CPH5871

Power MOSFET
30V, 52mΩ, 3.5A, Single N-Channel with Schottky Diode

ON Semiconductor®

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Features

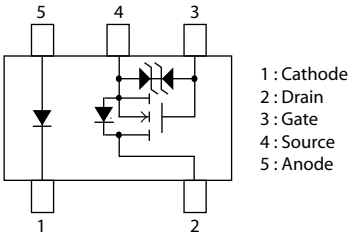
- Composite Type with a N-channel Sillicon MOSFET and a Schottky Barrier Diode Contained in One Package Facilitating High-density Mounting
- ESD Diode-Protected Gate
- Pb-Free, Halogen Free and RoHS Compliance

[MOSFET]
- High Speed Switching
- 1.8V Drive

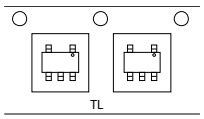
[SBD]
- Short Reverse Recovery Time
- Low Forward Voltage

V_{DSS}	R_{DS}(on) Max	I_D Max
[MOSFET] 30V	52mΩ@ 4.5V	3.5A
	74mΩ@ 2.5V	
	132mΩ@ 1.8V	

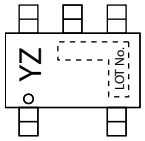
Electrical Connection
N-Channel



Packing Type : TL



Marking



Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Value	Unit
[MOSFET]			
Drain to Source Voltage	V_{DSS}	30	V
Gate to Source Voltage	V_{GSS}	±12	V
Drain Current (DC)	I_D	3.5	A
Drain Current (Pulse) PW≤10μs, duty cycle≤1%	I_{DP}	14	A
Power Dissipation When mounted on ceramic substrate (600mm^2 × 0.8mm) 1unit	P_D	0.9	W
Junction Temperature	Tj	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}	35	V
Average Output Current	I_O	1	A
Surge Forward Current 50Hz sine wave, 1cycle	I_{FSM}	10	A
Junction Temperature	Tj	−55 to +125	°C
Storage Temperature	Tstg	−55 to +125	°C

Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Junction to Ambient When mounted on ceramic substrate (600mm^2 × 0.8mm) 1unit	$R_{\theta JA}$	138.8	°C/W

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.

ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

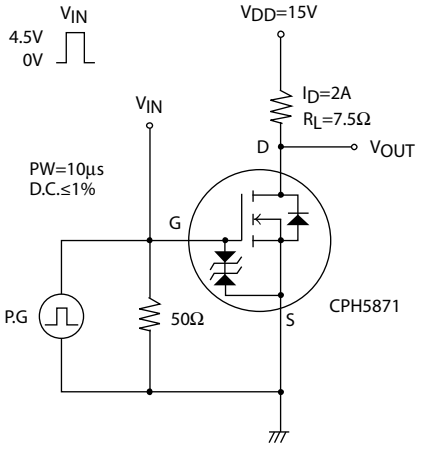
Electrical Characteristics at Ta = 25°C

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
[MOSFET]						
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}=±8V, V_{DS}=0V			±10	μA
Gate Threshold Voltage	$V_{GS}(th)$	V_{DS}=10V, I_D=1mA	0.4		1.3	V
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=2A	2.0	3.4		S
Static Drain to Source On-State Resistance	$R_{DS}(on)1$	I_D=2A, V_{GS}=4.5V		40	52	mΩ
	$R_{DS}(on)2$	I_D=1A, V_{GS}=2.5V		53	74	mΩ
	$R_{DS}(on)3$	I_D=0.5A, V_{GS}=1.8V		82	132	mΩ
Input Capacitance	Ciss	V_{DS}=10V, f=1MHz		430		pF
Output Capacitance	Coss			59		pF
Reverse Transfer Capacitance	Crss			38		pF
Turn-ON Delay Time	$t_d(on)$	See specified Test Circuit		10		ns
Rise Time	t_r			41		ns
Turn-OFF Delay Time	$t_d(off)$			36		ns
Fall Time	t_f			37		ns
Total Gate Charge	Qg	V_{DS}=15V, V_{GS}=4.5V, I_D=3.5A		4.7		nC
Gate to Source Charge	Qgs			0.8		nC
Gate to Drain “Miller” Charge	Qgd			1.1		nC
Forward Diode Voltage	V_{SD}	I_S=3.5A, V_{GS}=0V		0.8	1.2	V
[SBD]						
Reverse Voltage	V_R	I_R=0.5mA	30			V
Forward Voltage	V_{F1}	I_F=0.7A		0.45	0.5	V
	V_{F2}	I_F=1A		0.48	0.53	V
Reverse Current	I_R	V_R=16V			15	μA
Interterminal Capacitance	C	V_R=10V, f=1MHz, 1cycle		27		pF
Reverse Recovery Time	t_{rr}	I_F= I_R=100mA, See specified Test Circuit			10	ns

