

# MCH5839

## Power MOSFET –20V, 266mΩ, –1.5A, Single P-Channel with Schottky Diode

MCH5839 is a P-Channel Power MOSFET, with Schottky Diode for general-purpose switching device applications.

### Features

- Composite type with a P-Channel silicon MOSFET and a schottky barrier diode contained in one package facilitating high-density mounting
  - Pb-Free, Halogen Free and RoHS compliance
- [MOSFET]
- Low On-resistance
  - ESD Diode-Protected Gate
  - 1.8V drive
- [SBD]
- Short reverse recovery time
  - Low forward voltage

### Typical Applications

- DC/DC Converter

### SPECIFICATIONS

#### ABSOLUTE MAXIMUM RATING at Ta = 25°C (Note 1)

Parameter	Symbol	Value	Unit
[MOSFET]			
Drain to Source Voltage	V <sub>DSS</sub>	–20	V
Gate to Source Voltage	V <sub>GSS</sub>	±10	V
Drain Current (DC)	I <sub>D</sub>	–1.5	A
Drain Current (Pulse) PW ≤ 10μs, duty cycle ≤ 1%	I <sub>DP</sub>	–6	A
Power Dissipation When mounted on ceramic substrate (1000mm <sup>2</sup> × 0.8mm) 1unit	P <sub>D</sub>	0.8	W
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	–55 to +125	°C
[SBD]			
Repetitive Peak Reverse Voltage	V <sub>R</sub> RM	15	V
Nonrepetitive Peak Reverse Surge Voltage	V <sub>R</sub> SM	15	V
Average Output Current	I <sub>O</sub>	1	A
Surge Forward Current 50Hz sine wave, 1cycle	I <sub>FSM</sub>	3	A
Junction Temperature	T <sub>j</sub>	–55 to +125	°C
Storage Temperature	T <sub>stg</sub>	–55 to +125	°C

Note 1 : 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.

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Value	Unit
Junction to Ambient When mounted on ceramic substrate (1000mm <sup>2</sup> × 0.8mm) 1unit	R <sub>θJA</sub>	156.2	°C/W



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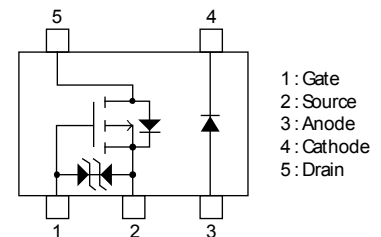
### MOSFET

V <sub>DSS</sub>	R <sub>DS(on)</sub> Max	I <sub>D</sub> Max
–20V	266mΩ@ –4.5V	–1.5A
	413mΩ@ –2.5V	
	645mΩ@ –1.8V	

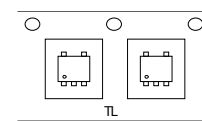
### SCHOTTKY DIODE

V <sub>RRM</sub>	V <sub>F</sub> Max	I <sub>FSM</sub>
15V	0.46V	3A

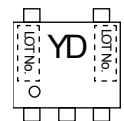
### ELECTRICAL CONNECTION P-Channel



### PACKING TYPE : TL



### MARKING



### ORDERING INFORMATION

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

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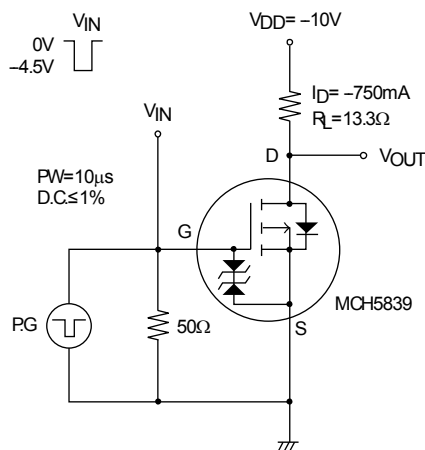
## ELECTRICAL CHARACTERISTICS at Ta = 25°C (Note 2)

