm) 1unit	0.8	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		-55 to +125	°C
[SBD]				
Repetitive Peak Reverse Voltage	V_{RRM}		15	V
Nonrepetitive Peak Reverse Surge Voltage	V_{RSM}		15	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 : QD

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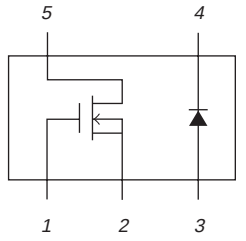
SANYO Electric Co.,Ltd. Semiconductor Company
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

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=700mA	0.85	1.2		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=700mA, V_{GS}=10V		230	300	mΩ
	R_{DS}(on)2	I_D=400mA, V_{GS}=4V		370	520	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		70		pF
Output Capacitance	Coss	V_{DS}=10V, f=1MHz		15		pF
Reverse Transfer Capacitance	Crss	V_{DS}=10V, f=1MHz		10		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit		6		ns
Rise Time	t_r	See specified Test Circuit		3		ns
Turn-OFF Delay Time	t_d(off)	See specified Test Circuit		10		ns
Fall Time	t_f	See specified Test Circuit		4		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=10V, I_D=1.4A		2.6		nC
Gate-to-Source Charge	Qgs	V_{DS}=10V, V_{GS}=10V, I_D=1.4A		0.6		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=10V, V_{GS}=10V, I_D=1.4A		0.5		nC
Diode Forward Voltage	V_{SD}	I_S=1.4A, V_{GS}=0		0.9	1.2	V
[SBD]						
Reverse Voltage	V_R	I_R=0.5mA	15			V
Forward Voltage	V_F1	I_F=0.3A		0.35	0.40	V
	V_F2	I_F=0.5A		0.40	0.45	V
Reverse Current	I_R	V_R=6V			200	μA
Interterminal Capacitance	C	V_R=10V, f=1MHz		20		pF
Reverse Recovery Time	t_{rr}	I_F=I_R=100mA, See specified Test Circuit.			10	ns

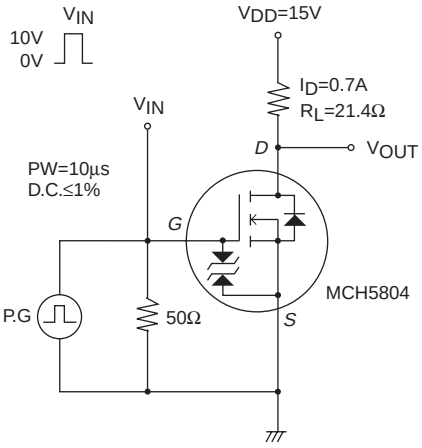
Electrical Connection (Top view)



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

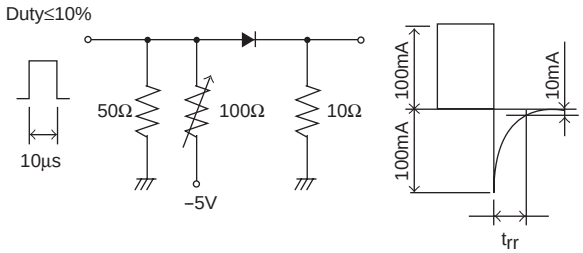
Switching Time Test Circuit

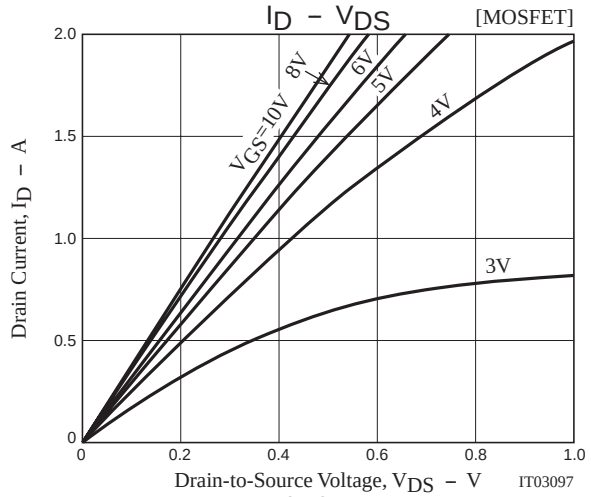
[MOSFET]

