QS5U33

4V Drive Pch+SBD MOSFET

Datasheet

V_{DSS}	-30V
$R_{DS(on)}$(Max.)	225mΩ
I_D	±2.0A
P_D	1.25W

● **Outline**

TSMT5

● **Inner circuit**

(1) Gate
(2) Source
(3) Anode
(4) Cathode
(5) Drain

*1 ESD Protection Diode
*2 Body Diode

● **Features**
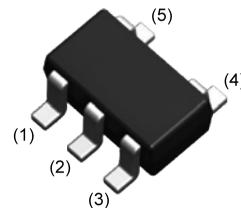
1) The QS5U33 combines Pch MOSFET with a Schottky barrier diode in a single TSMT5 package.
2) Low on-state resistance with fast swicthing
3) Low voltage drive (4V drive).
4) Built-in Low V_F schottky barrier diode.
5) Pb-free lead plating ; RoHS compliant.
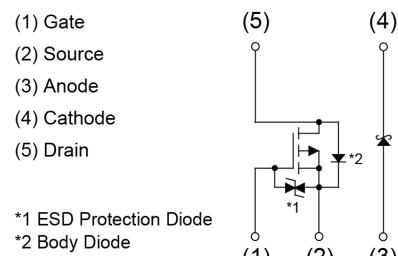
● **Packaging specifications**

Type	Packing	Embossed Tape
	Reel size (mm)	180
	Tape width (mm)	8
	Basic ordering unit (pcs)	3000
	Taping code	TR
	Marking	U33

● **Application**

Load switch, DC/ DC conversion

● **Absolute maximum ratings** (T_a = 25°C)

<MOSFET>

Parameter	Symbol	Value	Unit
Drain - Source voltage	V_{DSS}	-30	V
Gate - Source voltage	V_{GSS}	±20	V
Continuous drain current	I_D	±2.0	A
Pulsed drain current	$I_{D, pulse}$ [*1]	±8.0	A
Continuous source current (body diode)	I_S	-0.75	A
Pulsed source current (body diode)	$I_{S, pulse}$ [*1]	-8.0	A
Power dissipation	P_D [*3]	0.9	W/element
Junction temperature	T_j	150	°C

● **Absolute maximum ratings** (T_a = 25°C)

<SBD>

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	V_{RM}	25	V
Reverse voltage	V_R	20	V
Forward current	I_F	1.0	A
Forward current surge peak	I_{FSM}[*2]	3.0	A
Power dissipation	P_D[*3]	0.7	W/element
Junction temperature	T_j	150	℃

<MOSFET + SBD>

Parameter	Symbol	Value	Unit
Power dissipation	P_D[*3]	1.25	W/total
Range of storage temperature	T_{stg}	-55 to +150	℃

● **Electrical characteristics (T_a = 25°C)**

<MOSFET>

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Gate - Source leakage current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	-	-	±10	μA
Drain - Source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -1mA	-30	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} = -30V, V_{GS} = 0V	-	-	-1	μA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = -10V, I_D = -1mA	-1.0	-	-2.5	V
Static drain - source on - state resistance	$R_{DS(on)}$[*4]	V_{GS} = -10V, I_D = -2A	-	95	135	mΩ
		V_{GS} = -4.5V, I_D = -1A	-	145	205	
		V_{GS} = -4.0V, I_D = -1A	-	160	225	
Transconductance	g_{fs}[*4]	V_{DS} = -10V, I_D = -1A	1.4	-	-	S

2/10   **20130716 - Rev.001**

ROHM
SEMICONDUCTOR

● **Electrical characteristics** (T_a = 25°C)

\<MOSFET\>

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{iss}	V_{GS} = 0V	-	310	-	pF
Output capacitance	C_{oss}	V_{DS} = -10V	-	55	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	45	-	
Turn - on delay time	$t_{d(on)}$[*4]	$V_{DD} \simeq$ -15V, V_{GS} = -10V	-	7	-	ns
Rise time	t_r[*4]	I_D = -1A	-	6	-	
Turn - off delay time	$t_{d(off)}$[*4]	R_L = 15Ω	-	25	-	
Fall time	t_f[*4]	R_G = 10Ω	-	6	-	

● **Gate charge characteristics** (T_a = 25°C)

