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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Keep safety first in your circuit designs!

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H5N2509P

Silicon N Channel MOSFET High Speed Power Switching

RENESAS

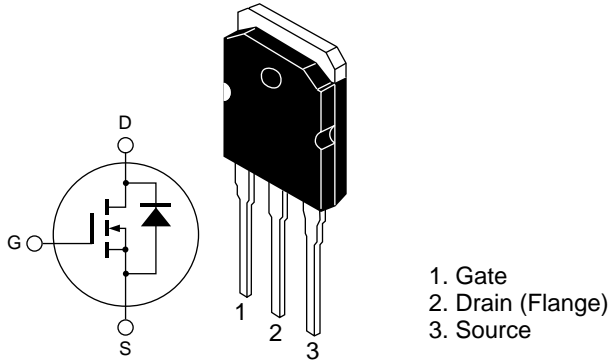
ADE-208-1378 (Z)
Target Specification 1st. Edition
Mar. 2001

Features

- Low on-resistance : $R_{DS(on)} = 0.053 \Omega$ typ.
- Low leakage current : $I_{DSS} = 1 \mu A$ max (at $V_{DS} = 250 V$, $V_{GS} = 0 V$)
- High speed switching : $t_f = 110 ns$ typ (at $I_D = 15 A$, $R_L = 8.3 \Omega$, $V_{GS} = 10 V$)
- Low gate charge : $Q_g = 110 nC$ typ (at $V_{DD} = 200 V$, $V_{GS} = 10 V$, $I_D = 30 A$)
- Avalanche ratings

Outline

TO-3P



Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V _{DSS}	250	V
Gate to source voltage	V _{GSS}	±30	V
Drain current	I _D	30	A
Drain peak current	I _{D (pulse)} ^{Note1}	120	A
Body-drain diode reverse drain current	I _{DR}	30	A
Body-drain diode reverse drain peak current	I _{DR (pulse)} ^{Note1}	120	A
Avalanche current	I _{AP} ^{Note3}	30	A
Channel dissipation	P _{ch} ^{Note2}	150	W
Channel to case thermal impedance	θ _{ch-c}	0.833	°C/W
Channel temperature	T _{ch}	150	°C
Storage temperature	T _{stg}	-55 to +150	°C