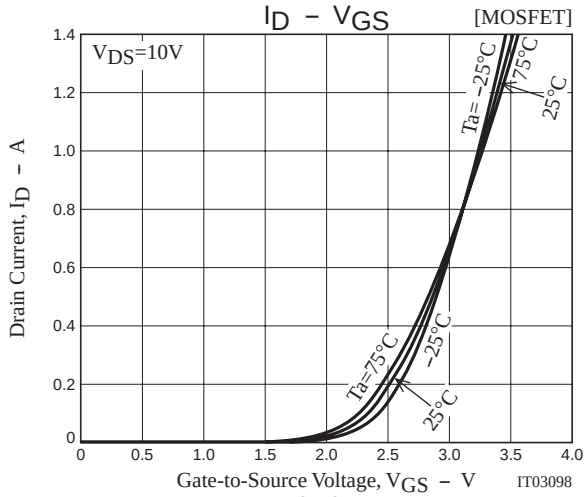


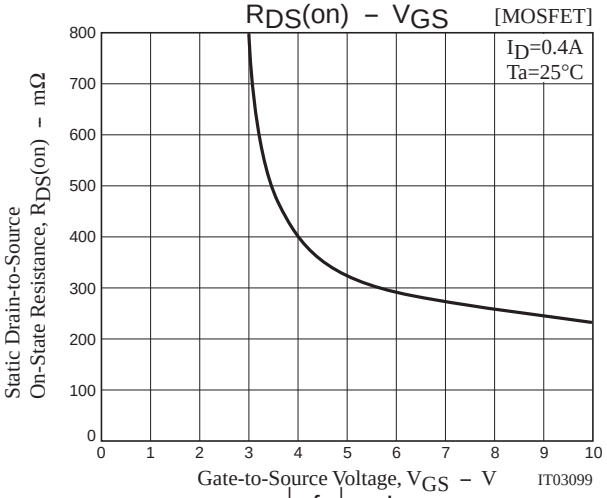
trr Test Circuit

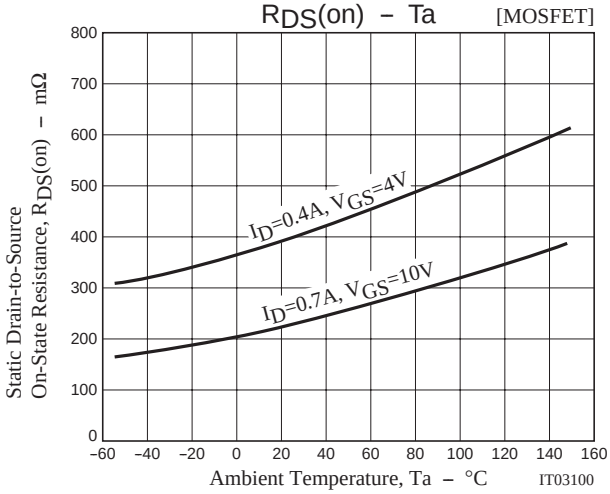
[SBD]

