

# HAT1110R

## Silicon P Channel Power MOS FET Power Switching

REJ03G0416-0200

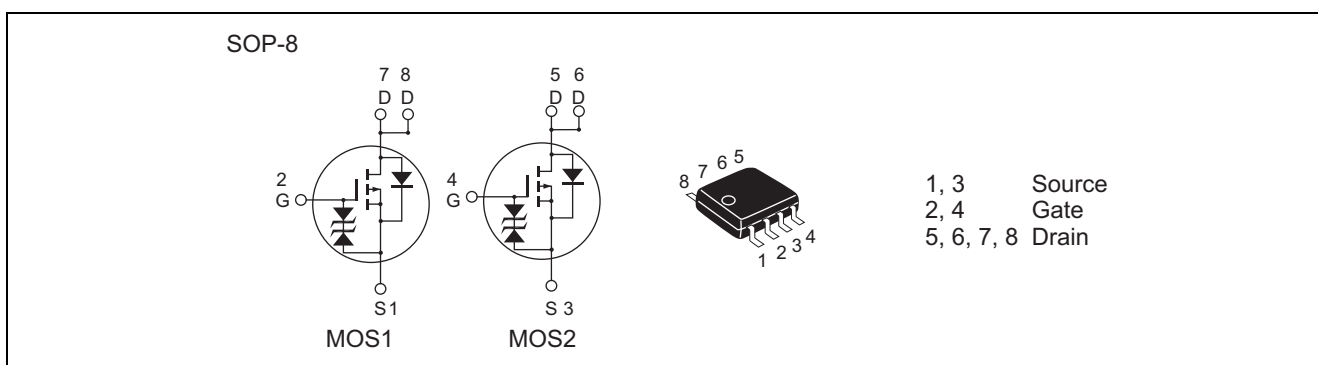
Rev.2.00

Oct.07.2004

### Features

- Capable of  $-4.5\text{ V}$  gate drive
- Low drive current
- High density mounting

### Outline



### Absolute Maximum Ratings

( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	$-80$	V
Gate to source voltage	$V_{GSS}$	$\pm 20$	V
Drain current	$I_D$	$-1$	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	$-6$	A
Reverse drain current	$I_{DR}$	$-1$	A
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	$1.2$	W
Channel dissipation	$P_{ch}$ <sup>Note3</sup>	$1.8$	W
Channel temperature	$T_{ch}$	$150$	$^\circ\text{C}$
Storage temperature	$T_{stg}$	$-55$ to $+150$	$^\circ\text{C}$

Notes: 1.  $PW \leq 10\text{ }\mu\text{s}$ , duty cycle  $\leq 1\%$

2. 1 Drive operation; When using the glass epoxy board (FR4 40 x 40 x 1.6 mm),  $PW \leq 10\text{ s}$

3. 2 Drive operation; When using the glass epoxy board (FR4 40 x 40 x 1.6 mm),  $PW \leq 10\text{ s}$

