

H5N5004PL-E0-E

500V - 50A - MOS FET
High Speed Power Switching

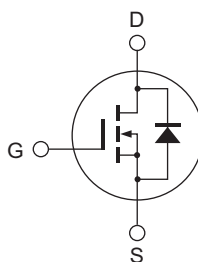
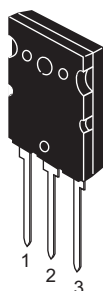
R07DS1198EJ0100
Rev.1.00
Mar 26, 2014

Features

- Low on-resistance
 $R_{DS(on)} = 0.09 \Omega$ typ. (at $I_D = 25 A$, $V_{GS} = 10 V$, $T_a = 25^\circ C$)
- Low leakage current
- High speed switching
- Low gate charge
- Avalanche ratings
- Built-in fast recovery diode: $t_{rr} = 190 ns$ typ

Outline

RENESAS Package code: PRSS0003ZC-A
(Package name:TO-264)



1. Gate
2. Drain
3. Source

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	$I_{D(pulse)}$ ^{Note1}	200	A
Body-drain diode reverse drain current	I_{DR}	50	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ ^{Note1}	200	A
Avalanche current	I_{AP} ^{Note3}	25	A
Channel dissipation	P_{ch} ^{Note2}	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. $STch = 25^\circ C$, $T_{ch} \leq 150^\circ C$

