

MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

P6SMBXXXA(CA)(MS)

Product specification

Features

- For surface mounted applications in order to optimize board
- space Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- 600W peak pulse power capability at 10/1000μswaveform,
- repetition rate (duty cycle): 0.01%
- Fast response time
- Typical IR less than 1μA above 12V
- High Temperature soldering: 260℃/ 40 seconds at terminals
- Plastic package has underwriters laboratory flammability 94V-0

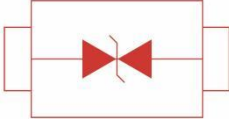
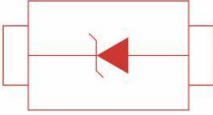
Mechanical Data

Case : JEDEC DO-214AA/SMB molded plastic body
Terminals : Solderable per MIL-STD-750,Method 2026
Polarity : Polarity symbol marking on body
Mounting Position : Any
Weight : 0.003 ounce, 0.095 grams

Applications

- I/O interface
- AC/DC power supply
- Industrial and Consumer electronic applications.

Reference News

PACKAGE OUTLINE	PIN CONFIGURATION	Marking Information
		
Unipolar		
		
Bipolar		

Maximum Ratings And Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation at $T_A=25^{\circ}\text{C}$ by 10x1000 μs waveform (Fig.1) (Note 1), (Note 2)	P_{PPM}	600	Watts
Power Dissipation on infinite heat sink at $T_A=50^{\circ}\text{C}$	$P_{\text{M(AV)}}$	5.0	Watts
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	100	Amps
Maximum Instantaneous Forward Voltage at 50A for Unidirectional only (Note 4)	V_{F}	3.5V/5.0	V
Operating Junction and Storage Temperature Range	$T_{\text{J}}, T_{\text{STG}}$	-65 to +150	$^{\circ}\text{C}$
Typical Thermal Resistance Junction to Lead	$R_{\theta\text{JL}}$	20	$^{\circ}\text{C/W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta\text{JA}}$	100	$^{\circ}\text{C/W}$

NOTES:

- 1.Non-repetitive current pulse , per Fig. 3 and derated above $T_A = 25^{\circ}\text{C}$ per Fig. 2.
- 2.Mounted on copper pad area of 0.2x0.2" (5.0 x 5.0mm) to each terminal.
- 3.Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.
4. $V_{\text{F}} < 3.5\text{V}$ for $V_{\text{BR}} < 200\text{V}$ and $V_{\text{F}} < 5.0\text{V}$ for $V_{\text{BR}} > 201\text{V}$.

Electrical Characteristics (TA=25°C)

Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @ I_{r}	Test Current	Maximum Clamping Voltage @ I_{PP}	Peak Pulse Current	Reverse Leakage @ V_{RWM}
Unidirectional	Bidirectional	UNI	BI	$V_{\text{RWM}}(\text{V})$	$V_{\text{BR}}(\text{V})$	$I_{\text{r}}(\text{mA})$	$V_{\text{c}}(\text{V})$	$I_{\text{PP}}(\text{A})$	$I_{\text{r}}(\mu\text{A})$
P6SMB6.8A (MS)	P6SMB6.8CA (MS)	6V8A	6V8C	5.80	6.45~7.14	10	10.5	58.1	1000
P6SMB7.5A (MS)	P6SMB7.5CA (MS)	7V5A	7V5C	6.40	7.13~7.88	10	11.3	54.0	500
P6SMB8.2A (MS)	P6SMB8.2CA (MS)	8V2A	8V2C	7.02	7.79~8.61	10	12.1	50.4	200
P6SMB9.1A (MS)	P6SMB9.1CA (MS)	9V1A	9V1C	7.78	8.65~9.55	1	13.4	45.5	50
P6SMB10A (MS)	P6SMB10CA (MS)	10A	10C	8.55	9.50~10.50	1	14.5	42.1	10
P6SMB11A (MS)	P6SMB11CA (MS)	11A	11C	9.40	10.50~11.60	1	15.6	39.1	5
P6SMB12A (MS)	P6SMB12CA (MS)	12A	12C	10.20	11.40~12.60	1	16.7	36.5	5
P6SMB13A (MS)	P6SMB13CA (MS)	13A	13C	11.10	12.40~13.70	1	18.2	33.5	1
P6SMB15A (MS)	P6SMB15CA (MS)	15A	15C	12.80	14.30~15.80	1	21.2	28.8	1
P6SMB16A (MS)	P6SMB16CA (MS)	16A	16C	13.60	15.20~16.80	1	22.5	27.1	1
P6SMB18A (MS)	P6SMB18CA (MS)	18A	18C	15.30	17.10~18.90	1	25.2	24.2	1
P6SMB20A (MS)	P6SMB20CA (MS)	20A	20C	17.10	19.00~21.00	1	27.7	22.0	1
P6SMB22A (MS)	P6SMB22CA (MS)	22A	22C	18.80	20.90~23.10	1	30.6	19.9	1
P6SMB24A (MS)	P6SMB24CA (MS)	24A	24C	20.50	22.80~25.20	1	33.2	18.4	1
P6SMB27A (MS)	P6SMB27CA (MS)	27A	27C	23.10	25.70~28.40	1	37.5	16.3	1
P6SMB30A (MS)	P6SMB30CA (MS)	30A	30C	25.60	28.50~31.50	1	41.4	14.7	1
P6SMB33A (MS)	P6SMB33CA (MS)	33A	33C	28.20	31.40~34.70	1	45.7	13.3	1

