Ordering number : ENA0687

SANYO Semiconductors

DATA SHEET

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

CPH5856 — General-Purpose Switching Device Applications

Features

· DC / DC converters.

Features

· Composite type with a N-channel sillicon MOSFET and a schottky barrier diode contained in one package facilitating high-density mounting.
[MOSFET]
· 1.8V drive.
[SBD]
· Short reverse recovery time.
· Low forward voltage.
· Junction temperature 150°C guarantee.

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		2.5	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	10	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 +150	°C

Marking : YJ

Continued on next page.

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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		1	A
Surge Forward Current	I_{FSM}	50Hz sine wave, 1 cycle	3	A
Junction Temperature	Tj		−55 to +150	°C
Storage Temperature	Tstg		−55 to +150	°C

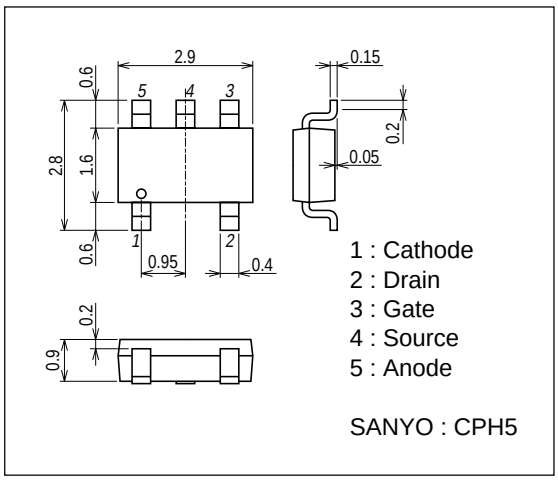
Electrical Characteristics at Ta=25°C

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	1.8	3.0		S
Static Drain-to-Source On-State Resistance	$R_{DS}(on)1$	I_D=1.5A, V_{GS}=4V		71	93	mΩ
	$R_{DS}(on)2$	I_D=1A, V_{GS}=2.5V		89	125	mΩ
	$R_{DS}(on)3$	I_D=0.5A, V_{GS}=1.8V		117	180	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		220		pF
Output Capacitance	Coss	V_{DS}=10V, f=1MHz		56		pF
Reverse Transfer Capacitance	Crss	V_{DS}=10V, f=1MHz		43		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit.		8.0		ns
Rise Time	t_r	See specified Test Circuit.		44		ns
Turn-OFF Delay Time	$t_d(off)$	See specified Test Circuit.		28		ns
Fall Time	t_f	See specified Test Circuit.		37		ns
Total Gate Charge	Qg	V_{DS}=10V, V_{GS}=4V, I_D=2.5A		2.9		nC
Gate-to-Source Charge	Qgs	V_{DS}=10V, V_{GS}=4V, I_D=2.5A		0.45		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=10V, V_{GS}=4V, I_D=2.5A		0.97		nC
Diode Forward Voltage	V_{SD}	I_S=2.5A, V_{GS}=0V		0.83	1.2	V
[SBD]						
Reverse Voltage	V_R	I_R=0.2mA	15			V
Forward Voltage	V_F1	I_F=0.5A		0.44	0.49	V
	V_F2	I_F=1A		0.51	0.56	V
Reverse Current	I_R	V_R=7.5V			3	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

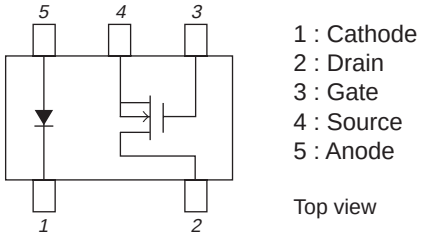
Package Dimensions

unit : mm (typ)