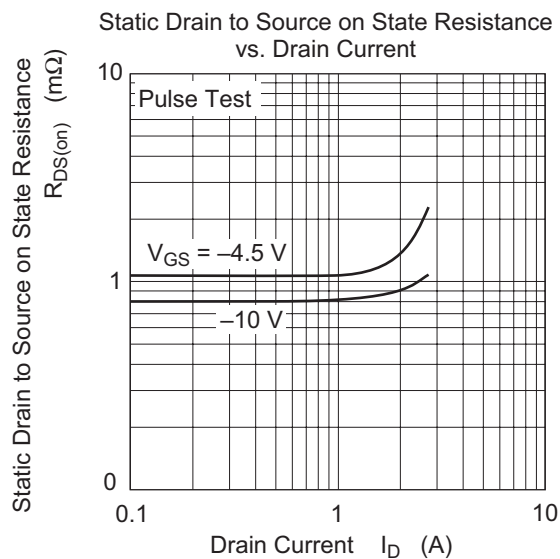
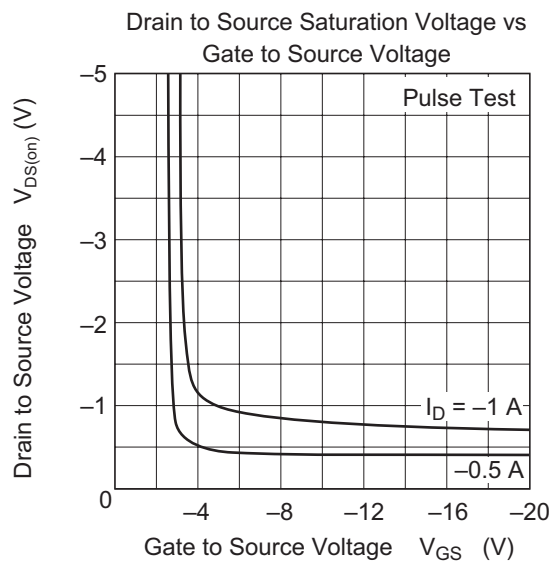
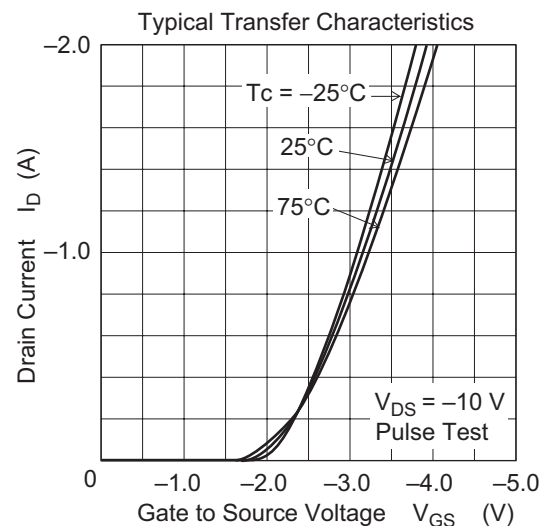
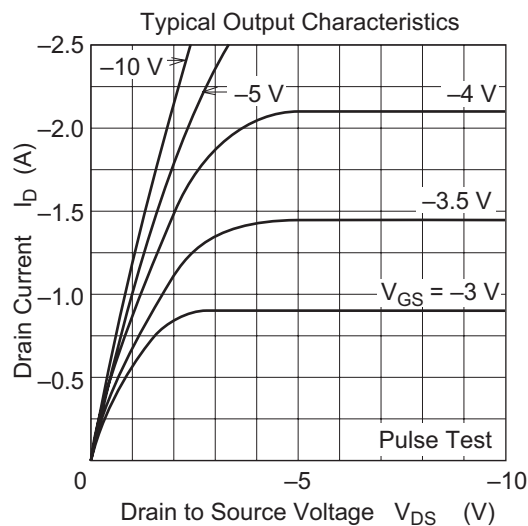
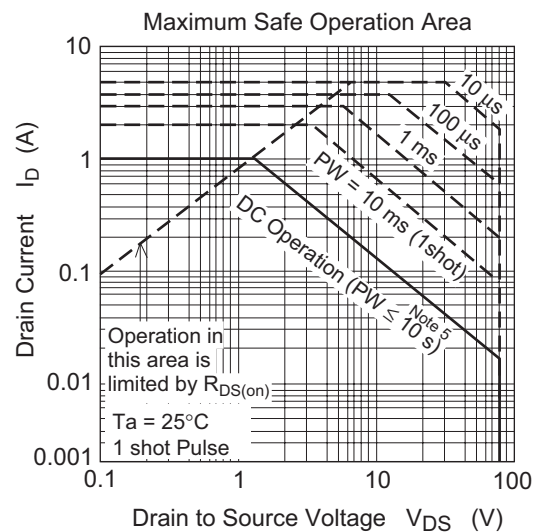
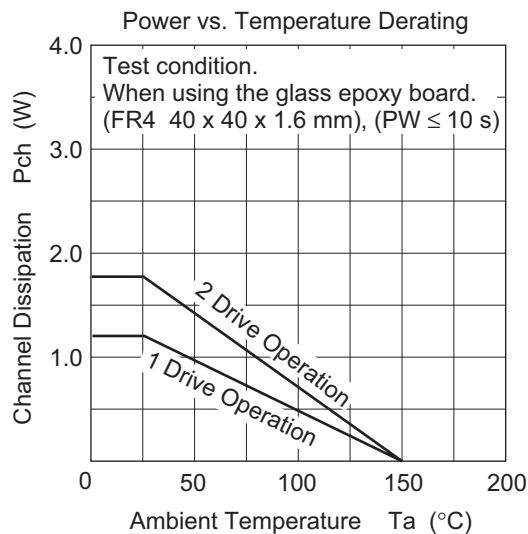
## Electrical Characteristics

