Product Standards

PGA26E19BA

Panasonic PGA26E19BA

Type	GaN-Tr		
Application	For power switching		
Structure	N-channel enhancement mode FET		
Equivalent Circuit	Figure 1		
Out Line	DFN 8X8	Marking	PGA26E19

A. ABSOLUTE MAXIMUM RATINGS (Tj = 25 °C , unless otherwise specified)

No.	Item	Symbol	Values			Unit	Note
			Min.	Typ.	Max.		
1	Drain-source voltage (DC) *1	VDSS	-	-	600	V	
2	Drain-source voltage (pulse) *2	VDSP	-	-	750	V	
3	Gate-source voltage (DC) *1	VGSS	-10	-	-	V	*VGSS+ is given by IG ratings *See application note
4	Gate current (DC) *1	IG	-	-	19	mA	*See application note
5	Gate current (pulse) *3,4	IGP	-	-	0.6	A	*See application note
6	Electric gate charge (pulse)	QGP	-	-	12	nC	*f=200kHz *See application note
7	Drain current (DC) (Tc = 25°C) *1	ID	-	-	13	A	Figure 4
8	Drain reverse current (DC) (Tc = 25°C) *1	IDR	-	-	13	A	
9	Drain current (pulse)*5 (Tc = 25°C)*1	ID pulse	-	-	23	A	Figure 4
10	Drain reverse current (pulse)*5 (Tc = 25°C)*1	IDR pulse	-	-	23	A	
11	Power dissipation (Tc = 25°C)	PD	-	-	66	W	Figure 2
12	Junction temperature	Tj	-	-	150	°C	
13	Storage temperature	Tstg	-55	-	150	°C	
14	Drain-source voltage slope	dv/dt	-	-	200	V/ns	

[Special instructions]
*1 : Please use this product to meet a condition of Tj within 150 °C.
*2 : Spike duty cycle D < 0.1, spike duration < 1us, total spike time < 1hour.
*3 : IGP is defined as (Vcc - Vplateau) / Rgon, as shown in Figure A.
Vplateau is the voltage between Gate and Source1.
*4 : Please use this product to meet both a maximum gate current and a maximum gate pulse charge of IGP(0.6A) and Q(12nC) respectively, as shown in Figure H.
*5 : Pulse width limited by Tjmax.

B. ELECTRICAL CHARACTERISTICS (Tj = 25 °C , unless otherwise specified)

No.	Item	Symbol	Measurement Condition	Min.	Typ.	Max.	Unit
1	Drain cut-off current	IDSS	VDS=600 V, VGS=0 V, Tj=25 °C	-	-	39	μA
			VDS=600 V, VGS=0 V, Tj=150 °C	-	39	-	μA
2	Gate-source leakage current	IGSS	VGS=-3 V VDS=0 V	-1	-	-	μA
3	Gate forward voltage	VGSF	IGS=10 mA open drain	2.8	3.5	4.2	V
4	Gate threshold voltage	VTH	VDS=10 V IDS=1 mA	0.9	1.2	1.6	V
5	Drain-source on-state resistance	RDS(on)	IGS=10 mA, IDS=5 A, Tj=25 °C	-	140	190	mΩ
			IGS=10 mA, IDS=5 A, Tj=150 °C	-	290	-	mΩ
6	Gate resistance	RG	f=100MHz open drain	-	0.8	-	Ω
7	Transfer conductance	gfs	VDS=8 V IDS=5 A	-	15	-	S
8	Input capacitance	Ciss	VDS=400 V VGS=0 V f=1 MHz	-	160	-	pF
9	Output capacitance	Coss		-	28	-	pF
10	Reverse transfer capacitance	Crss		-	0.2	-	pF
11	Turn-on delay time	td(on)	VDD=400 V IDS=5 A (Figure A, Figure B) Vcc=12 V Rgon=15 Ω, Rgoff=4.7 Ω, Rig=1500 Ω, Cs=680 pF	-	3.4	-	ns
12	Rise time	tr		-	5.2	-	ns
13	Turn-off delay time	td(off)		-	3.4	-	ns
14	Fall time	tf		-	2.4	-	ns
15	Effective output capacitance (energy related)	Co(er)	VDS=0-480 V	-	33	-	pF
16	Effective output capacitance (time related)	Co(tr)		-	37	-	pF

