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April 1st, 2010
Renesas Electronics Corporation

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

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EOL announced Product

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H5N5004PL

Silicon N Channel MOS FET High Speed Power Switching

REJ03G1113-0300

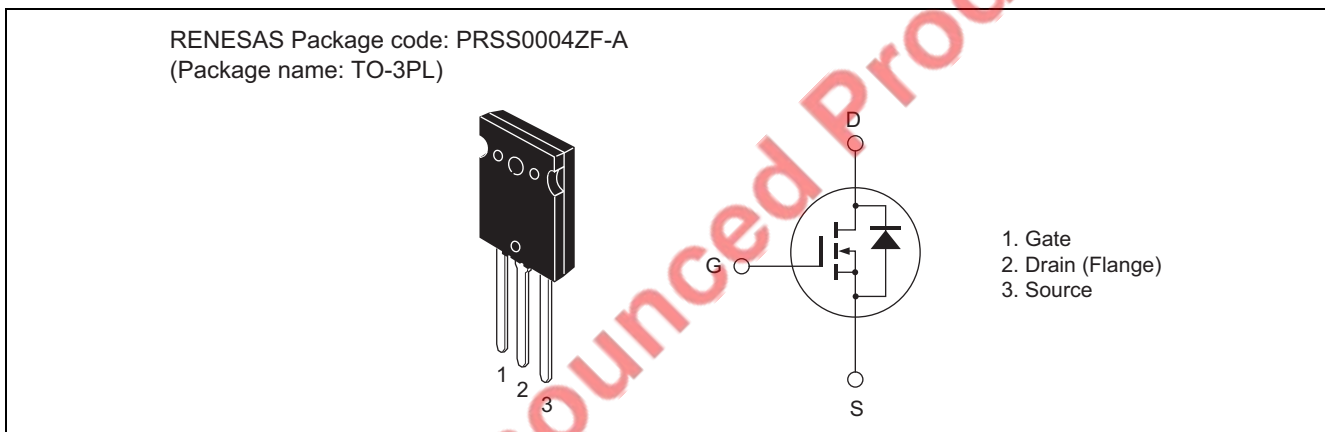
Rev.3.00

May 13, 2009

Features

- Low on-resistance: $R_{DS(on)} = 0.09 \Omega$ typ.
- Low leakage current: $I_{DSS} = 10 \mu A$ max (at $V_{DS} = 500 V$)
- High speed switching: $t_f = 280 ns$ typ (at $V_{GS} = 10 V$, $V_{DD} = 250 V$, $I_D = 25 A$)
- Low gate charge: $Q_g = 220 nC$ typ (at $V_{DD} = 400 V$, $V_{GS} = 10 V$, $I_D = 50 A$)
- Avalanche ratings
- Built-in fast recovery diode: $t_{rr} = 190 ns$ typ

Outline



Absolute Maximum Ratings

($T_a = 25^\circ C$)

Item	Symbol	Value	Unit
Drain to source voltage	V_{DSS}	500	V
Gate to source voltage	V_{GSS}	± 30	V
Drain current	I_D	50	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	200	A
Body-drain diode reverse drain current	I_{DR}	50	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ ^{Note 1}	200	A
Avalanche current	I_{AP} ^{Note 3}	15	A
Channel dissipation	P_{ch} ^{Note 2}	250	W
Channel to case thermal Impedance	θ_{ch-c}	0.5	$^\circ C/W$
Channel temperature	T_{ch}	150	$^\circ C$
Storage temperature	T_{stg}	-55 to +150	$^\circ C$

