Ordering number : ENA1821

SANYO Semiconductors

DATA SHEET

EMH2801

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

General-Purpose Switching Device Applications

Features

- Composite type with a P-Channel Sillicon MOSFET and a Schottky Barrier Diode contained in one package facilitating high-density mounting
- [MOSFET]
  - Low ON-resistance
  - 1.8V drive
- [SBD]
  - Small switching noise
  - Low forward voltage (I_F=2.0A, V_F max=0.46V)
- Halogen free compliance

Specifications

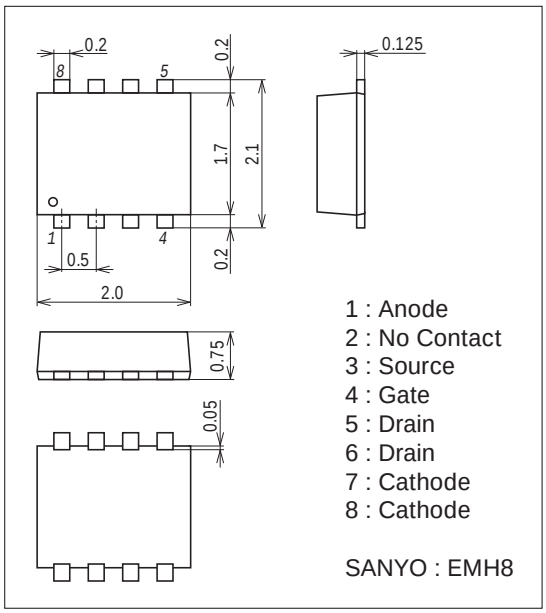
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
[MOSFET]				
Drain-to-Source Voltage	V_{DSS}		−20	V
Gate-to-Source Voltage	V_{GSS}		±10	V
Drain Current (DC)	I_D		−3	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	−20	A
Allowable Power Dissipation	P_D	When mounted on ceramic substrate (900mm²×0.8mm) 1unit	1.0	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +125	°C

Continued on next page.

Package Dimensions

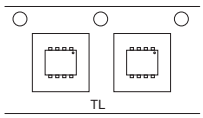
unit : mm (typ)
7045-007



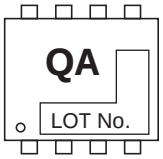
Product & Package Information

- Package : EMH8
- JEITA, JEDEC : -
- Minimum Packing Quantity : 3,000 pcs./reel

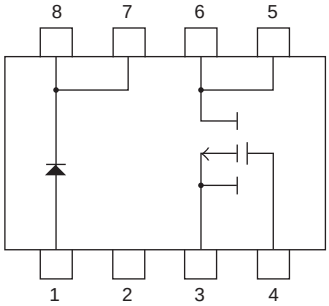
Packing Type : TL



Marking



Electrical Connection



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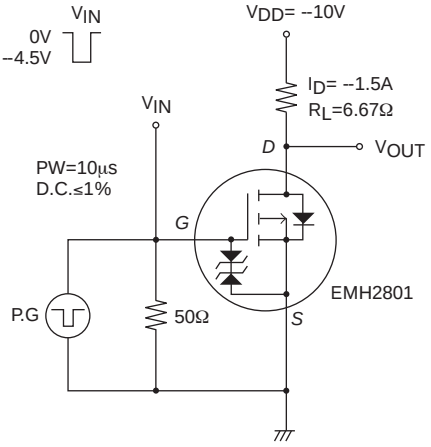
Parameter	Symbol	Conditions	Ratings	Unit
[SBD]				
Repetitive Peak Reverse Voltage	V_{RRM}		15	V
Nonrepetitive Peak Reverse Surge Voltage	V_{RSM}		15	V
Average Output Current	I_O	Rectangular wave	2.0	A
Surge Forward Current	I_{FSM}	50Hz sine wave, 1 cycle	20	A
Junction Temperature	Tj		−55 to +125	°C
Storage Temperature	Tstg		−55 to +125	°C