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
<b>[MOSFET]</b>						
Drain to Source Breakdown Voltage	V(BR)DSS	I <sub>D</sub> =-1mA, V <sub>GS</sub> =0V	-20			V
Zero-Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V			-1	μA
Gate to Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V			±10	μA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-1mA	-0.4		-1.4	V
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-750mA		1.9		S
Static Drain to Source On-State Resistance	R <sub>DS(on)1</sub>	I <sub>D</sub> =-750mA, V <sub>GS</sub> =-4.5V		205	266	mΩ
	R <sub>DS(on)2</sub>	I <sub>D</sub> =-300mA, V <sub>GS</sub> =-2.5V		295	413	mΩ
	R <sub>DS(on)3</sub>	I <sub>D</sub> =-100mA, V <sub>GS</sub> =-1.8V		430	645	mΩ
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-10V, f=1MHz		120		pF
Output Capacitance	C <sub>oss</sub>			26		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			20		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	See specified Test Circuit		5.3		ns
Rise Time	t <sub>r</sub>			9.7		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>			16		ns
Fall Time	t <sub>f</sub>			14		ns
Total Gate Charge	Q <sub>g</sub>				1.7	
Gate to Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1.5A		0.28		nC
Gate to Drain "Miller" Charge	Q <sub>gd</sub>			0.47		nC
Forward Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> =-1.5A, V <sub>GS</sub> =0V		-0.89	-1.2	V
<b>[SBD]</b>						
Reverse Voltage	V <sub>R</sub>	I <sub>R</sub> =0.5mA	15			V
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =0.5A		0.4	0.46	V
Reverse Current	I <sub>R</sub>	V <sub>R</sub> =6V			90	μA
Interterminal Capacitance	C	V <sub>R</sub> =10V, f=1MHz		13		pF
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =I <sub>R</sub> =100mA, See specified Test Circuit			10	ns

Note 2 : 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.