Electrical Characteristics (TA=25°C)

Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @I _r	Test Current	Maximum Clamping Voltage @I _{PP}	Peak Pulse Current	Reverse Leakage @ V _{RWM}
Unidirectional	Bidirectional	UNI	BI	V _{RWM} (V)	V _{BR} (V)	I _r (mA)	V _C (V)	I _{PP} (A)	k(μA)
P6SMB36A (MS)	P6SMB36CA (MS)	36A	36C	30.80	34.20~37.80	1	49.9	12.2	1
P6SMB39A (MS)	P6SMB39CA (MS)	39A	39C	33.30	37.10~41.00	1	53.9	11.3	1
P6SMB43A (MS)	P6SMB43CA (MS)	43A	43C	36.80	40.90~45.20	1	59.3	10.3	1
P6SMB47A (MS)	P6SMB47CA (MS)	47A	47C	40.20	44.70~49.40	1	64.8	9.4	1
P6SMB51A (MS)	P6SMB51CA (MS)	51A	51C	43.60	48.50~53.60	1	70.1	8.7	1
P6SMB56A (MS)	P6SMB56CA (MS)	56A	56C	47.80	53.20~58.80	1	77.0	7.9	1
P6SMB62A (MS)	P6SMB62CA (MS)	62A	62C	53.00	58.90~65.10	1	85.0	7.2	1
P6SMB68A (MS)	P6SMB68CA (MS)	68A	68C	58.10	64.60~71.40	1	92.0	6.6	1
P6SMB75A (MS)	P6SMB75CA (MS)	75A	75C	64.10	71.30~78.80	1	103.0	5.9	1
P6SMB82A (MS)	P6SMB82CA (MS)	82A	82C	70.10	77.90~86.10	1	113.0	5.4	1
P6SMB91A (MS)	P6SMB91CA (MS)	91A	91C	77.80	86.50~95.50	1	125.0	4.9	1
P6SMB100A (MS)	P6SMB100CA (MS)	100A	100C	85.50	95.00~105.00	1	137.0	4.5	1
P6SMB110A (MS)	P6SMB110CA (MS)	110A	110C	94.00	105.00~116.00	1	152.0	4.0	1
P6SMB120A (MS)	P6SMB120CA (MS)	120A	120C	102.00	114.00~126.00	1	165.0	3.7	1
P6SMB130A (MS)	P6SMB130CA (MS)	130A	130C	111.00	124.00~137.00	1	179.0	3.4	1
P6SMB150A (MS)	P6SMB150CA (MS)	150A	150C	128.00	143.00~158.00	1	207.0	2.9	1
P6SMB160A (MS)	P6SMB160CA (MS)	160A	160C	136.00	152.00~168.00	1	219.0	2.8	1
P6SMB170A (MS)	P6SMB170CA (MS)	170A	170C	145.00	162.00~179.00	1	234.0	2.6	1
P6SMB180A (MS)	P6SMB180CA (MS)	180A	180C	154.00	171.00~189.00	1	246.0	2.5	1
P6SMB200A (MS)	P6SMB200CA (MS)	200A	200C	171.00	190.00~210.00	1	274.0	2.2	1
P6SMB220A (MS)	P6SMB220CA (MS)	220A	220C	185.00	209.00~231.00	1	328.0	1.9	1
P6SMB250A (MS)	P6SMB250CA (MS)	250A	250C	214.00	237.00~263.00	1	344.0	1.8	1
P6SMB300A (MS)	P6SMB300CA (MS)	300A	300C	256.00	285.00~315.00	1	414.0	1.5	1
P6SMB350A (MS)	P6SMB350CA (MS)	350A	350C	300.00	332.00~368.00	1	482.0	1.3	1
P6SMB400A (MS)	P6SMB400CA (MS)	400A	400C	342.00	380.00~420.00	1	548.0	1.1	1
P6SMB440A (MS)	P6SMB440CA (MS)	440A	440C	376.00	418.00~462.00	1	602.0	1.0	1
P6SMB480A (MS)	P6SMB480CA (MS)	480A	480C	408.00	456.00~504.00	1	658.0	0.9	1
P6SMB510A (MS)	P6SMB510CA (MS)	510A	510C	434.00	485.00~535.00	1	698.0	0.9	1
P6SMB530A (MS)	P6SMB530CA (MS)	530A	530C	450.00	503.50~556.50	1	725.0	0.8	1
P6SMB540A (MS)	P6SMB540CA (MS)	540A	540C	459.00	513.00~567.00	1	740.0	0.8	1
P6SMB550A (MS)	P6SMB550CA (MS)	550A	550C	467.00	522.50~577.50	1	760.0	0.8	1