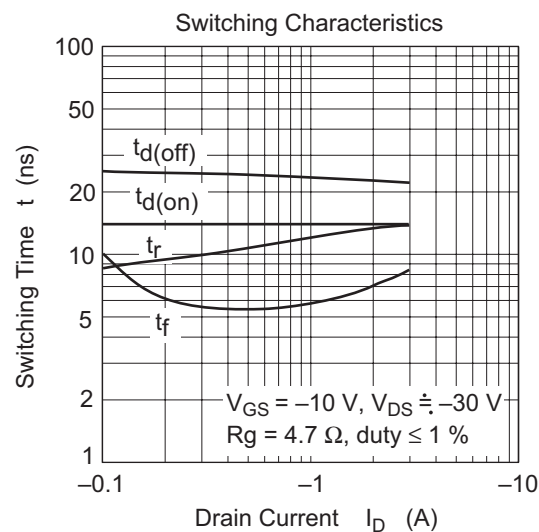
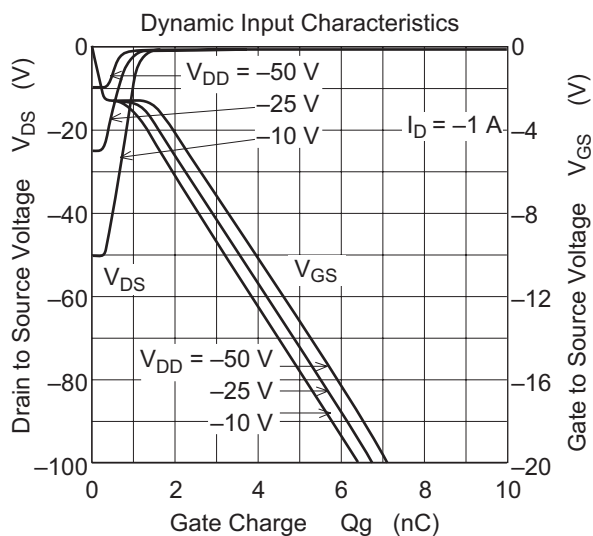
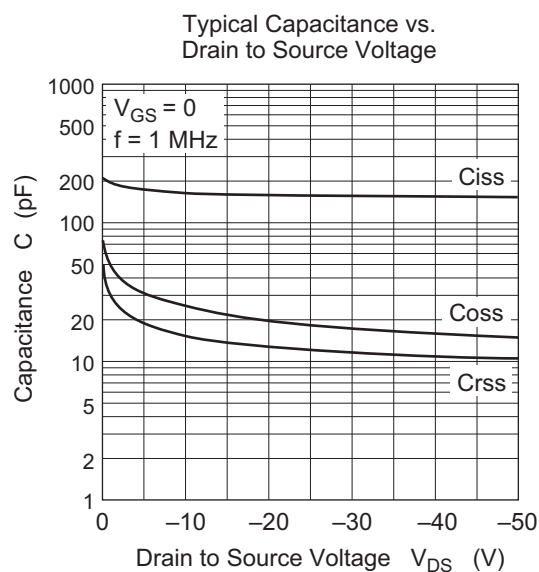
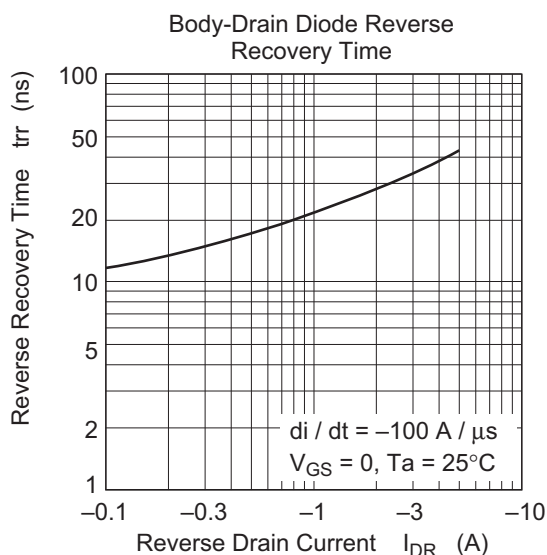
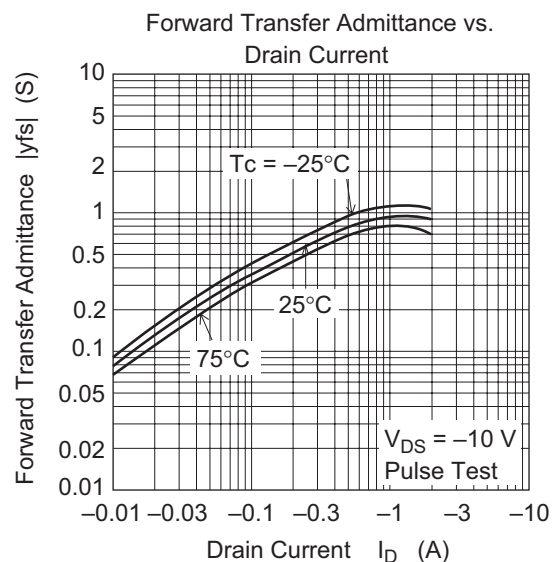
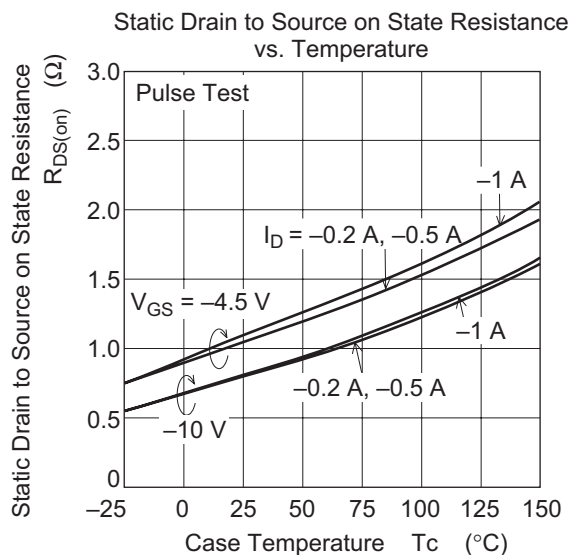
(Ta = 25°C)

