

# HAT1126R, HAT1126RJ

Silicon P Channel Power MOS FET  
High Speed Power Switching

REJ03G0406-0100

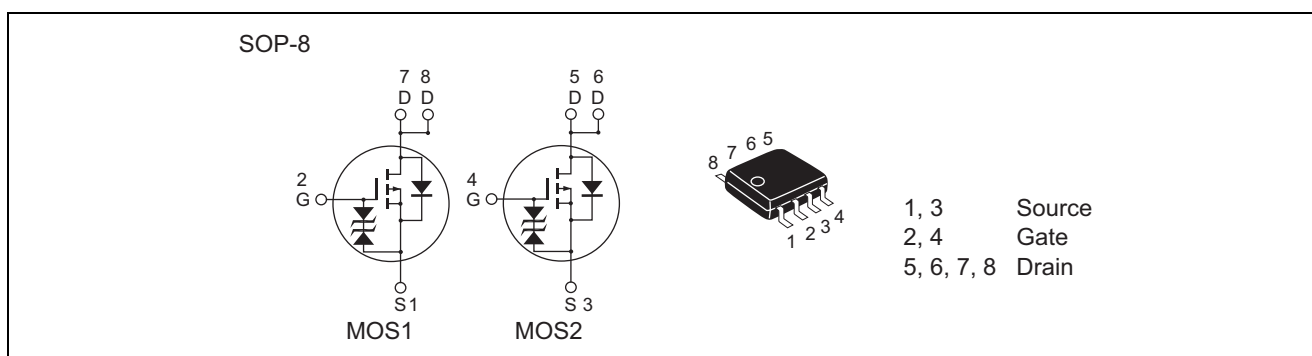
Rev.1.00

Sep.10.2004

## Features

- Low on-resistance
- Capable of 4.5 V gate drive
- High density mounting
- “J” is for Automotive application  
High temperature D-S leakage guarantee  
Avalanche rating

## Outline



## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings		Unit
		HAT1126R	HAT1126RJ	
Drain to source voltage	$V_{DSS}$	-60	-60	V
Gate to source voltage	$V_{GSS}$	±20	±20	V
Drain current	$I_D$	-6.0	-6.0	A
Drain peak current	$I_D$ (pulse) <sup>Note1</sup>	-48	-48	A
Avalanche current	$I_{AP}$ <sup>Note4</sup>	—	-6.0	A
Avalanche energy	$E_{AR}$ <sup>Note4</sup>	—	3.08	mJ
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	2	2	W
Channel dissipation	$P_{ch}$ <sup>Note3</sup>	3	3	W
Channel temperature	$T_{ch}$	150	150	°C
Storage temperature	$T_{stg}$	-55 to +150	-55 to +150	°C