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

2. Value at $T_c = 25^\circ C$

3. $T_{ch} \leq 150^\circ C$

Electrical Characteristics

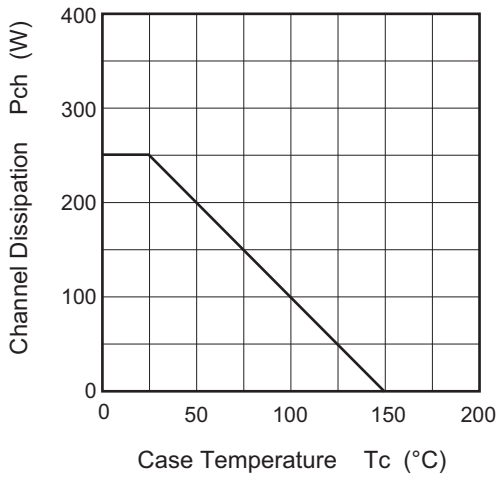
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	500	—	—	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}	—	—	10	μA	$V_{DS} = 500 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	4.0	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.09	0.11	Ω	$I_D = 25 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note 4}
Forward transfer admittance	$ y_{fs} $	27	45	—	S	$I_D = 25 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 4}
Input capacitance	C_{iss}	—	7630	—	pF	$V_{DS} = 25 \text{ V}$
Output capacitance	C_{oss}	—	770	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	160	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	90	—	ns	$I_D = 25 \text{ A}$
Rise time	t_r	—	340	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	370	—	ns	$R_L = 10 \Omega$
Fall time	t_f	—	280	—	ns	$R_g = 10 \Omega$
Total gate charge	Q_g	—	220	—	nC	$V_{DD} = 400 \text{ V}$
Gate to source charge	Q_{gs}	—	30	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	110	—	nC	$I_D = 50 \text{ A}$
Body-drain diode forward voltage	V_{DF}	—	0.98	1.5	V	$I_F = 50 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	190	—	ns	$I_F = 50 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery charge	Q_{rr}	—	1.3	—	μC	$di_F/dt = 100 \text{ A}/\mu\text{s}$