7017A-005

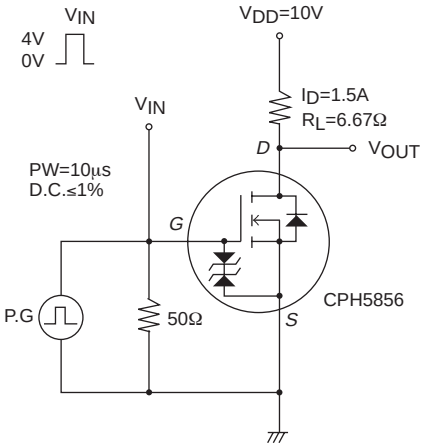


Electrical Connection



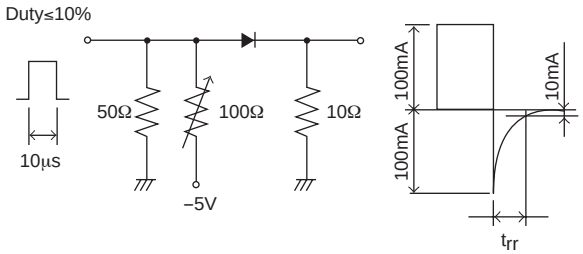
Switching Time Test Circuit

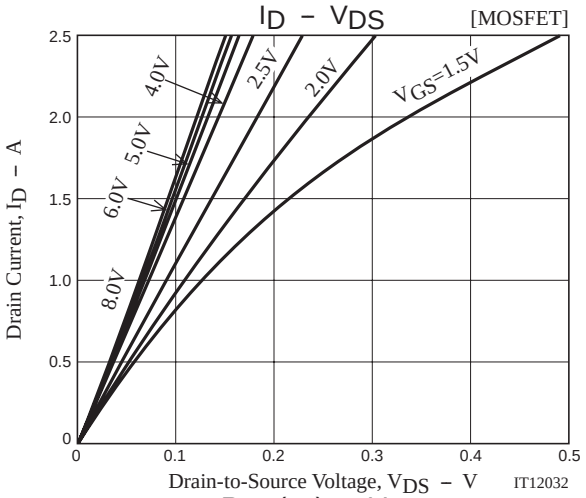
[MOSFET]

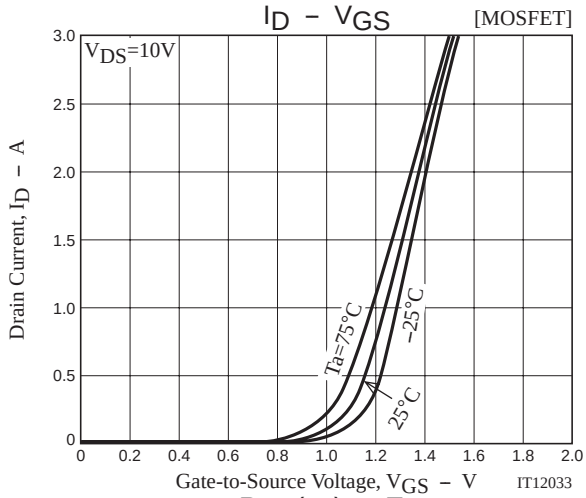


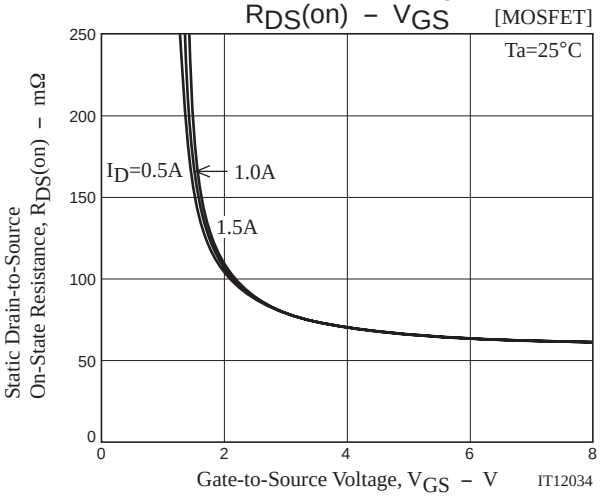
t_{rr} Test Circuit

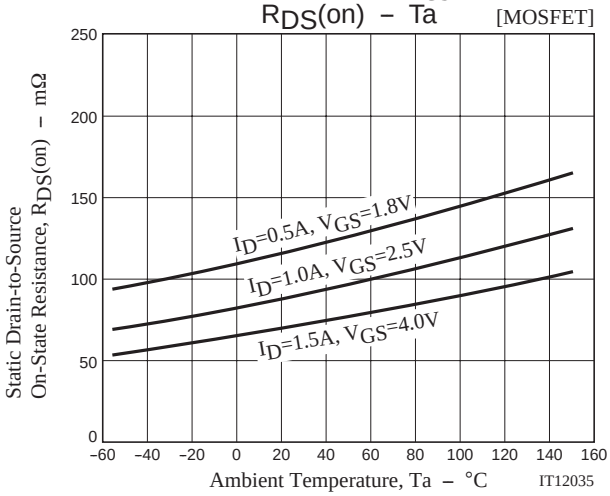
[SBD]