Notes: 1. PW ≤ 10 μs and duty cycle ≤ 1%

2. Value at Tc = 25°C

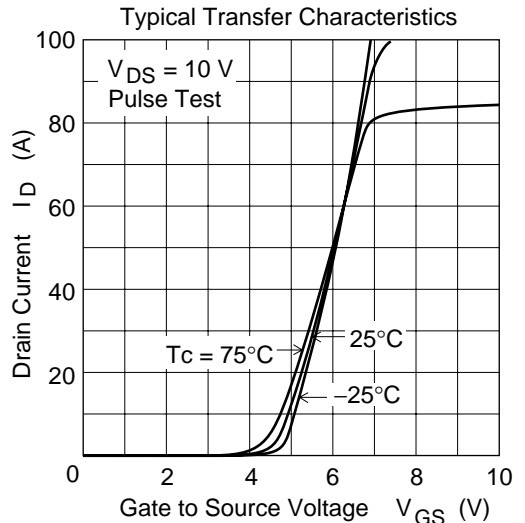
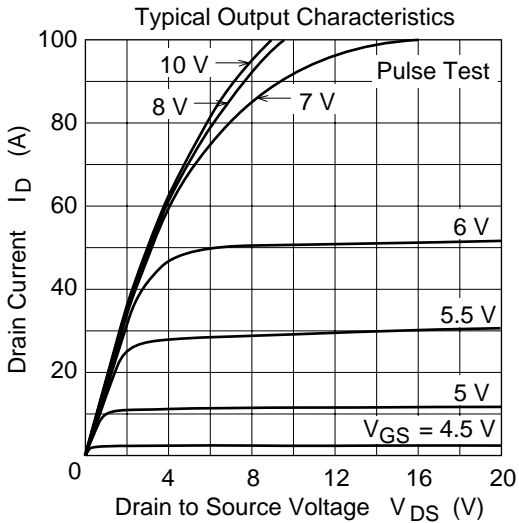
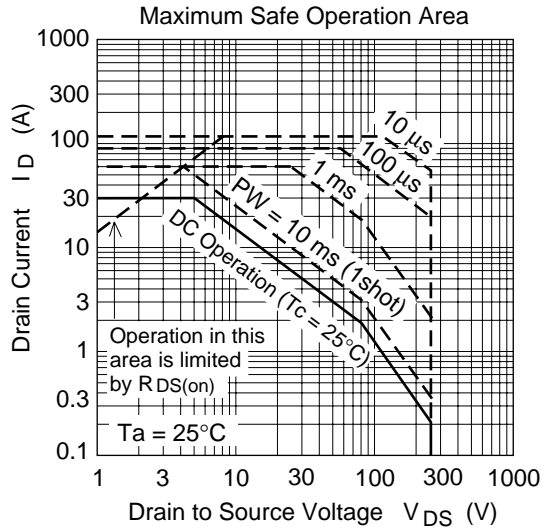
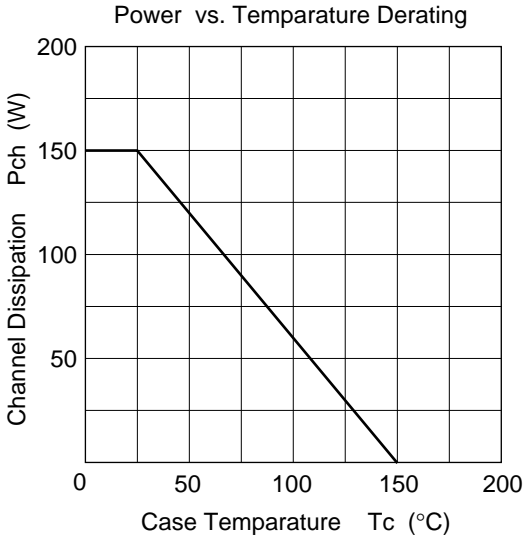
3. T_{ch} ≤ 150°C