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.

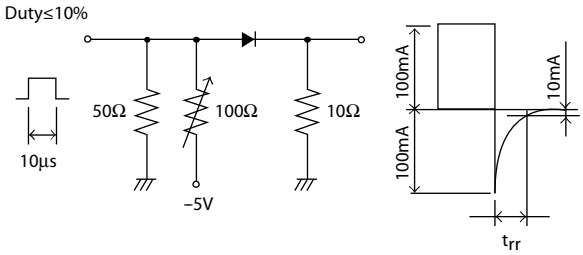
Switching Time Test Circuit

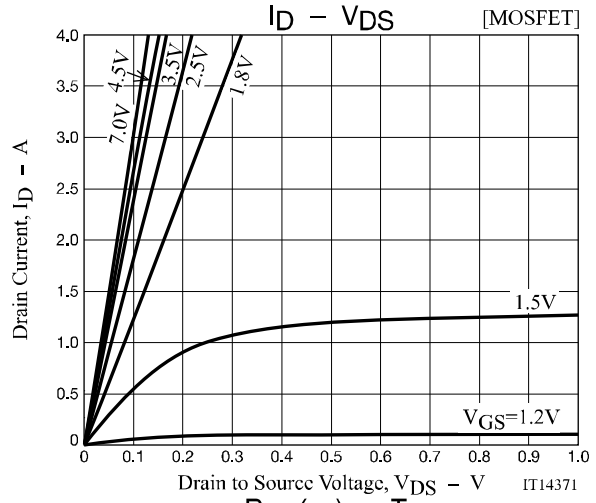
(MOSFET)