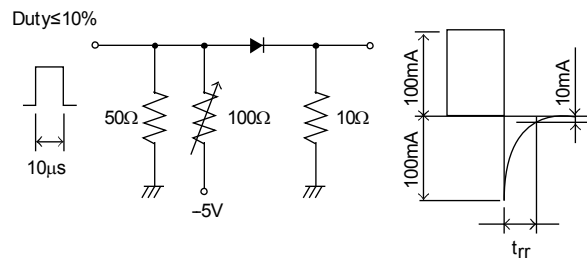
### Switching Time Test Circuit

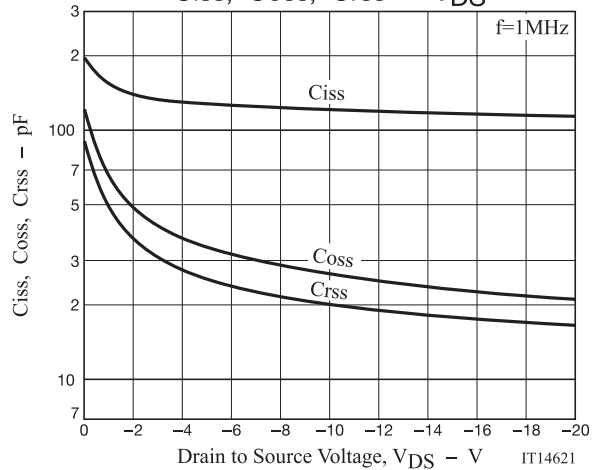
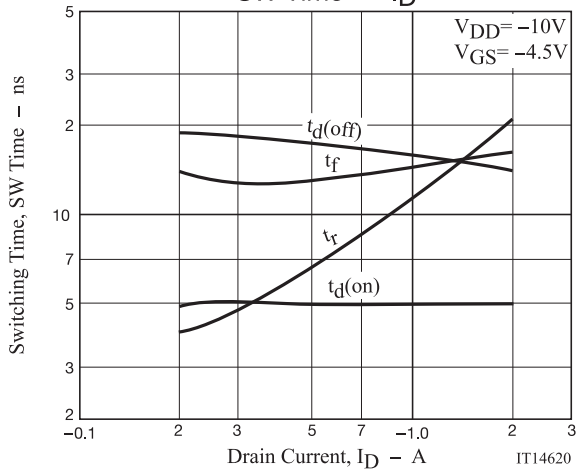
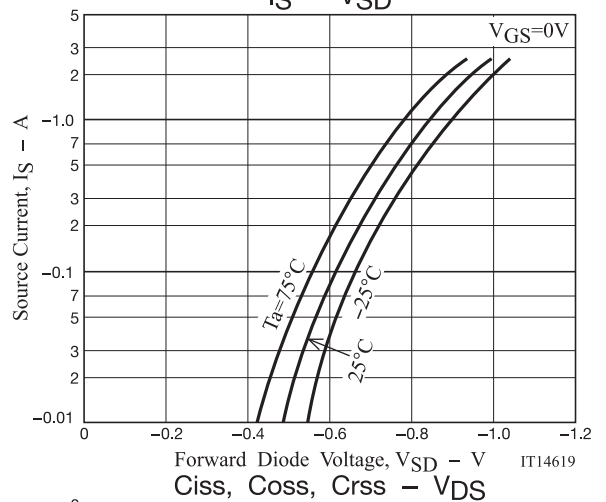