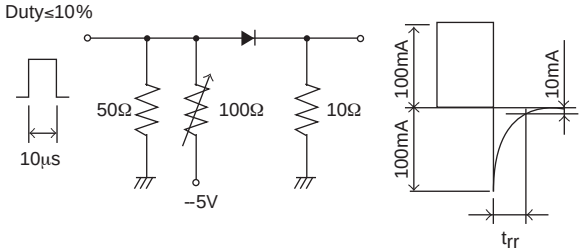
Electrical Characteristics at Ta=25°C

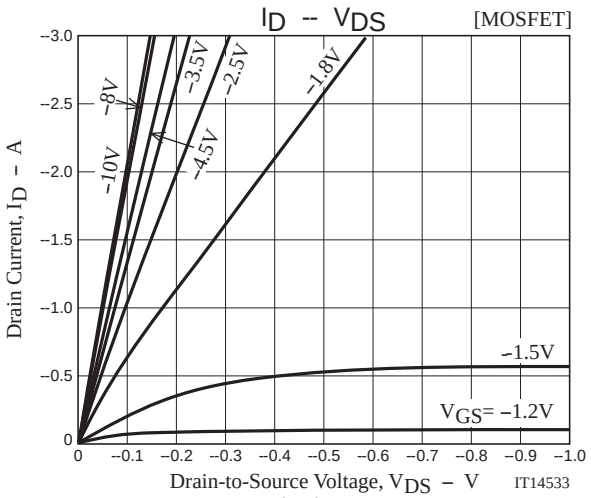
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[MOSFET]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=−1mA, V_{GS}=0V	−20			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=−20V, V_{GS}=0V			−1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=−10V, I_D=−1mA	−0.4		−1.3	V
Forward Transfer Admittance	| yfs |	V_{DS}=−10V, I_D=−1.5A		3.6		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)1	I_D=−1.5A, V_{GS}=−4.5V		65	85	mΩ
	R_{DS}(on)2	I_D=−1A, V_{GS}=−2.5V		98	137	mΩ
	R_{DS}(on)3	I_D=−0.5A, V_{GS}=−1.8V		155	235	mΩ
Input Capacitance	Ciss	V_{DS}=−10V, f=1MHz		320		pF
Output Capacitance	Coss	V_{DS}=−10V, f=1MHz		66		pF
Reverse Transfer Capacitance	Crss	V_{DS}=−10V, f=1MHz		50		pF
Turn-ON Delay Time	t_d(on)	See specified Test Circuit.		7.1		ns
Rise Time	t_r	See specified Test Circuit.		21		ns
Turn-OFF Delay Time	t_d(off)	See specified Test Circuit.		37		ns
Fall Time	t_f	See specified Test Circuit.		32		ns
Total Gate Charge	Qg	V_{DS}=−10V, V_{GS}=−4.5V, I_D=−3A		4.0		nC
Gate-to-Source Charge	Qgs	V_{DS}=−10V, V_{GS}=−4.5V, I_D=−3A		0.6		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=−10V, V_{GS}=−4.5V, I_D=−3A		1.1		nC
Diode Forward Voltage	V_{SD}	I_S=−3A, V_{GS}=0V		−0.83	−1.2	V
[SBD]						
Reverse Voltage	V_R	I_R=1mA	15			V
Forward Voltage	V_F1	I_F=1.0A		0.33	0.39	V
	V_F2	I_F=2.0A		0.39	0.46	V
Reverse Current	I_R	V_R=7.5V			300	μA
Interterminal Capacitance	C	V_R=10V, f=1MHz		35		pF

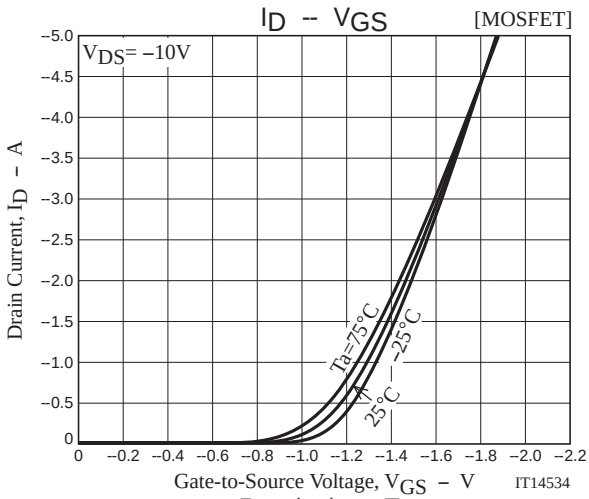
Switching Time Test Circuit
(MOSFET)

