To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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HAT2215R, HAT2215RJ

Silicon N Channel Power MOS FET
High Speed Power Switching

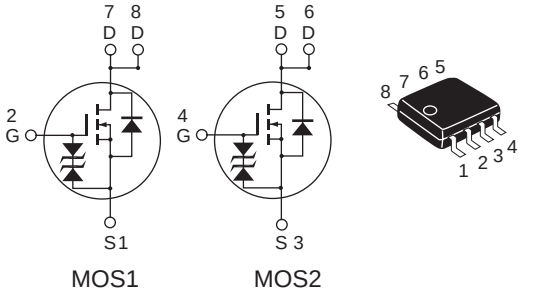
REJ03G0486-0300
Rev.3.00
Dec.22.2004

Features

- Low on-resistance
- Capable of 4.5 V gate drive
- High density mounting

Outline

SOP-8



1, 3 Source
2, 4 Gate
5, 6, 7, 8 Drain

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings		Unit
		HAT2215R	HAT2215RJ	
Drain to source voltage	V_{DSS}	80	80	V
Gate to source voltage	V_{GSS}	±20	±20	V
Drain current	I_D	3.4	3.4	A
Drain peak current	$I_{D(pulse)}$ Note1	20.4	20.4	A
Reverse drain current	I_{DR}	3.4	3.4	A
Avalanche current	I_{AP} Note 2	—	3.4	A
Avalanche energy	E_{AR} Note 2	—	1.54	mJ
Channel dissipation	Pch Note3	1.5	1.5	W
Channel dissipation	Pch Note4	2.2	2.2	W
Channel temperature	Tch	150	150	°C
Storage temperature	Tstg	–55 to +150	–55 to +150	°C

Notes: 1. PW ≤ 10 µs, duty cycle ≤ 1 %
2. Value at Tch = 25°C, Rg ≥ 50 Ω
3. 1 Drive operation; When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW ≤ 10 s
4. 2 Drive operation; When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW ≤ 10 s

Electrical Characteristics

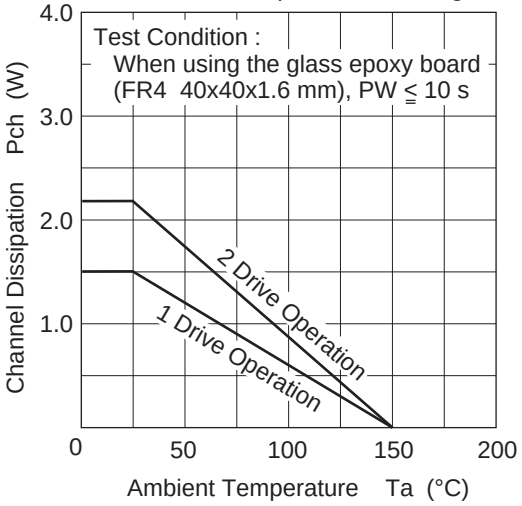
(Ta = 25°C)