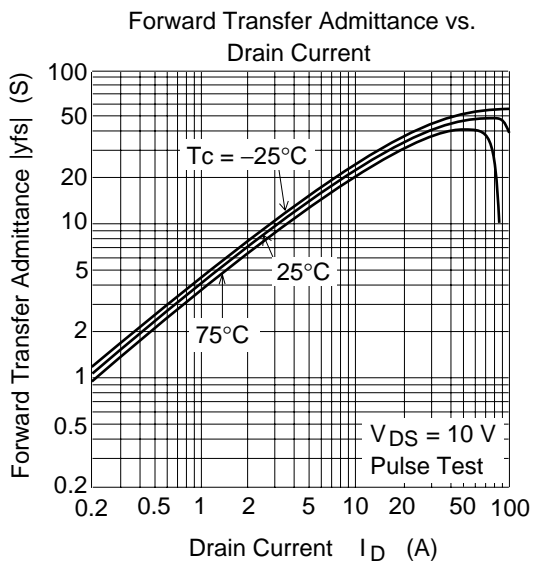
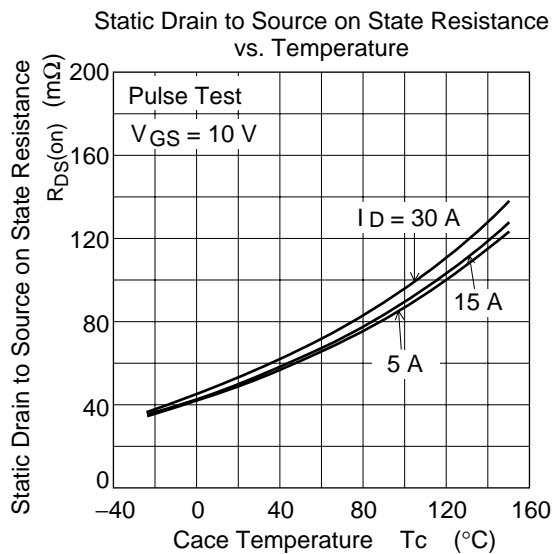
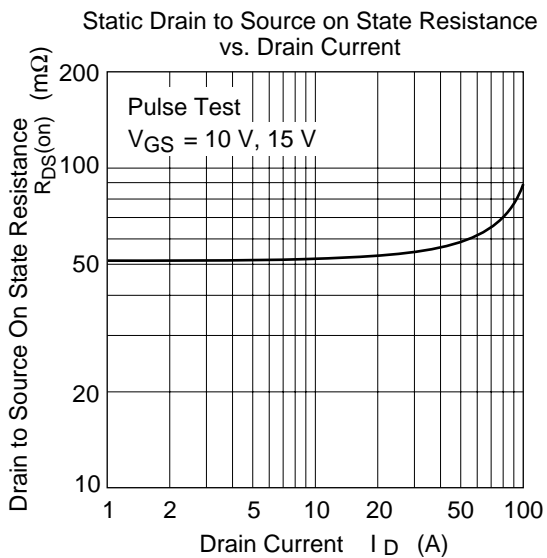
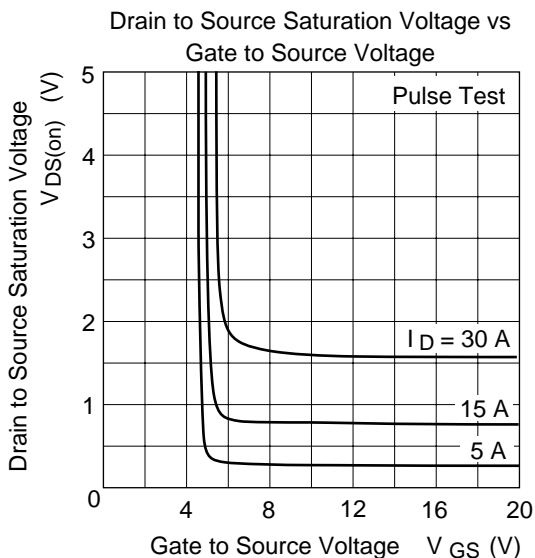
Electrical Characteristics (Ta = 25°C)