Notes: For bidirectional type having V_{RWM} of 10V and less, the I_R limit is double.

Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

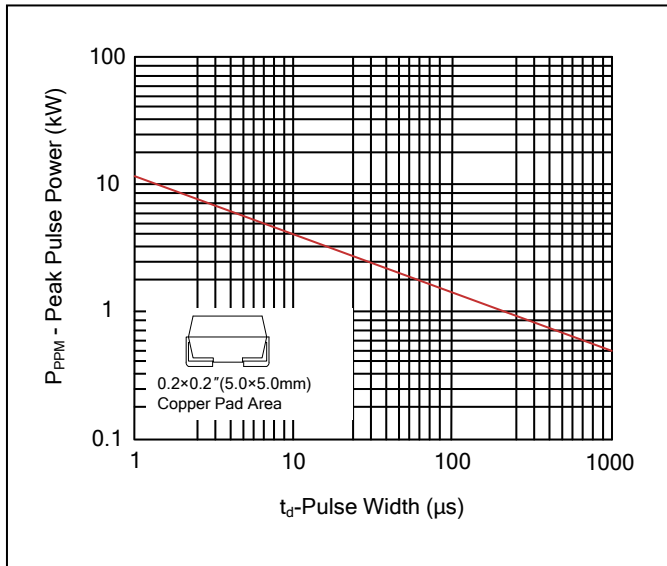


Figure 2. Pulse Derating Curve

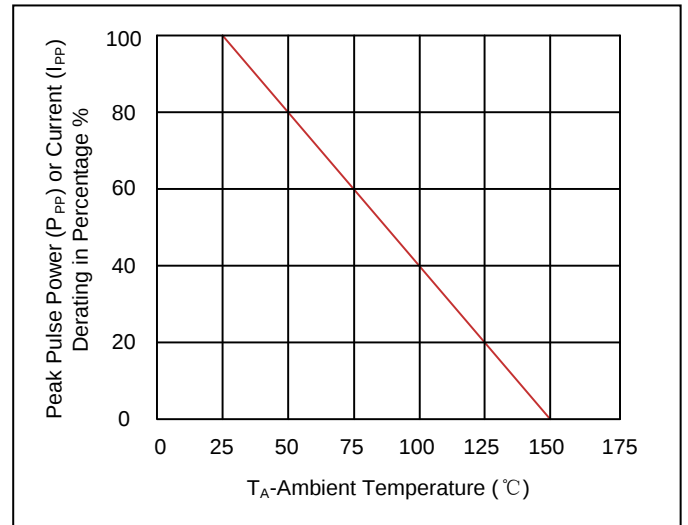


Figure 3. Pulse Waveform