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

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

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

4. Value at  $T_{ch} = 25^\circ C$ ,  $R_g \geq 50 \Omega$

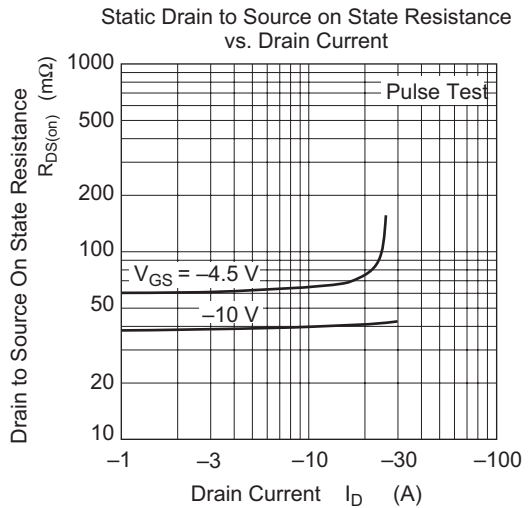
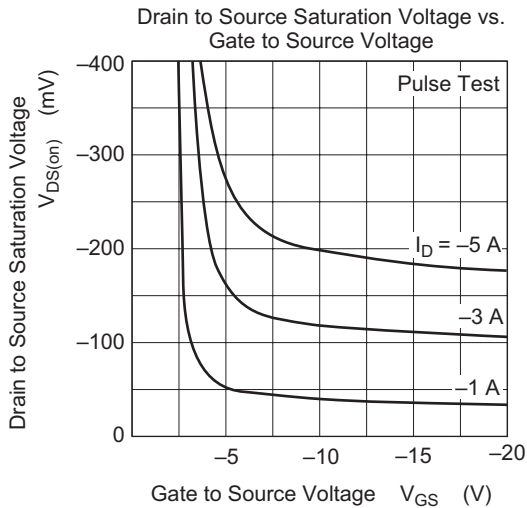
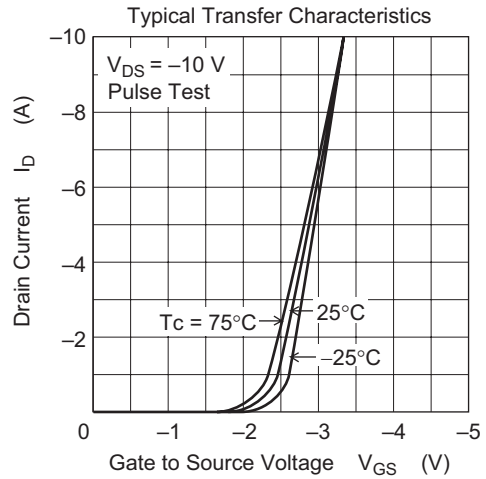
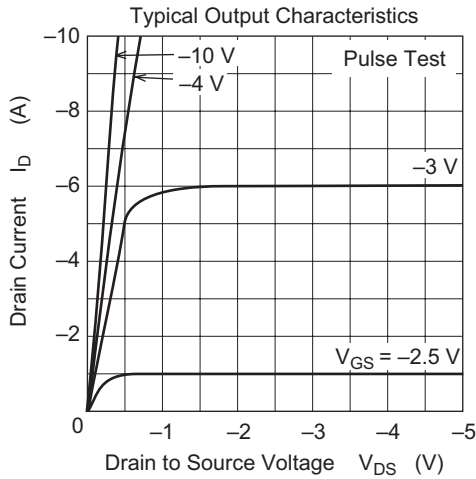
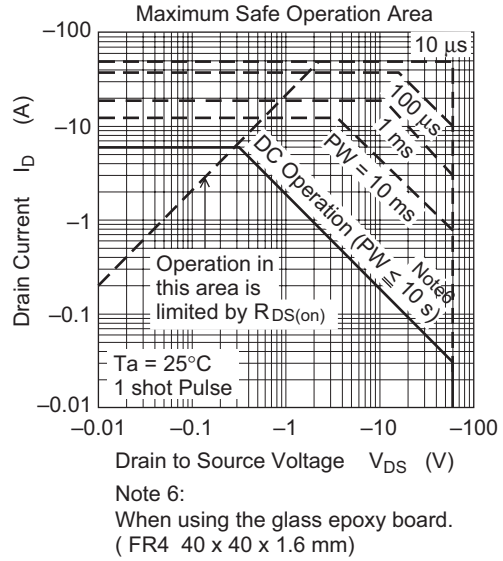
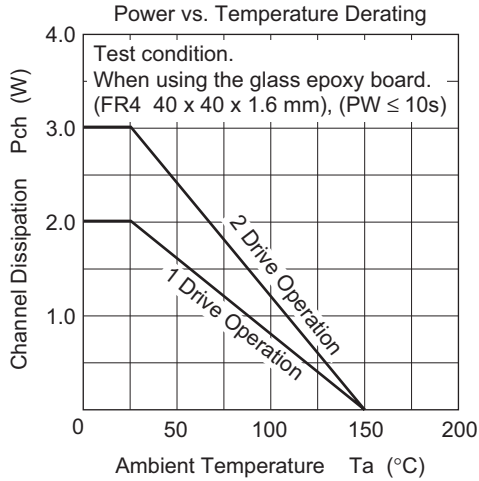
## Electrical Characteristics