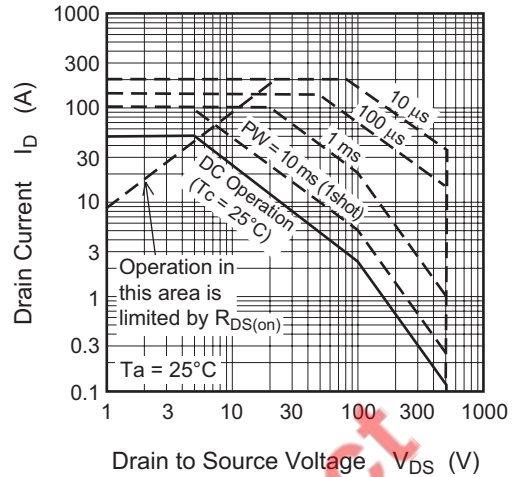
Note: 4. Pulse test

Main Characteristics

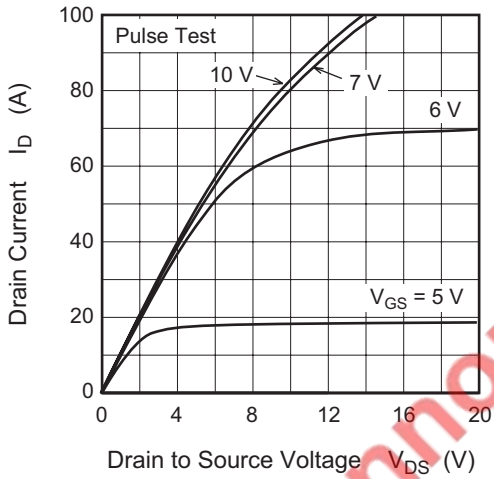
Power vs. Temperature Derating



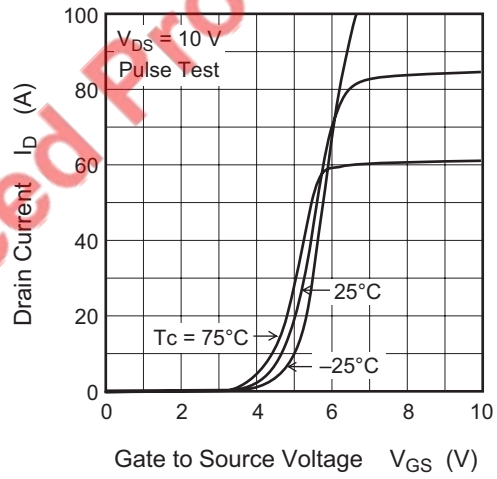
Maximum Safe Operation Area



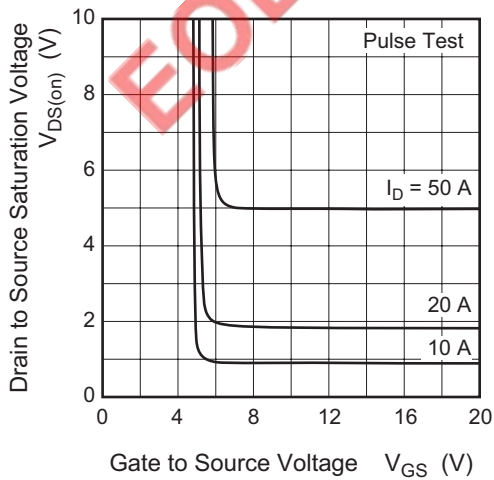
Typical Output Characteristics



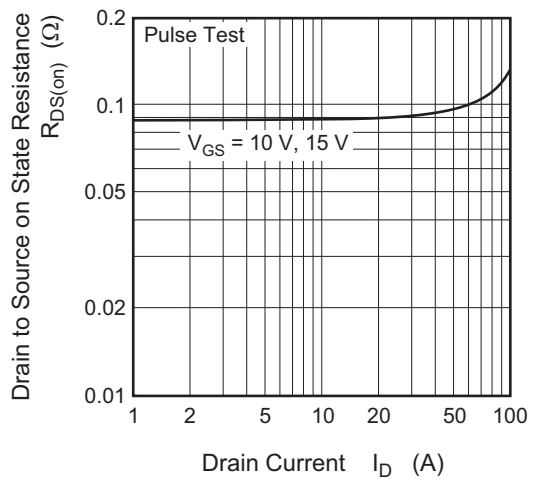
Typical Transfer Characteristics



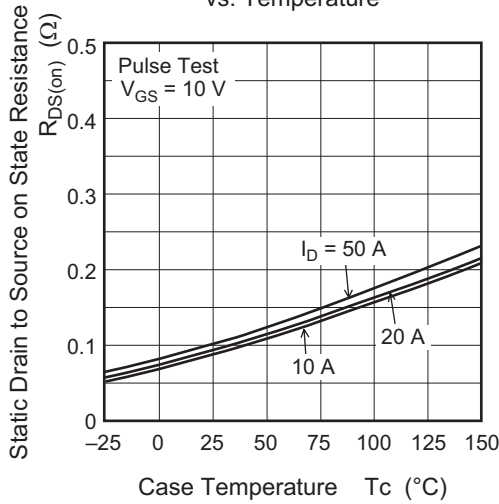
Drain to Source Saturation Voltage vs. Gate to Source Voltage



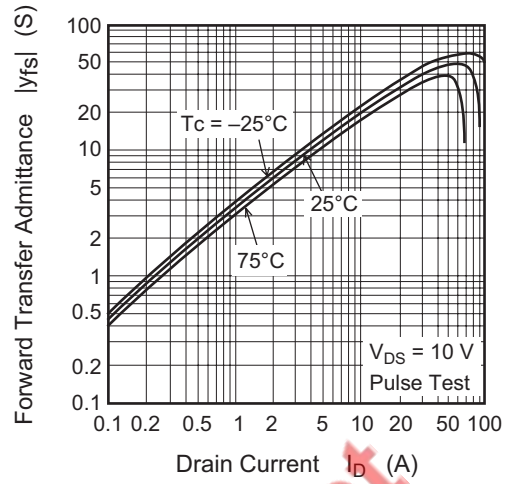
Static Drain to Source on State Resistance vs. Drain Current