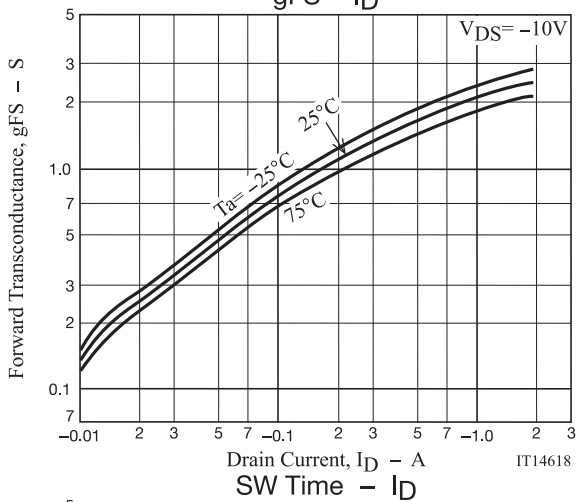
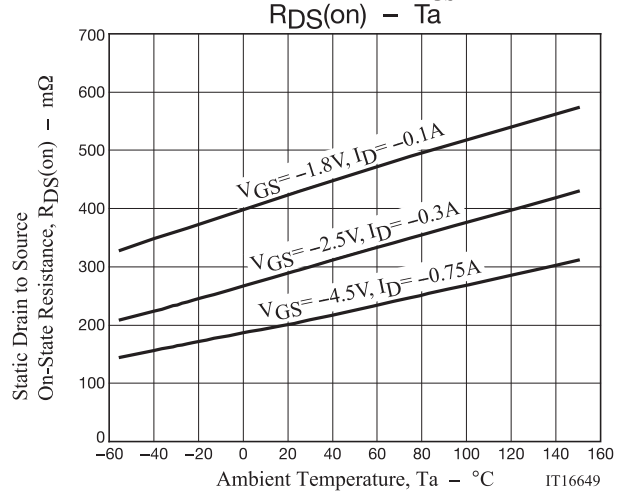
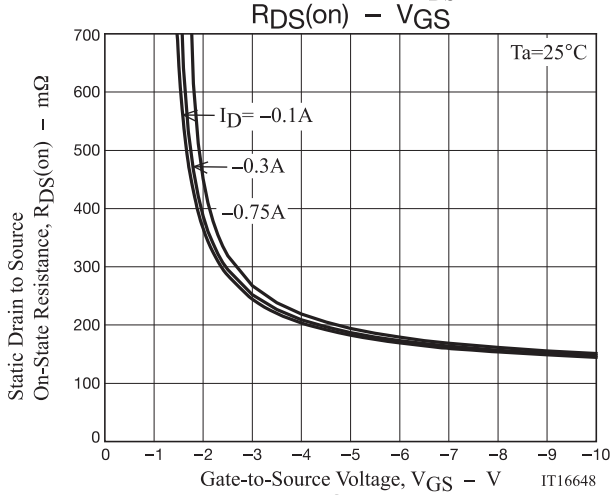
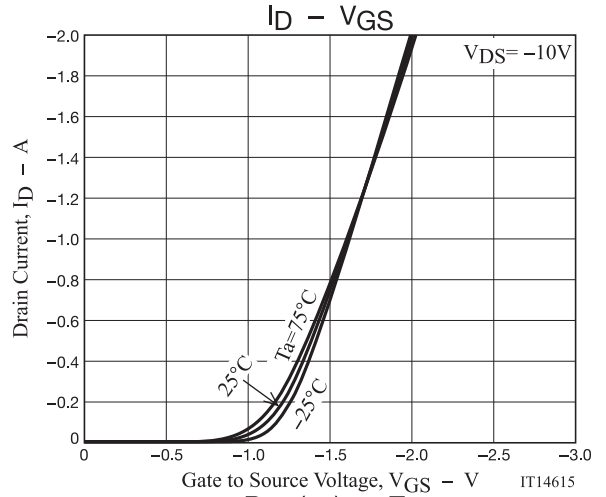
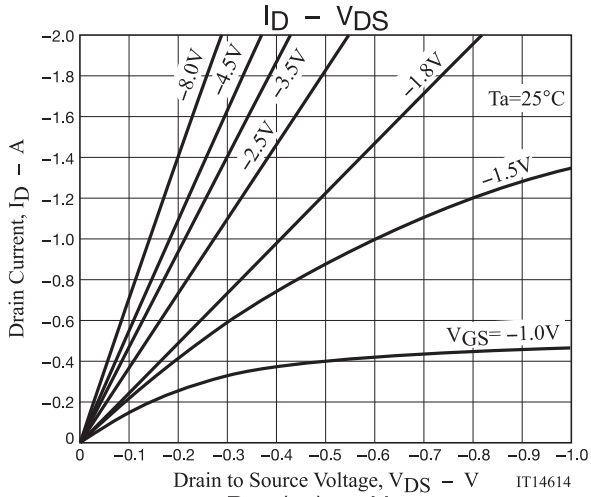
(MOSFET)