C. GATE CHARGE CHARACTERISTICS (Tj = 25 °C, unless otherwise specified)

No.	Item	Symbol	Measurement Condition	Min.	Typ.	Max.	Unit
1	Gate charge	Qg	VDD=400 V IDS=5 A (Figure C, Figure D)	-	2.0	-	nC
2	Gate-source charge	Qgs		-	0.3	-	nC
3	Gate-drain charge	Qgd		-	1.0	-	nC
4	Gate plateau voltage	V plateau	VDD=400 V IDS=5 A	-	1.8	-	V

D. REVERSE CONDUCTING CHARACTERISTICS (Tj = 25 °C, unless otherwise specified)

No.	Item	Symbol	Measurement Condition	Min.	Typ.	Max.	Unit
1	Source-drain forward voltage	VSD	VGS=0 V ISD=5 A	-	2.6	-	V
2	Reverse recovery charge	Qrr	VDS=400 V ISD=5 A	-	0	-	nC
3	Reverse recovery time	trr		-	0	-	ns
4	Peak reverse recovery current	Irrm		-	0	-	A
5	Output charge	Qoss		-	17	-	nC

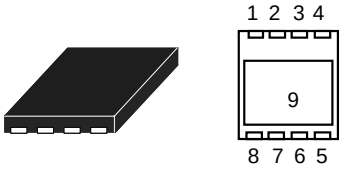
E. THERMAL RESISTANCE CHARACTERISTICS

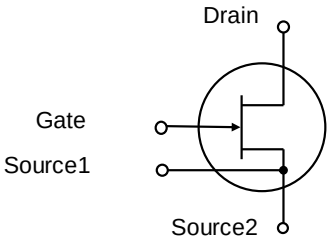
No.	Item	Symbol	Measurement Condition	Min.	Typ.	Max.	Unit
1	Thermal resistance (junction to case)	Rth(j-c)		-	-	1.9	°C/W
2	Thermal resistance (junction to ambient) *1	Rth(j-a)		-	-	46	°C/W
3	Reflow soldering temperature	Tsold	reflow MSL3	-	-	260	°C

[Notes]

*1 : Device mounted on four layers epoxy PCB (6.45 cm^2 copper area and 70 μm thickness).

■Equivalent circuit / Electrical characteristics

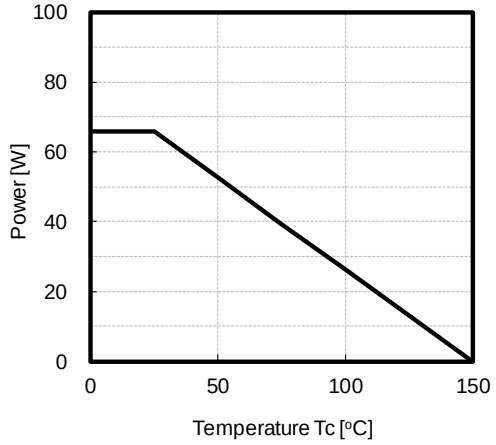




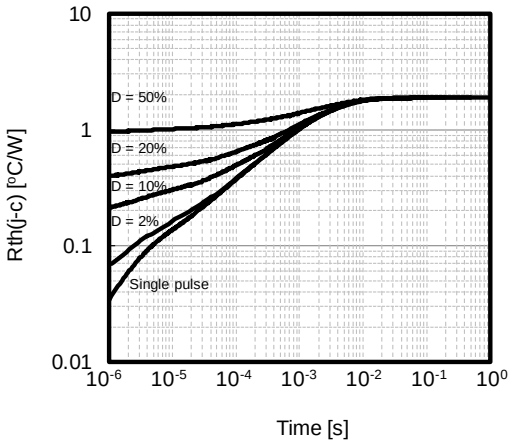
1,2.3,4	: Drain
5,6,9	: Source2
7	: Source1
8	: Gate

Notice:
Please connect Source1 pin to gate driver.