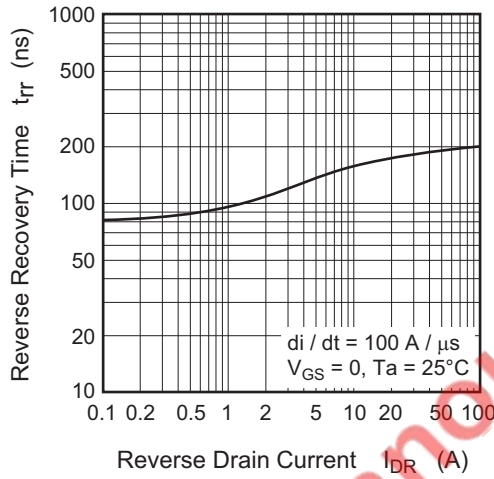
Static Drain to Source on State Resistance vs. Temperature



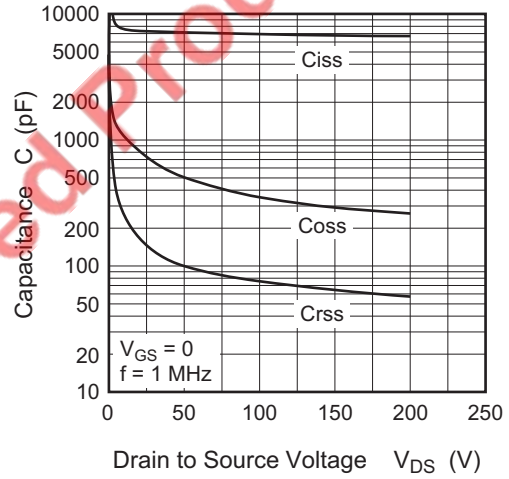
Forward Transfer Admittance vs. Drain Current



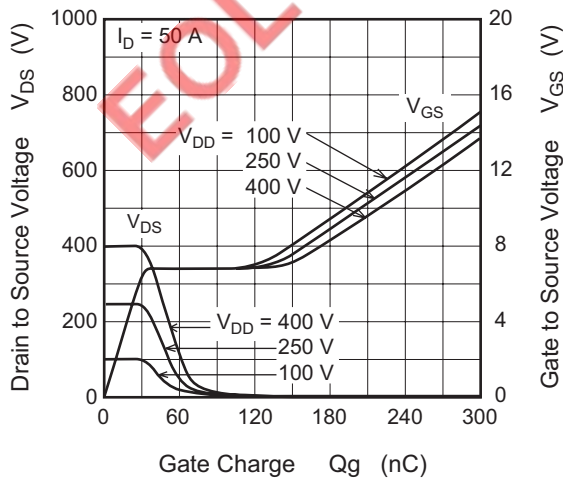
Body-Drain Diode Reverse Recovery Time



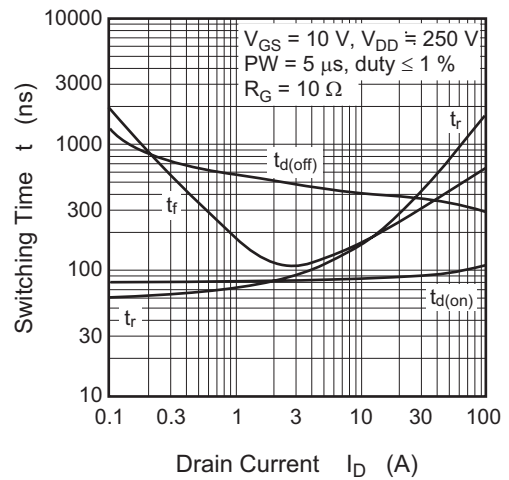
Typical Capacitance vs. Drain to Source Voltage