Item		Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage		$V_{(BR)DSS}$	80	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage		$V_{(BR)GSS}$	±20	—	—	V	I_G = ±100 µA, V_{GS} = 0
Gate to source leak current		I_{GSS}	—	—	±10	µA	V_{GS} = ±16 V, V_{DS} = 0
Zero gate voltage drain current		I_{DSS}	—	—	1	µA	V_{DS} = 80 V, V_{GS} = 0
Zero gate voltage drain current	HAT2215R	I_{DSS}	—	—	—	µA	V_{DS} = 64 V, V_{GS} = 0 Ta = 125°C
	HAT2215RJ	I_{DSS}	—	—	10	µA	
Gate to source cutoff voltage		$V_{GS(off)}$	1.0	—	2.5	V	V_{DS} = 10 V, I_D = 1 mA
Static drain to source on state resistance		$R_{DS(on)}$	—	88	115	mΩ	I_D = 1.7 A, V_{GS} = 10 V [Note5]
		$R_{DS(on)}$	—	100	145	mΩ	I_D = 1.7 A, V_{GS} = 4.5 V [Note5]
Forward transfer admittance		$\|y_{fs}\|$	4.2	7.0	—	S	I_D = 1.7 A, V_{DS} = 10 V [Note5]
Input capacitance		Ciss	—	400	—	pF	V_{DS} = 10 V V_{GS} = 0 f = 1MHz
Output capacitance		Coss	—	57	—	pF	
Reverse transfer capacitance		Crss	—	24	—	pF	
Total gate charge		Qg	—	7.3	—	nC	V_{DD} = 25 V V_{GS} = 10 V I_D = 3.4 A
Gate to source charge		Qgs	—	1.1	—	nC	
Gate to drain charge		Qgd	—	1.3	—	nC	
Turn-on delay time		$t_{d(on)}$	—	6.0	—	ns	V_{GS} =10 V, I_D = 1.7 A V_{DD} ≈ 30 V R_L = 17.6 Ω R_g = 4.7 Ω
Rise time		t_r	—	4.0	—	ns	
Turn-off delay time		$t_{d(off)}$	—	39	—	ns	
Fall time		t_f	—	3.5	—	ns	
Body–drain diode forward voltage		V_{DF}	—	0.83	1.08	V	IF = 3.4 A, V_{GS} = 0 [Note5]
Body–drain diode reverse recovery time		t_{rr}	—	30	—	ns	IF =3.4 A, V_{GS} = 0 diF/ dt = 100 A/µs

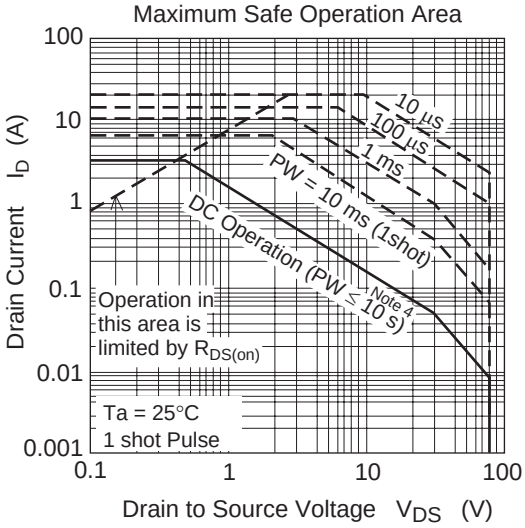
Notes: 5. Pulse test

Main Characteristics

Power vs. Temperature Derating

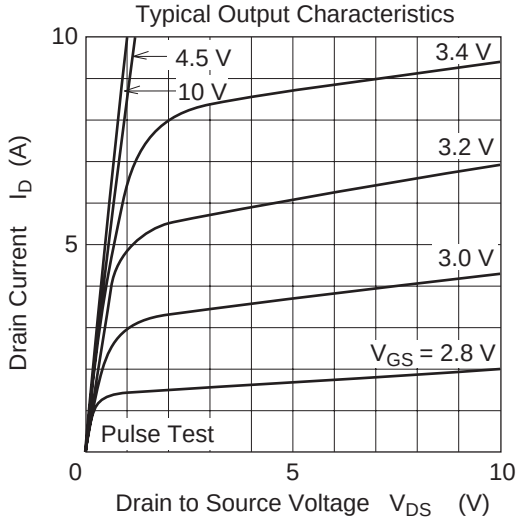


Maximum Safe Operation Area

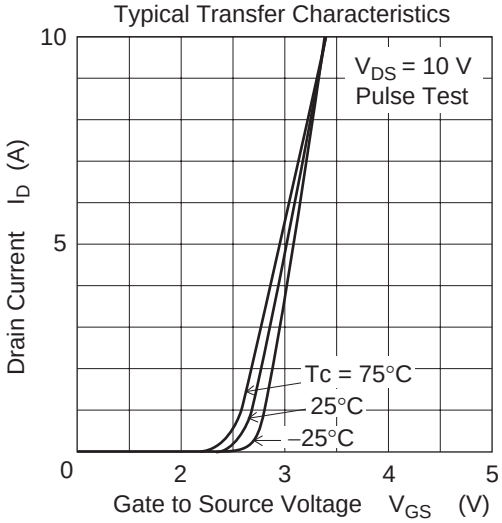


Note 4 :
When using the glass epoxy board
(FR4 40x40x1.6 mm)