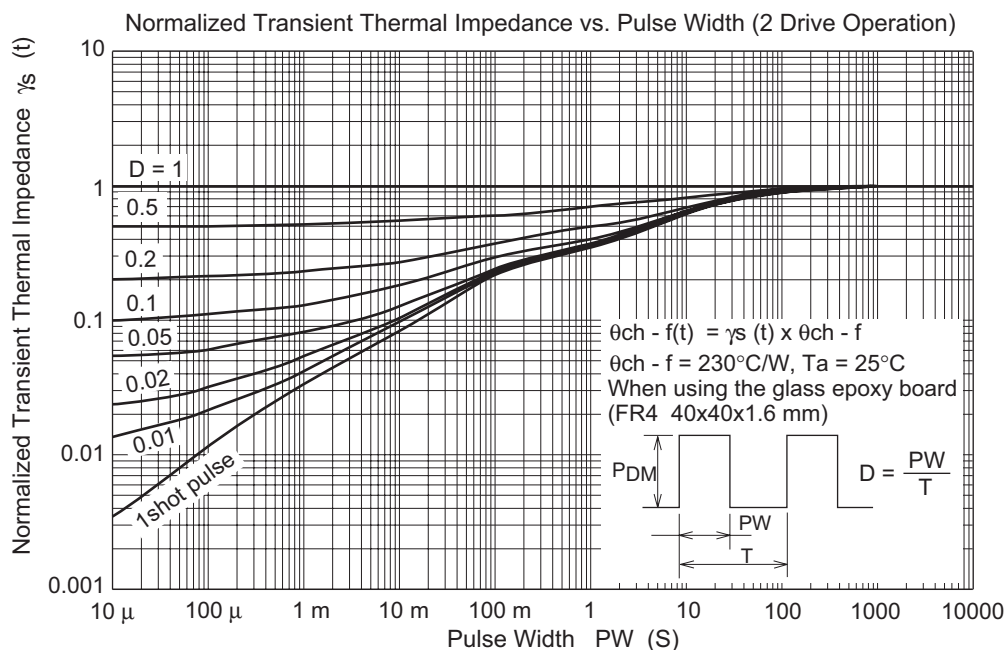
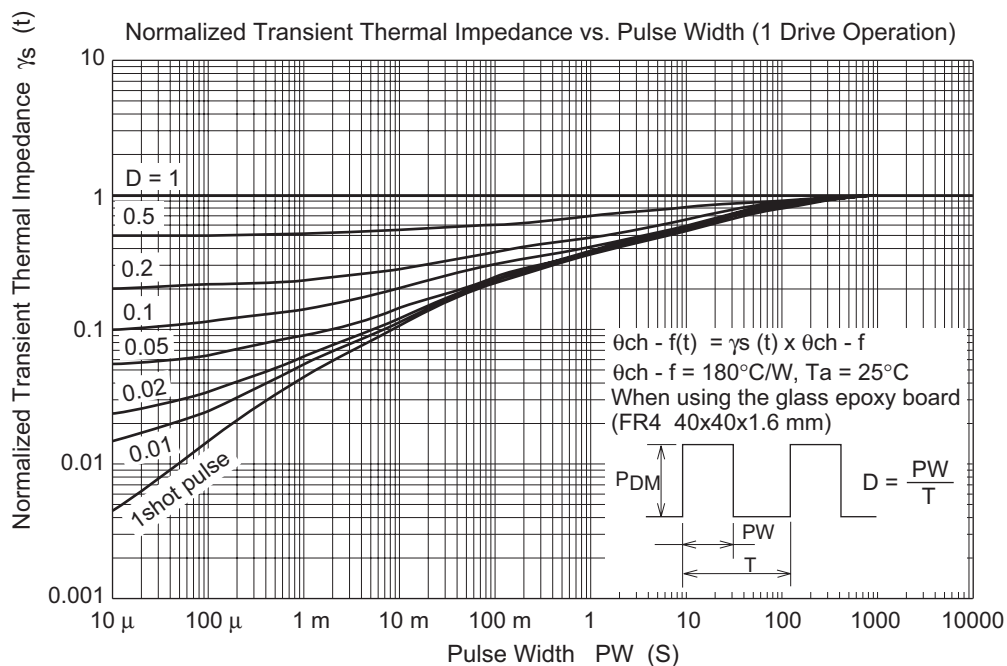
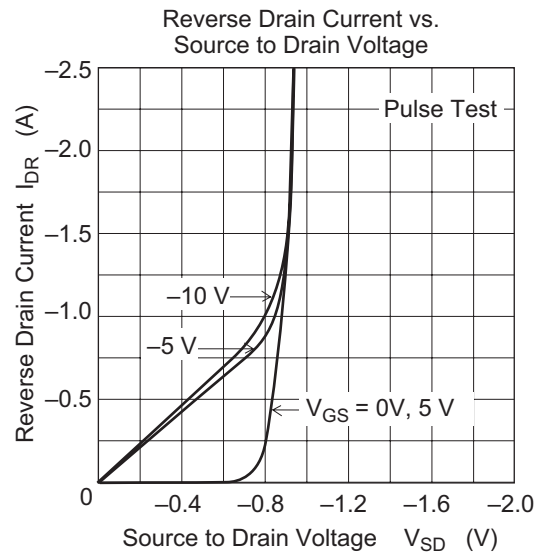
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	-80	—	—	V	$I_D = -10 \text{ mA}$ , $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	$\pm 20$	—	—	V	$I_G = \pm 100 \mu\text{A}$ , $V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 16 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	-1	$\mu\text{A}$	$V_{DS} = -80 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	-1.0	—	-2.5	V	$V_{DS} = -10 \text{ V}$ , $I_D = -1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.8	1.05	$\Omega$	$I_D = -0.5 \text{ A}$ , $V_{GS} = -10 \text{ V}$ <sup>Note4</sup>
	$R_{DS(on)}$	—	1.02	1.38	$\Omega$	$I_D = -0.5 \text{ A}$ , $V_{GS} = -4.5 \text{ V}$ <sup>Note4</sup>
Forward transfer admittance	$ y_{fs} $	0.4	0.8	—	S	$I_D = -0.5 \text{ A}$ , $V_{DS} = -10 \text{ V}$ <sup>Note4</sup>
Input capacitance	$C_{iss}$	—	170	—	pF	$V_{DS} = -10 \text{ V}$
Output capacitance	$C_{oss}$	—	24	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	16	—	pF	$f = 1 \text{ MHz}$
Total gate charge	$Q_g$	—	3.6	—	nC	$V_{DD} = -25 \text{ V}$
Gate to source charge	$Q_{gs}$	—	0.3	—	nC	$V_{GS} = -10 \text{ V}$
Gate to drain charge	$Q_{gd}$	—	0.7	—	nC	$I_D = -1.0 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	14	—	ns	$V_{GS} = -10 \text{ V}$ , $I_D = -0.5 \text{ A}$
Rise time	$t_r$	—	12	—	ns	$V_{DD} \approx -30 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	25	—	ns	$R_L = 60 \Omega$
Fall time	$t_f$	—	5.5	—	ns	$R_g = 4.7 \Omega$
Body-drain diode forward voltage	$V_{DF}$	—	-0.86	-1.12	V	$I_F = -1.0 \text{ A}$ , $V_{GS} = 0$ <sup>Note4</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	21	—	ns	$I_F = -1.0 \text{ A}$ , $V_{GS} = 0$ $diF/dt = 100 \text{ A}/\mu\text{s}$