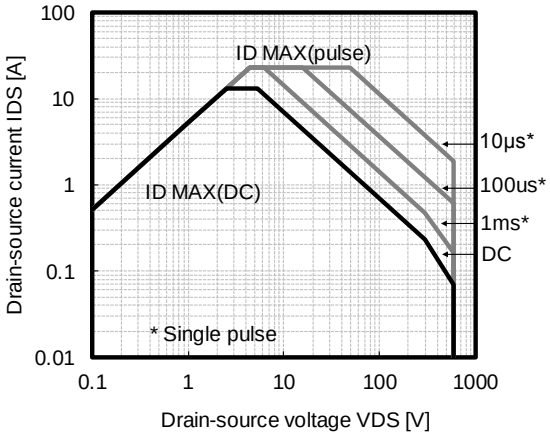
【Figure 1: Pin layout / Equivalent circuit】



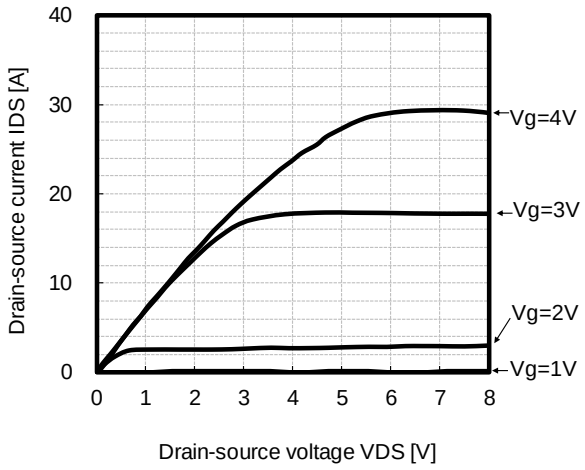
【Figure 2: Max. power dissipation】



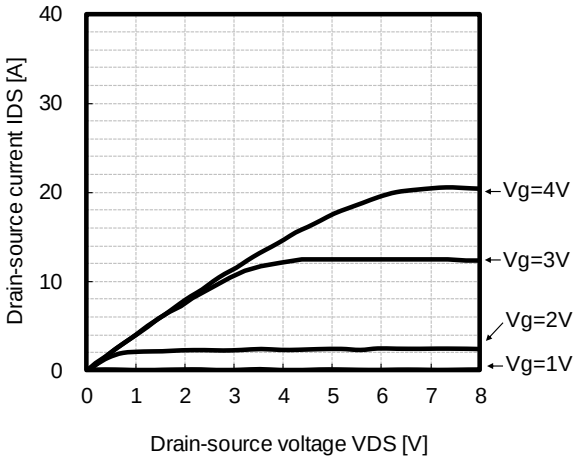
【Figure 3 : Transient thermal impedance】



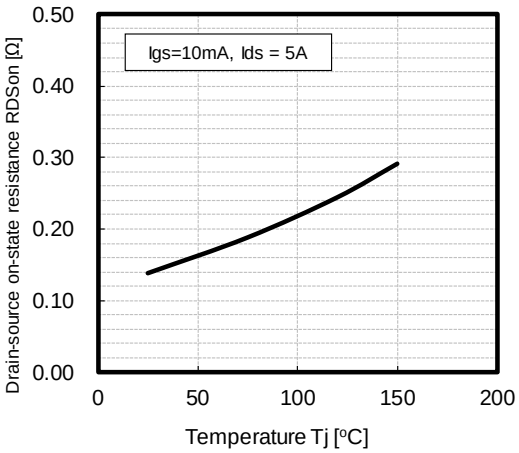
【Figure 4: Safe operating area Tc = 25 °C】



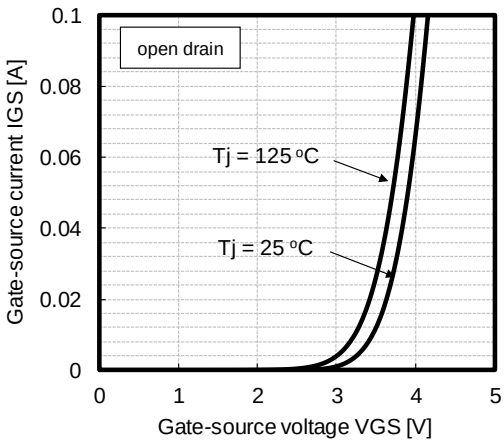
【Figure.5:Output characteristics Tc=25°C】