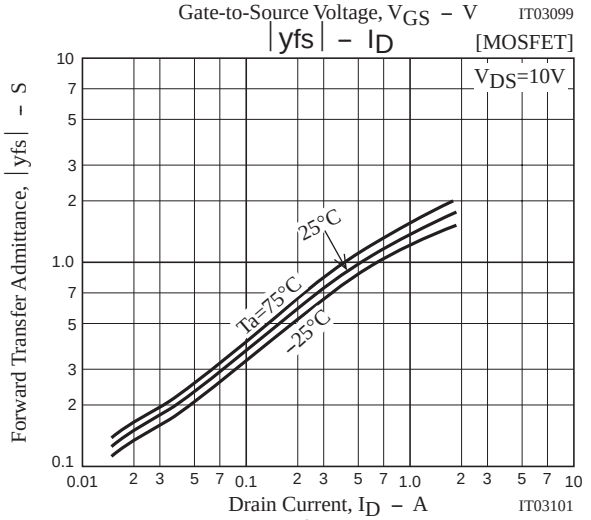


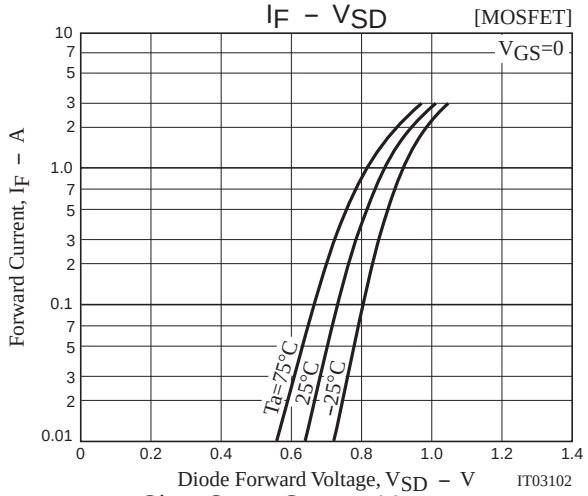

ID – VDS [MOSFET]
VGS=10V
8V
6V
5V
4V
3V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT03097

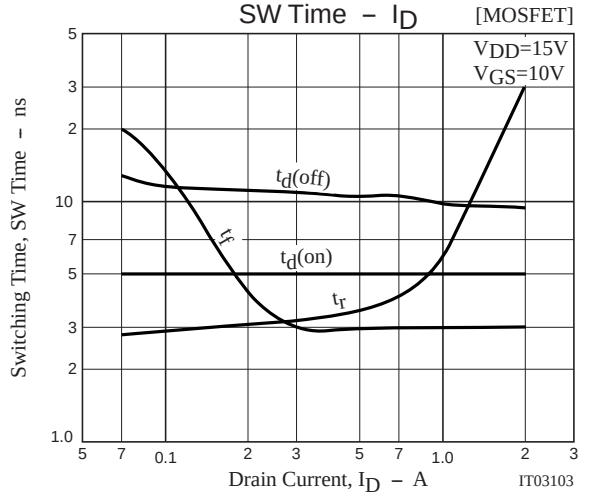

ID – VGS [MOSFET]
VDS=10V
Ta=–25°C
75°C
25°C
Ta=75°C
25°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT03098

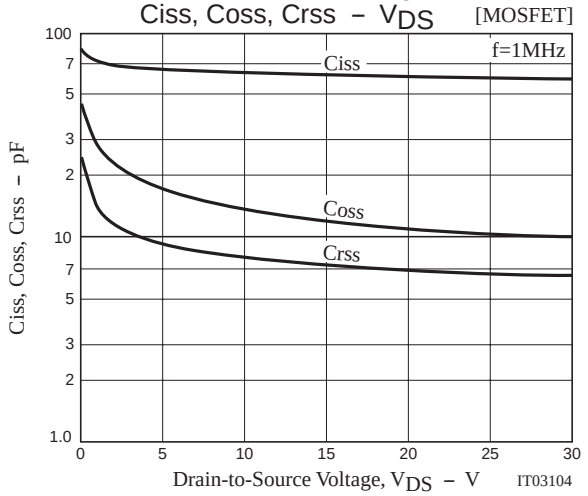

RDS(on) – VGS [MOSFET]
ID=0.4A
Ta=25°C
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT03099

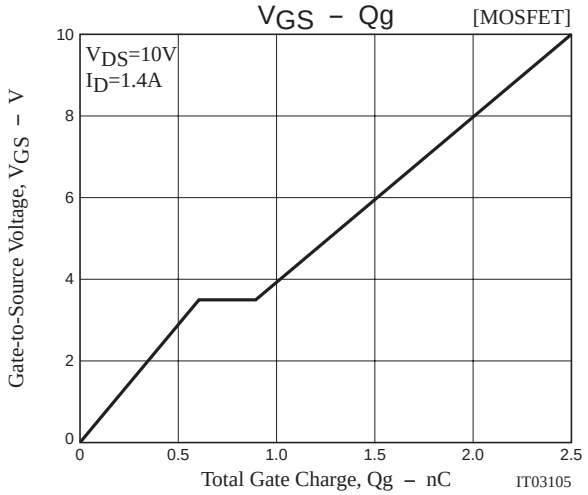

RDS(on) – Ta [MOSFET]
ID=0.4A, VGS=4V
ID=0.7A, VGS=10V
Static Drain-to-Source
On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT03100