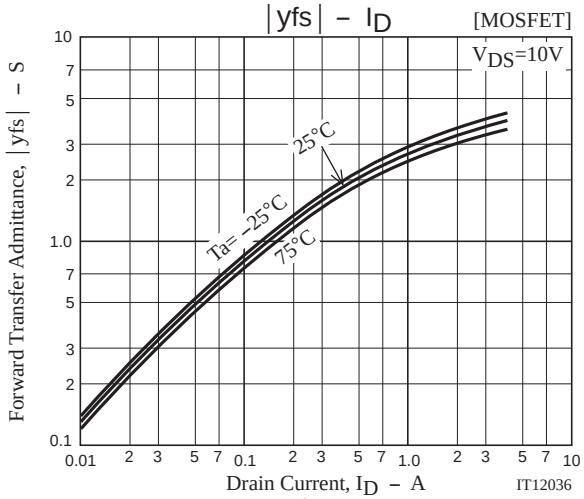


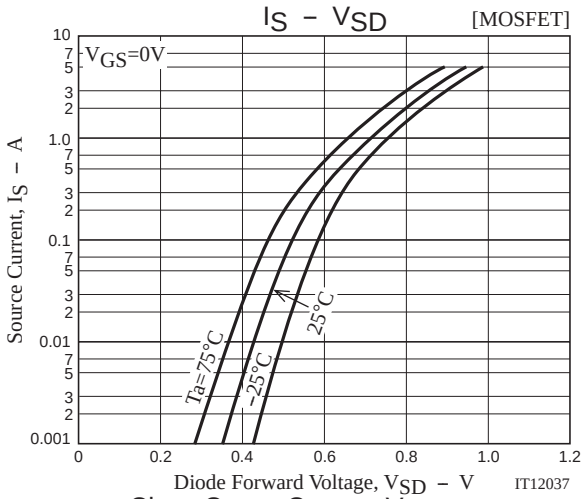


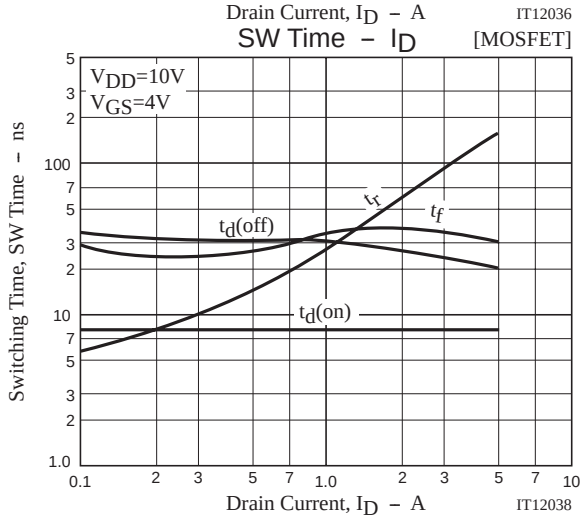


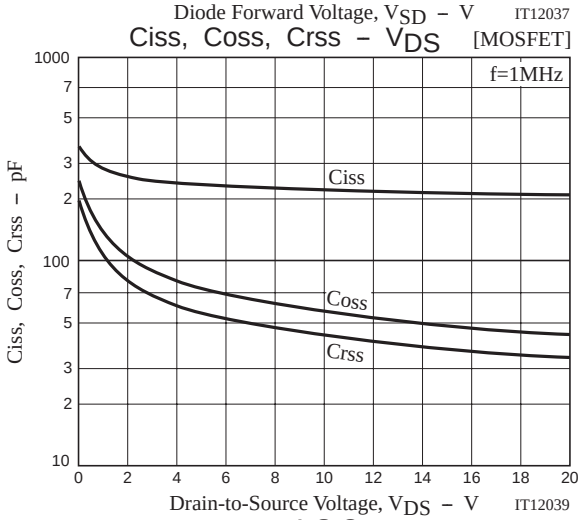


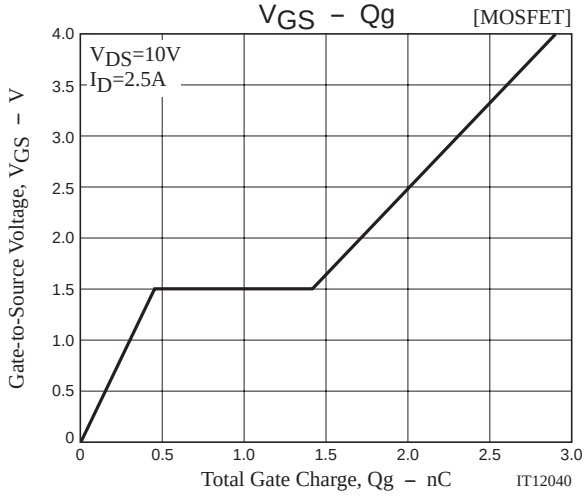


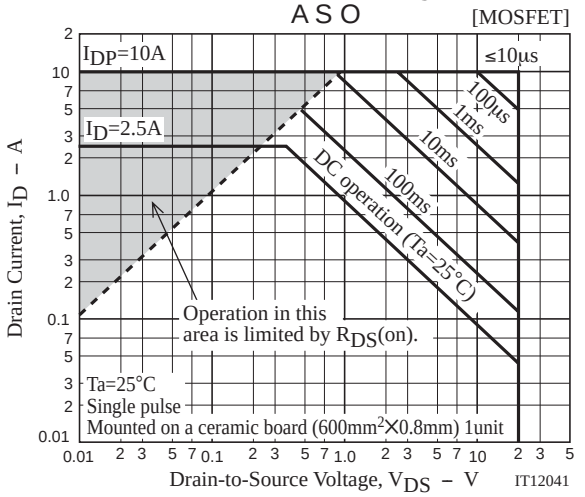

|yfs| – ID [MOSFET]
VDS=10V
25°C
Ta=–25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT12036