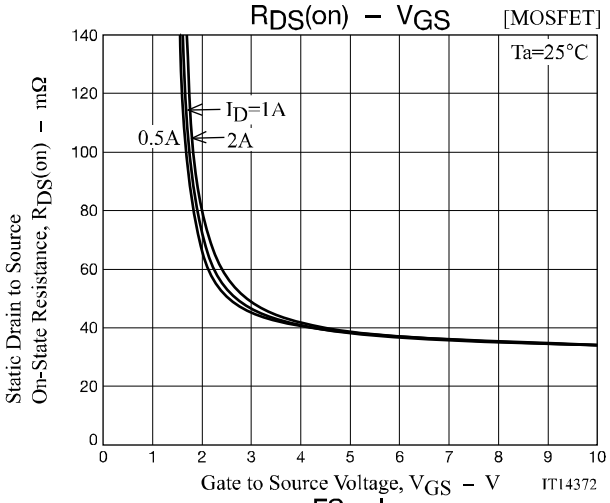


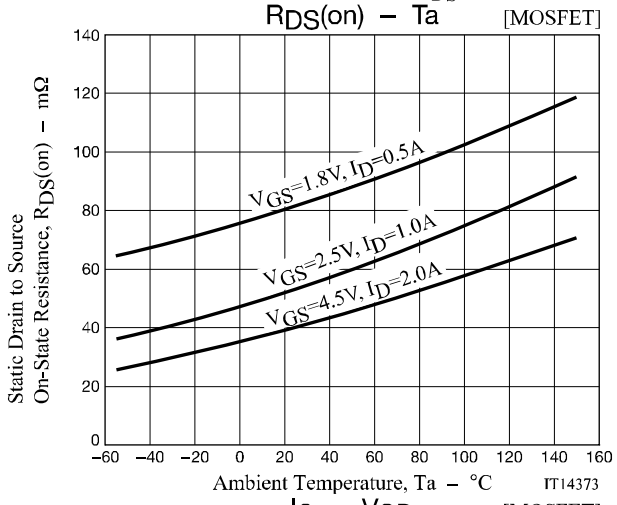
trr Test Circuit

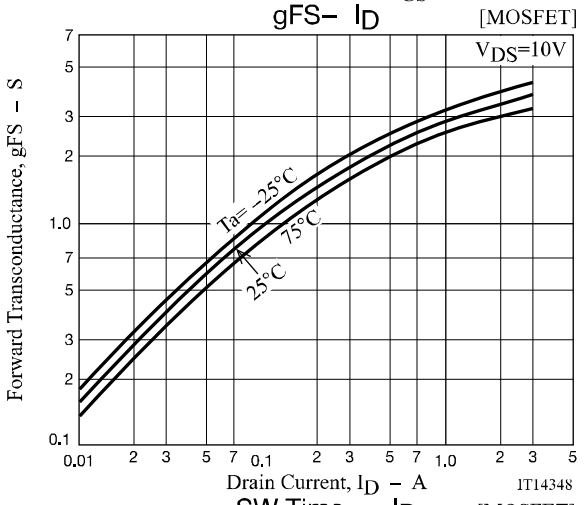
(SBD)

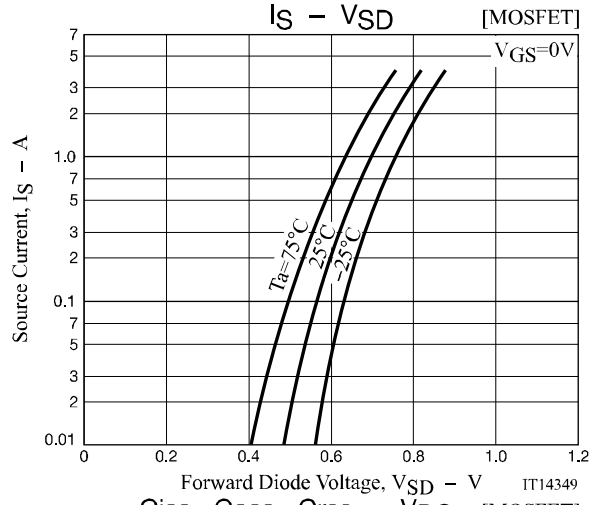


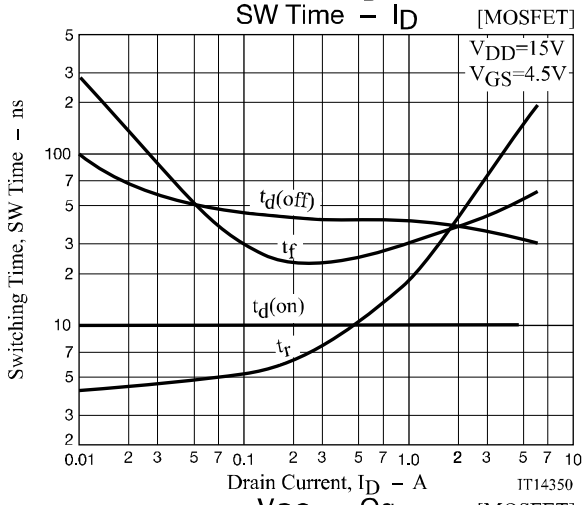

ID – VDS [MOSFET]
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT14371
7.0V
4.5V
3.5V
2.5V
1.8V
1.5V
VGS=1.2V