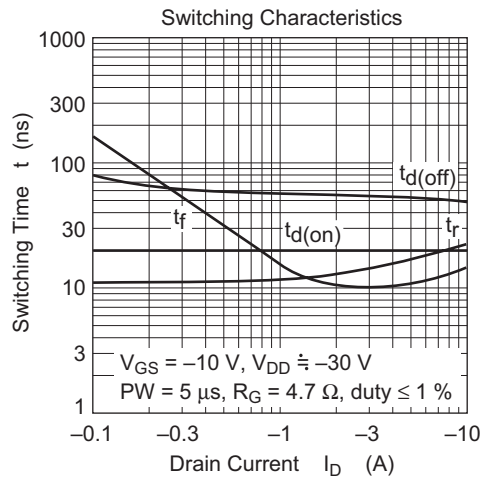
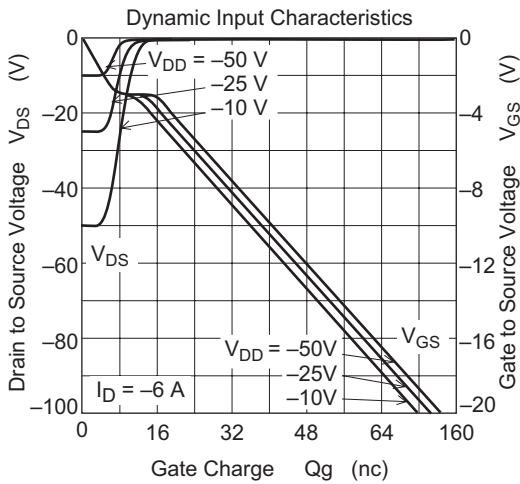
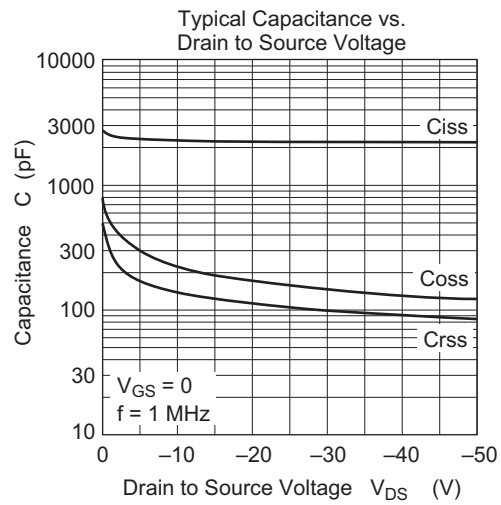
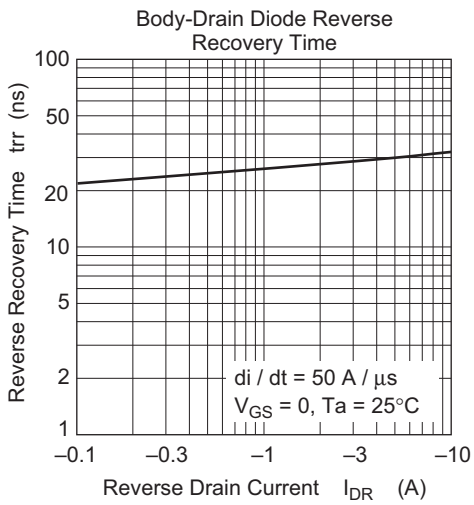
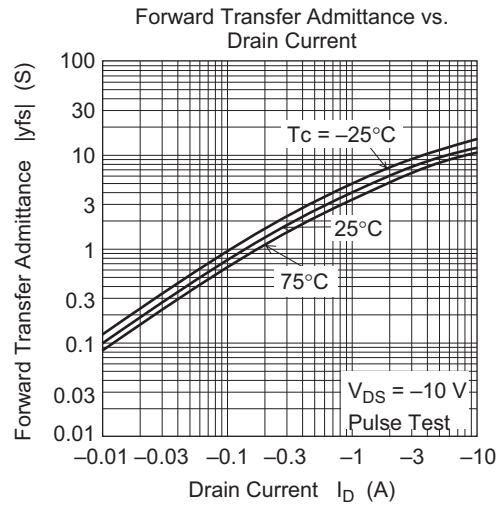
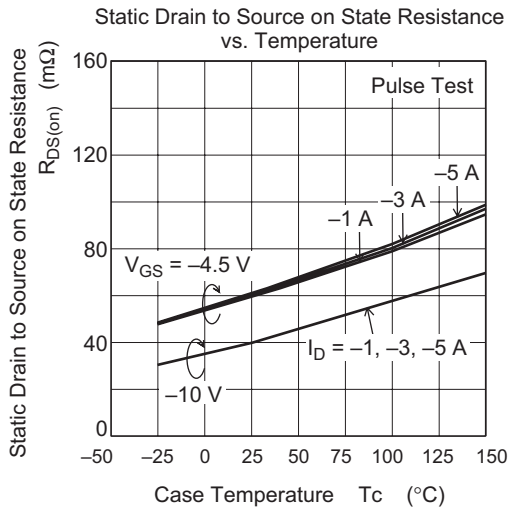
(Ta = 25°C)