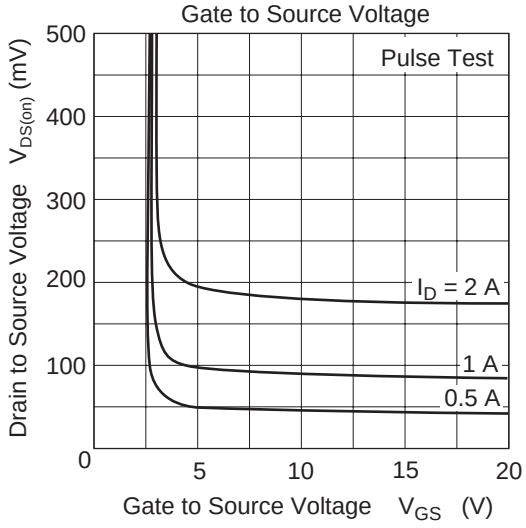
Typical Output Characteristics



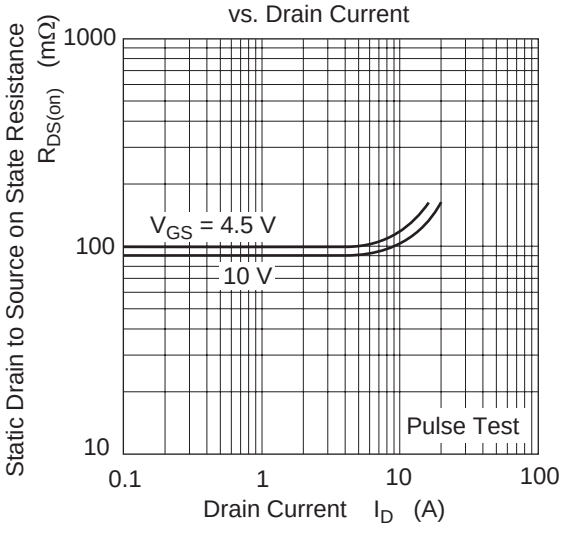
Typical Transfer Characteristics



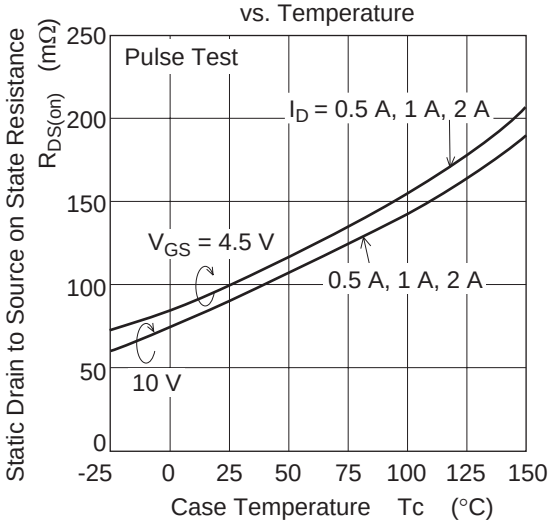
Drain to Source Saturation Voltage vs
Gate to Source Voltage