\<MOSFET\>

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Total gate charge	Q_g[*4]	$V_{DD} \simeq$ -15V, I_D = -2A V_{GS} = -5V	-	3.4	-	nC
Gate - Source charge	Q_{gs}[*4]		-	1.0	-	
Gate - Drain charge	Q_{gd}[*4]		-	1.3	-	

● **Body diode electirical characteristics** (Source-Drain) (T_a = 25°C)

\<MOSFET\>

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Forward voltage	V_{SD}[*4]	V_{GS} = 0V, I_S = -0.75A	-	-	-1.2	V

    3/10   **ROHM** SEMICONDUCTOR   **20130716 - Rev.001**

●**Electrical characteristics** (T_a = 25°C)

\<SBD\>

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Forward voltage	V_F	I_F = 1.0A	-	-	0.45	V
Reverse current	I_R	V_R = 20V	-	-	200	µA

*1 Pw ≤ 10µs, Duty cycle ≤ 1%

*2 60Hz・1 cycle

*3 Mounted on a ceramic board

*4 Pulsed

4/10   **20130716 - Rev.001**

ROHM
SEMICONDUCTOR

● **Electrical characteristic curves <MOSFET>**

Fig.1 Typical Capacitance vs. Drain -
Source Voltage
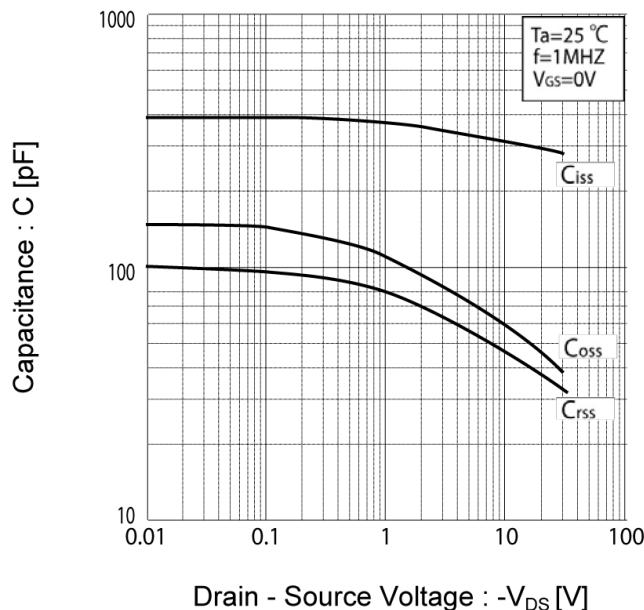
Fig.2 Switching Characteristics
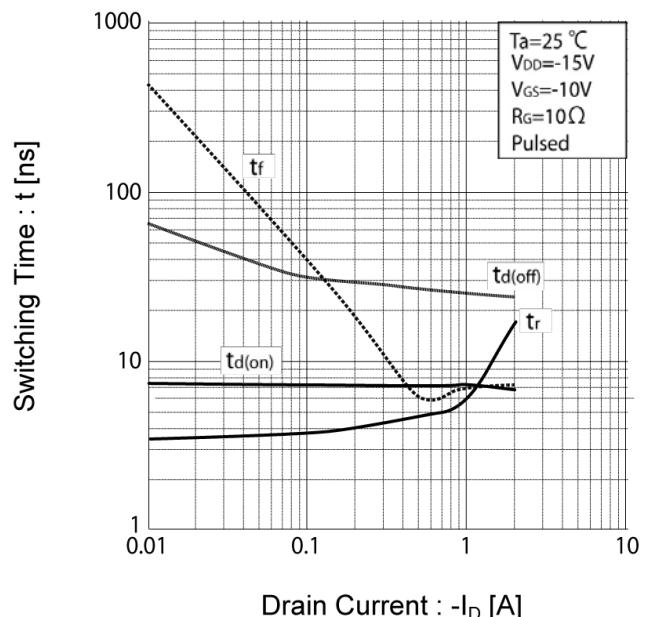
Fig.3 Dynamic input Characteristics
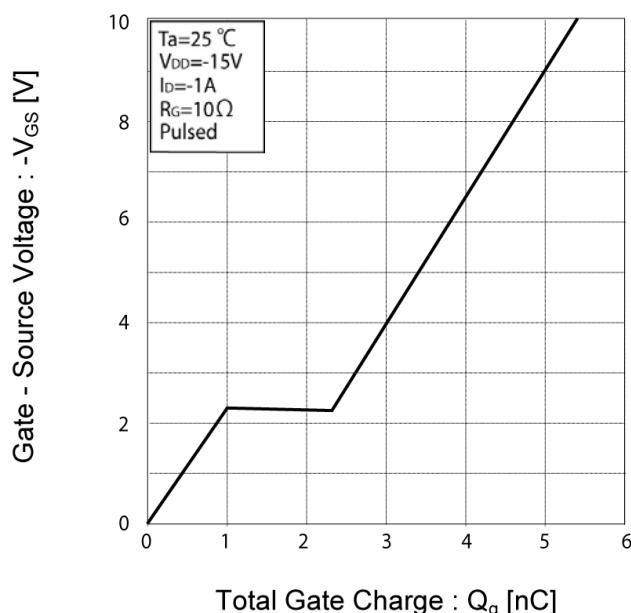
Fig.4 Typical Transfer Characteristics
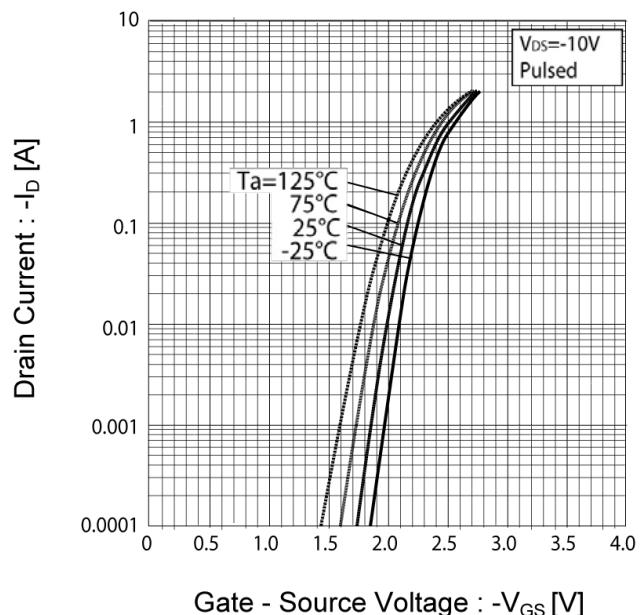
● **Electrical characteristic curves <MOSFET>**