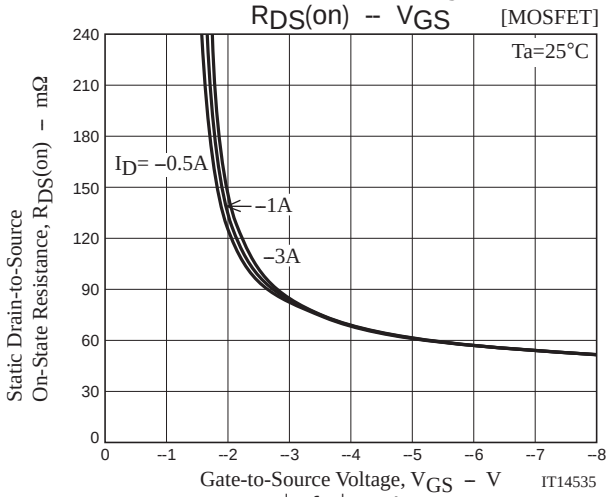


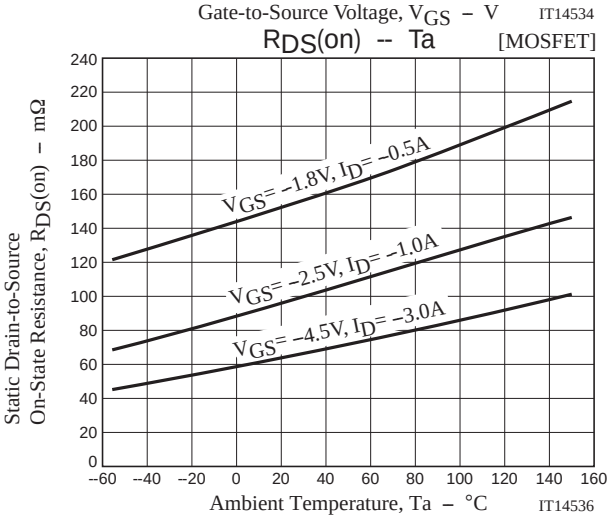
t_{rr} Test Circuit
(SBD)

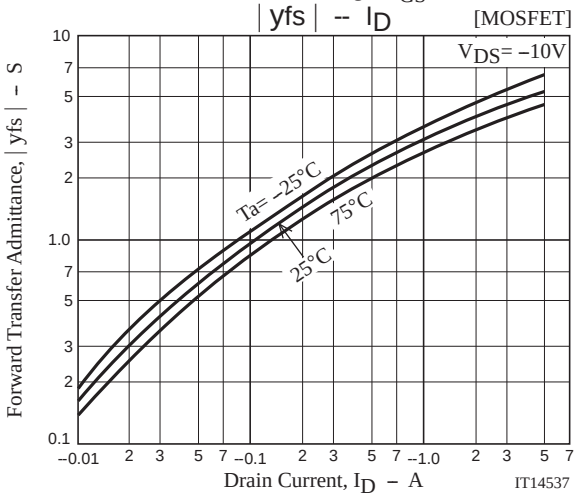


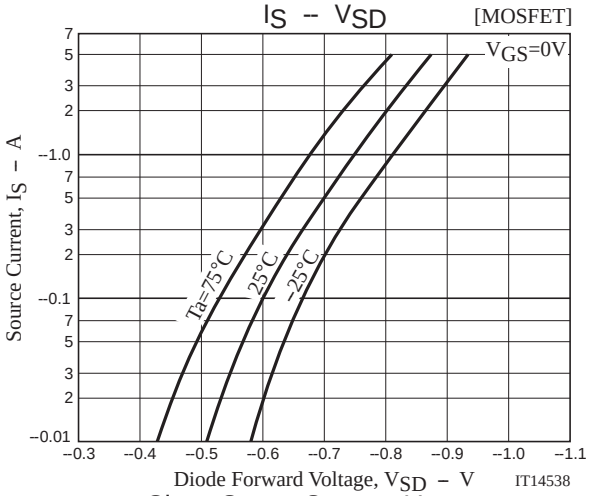

ID -- VDS [MOSFET]
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT14533
–8V
–10V
–3.5V
–2.5V
–4.5V
–1.8V
–1.5V
VGS= –1.2V