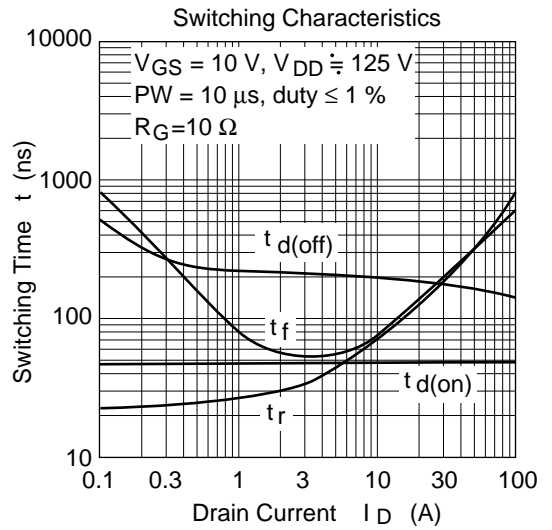
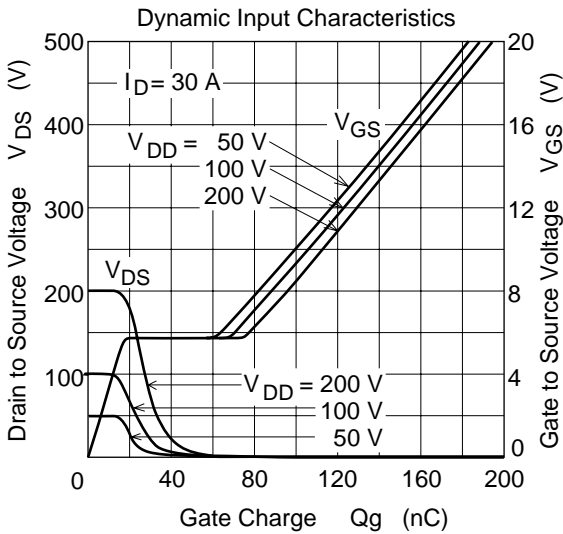
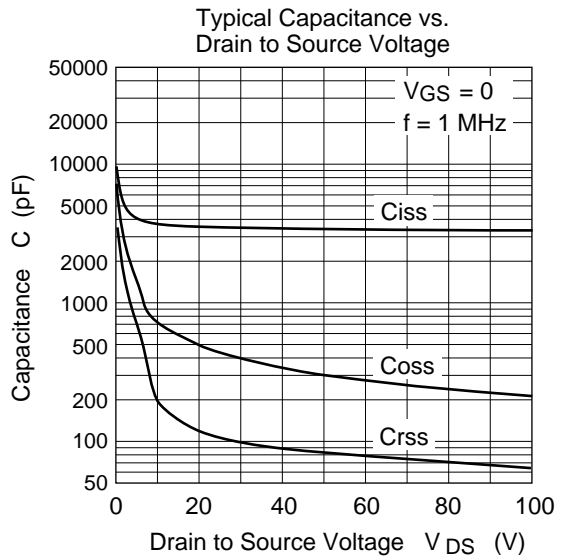
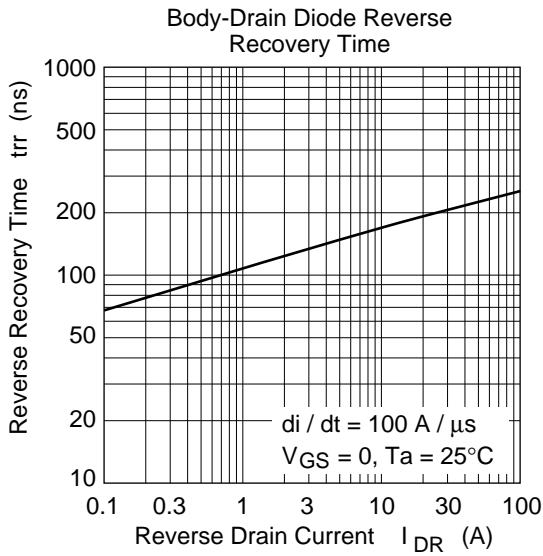
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	250	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 250 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3.0	—	4.0	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.053	0.069	Ω	$I_D = 15 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	17	28	—	S	$I_D = 15 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	3600	—	pF	$V_{DS} = 25 \text{ V}$
Output capacitance	C_{oss}	—	450	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	115	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_d(on)$	—	48	—	ns	$I_D = 15 \text{ A}$
Rise time	t_r	—	120	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_d(off)$	—	190	—	ns	$R_L = 8.3 \Omega$
Fall time	t_f	—	110	—	ns	$R_g = 10 \Omega$
Total gate charge	Q_g	—	110	—	nC	$V_{DS} = 200 \text{ V}$
Gate to source charge	Q_{gs}	—	19	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	53	—	nC	$I_D = 30 \text{ A}$
Body-drain diode forward voltage	V_{DF}	—	0.9	1.35	V	$I_F = 30 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	210	—	ns	$I_F = 30 \text{ A}$, $V_{GS} = 0$ $diF/dt = 100 \text{ A}/\mu\text{s}$
Body-drain diode reverse recovery charge	Q_{rr}	—	1.8	—	μC	