Fig.5 Static Drain - Source On - State Resistance vs. Gate Source Voltage
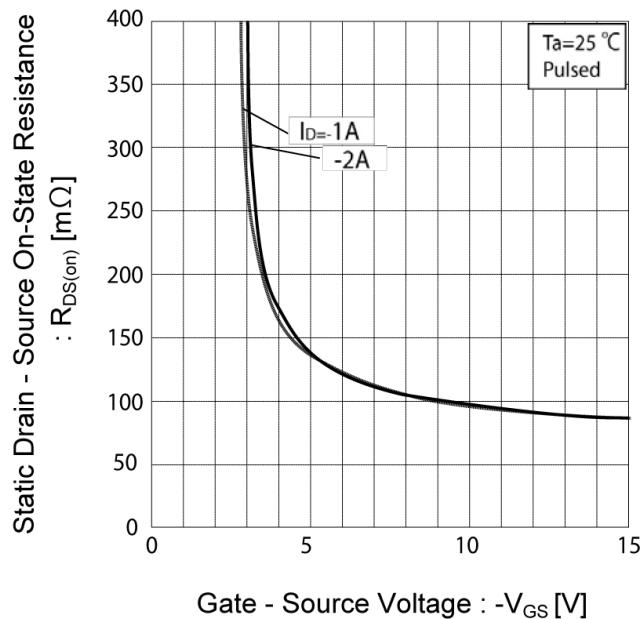