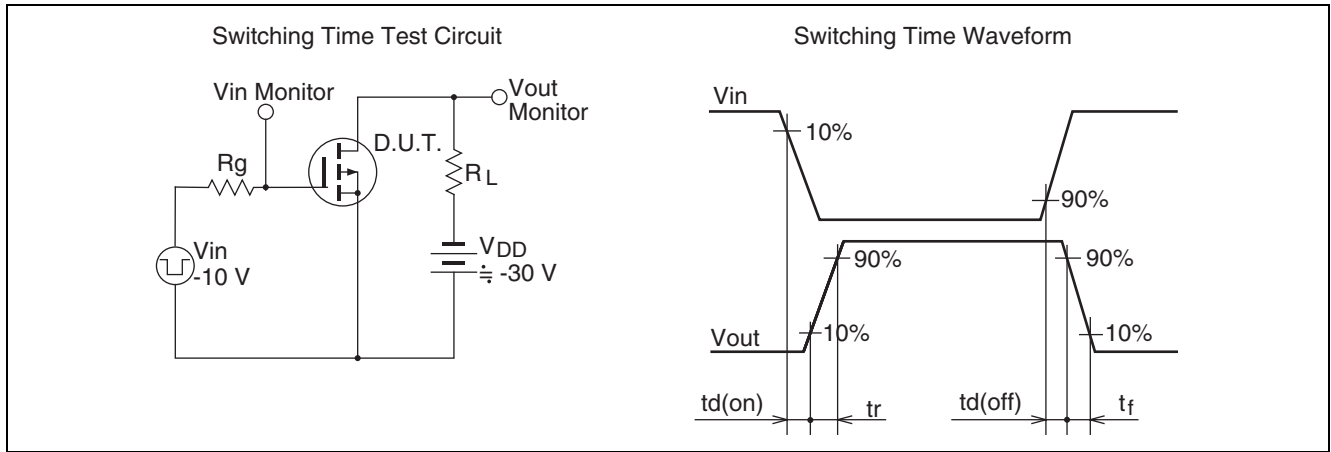
Notes: 4. Pulse test

## Main Characteristics



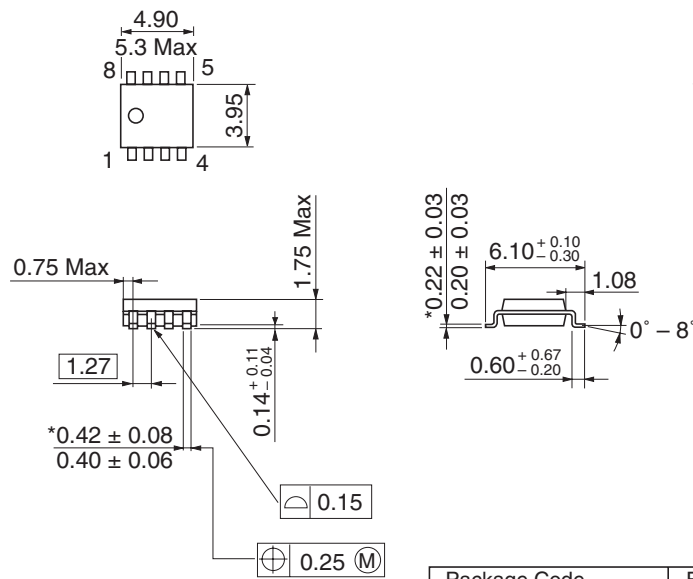






## Package Dimensions

As of January, 2003  
Unit: mm



\*Dimension including the plating thickness  
Base material dimension

## Ordering Information

Part Name	Quantity	Shipping Container
HAT1110R-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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