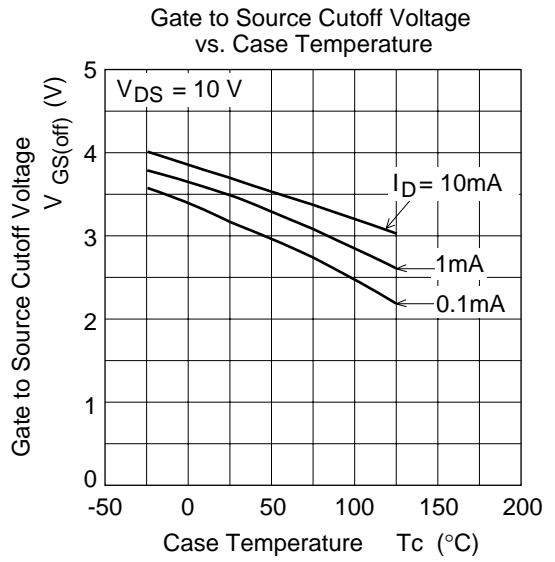
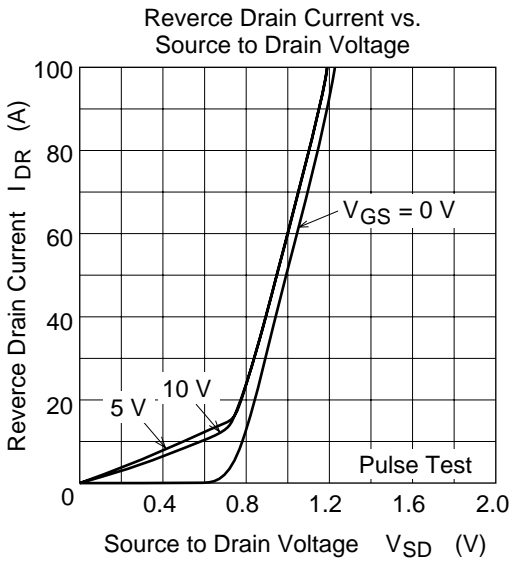
Note: 4. Pulse test