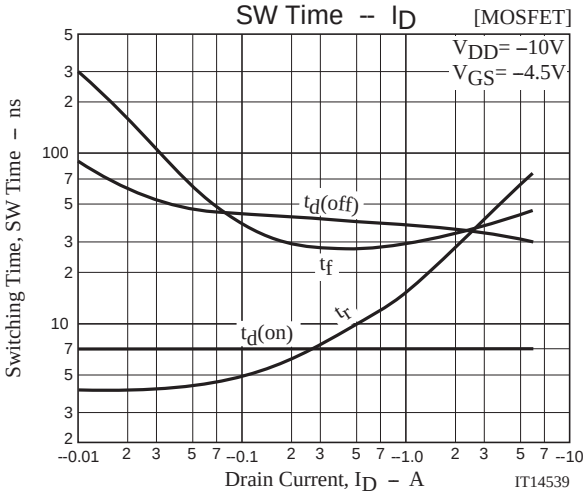

ID -- VGS [MOSFET]
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT14534
VDS= –10V
Ta=75°C
–25°C
25°C

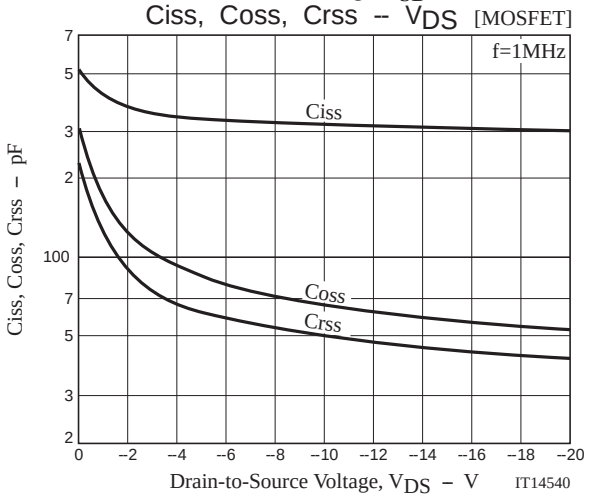

RDS(on) -- VGS [MOSFET]
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT14535
Ta=25°C
ID= –0.5A
–1A
–3A

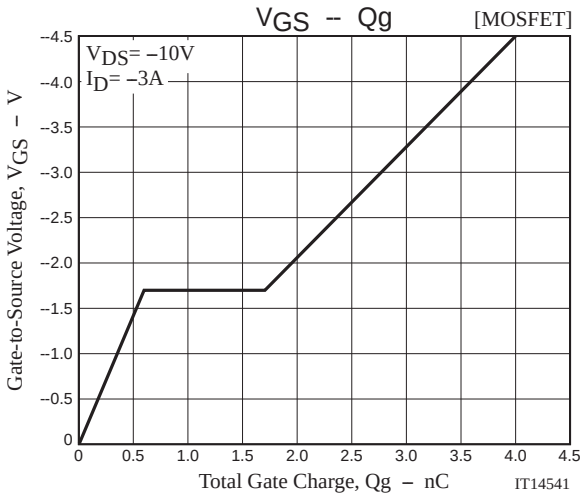

RDS(on) -- Ta [MOSFET]
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT14536
VGS= –1.8V, ID= –0.5A
VGS= –2.5V, ID= –1.0A
VGS= –4.5V, ID= –3.0A

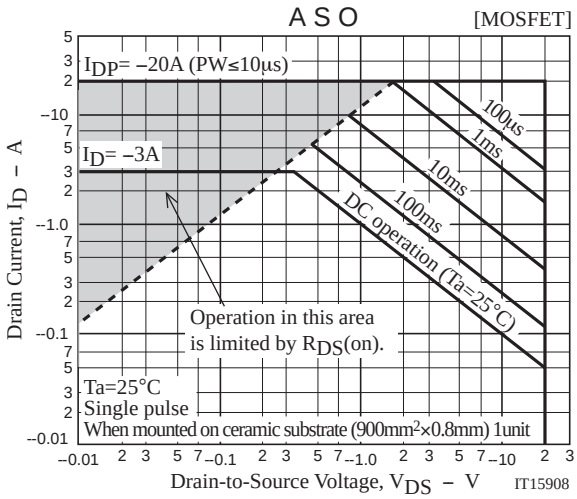

| yfs | -- ID [MOSFET]
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT14537
VDS= –10V
Ta= –25°C
75°C
25°C