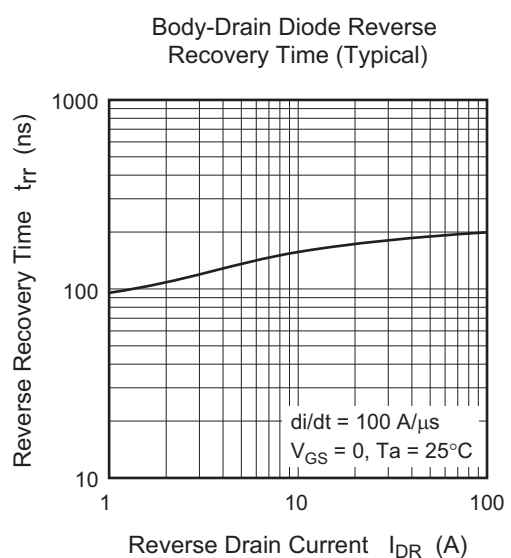
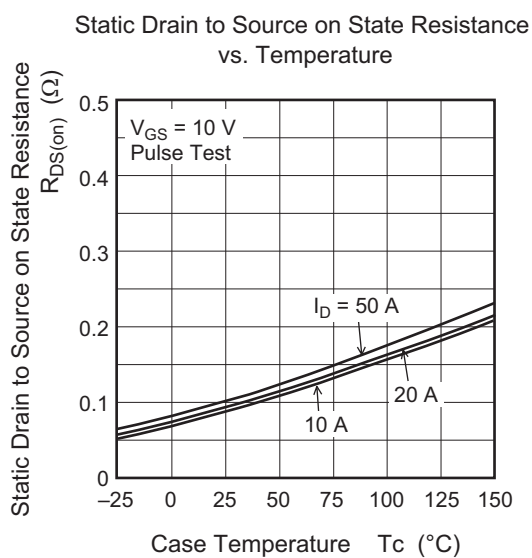
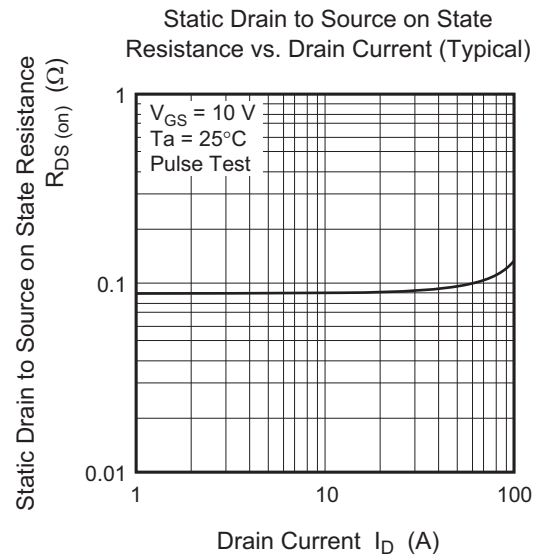
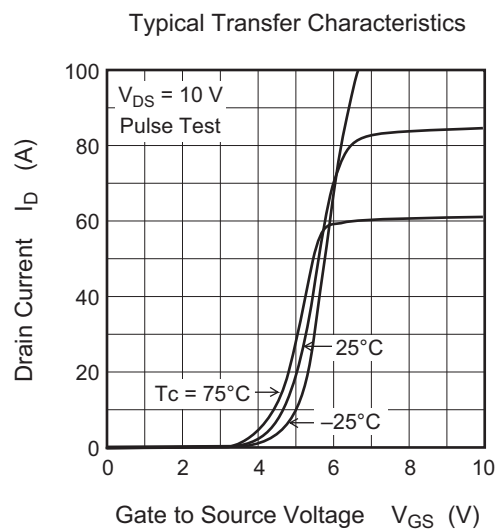
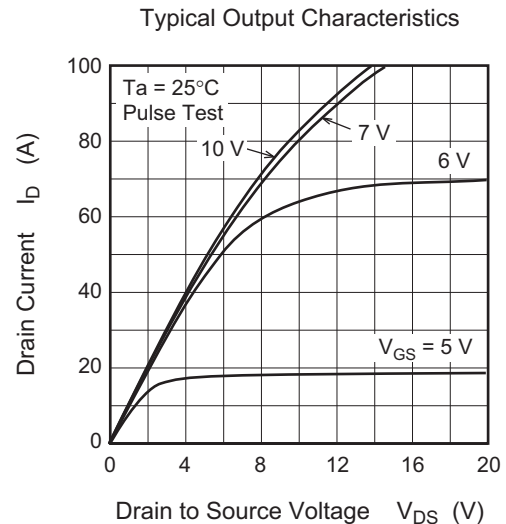
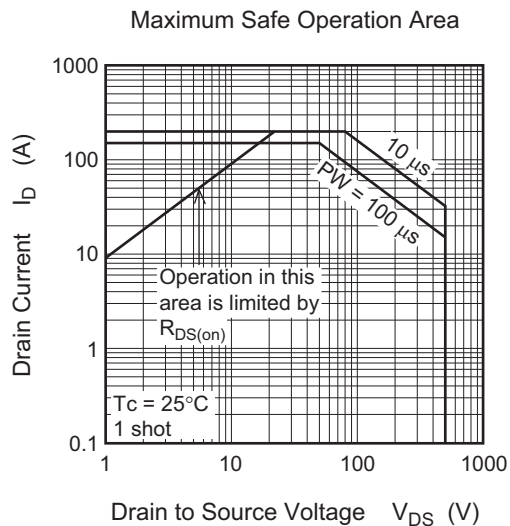
Electrical Characteristics

(Ta = 25°C)