Fig.6 Source Current vs. Source Drain Voltage
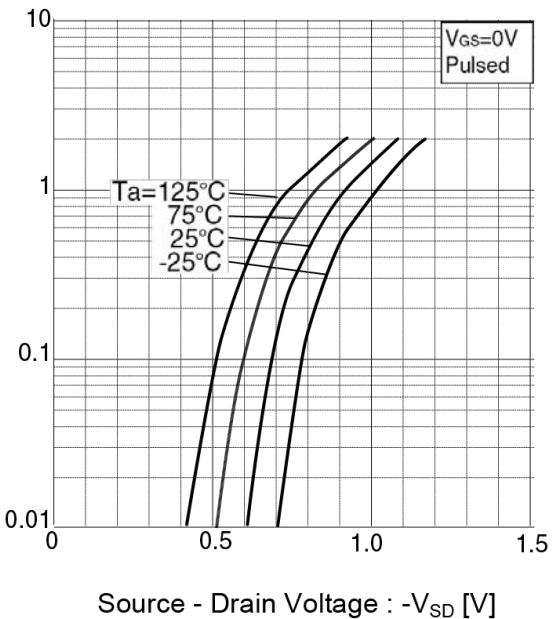
Fig.7 Static Drain - Source On - State Resistance vs. Drain Current (I)
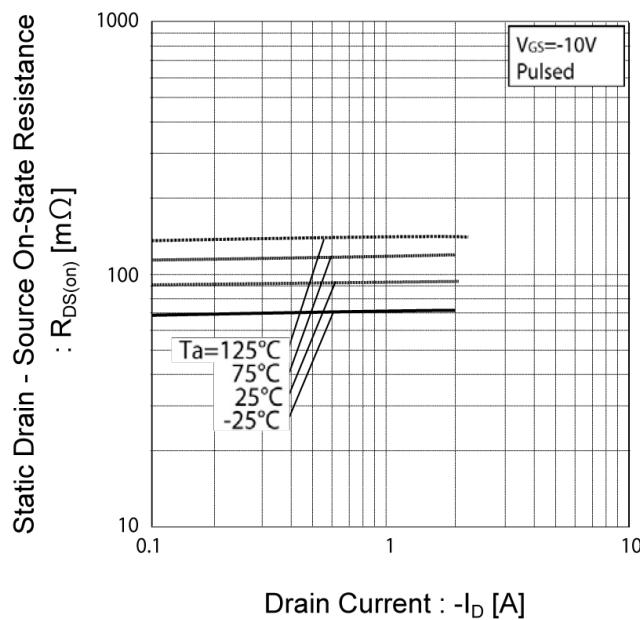
Fig.8 Static Drain - Source On - State Resistance vs. Drain Current (II)

6/10   **20130716 - Rev.001**
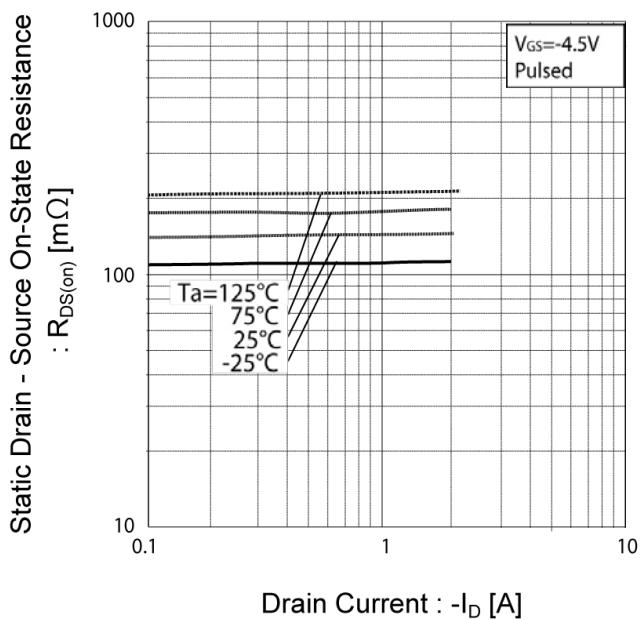
● **Electrical characteristic curves <MOSFET>**

Fig.9 Static Drain - Source On - State
Resistance vs. Drain Current (III)

Static Drain - Source On-State Resistance : $R_{DS(on)}$ [mΩ]

V_{GS}=-4.0V
Pulsed

Ta=125°C
75°C
25°C
-25°C

Drain Current : -I_D [A]
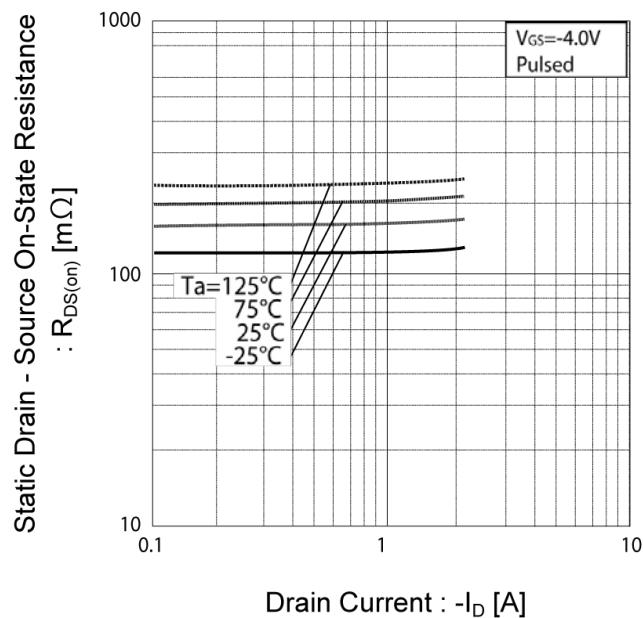
● **Electrical characteristic curves <SBD>**