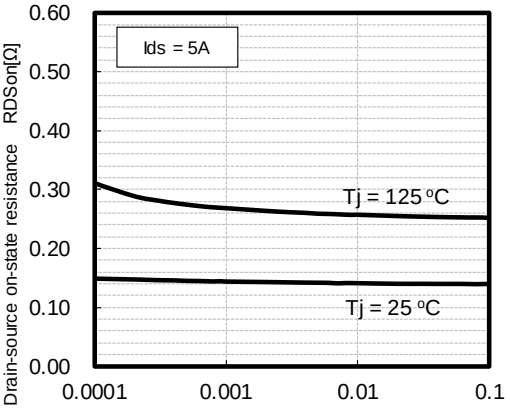
【Figure.6:Output characteristics Tc=125°C】



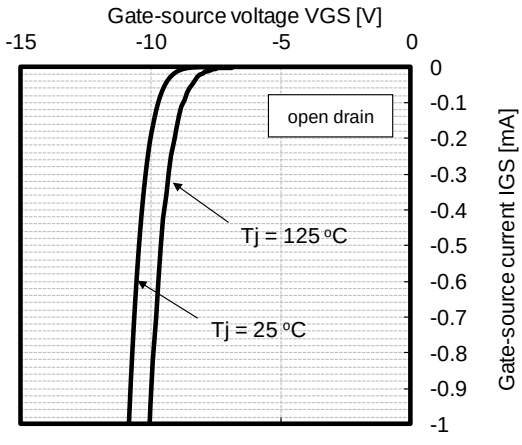
【Figure 7:Drain-source on-state resistance(RDS(on)-Tj)】



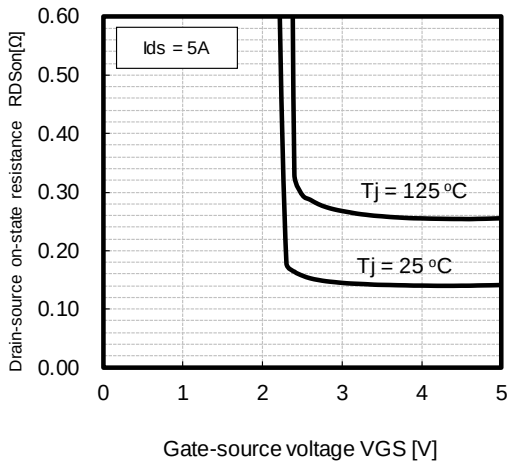
【Figure 8:Gate characteristics】



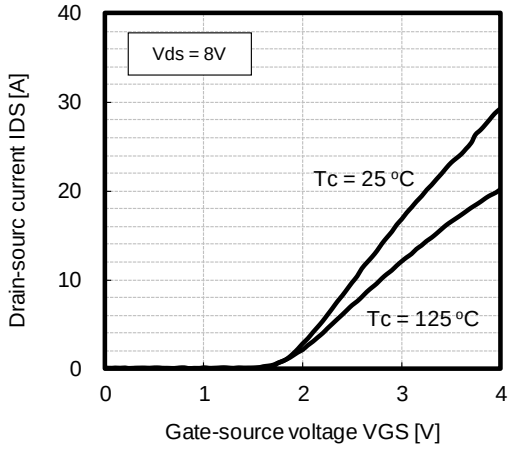
【Figure 9:Drain-source on-state resistance(RDS(on)-IGS)】