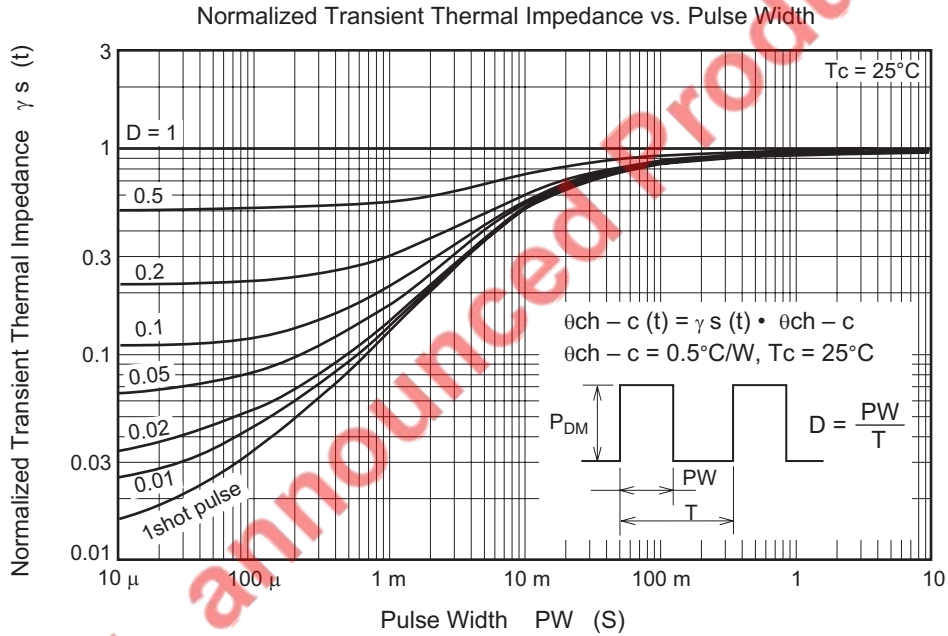
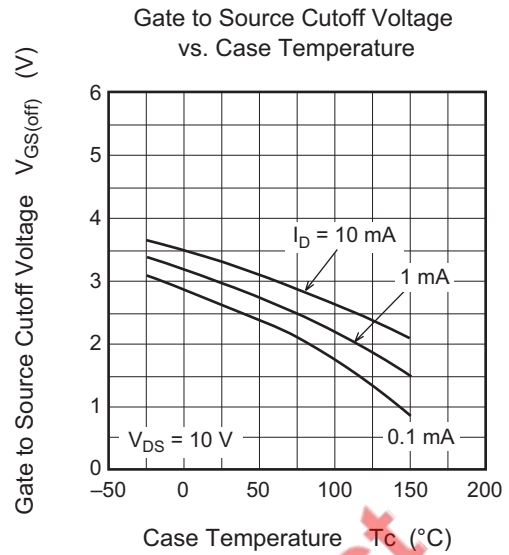
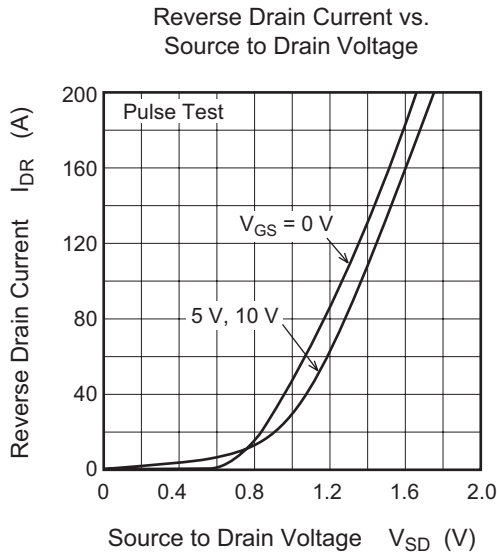