Fig.11 Forward Current vs. Forward Voltage
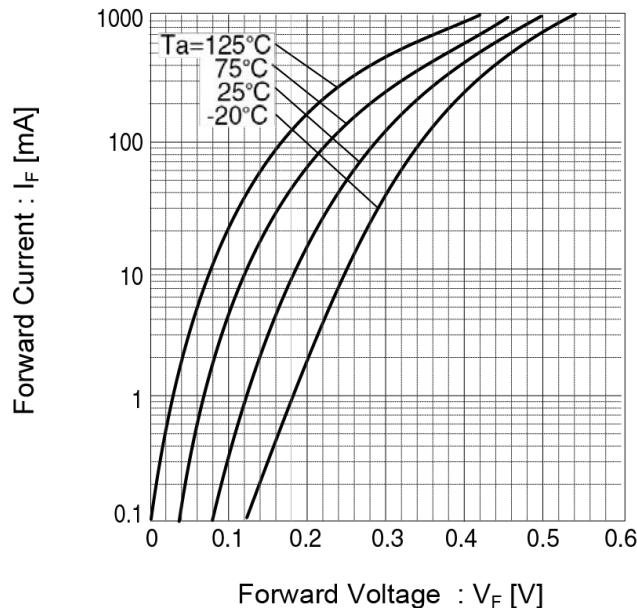
Fig.12 Reverse Current vs. Reverse Voltage
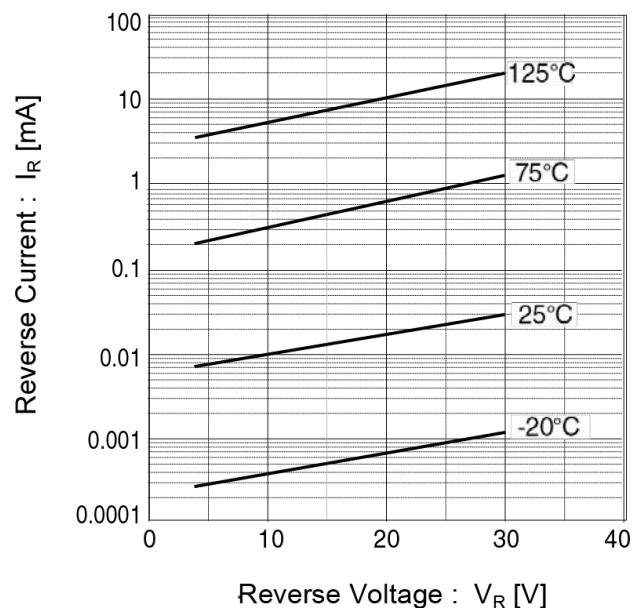
● **Notice**

1. SBD has a large reverse leak current compared to other type of diode. Therefore, it would raise a junction temperature, and increase a reverse power loss. Further rise of inside temperature would cause a thermal runaway. This built-in SBD has low V_F characteristics and therefore, higher leak current. Please consider enough the surrounding temperature, generating heat of MOSFET and the reverse current.

2. This product might cause chip aging and breakdown under the large electrified environment. Please consider to design ESD protection circuit.