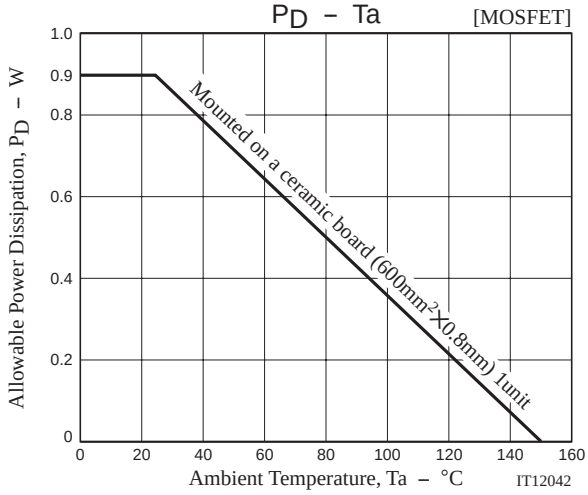

IS – VSD [MOSFET]
VGS=0V
Ta=75°C
–25°C
25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT12037

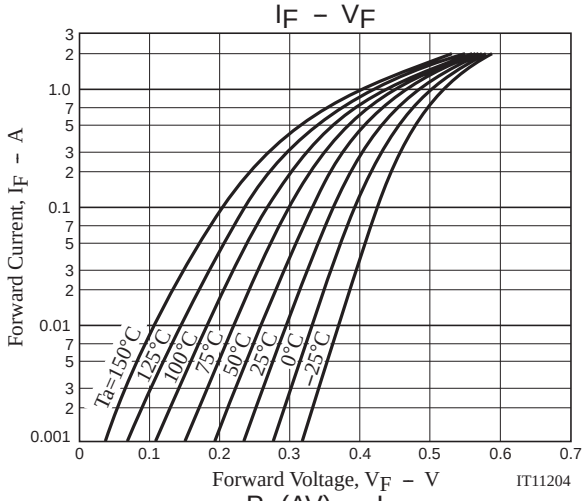

SW Time – ID [MOSFET]
VDD=10V
VGS=4V
tf
td(off)
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT12038