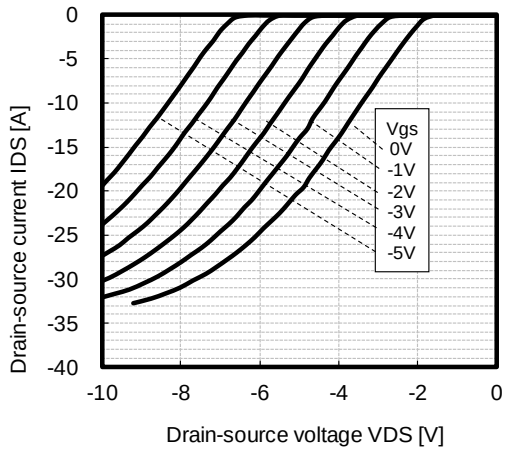
【Figure.10:Gate characteristics】



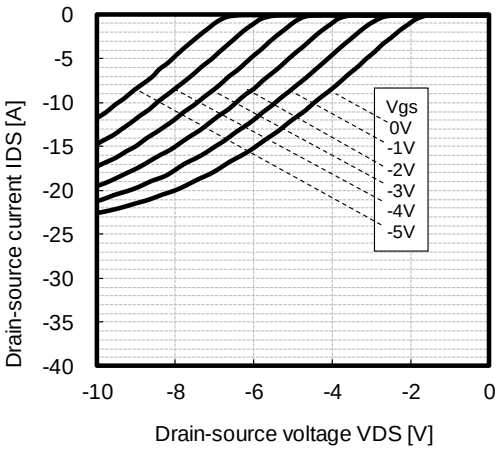
【Figure.11:Drain-source on-state resistance(RDS(on)-VGS)】



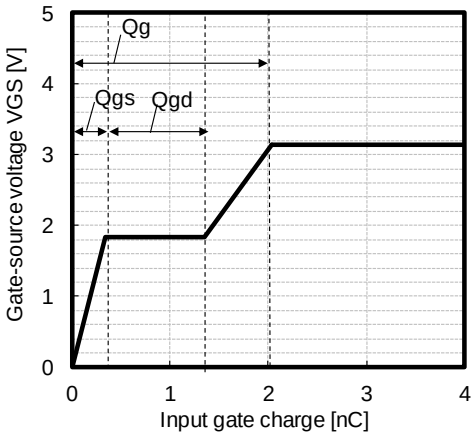
【Figure 12:Transfer characteristics】



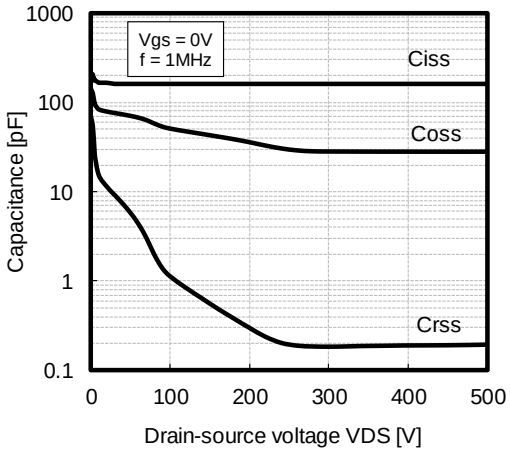
【Figure.13:Reverse channel characteristics (Tc=25℃)】



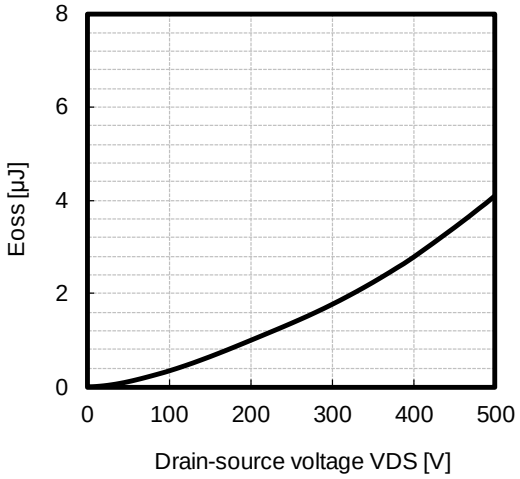
【Figure.14:Reverse channel characteristics (Tc=125℃)】