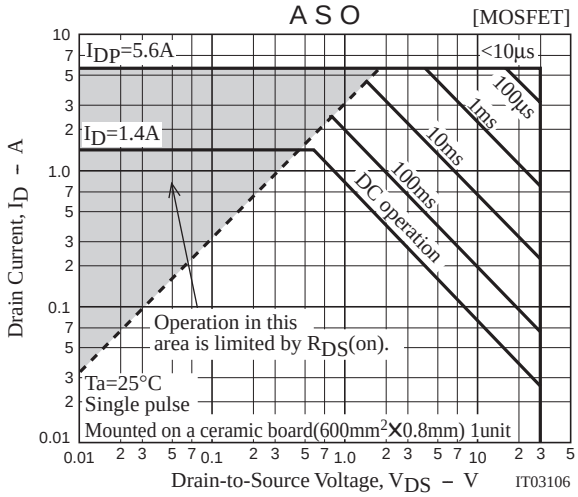

|yfs| – ID [MOSFET]
VDS=10V
25°C
Ta=75°C
–25°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT03101

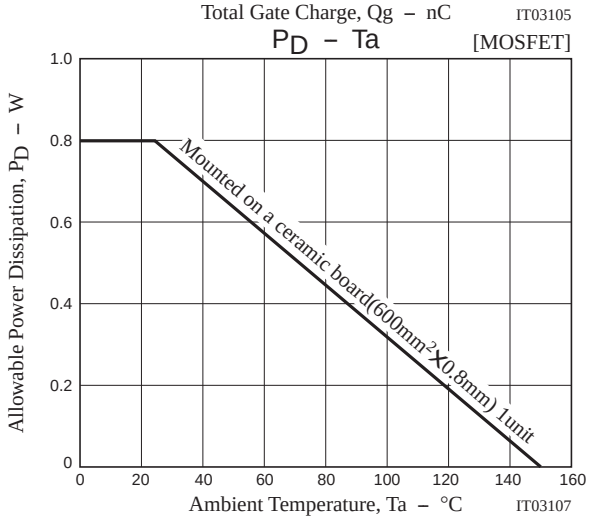

IF – VSD [MOSFET]
VGS=0
Ta=75°C
25°C
–25°C
Forward Current, IF – A
Diode Forward Voltage, VSD – V
IT03102

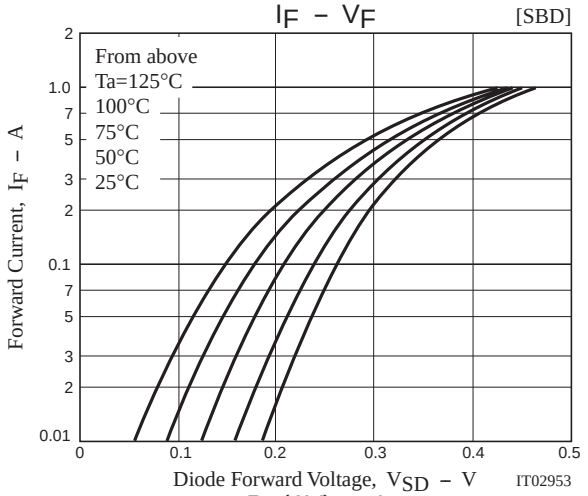

SW Time – ID [MOSFET]
VDD=15V
VGS=10V
td(off)
tf
td(on)
tr
Switching Time, SW Time – ns
Drain Current, ID – A
IT03103

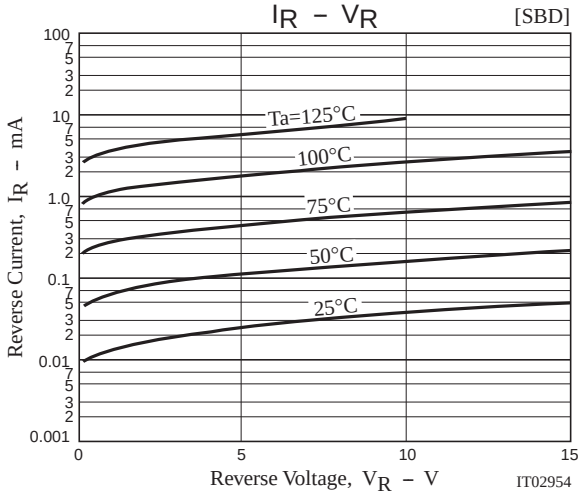

Ciss, Coss, Crss – VDS [MOSFET]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT03104