Dynamic Input Characteristics

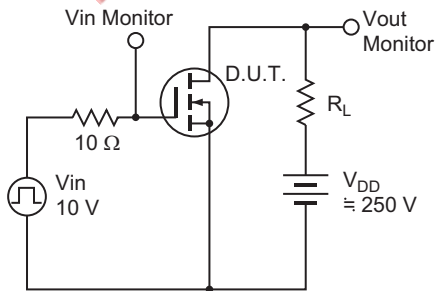


Switching Characteristics

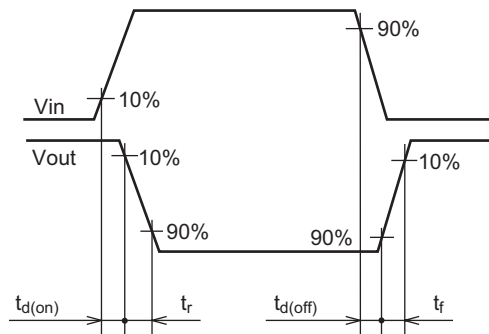




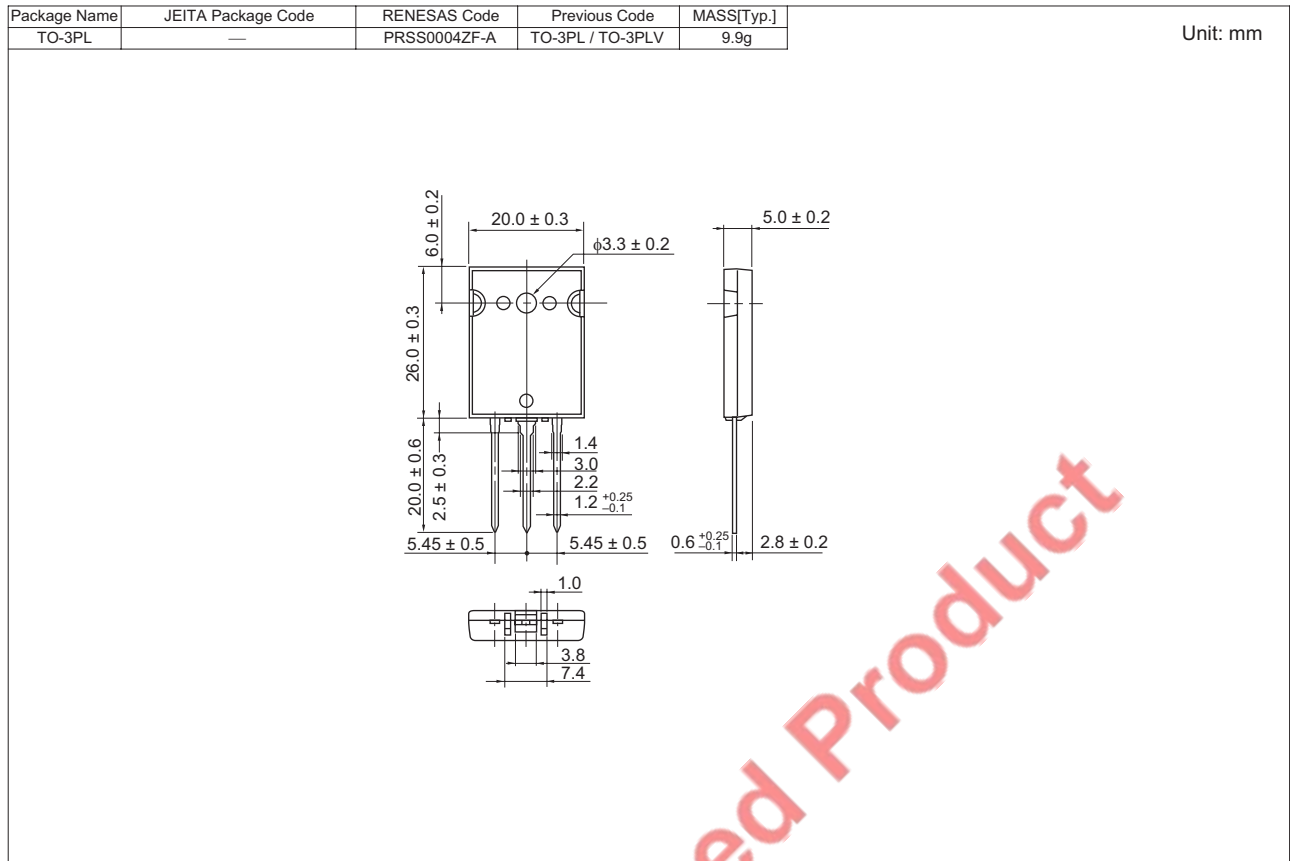
Switching Time Test Circuit



Waveform



Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
H5N5004PL-E	250 pcs	Box (Tube)

EOL announced Product

Notes:

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