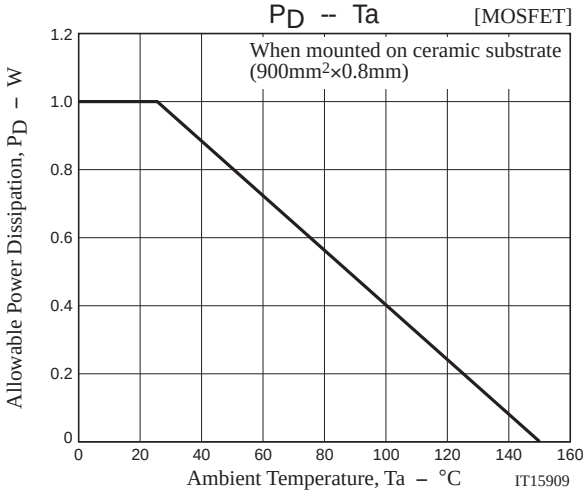

IS -- VSD [MOSFET]
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT14538
VGS=0V
Ta=75°C
25°C
–25°C

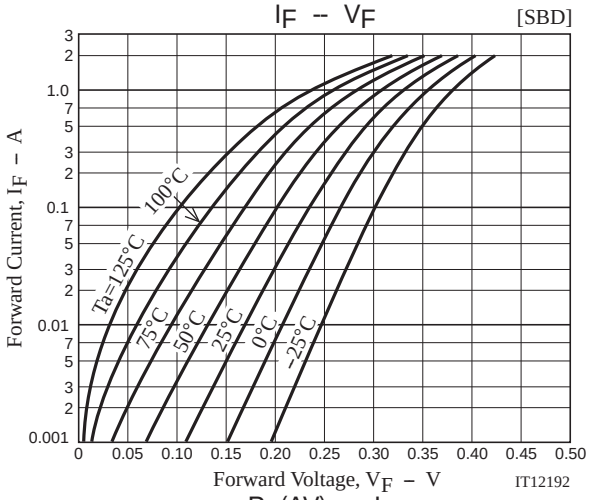

SW Time -- ID [MOSFET]
Switching Time, SW Time – ns
Drain Current, ID – A
IT14539
VDD= –10V
VGS= –4.5V
td(off)
tf
tr
td(on)

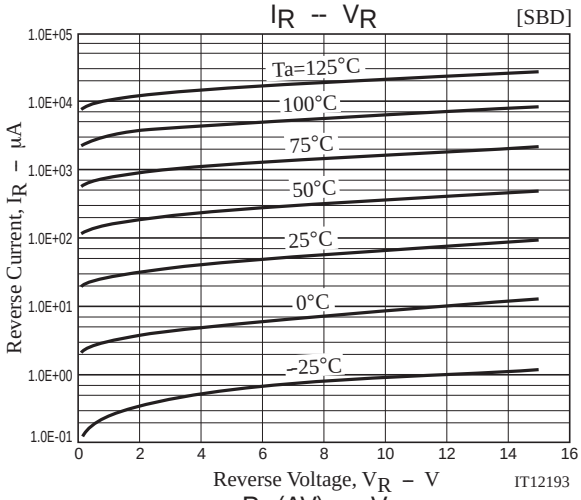

Ciss, Coss, Crss -- VDS [MOSFET]
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT14540
f=1MHz
Ciss
Coss
Crss

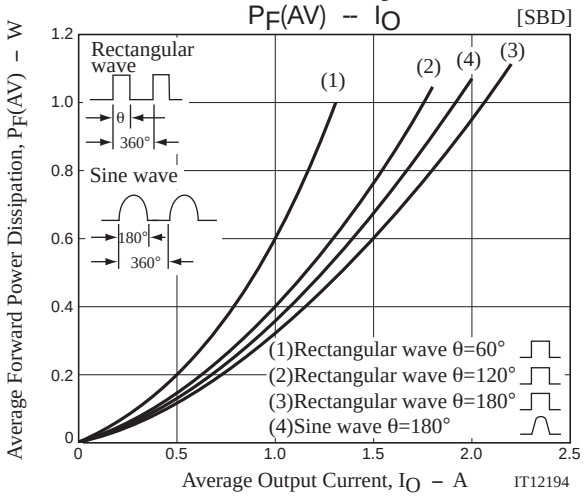

VGS -- Qg
[MOSFET]
VDS= −10V
ID= −3A
Gate-to-Source Voltage, VGS − V
Total Gate Charge, Qg − nC
IT14541