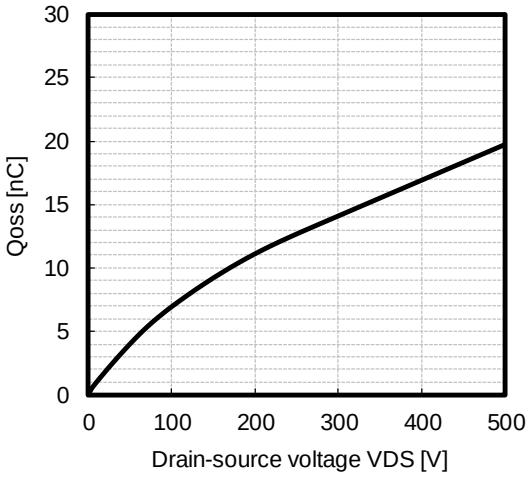
【Figure 15:Gate charge characteristics】



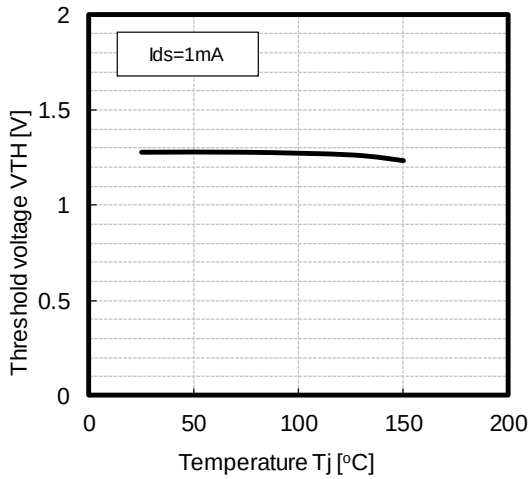
【Figure 16:Capacitance characteristics】



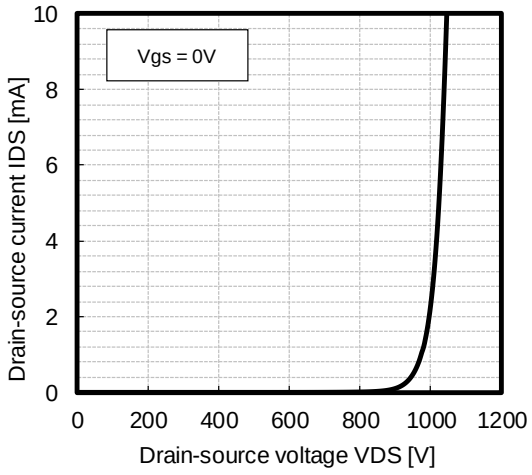
【Figure 17:Output capacitance stored energy】



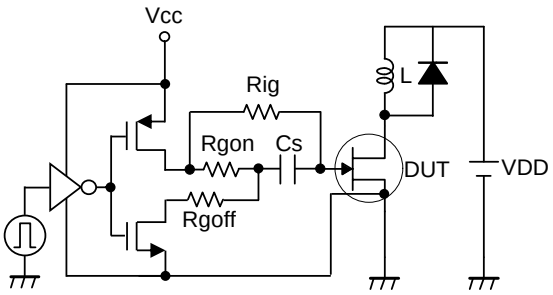
【Figure 18:Output charge】



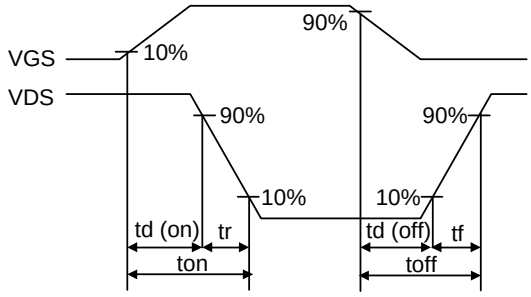
【Figure.19:Threshold voltage (VTH-Tj)】



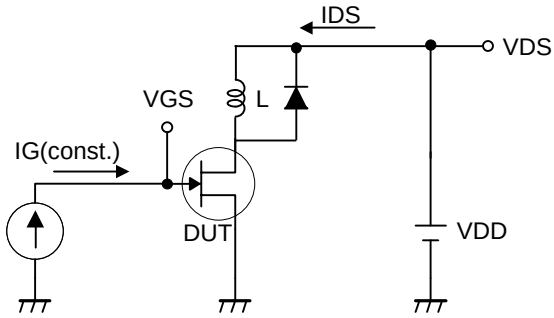
【Figure.20:Drain-Source leakage current (Tc=25℃)】