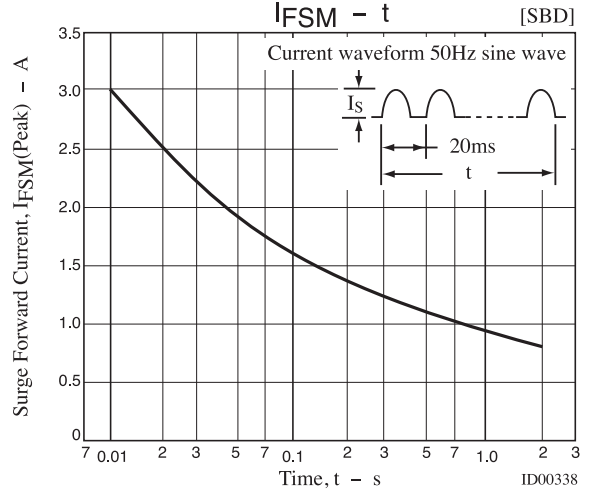
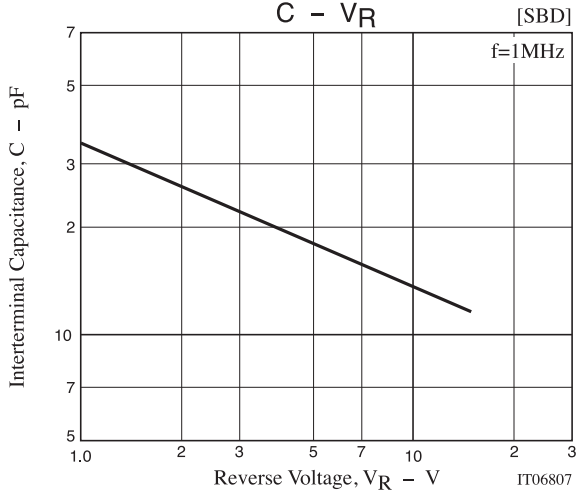
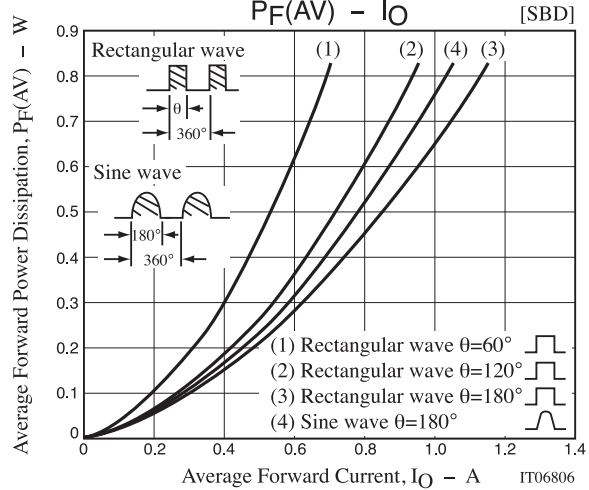
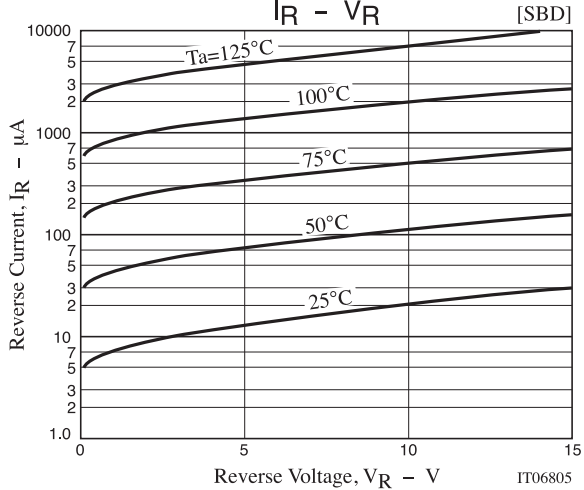
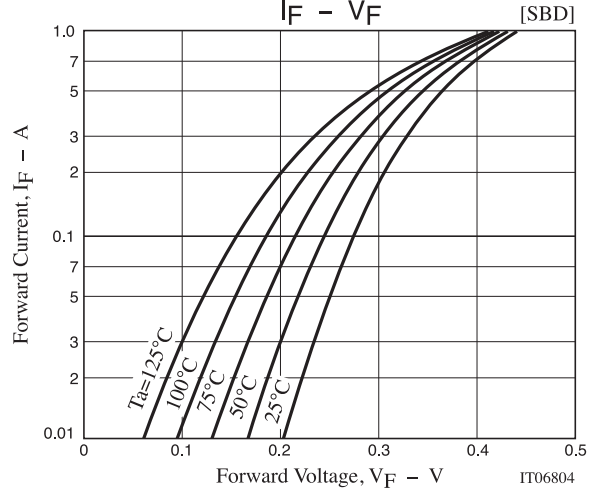
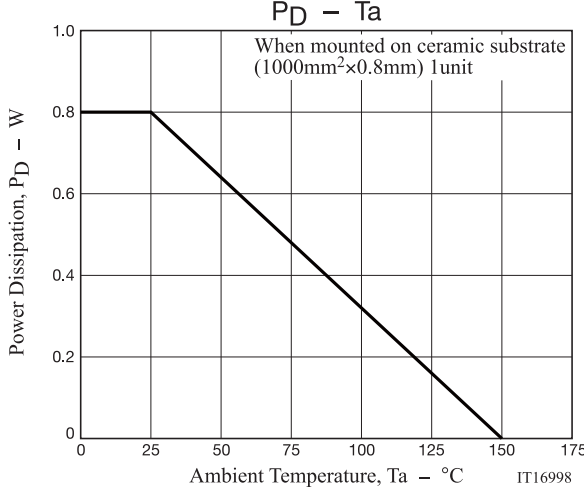
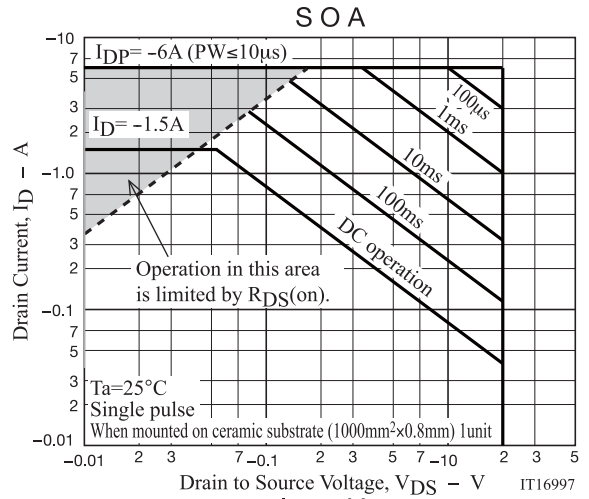
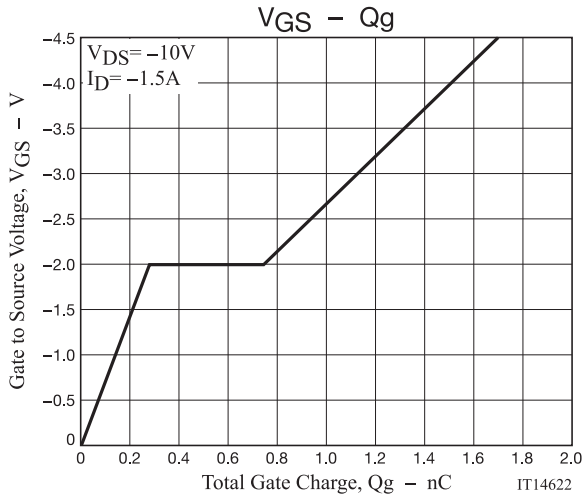