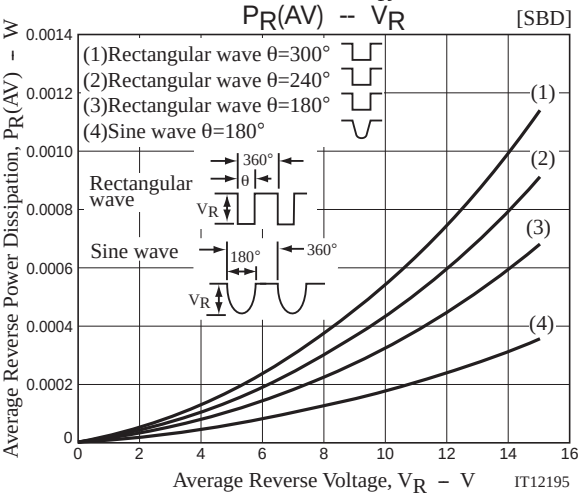

A S O
[MOSFET]
IDP= −20A (PW≤10μs)
ID= −3A
100μs
1ms
10ms
100ms
DC operation (Ta=25°C)
Operation in this area
is limited by RDS(on).
Ta=25°C
Single pulse
When mounted on ceramic substrate (900mm2×0.8mm) 1unit
Drain Current, ID − A
Drain-to-Source Voltage, VDS − V
IT15908

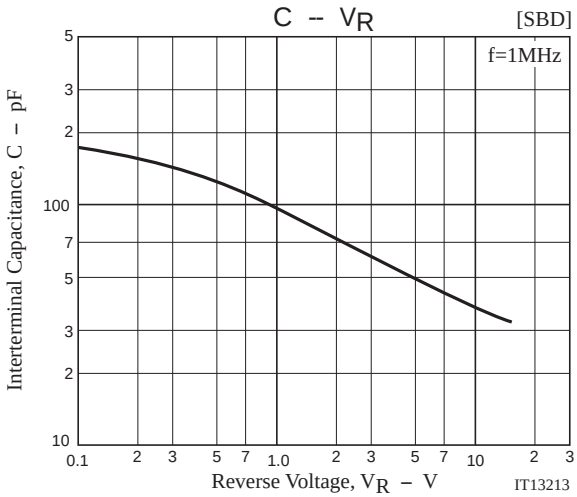

PD -- Ta
[MOSFET]
When mounted on ceramic substrate
(900mm2×0.8mm)
Allowable Power Dissipation, PD − W
Ambient Temperature, Ta − °C
IT15909

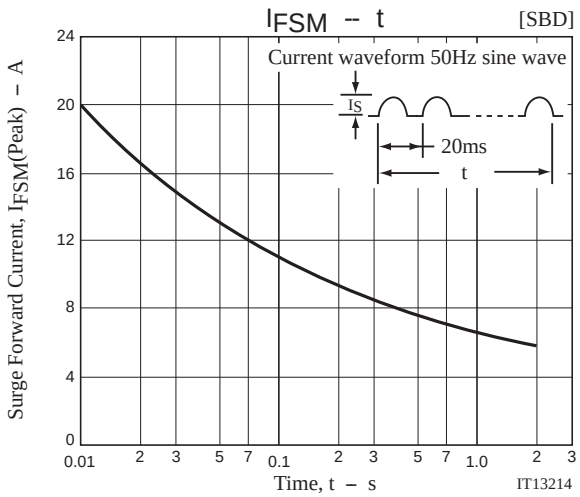

IF -- VF
[SBD]
100°C
Ta=125°C
75°C
50°C
25°C
0°C
−25°C
Forward Current, IF − A
Forward Voltage, VF − V
IT12192


IR -- VR
[SBD]
Ta=125°C
100°C
75°C
50°C
25°C
0°C
−25°C
Reverse Current, IR − μA
Reverse Voltage, VR − V
IT12193


PF(AV) -- IO
[SBD]
Rectangular wave
θ
360°
Sine wave
180°
360°
(1)
(2)
(4)
(3)
(1)Rectangular wave θ=60°
(2)Rectangular wave θ=120°
(3)Rectangular wave θ=180°
(4)Sine wave θ=180°
Average Forward Power Dissipation, PF(AV) − W
Average Output Current, IO − A
IT12194


PR(AV) -- VR
[SBD]
(1)Rectangular wave θ=300°
(2)Rectangular wave θ=240°
(3)Rectangular wave θ=180°
(4)Sine wave θ=180°
Rectangular wave
360°
θ
VR
Sine wave
180°
360°
VR
(1)
(2)
(3)
(4)
Average Reverse Power Dissipation, PR(AV) − W
Average Reverse Voltage, VR − V
IT12195





Note on usage : Since the EMH2801 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

This catalog provides information as of August, 2010. Specifications and information herein are subject to change without notice.