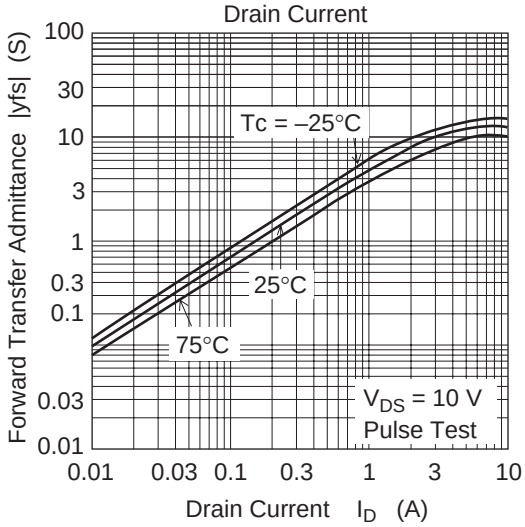
Static Drain to Source on State Resistance
vs. Drain Current



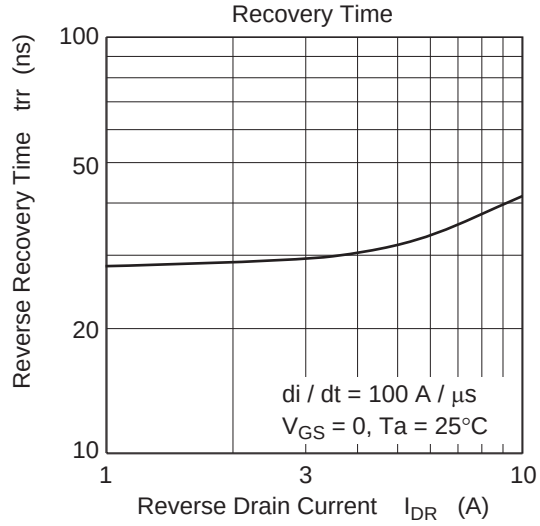
Static Drain to Source on State Resistance vs. Temperature



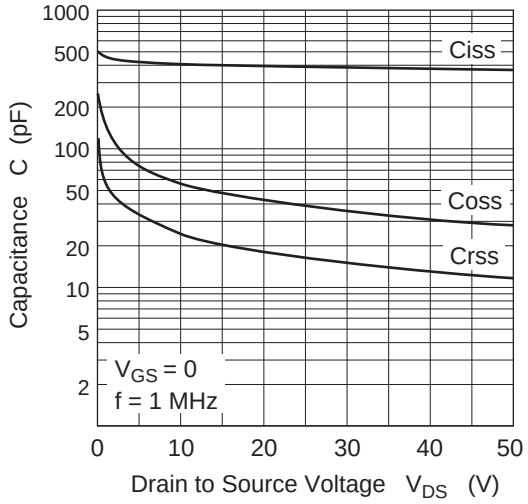
Forward Transfer Admittance vs. Drain Current