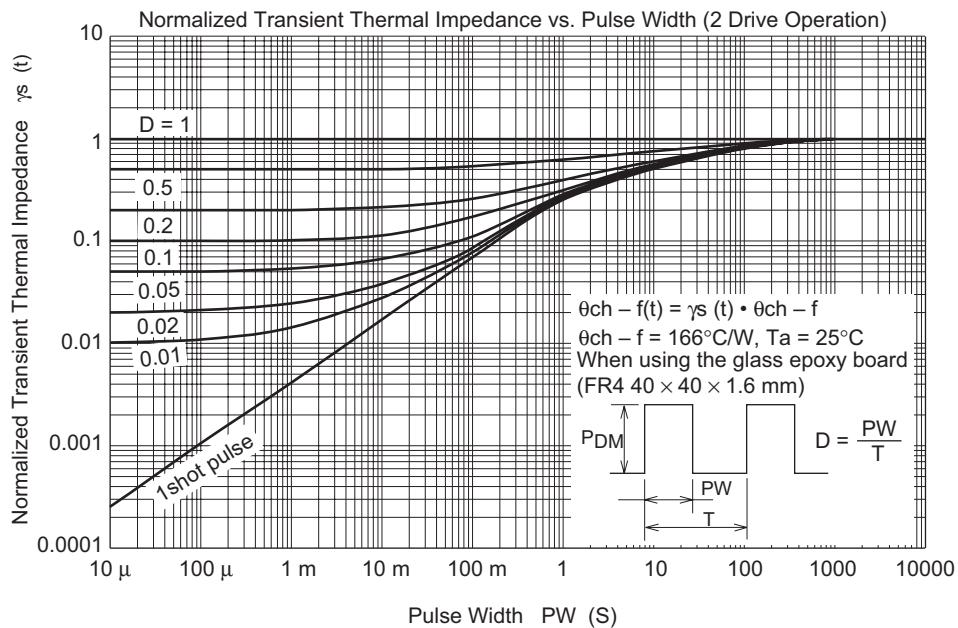
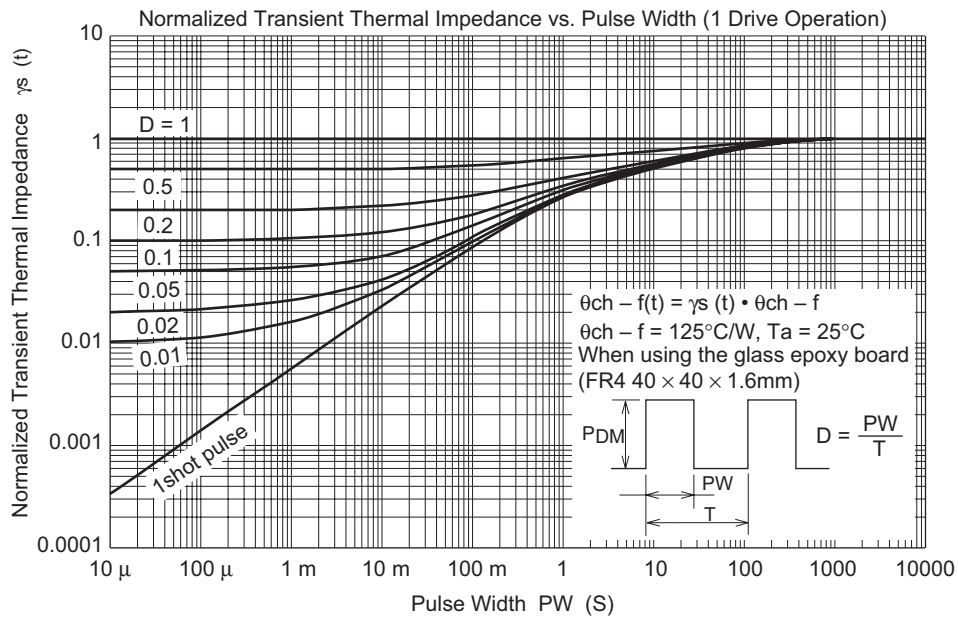
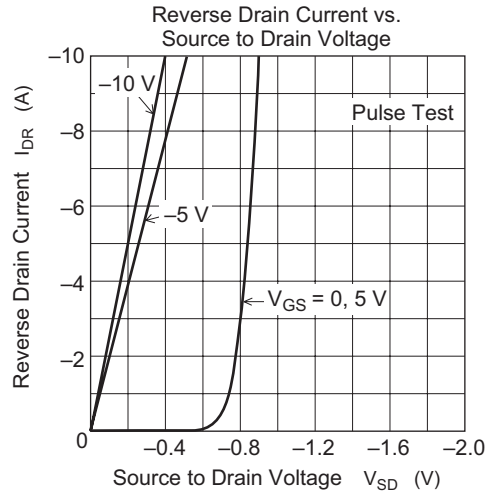
Item	Symbol	Min	Typ	Max	Unit	Unit
Drain to source breakdown voltage	$V_{(BR)DSS}$	-60	—	—	V	$I_D = -10 \text{ mA}, V_{GS} = 0$
Gate to Source breakdown voltage	$V_{(BR)GSS}$	$\pm 20$	—	—	V	$I_G = \pm 100 \text{ }\mu\text{A}, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	-1	$\mu\text{A}$	$V_{DS} = -60 \text{ V}, V_{GS} = 0$
Zero gate voltage drain current	HAT1126R	$I_{DSS}$	—	—	$\mu\text{A}$	$V_{DS} = -48 \text{ V}, V_{GS} = 0$
	HAT1126RJ	$I_{DSS}$	—	—	-10	$\mu\text{A}$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	-1.0	—	-2.5	V	$V_{DS} = -10 \text{ V}, I_D = -1 \text{ mA}$
Forward transfer admittance	$ y_{fs} $	4.0	7.0	—	S	$I_D = -3.0 \text{ A}^{\text{Note5}}, V_{DS} = -10 \text{ V}$
Static drain to source on state resistance	$R_{DS(on)}$	—	40	50	m $\Omega$	$I_D = -3.0 \text{ A}^{\text{Note5}}, V_{GS} = -10 \text{ V}$