### t<sub>rr</sub> Test Circuit

(SBD)

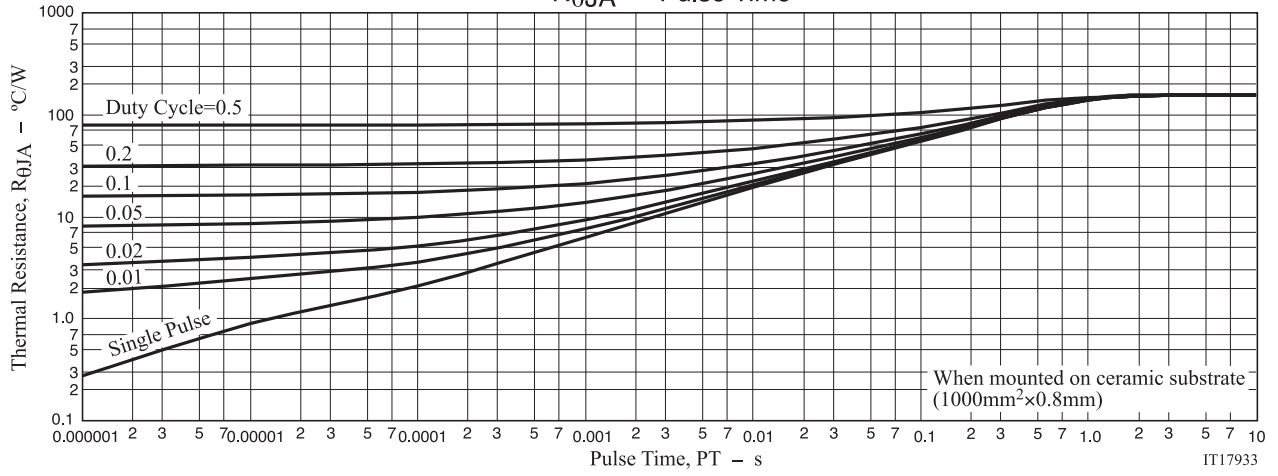






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## $R_{\theta JA}$ - Pulse Time