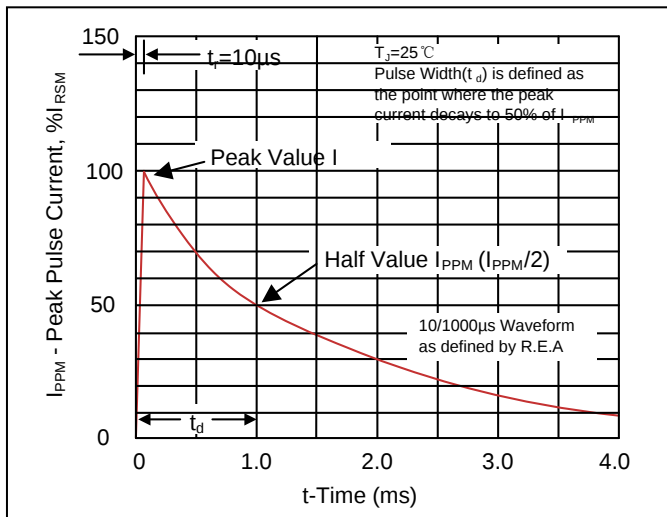


Figure 5. Steady State Power Dissipation Derating Curve

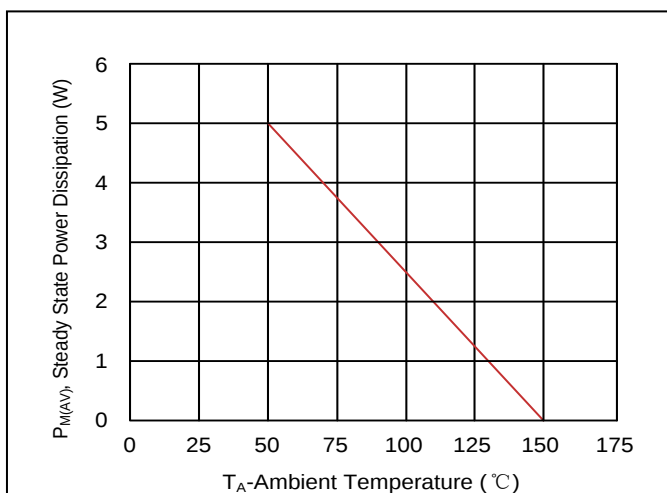


Figure 4. Typical Junction Capacitance

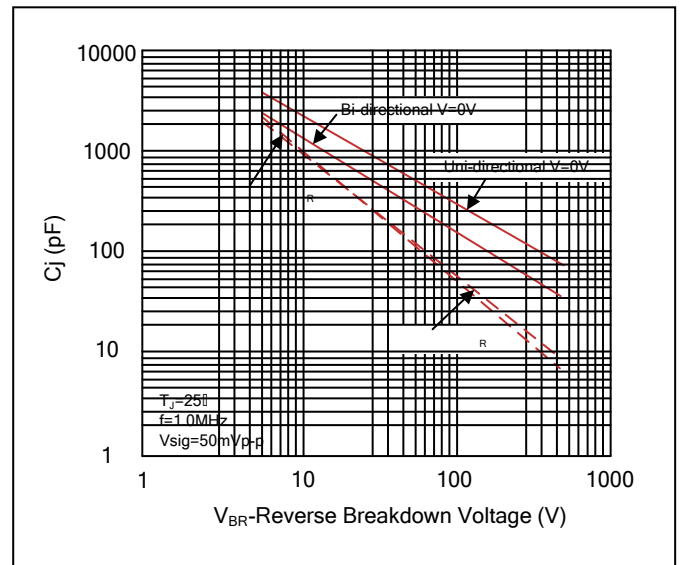
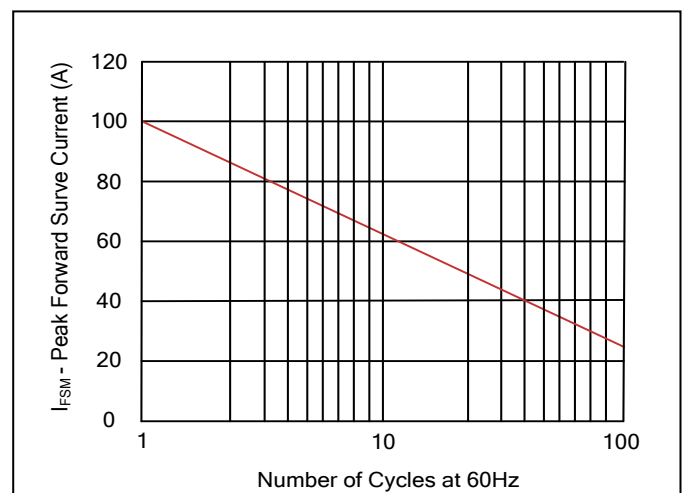
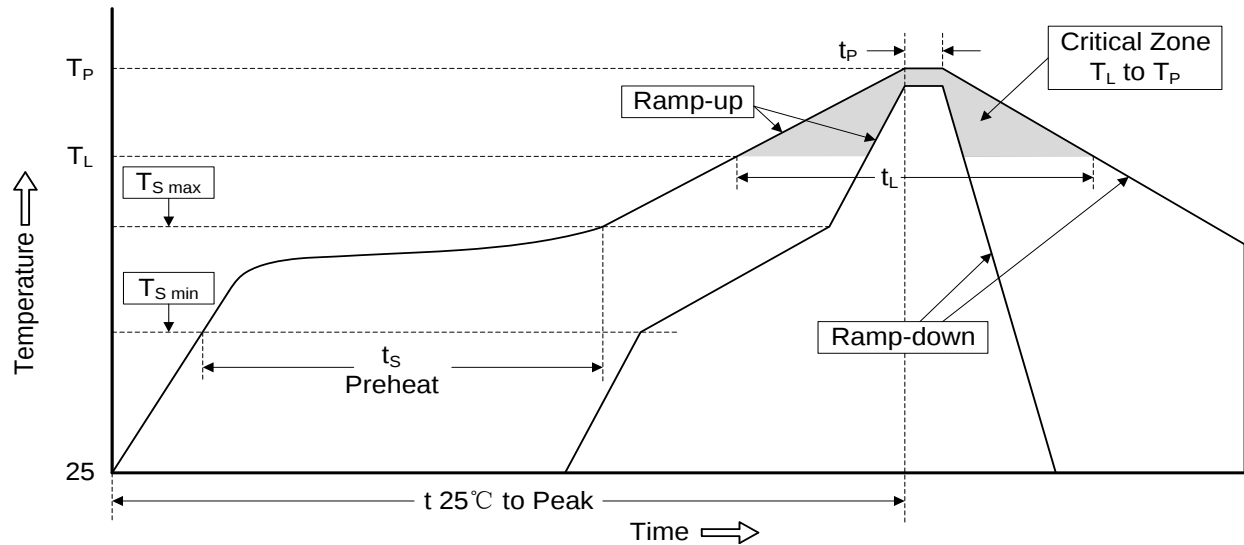


Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



Recommended Soldering Conditions

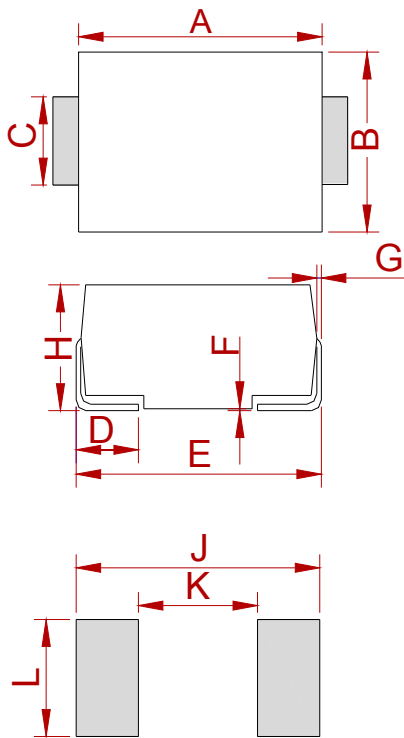
Reflow Soldering



Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T _L to T _P)	3°C/second max.
Preheat	
-Temperature Min (T _{S min})	150°C
-Temperature Max (T _{S max})	200°C
-Time (min to max) (t _S)	60-180 seconds
T _{S max} to T _L	
-Ramp-up Rate	3°C/second max.
Time maintained above:	
-Temperature (T _L)	217°C
-Time (t _L)	60-150 seconds
Peak Temperature (T _P)	260°C
Time within 5°C of actual Peak Temperature (t _P)	20-40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

PACKAGE MECHANICAL DATA



DO-214AA (SMB)

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.25	4.75	0.167	0.187
B	3.30	3.94	0.130	0.155
C	1.85	2.21	0.073	0.087
D	0.76	1.52	0.030	0.060
E	5.08	5.59	0.200	0.220
F	0.051	0.203	0.002	0.008
G	0.15	0.31	0.006	0.012
H	2.11	2.44	0.083	0.096
J	6.80		0.270	
K		2.60		0.100
L	2.40		0.090	

REEL SPECIFICATION

P/N	PKG	QTY
P6SMBXXXA(CA)(MS)	SMB	3000

Attention

■ Any and all MSKSEMI Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your MSKSEMI Semiconductor representative nearest you before using any MSKSEMI Semiconductor products described or contained herein in such applications.

■ MSKSEMI Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specification of any and all MSKSEMI Semiconductor products described or contained herein.

■ Specifications of any and all MSKSEMI Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

■ MSKSEMI Semiconductor strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

■ In the event that any or all MSKSEMI Semiconductor products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

■ No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of MSKSEMI Semiconductor.

■ Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. MSKSEMI Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringement of intellectual property rights or other rights of third parties.

■ Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the MSKSEMI Semiconductor product that you intend to use.