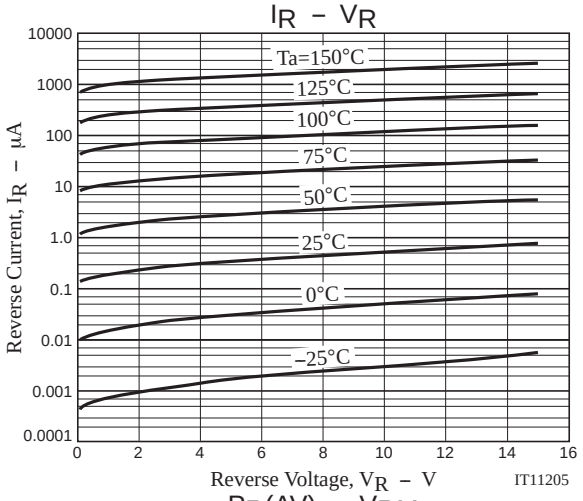

Ciss, Coss, Crss – VDS [MOSFET]
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT12039

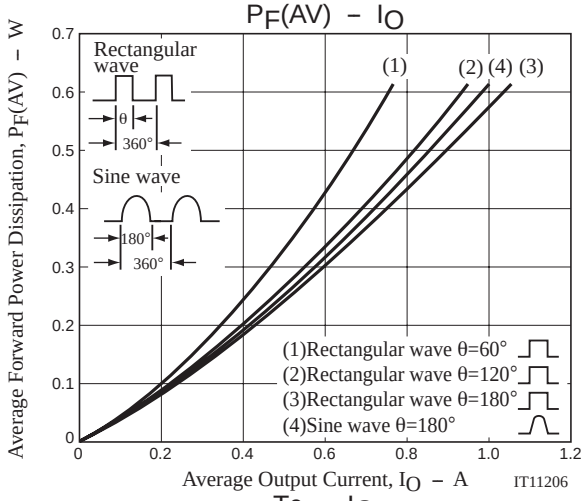

VGS – Qg [MOSFET]
VDS=10V
ID=2.5A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT12040

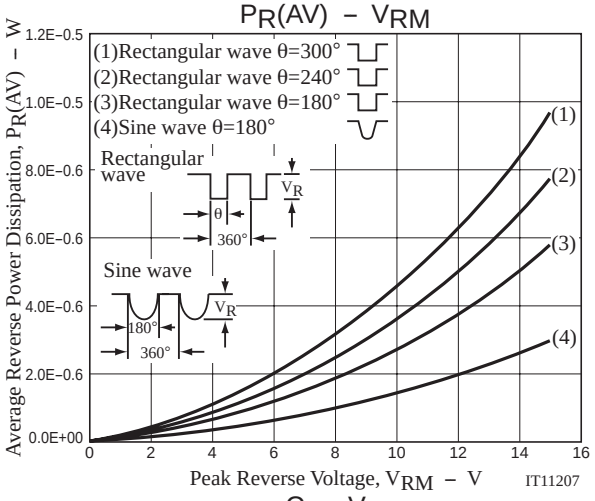

A S O [MOSFET]
IDP=10A
ID=2.5A
≤10μs
100μs
1ms
10ms
100ms
DC operation (Ta=25°C)
Operation in this
area is limited by RDS(on).
Ta=25°C
Single pulse
Mounted on a ceramic board (600mm2×0.8mm) 1unit
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT12041

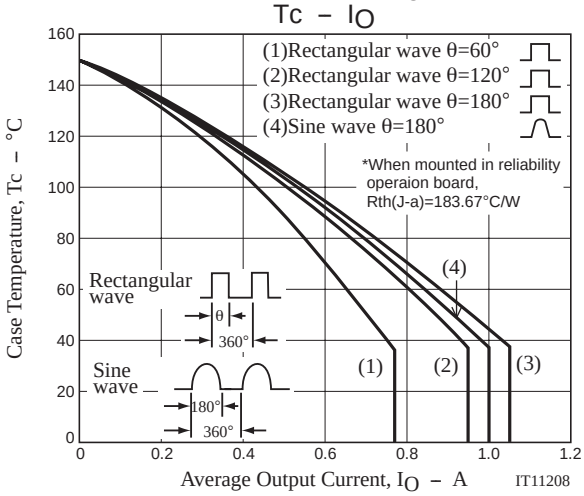

PD – Ta [MOSFET]
Mounted on a ceramic board (600mm2×0.8mm) 1unit
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT12042