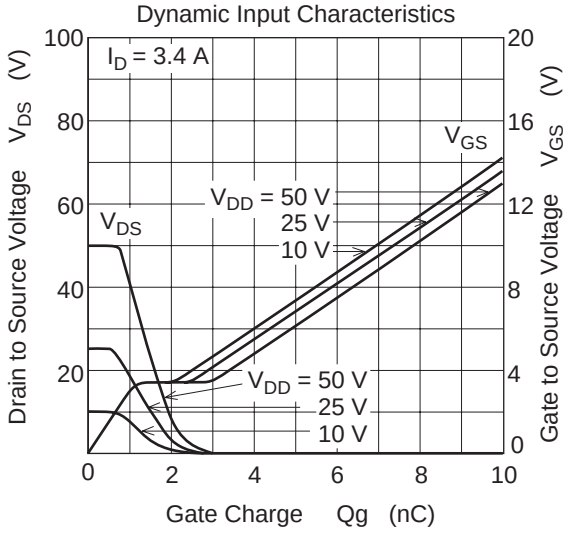
Body-Drain Diode Reverse Recovery Time



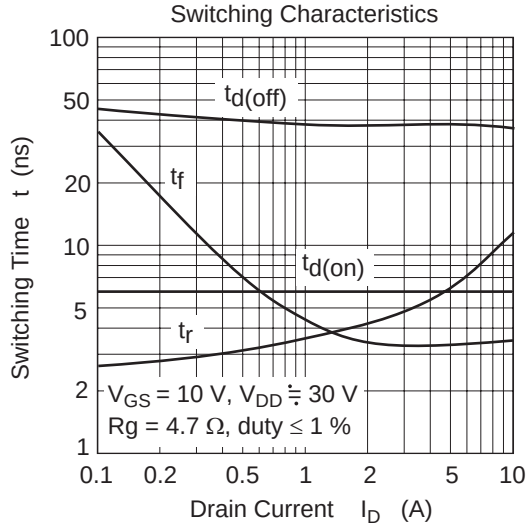
Typical Capacitance vs. Drain to Source Voltage



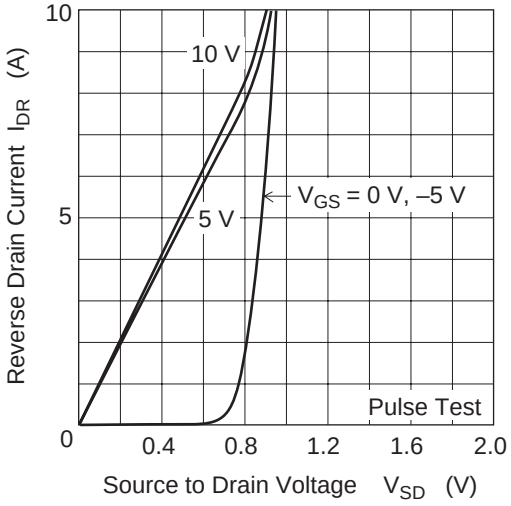
Dynamic Input Characteristics



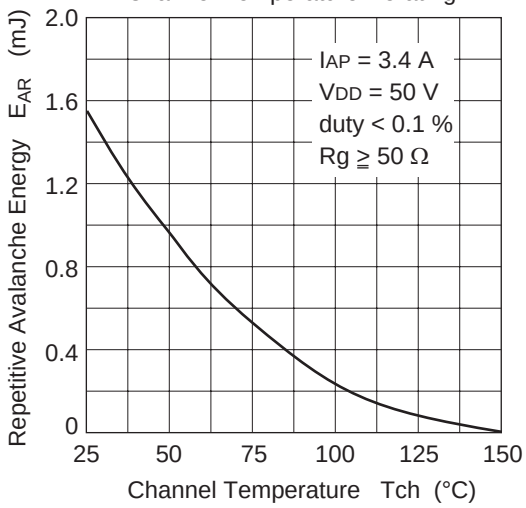
Switching Characteristics



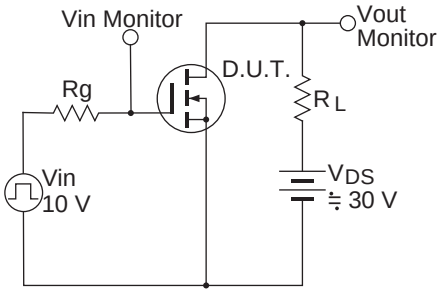
Reverse Drain Current vs. Source to Drain Voltage



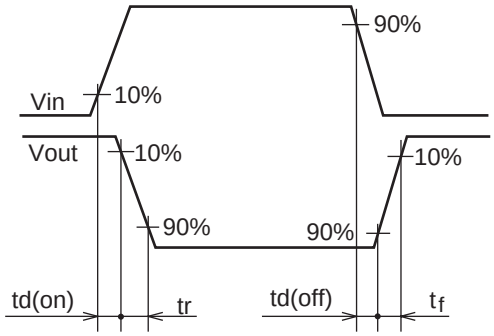
Maximum Avalanche Energy vs. Channel Temperature Derating