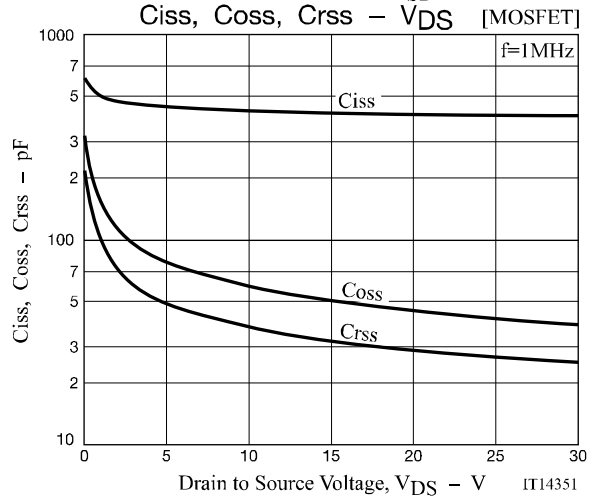

RDS(on) – VGS [MOSFET]
Ta=25°C
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT14372
ID=1A
0.5A
2A

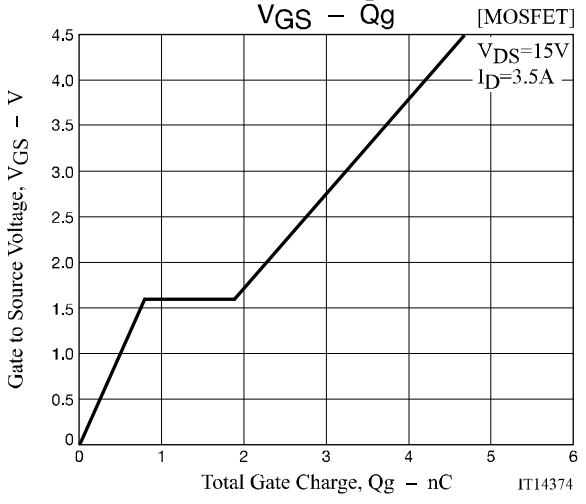

RDS(on) – Ta [MOSFET]
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Ambient Temperature, Ta – °C
IT14373
VGS=1.8V, ID=0.5A
VGS=2.5V, ID=1.0A
VGS=4.5V, ID=2.0A


gFS– ID [MOSFET]
VDS=10V
Forward Transconductance, gFS – S
Drain Current, ID – A
IT14348
Ta= –25°C
75°C
25°C

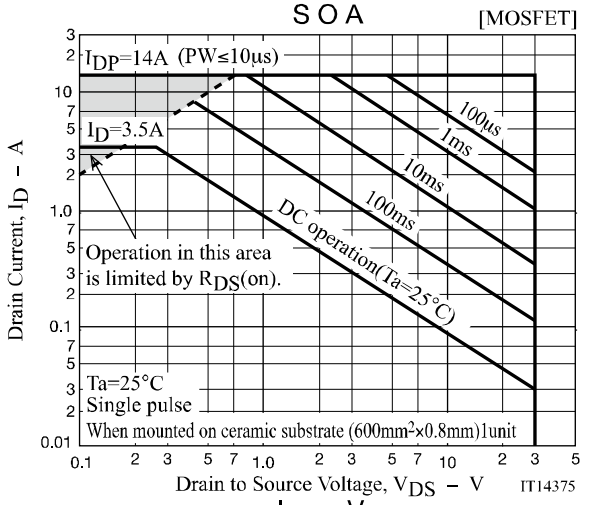

IS – VSD [MOSFET]
VGS=0V
Source Current, IS – A
Forward Diode Voltage, VSD – V
IT14349
Ta=75°C
25°C
–25°C


SW Time – ID [MOSFET]
VDD=15V
VGS=4.5V
Switching Time, SW Time – ns
Drain Current, ID – A
IT14350
td(off)
tf
td(on)
tr