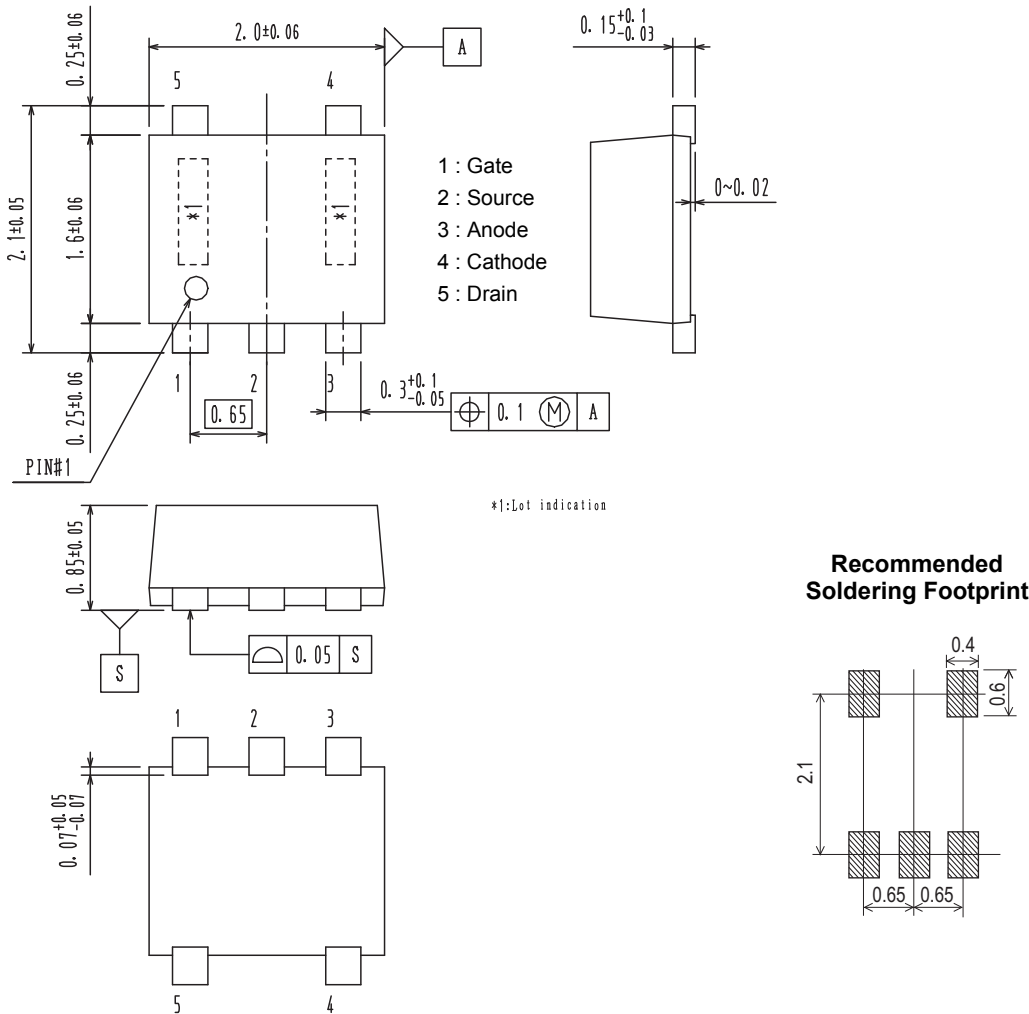


# MCH5839

## PACKAGE DIMENSIONS

unit : mm

SC-88AFL / MCPH5  
CASE 419AP  
ISSUE 0



## ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
MCH5839-TL-H	YD	SC-88AFL / MCPH5 (Pb-Free / Halogen Free)	3,000 / Tape & Reel
MCH5839-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](http://www.onsemi.com/pub_link/Collateral/BRD8011-D.PDF)

Note on usage : Since the MCH5839 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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