	$R_{DS(on)}$	—	60	85	m $\Omega$	$I_D = -3.0 \text{ A}^{\text{Note5}}, V_{GS} = -4.5 \text{ V}$
Input capacitance	$C_{iss}$	—	2300	—	pF	$V_{DS} = -10 \text{ V}, V_{GS} = 0$
Output capacitance	$C_{oss}$	—	230	—	pF	$f = 1 \text{ MHz}$
Reverse transfer capacitance	$C_{rss}$	—	140	—	pF	
Total gate charge	$Q_g$	—	37	—	nC	$V_{DD} = -25 \text{ V}$
Gate to source charge	$Q_{gs}$	—	6.5	—	nC	$V_{GS} = -10 \text{ V}$
Gate to drain charge	$Q_{gd}$	—	8	—	nC	$I_D = -6.0 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	20	—	ns	$V_{GS} = -10 \text{ V}, I_D = -3.0 \text{ A}$
Rise time	$t_r$	—	15	—	ns	$V_{DD} \cong -30 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	55	—	ns	$R_L = 10 \text{ }\Omega$
Fall time	$t_f$	—	10	—	ns	$R_G = 4.7 \text{ }\Omega$
Body-drain diode forward voltage	$V_{DF}$	—	-0.85	-1.1	V	$I_F = -6.0 \text{ A}, V_{GS} = 0^{\text{Note5}}$
Body-drain diode reverse recovery time	$t_{rr}$	—	30	—	ns	$I_F = -6.0 \text{ A}, V_{GS} = 0$ $diF/dt = 100 \text{ A} / \mu\text{s}$