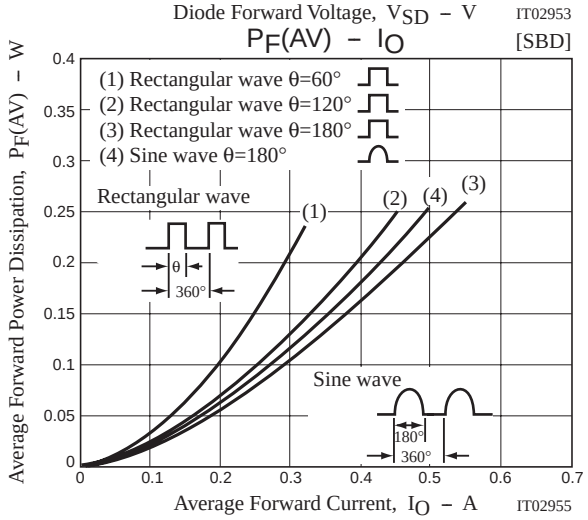

VGS – Qg
[MOSFET]
VDS=10V
ID=1.4A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT03105

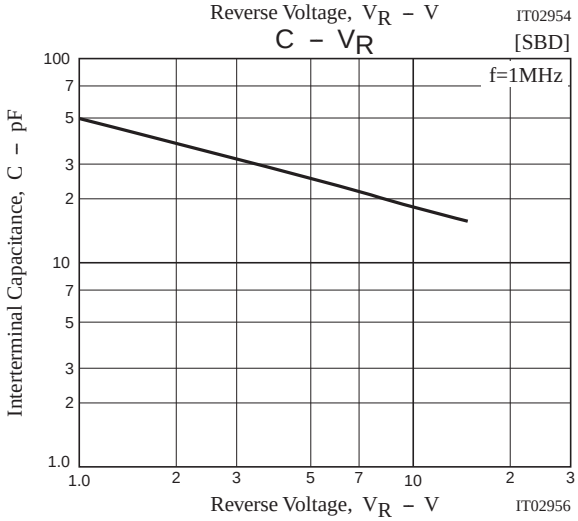

A S O
[MOSFET]
IDP=5.6A
ID=1.4A
<10µs
100µs
1ms
10ms
100ms
DC operation
Operation in this area is limited by RDS(on).
Ta=25°C
Single pulse
Mounted on a ceramic board(600mm2×0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT03106

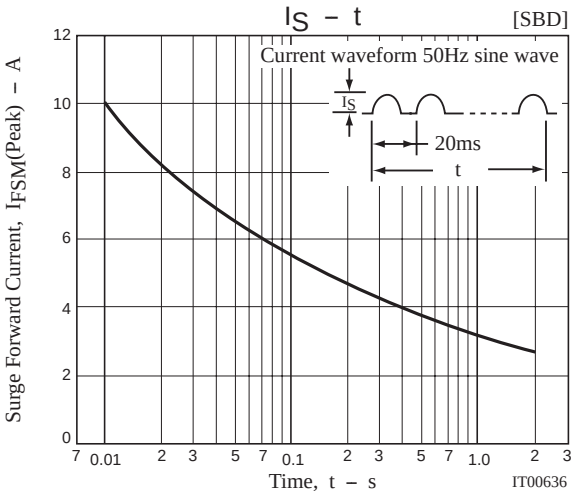

PD – Ta
[MOSFET]
Mounted on a ceramic board(600mm2×0.8mm) 1unit
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT03107


IF – VF
[SBD]
From above
Ta=125°C
100°C
75°C
50°C
25°C
Forward Current, IF – A
Diode Forward Voltage, VSD – V
IT02953


IR – VR
[SBD]
Ta=125°C
100°C
75°C
50°C
25°C
Reverse Current, IR – mA
Reverse Voltage, VR – V
IT02954


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
IT02955


C – VR
[SBD]
f=1MHz
Interterminal Capacitance, C – pF
Reverse Voltage, VR – V
IT02956



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