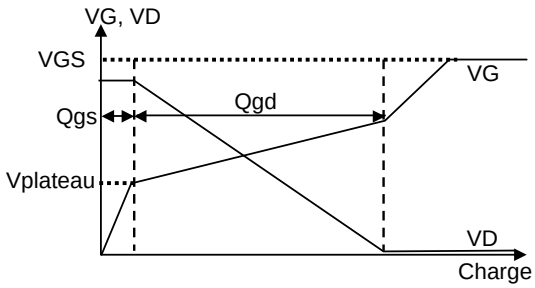
【Figure A : Switching time measurement】



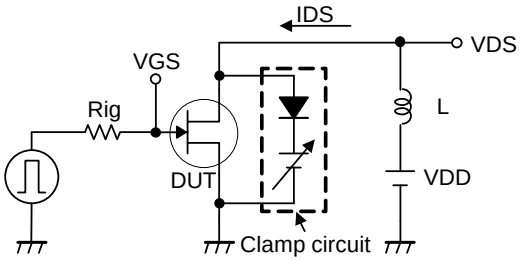
【Figure B : Switching wave form】



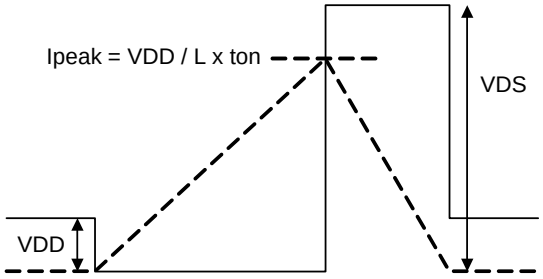
【Figure C : Gate charge measurement】



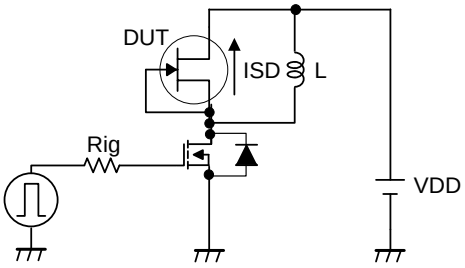
【Figure D : Gate charge wave form】



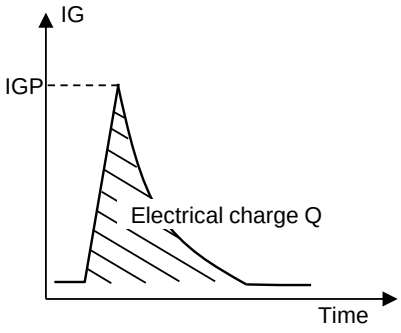
【Figure E : Reverse bias safe operating area
dv/dt measurement circuit】



【Figure F : Reverse bias safe operating area
dv/dt wave form】



【Figure G : di/dt measurement circuit】



【Figure H : IGP wave form】

[Precautions for Use]