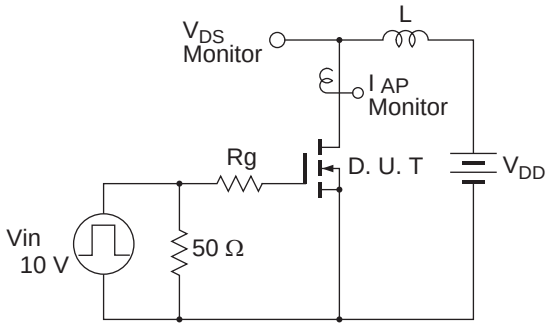
Switching Time Test Circuit



Switching Time Waveform

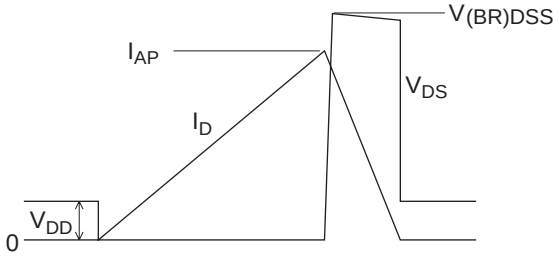


Avalanche Test Circuit

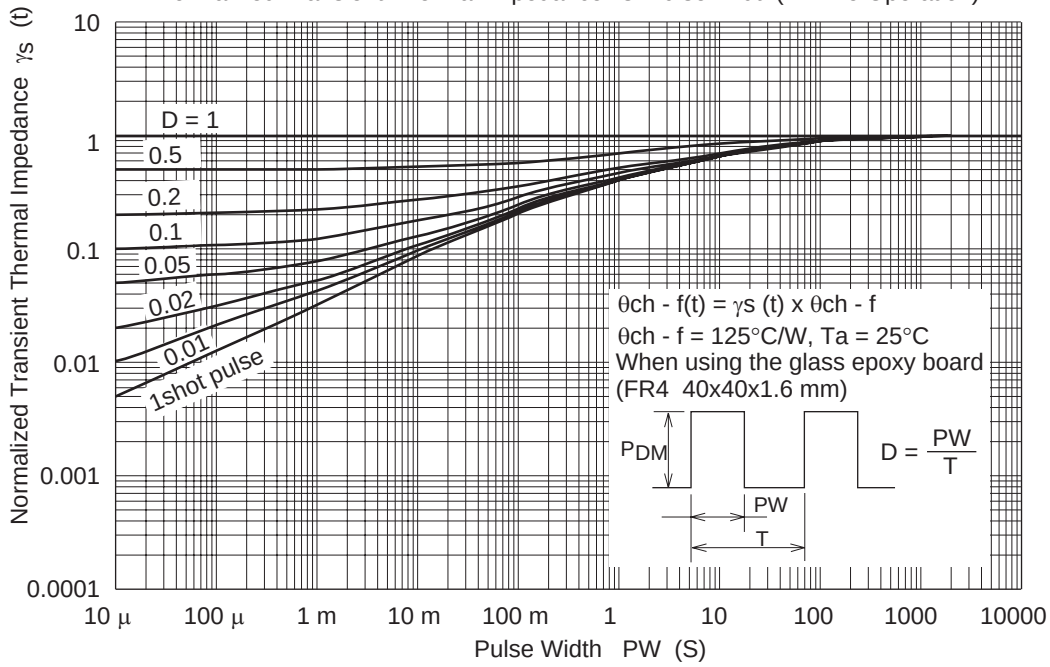


Avalanche Waveform

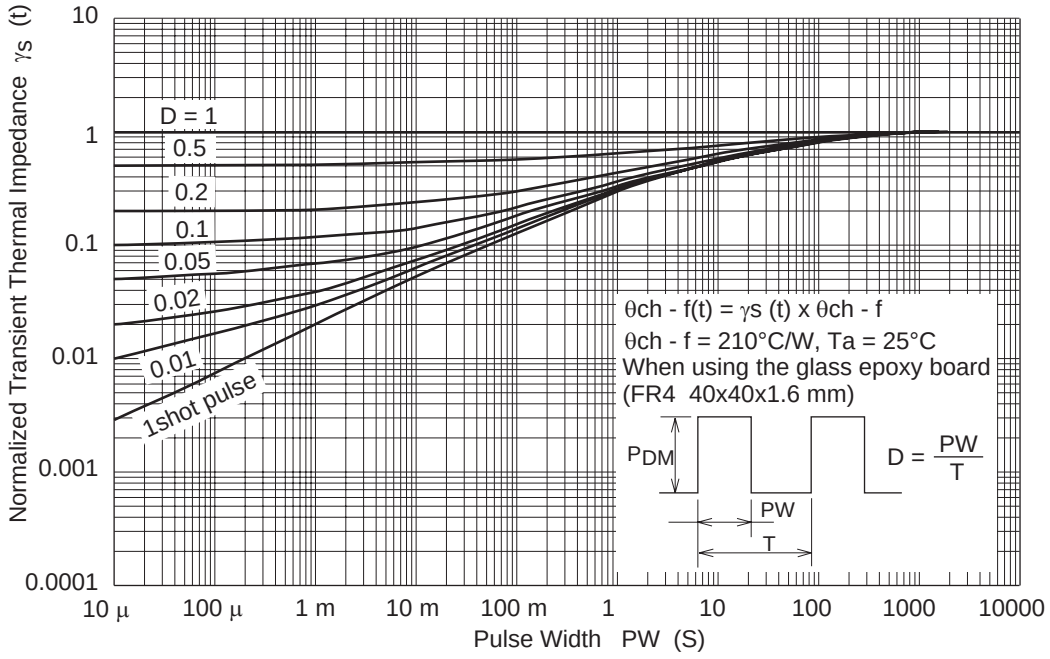
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Normalized Transient Thermal Impedance vs. Pulse Width(1 Drive Operation)



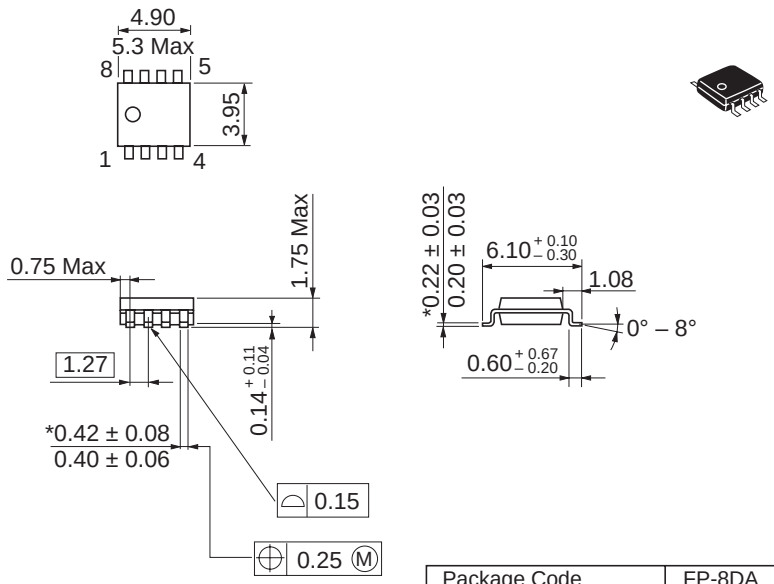
Normalized Transient Thermal Impedance vs. Pulse Width (2 Drive Operation)



Package Dimensions

As of January, 2003

Unit: mm



*Dimension including the plating thickness
Base material dimension

Package Code	FP-8DA
JEDEC	Conforms
JEITA	—
Mass (reference value)	0.085 g

Ordering Information

Part Name	Quantity	Shipping Container
HAT2215R-EL-E	2500 pcs	Taping
HAT2215RJ-EL-E	2500 pcs	Taping

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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