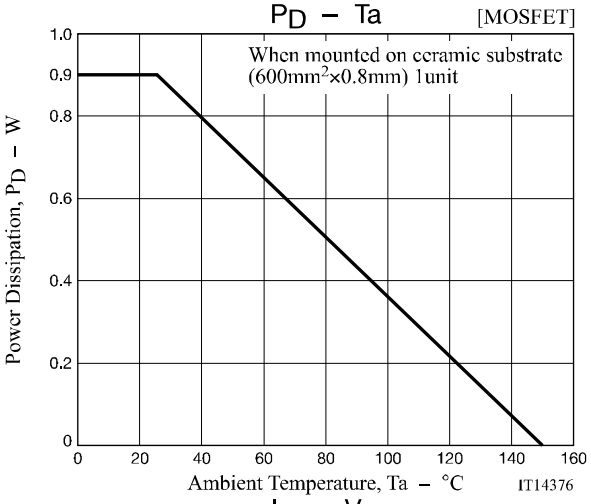

Ciss, Coss, Crss – VDS [MOSFET]
f=1MHz
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT14351
Ciss
Coss
Crss


VGS – Qg [MOSFET]
VDS=15V
ID=3.5A
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT14374

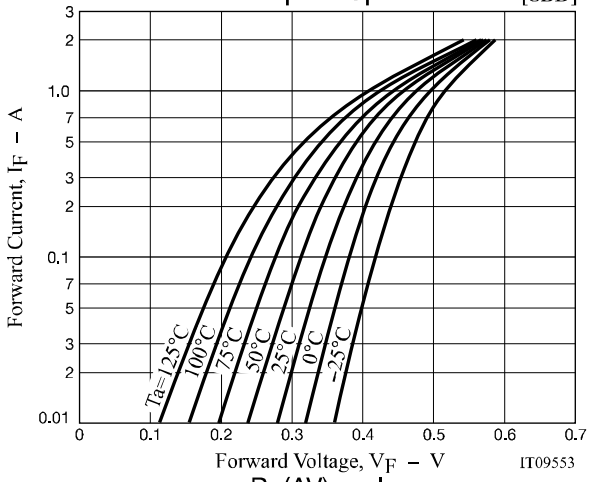
S O A [MOSFET]



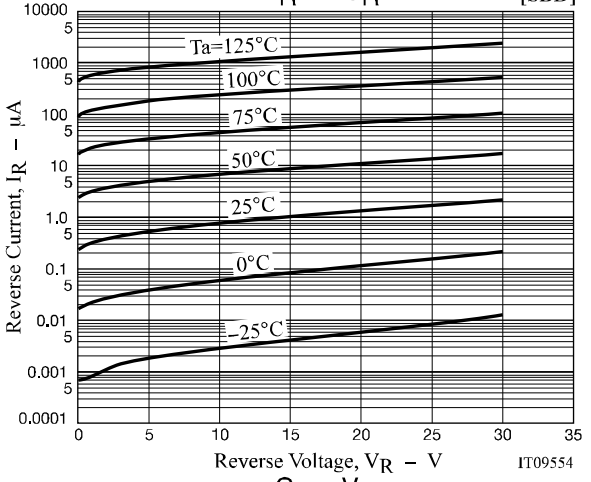
PD – Ta [MOSFET]



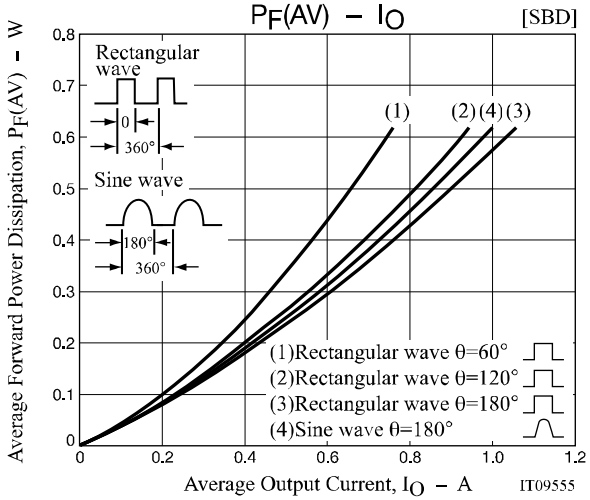
IF – VF [SBD]