Notes: 5. Pulse test

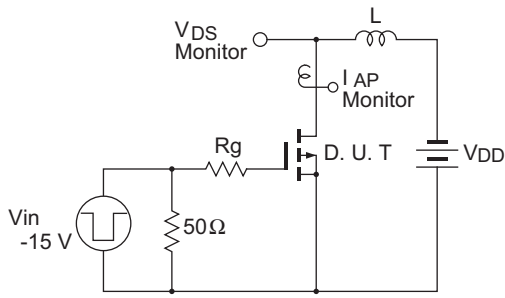
Main Characteristics



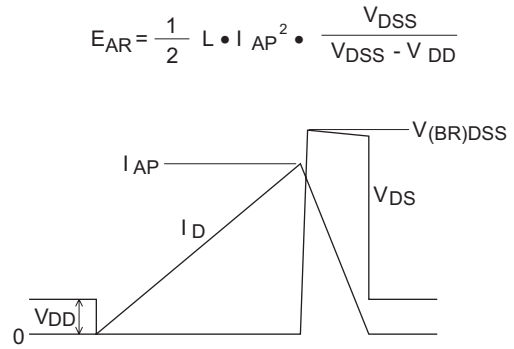




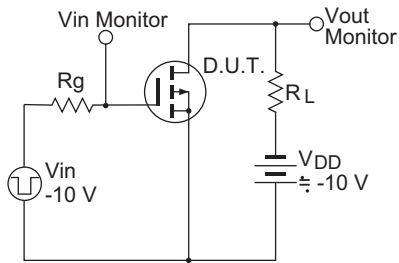
Avalanche Test Circuit



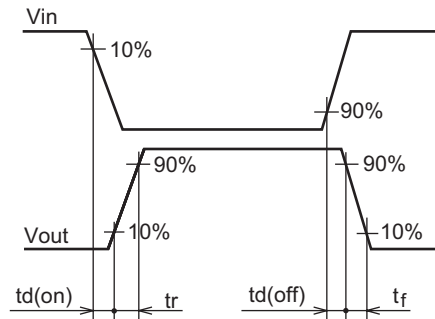
Avalanche Waveform



Switching Time Test Circuit



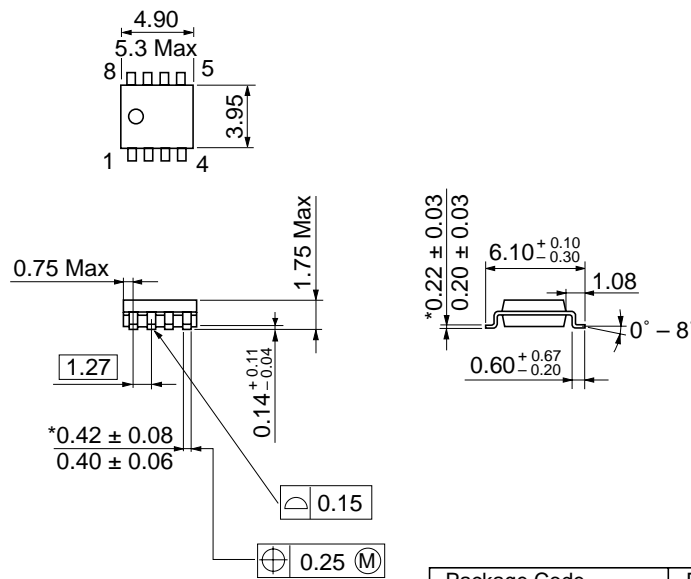
Switching Time Waveform



## 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
HAT1126R-EL-E	2500 pcs	Taping
HAT1126RJ-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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