                                           20130716 - Rev.001

● **Measurement circuits**

Fig.1-1 Switching Time Measurement Circuit
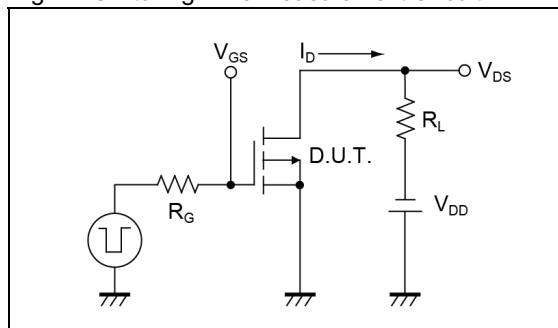
Fig.1-2 Switching Waveforms
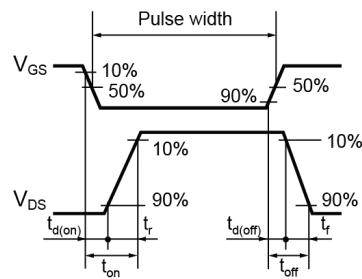
Fig.2-1 Gate Charge Measurement Circuit
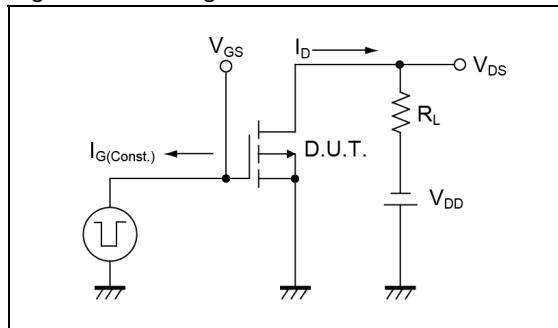
Fig.2-2 Gate Charge Waveform

9/10   **20130716 - Rev.001**

●Dimensions

TSMT5
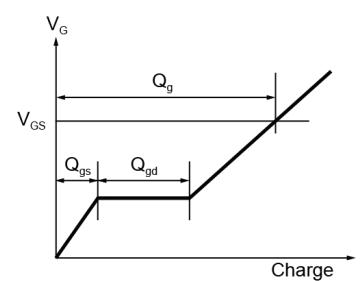
Pattern of terminal position areas
[Not a recommended pattern of soldering pads]
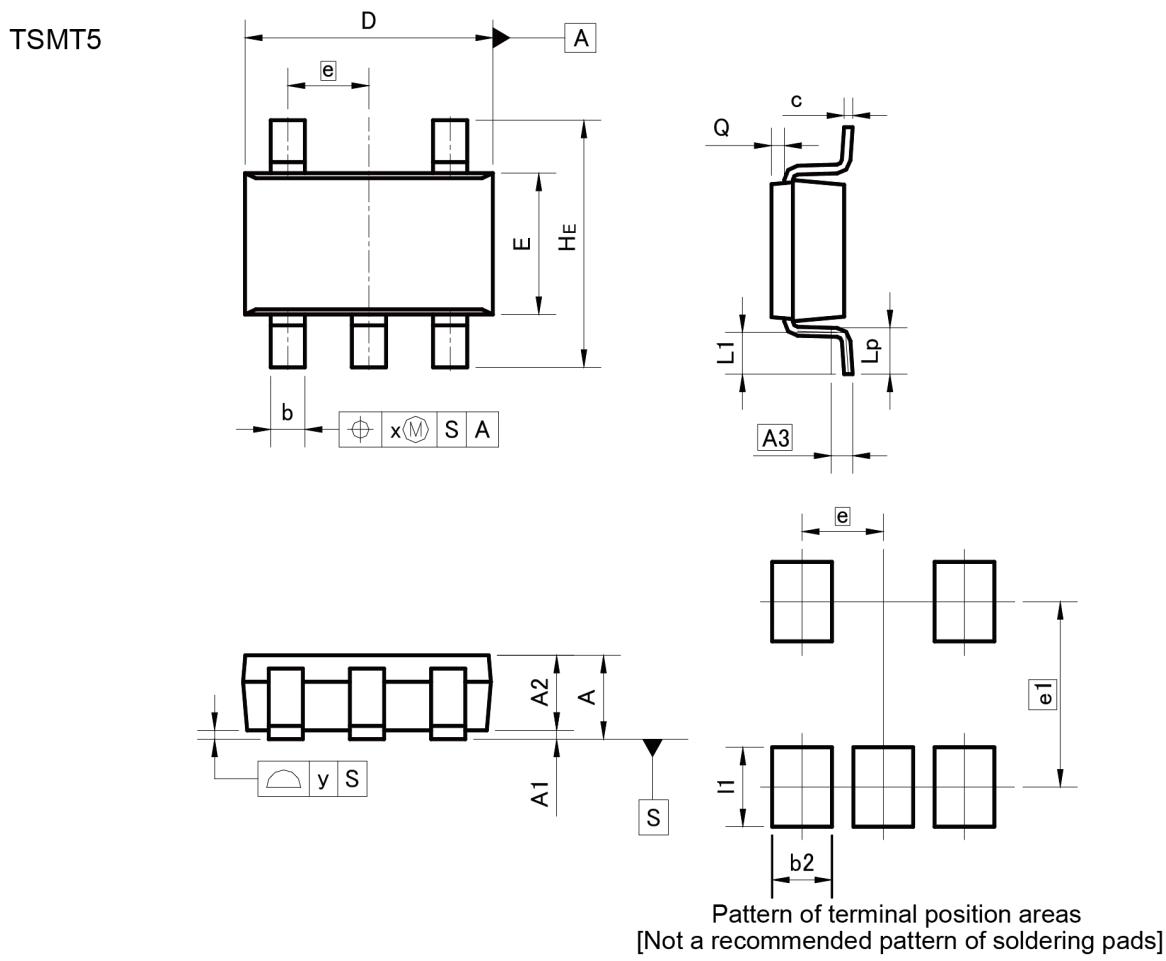
DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	–	1.00	–	0.039
A1	0.00	0.10	0.000	0.004
A2	0.75	0.95	0.030	0.037
A3	0.25		0.010	
b	0.35	0.50	0.014	0.020
c	0.10	0.26	0.004	0.010
D	2.80	3.00	0.110	0.118
E	1.50	1.80	0.059	0.071
e	0.95		0.037	
HE	2.60	3.00	0.102	0.118
L1	0.30	0.60	0.012	0.024
Lp	0.40	0.70	0.016	0.028
Q	0.05	0.25	0.002	0.010
x	–	0.20	–	0.008
y	–	0.10	–	0.004

DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b2		0.70	–	0.028
e1	2.10		0.083	
l1	–	0.90	–	0.035

Dimension in mm/inches

20130716 - Rev.001

ROHM
SEMICONDUCTOR

N o t e s

1) The information contained herein is subject to change without notice.

2) Before you use our Products, please contact our sales representative and verify the latest specifications :

3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. ROHM shall have no responsibility for any damages arising out of the use of our Poducts beyond the rating specified by ROHM.

4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.

6) The Products are intended for use in general electronic equipment (i.e. AV/OA devices, communication, consumer systems, gaming/entertainment sets) as well as the applications indicated in this document.

7) The Products specified in this document are not designed to be radiation tolerant.

8) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.

9) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.

10) ROHM shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions and specifications contained herein.

11) ROHM has used reasonable care to ensur the accuracy of the information contained in this document. However, ROHM does not warrants that such information is error-free, and ROHM shall have no responsibility for any damages arising from any inaccuracy or misprint of such information.

12) Please use the Products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. For more details, including RoHS compatibility, please contact a ROHM sales office. ROHM shall have no responsibility for any damages or losses resulting non-compliance with any applicable laws or regulations.

13) When providing our Products and technologies contained in this document to other countries, you must abide by the procedures and provisions stipulated in all applicable export laws and regulations, including without limitation the US Export Administration Regulations and the Foreign Exchange and Foreign Trade Act.

14) This document, in part or in whole, may not be reprinted or reproduced without prior consent of ROHM.

Thank you for your accessing to ROHM product informations.
More detail product informations and catalogs are available, please contact us.

ROHM Customer Support System

http://www.rohm.com/contact/

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for MOSFET *category:*

Click to view products by ROHM *manufacturer:*

Other Similar products are found below :

614233C 648584F IRFD120 JANTX2N5237 FCA20N60_F109 FDZ595PZ 2SK2545(Q,T) 405094E 423220D TPCC8103,L1Q(CM MIC4420CM-TR VN1206L SBVS138LT1G 614234A 715780A NTNS3166NZT5G SSM6J414TU,LF(T 751625C BUK954R8-60E DMN3404LQ-7 NTE6400 SQJ402EP-T1-GE3 2SK2614(TE16L1,Q) 2N7002KW-FAI DMN1017UCP3-7 EFC2J004NUZTDG ECH8691-TL-W FCAB21350L1 P85W28HP2F-7071 DMN1053UCP4-7 NTE221 NTE2384 NTE2903 NTE2941 NTE2945 NTE2946 NTE2960 NTE2967 NTE2969 NTE2976 NTE455 NTE6400A NTE2910 NTE2916 NTE2956 NTE2911 DMN2080UCB4-7 TK10A80W,S4X(S SSM6P69NU,LF DMP22D4UFO-7B