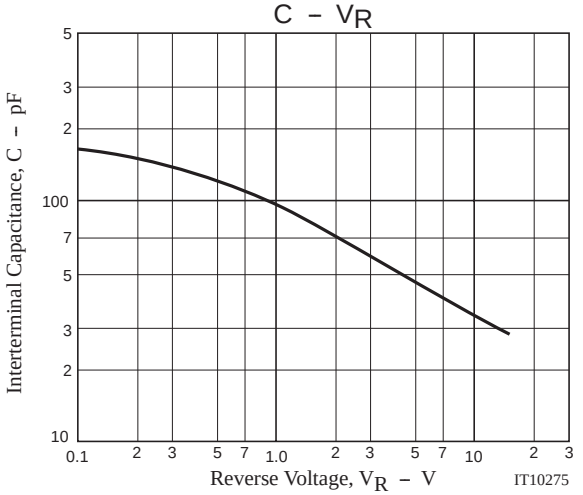

IF – VF
Forward Current, IF – A
Forward Voltage, VF – V
Ta=150°C
125°C
100°C
75°C
50°C
25°C
0°C
–25°C
IT11204

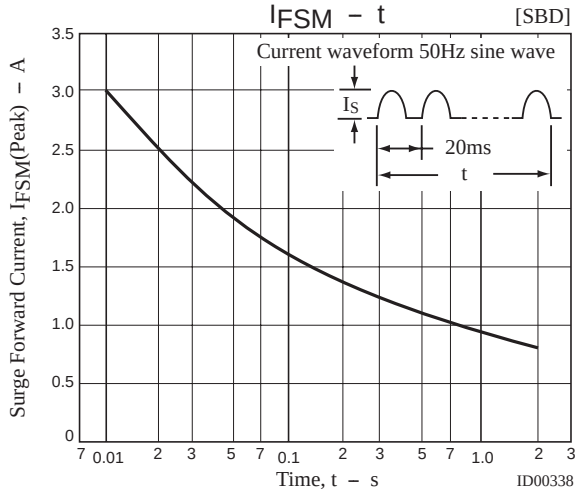

IR – VR
Reverse Current, IR – μA
Reverse Voltage, VR – V
Ta=150°C
125°C
100°C
75°C
50°C
25°C
0°C
–25°C
IT11205


PF(AV) – IO
Average Forward Power Dissipation, PF(AV) – W
Average Output Current, IO – A
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°
IT11206


PR(AV) – VRM
Average Reverse Power Dissipation, PR(AV) – W
Peak Reverse Voltage, VRM – V
(1)Rectangular wave θ=300°
(2)Rectangular wave θ=240°
(3)Rectangular wave θ=180°
(4)Sine wave θ=180°
Rectangular wave
VR
θ
360°
Sine wave
180°
360°
(1)
(2)
(3)
(4)
IT11207


Tc – IO
Case Temperature, Tc – °C
Average Output Current, IO – A
(1)Rectangular wave θ=60°
(2)Rectangular wave θ=120°
(3)Rectangular wave θ=180°
(4)Sine wave θ=180°
*When mounted in reliability operaion board, Rth(J-a)=183.67°C/W
Rectangular wave
θ
360°
Sine wave
180°
360°
(1)
(2)
(3)
(4)
IT11208


C – VR
Interterminal Capacitance, C – pF
Reverse Voltage, VR – V
IT10275


IFSM – t
[SBD]
Surge Forward Current, IFSM(Peak) – A
Time, t – s
Current waveform 50Hz sine wave
IS
20ms
t
ID00338

Note on usage : Since the CPH5856 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

This catalog provides information as of February, 2007. Specifications and information herein are subject to change without notice.