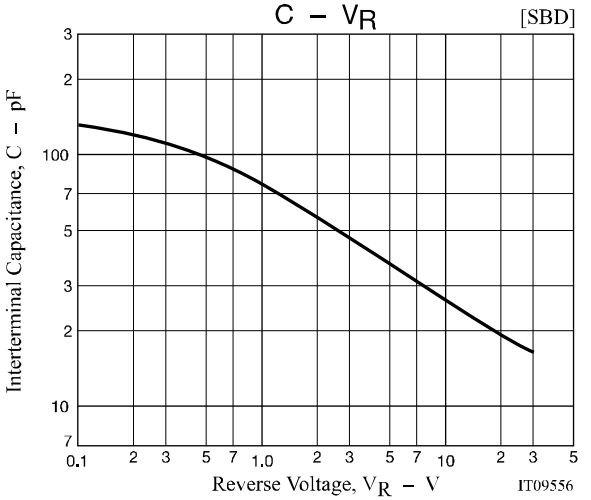
IR – VR [SBD]



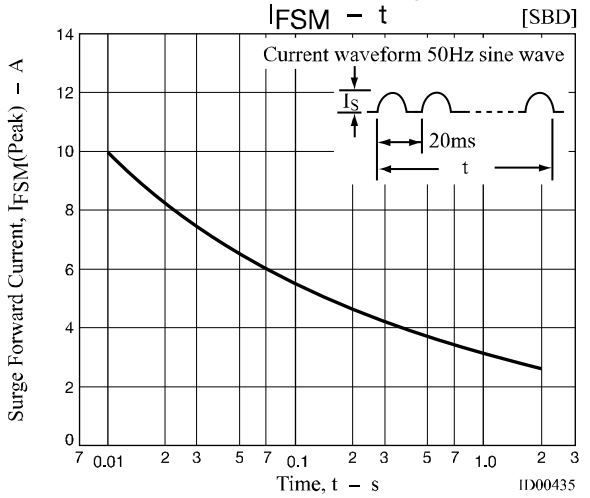
PF(AV) – IO [SBD]

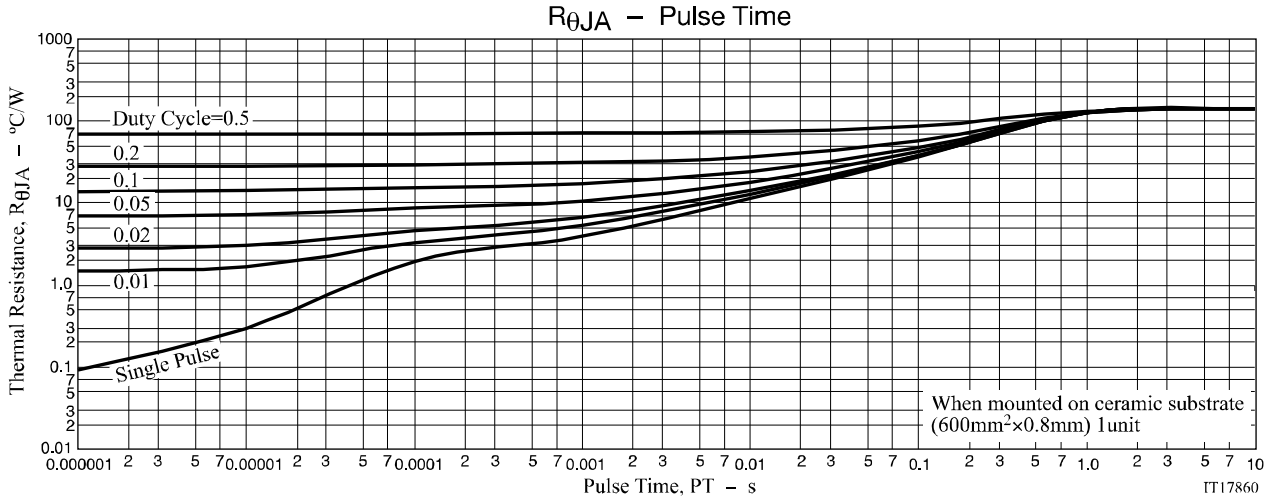


C – VR [SBD]