Main Characteristics

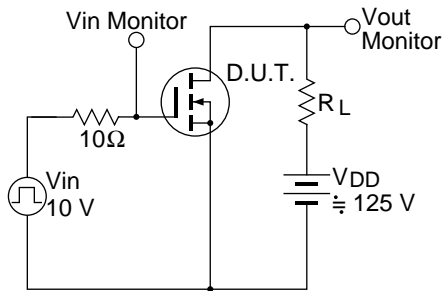




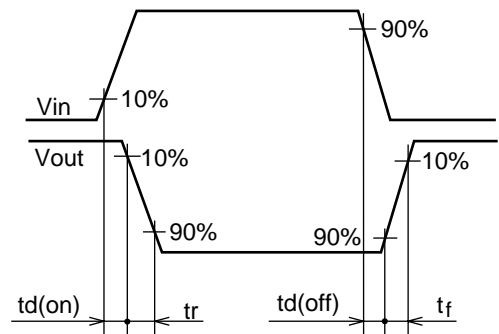


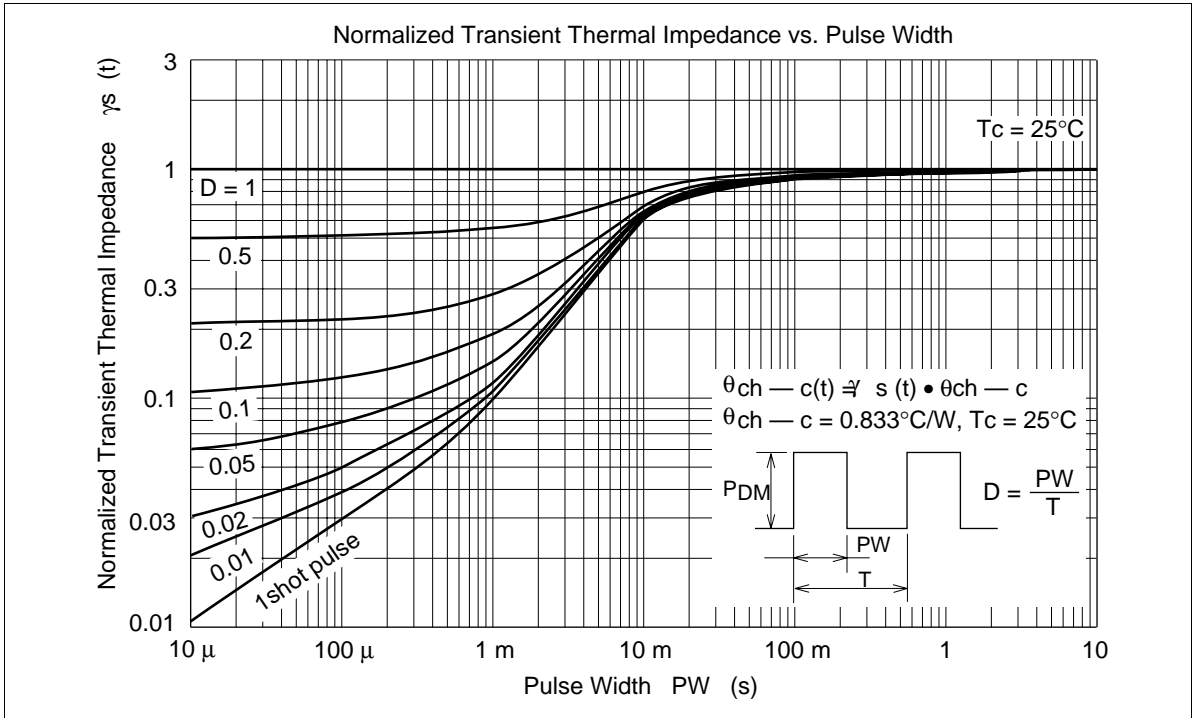


Switching Time Test Circuit



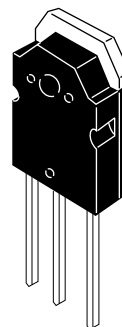
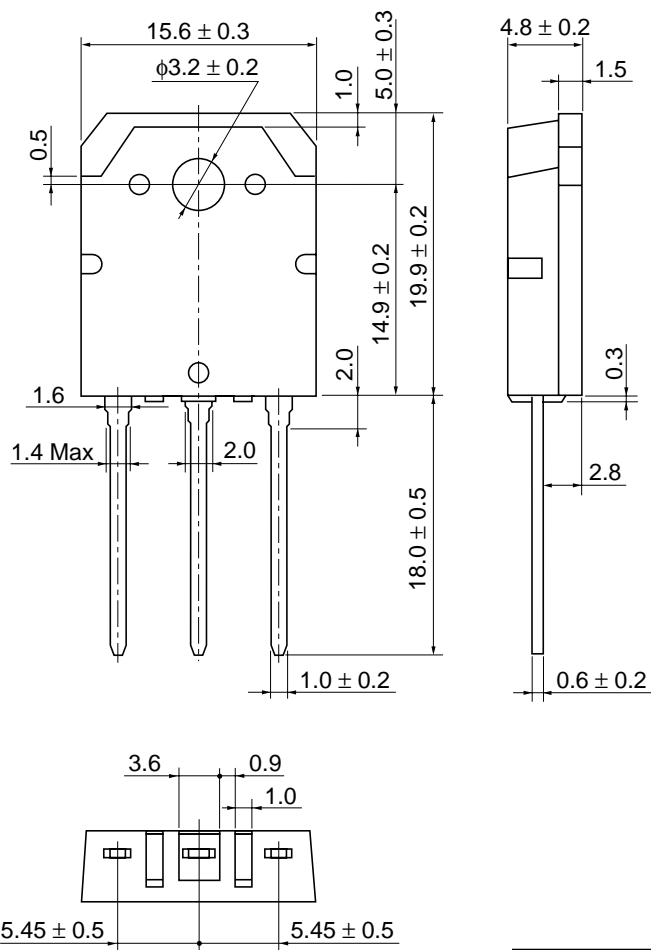
Waveform





Package Dimension

Unit: mm



Hitachi Code	TO-3P
JEDEC	—
EIAJ	Conforms
Mass (reference value)	5.0 g

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