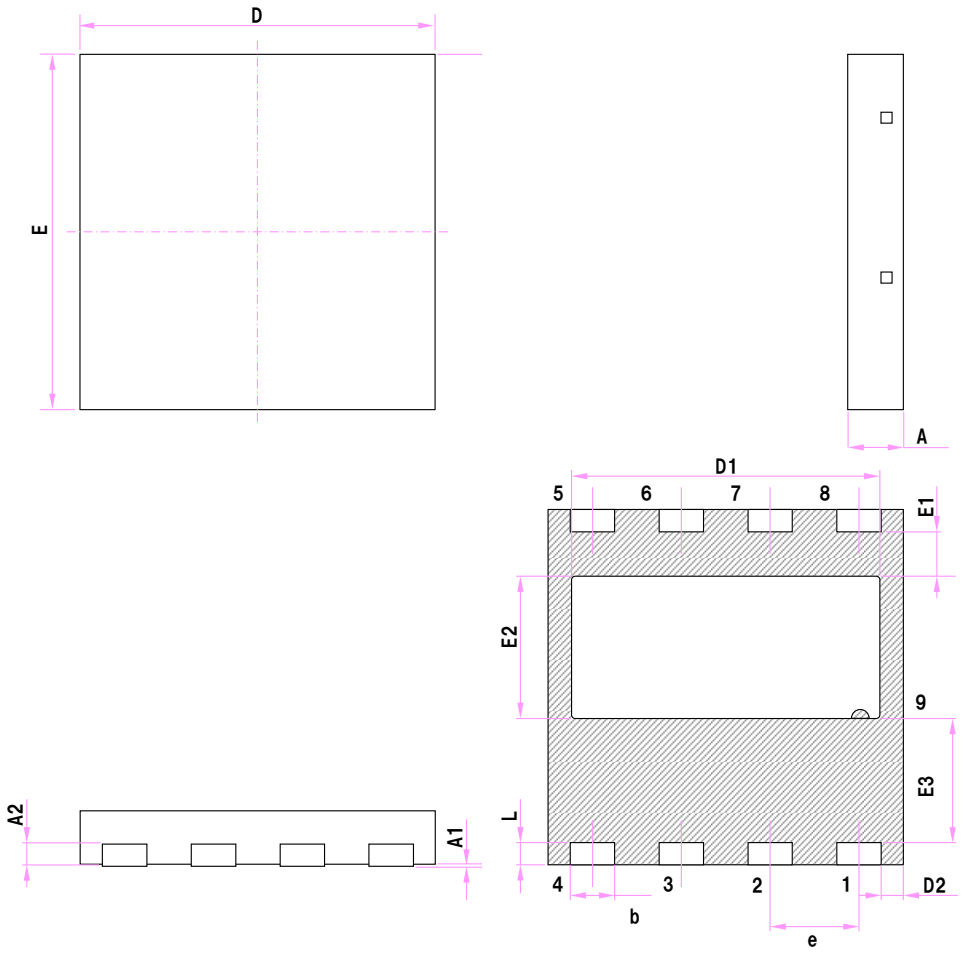
1) The product has risks for break-down or burst or giving off smoke in following conditions. Avoid the following use. Fuse should be added at the input side or connect zener diode between Gate pin and GND, etc as a countermeasure to pass regulatory Safety Standard. Concrete countermeasure could be provided individually. However, customer should make the final judgment.

   （1）Reverse the Drain pin and gate pin connection to the power supply board.
   （2）Drain pin short to Source1 pin and Source2 pin.
   （3）Drain pin short to Gate pin.
   （4）Gate pin open.

2) This product is under development and is subject to change without notice standards.

■ Outline

Unit: mm



SYMBOL	DIMENSION		
	MIN	NOM	MAX
A	1.15	1.25	1.35
A1	0.00	0.02	0.05
A2	0.40	0.50	0.60
b	0.90	1.00	1.10
D	7.90	8.00	8.10
D1	6.84	6.94	7.04
D2	0.40	0.50	0.60
E	7.90	8.00	8.10
E1	0.90	1.00	1.10
E2	3.10	3.20	3.30
E3	2.70	2.80	2.90
e	2.00 B.S.C.		
L	0.40	0.50	0.60

*Please note that technical specifications are subject to change without notice.

Request for your special attention and precautions in using the technical information and semiconductors described in this book

(1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.

(2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products. No license is granted in and to any intellectual property right or other right owned by Panasonic Corporation or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information de-scribed in this book.

(3) The products described in this book are intended to be used for general applications (such as office equipment, communications equipment, measuring instruments and household appliances), or for specific applications as expressly stated in this book.
Please consult with our sales staff in advance for information on the following applications, moreover please exchange documents separately on terms of use etc.: Special applications (such as for in-vehicle equipment, airplanes, aerospace, automotive equipment, traffic signaling equipment, combustion equipment, medical equipment and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
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(5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Other-wise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. We do not guarantee quality for disassembled products or the product re-mounted after removing from the mounting board.
When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.

(7) When reselling products described in this book to other companies without our permission and receiving any claim of request from the resale destination, please understand that customers will bear the burden.

No.010618