IFSM – t [SBD]




RθJA – Pulse Time
Thermal Resistance, RθJA – °C/W
Duty Cycle=0.5
0.2
0.1
0.05
0.02
0.01
Single Pulse
When mounted on ceramic substrate
(600mm²×0.8mm) 1unit
Pulse Time, PT – s
IT17860

Package Dimensions

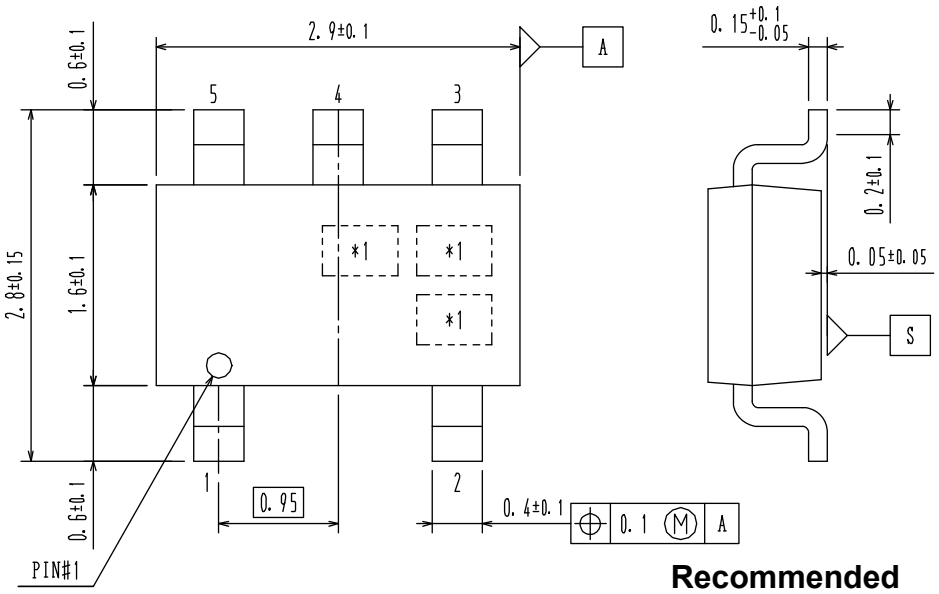
CPH5871-TL-H / CPH5871-TL-W

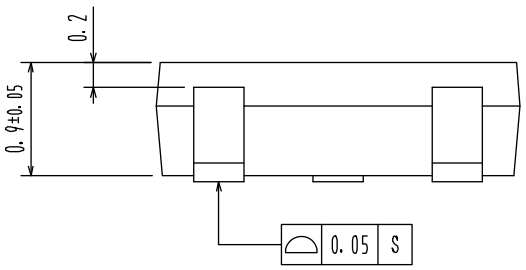
CPH5

CASE 318BC
ISSUE O

unit : mm

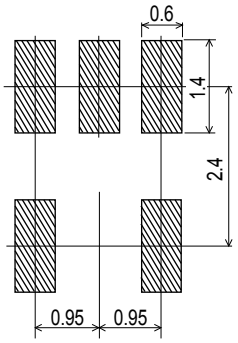
1 : Cathode
2 : Drain
3 : Gate
4 : Source
5 : Anode





*1:Lot indication

Recommended Soldering Footprint



ORDERING INFORMATION

Device	Package	Shipping	Note
CPH5871-TL-H	CPH5 SC-74A, SOT-25	3,000 pcs. / Tape & Reel	Pb-Free and Halogen Free
CPH5871-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 CPH5871 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.