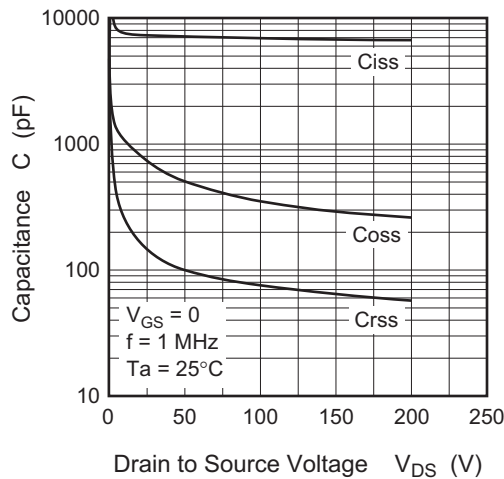
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	500	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	10	μA	$V_{DS} = 500 \text{ V}$, $V_{GS} = 0$
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} $	20	35	—	S	$I_D = 25 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 4}
Input capacitance	C_{iss}	—	7630	—	pF	$V_{DS} = 25 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	770	—	pF	
Reverse transfer capacitance	C_{rss}	—	160	—	pF	
Turn-on delay time	$t_{d(on)}$	—	90	—	ns	$I_D = 25 \text{ A}$ $V_{GS} = 10 \text{ V}$ $R_L = 10 \Omega$ $R_g = 10 \Omega$
Rise time	t_r	—	340	—	ns	
Turn-off delay time	$t_{d(off)}$	—	370	—	ns	
Fall time	t_f	—	280	—	ns	
Total gate charge	Q_g	—	220	—	nC	$V_{DD} = 400 \text{ V}$ $V_{GS} = 10 \text{ V}$ $I_D = 50 \text{ A}$
Gate to source charge	Q_{gs}	—	30	—	nC	
Gate to drain charge	Q_{gd}	—	110	—	nC	
Body-drain diode forward voltage	V_{DF}	—	1.0	1.5	V	$I_F = 50 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	190	—	ns	$I_F = 50 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$
Body-drain diode reverse recovery charge	Q_{rr}	—	1.3	—	μC	

Notes: 4. Pulse test

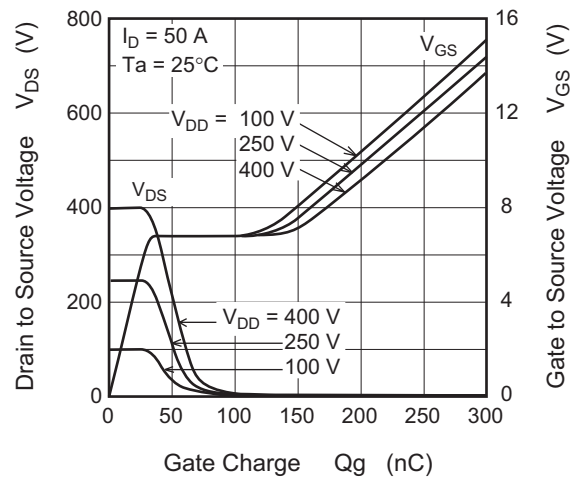
Main Characteristics



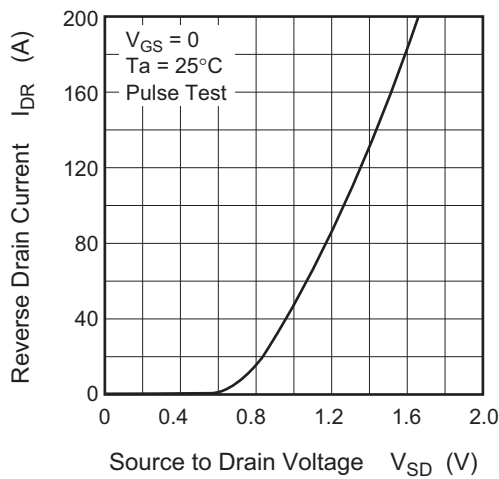
Typical Capacitance vs.
Drain to Source Voltage



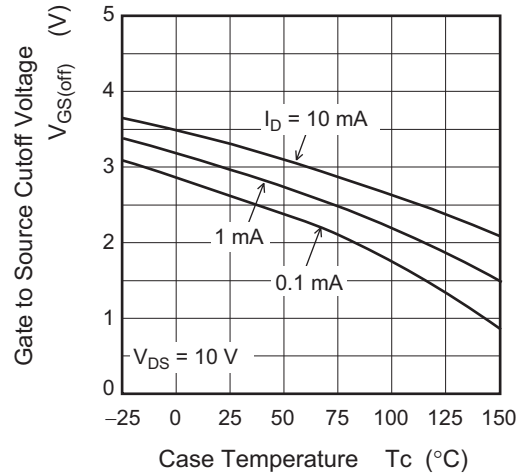
Dynamic Input Characteristics (Typical)

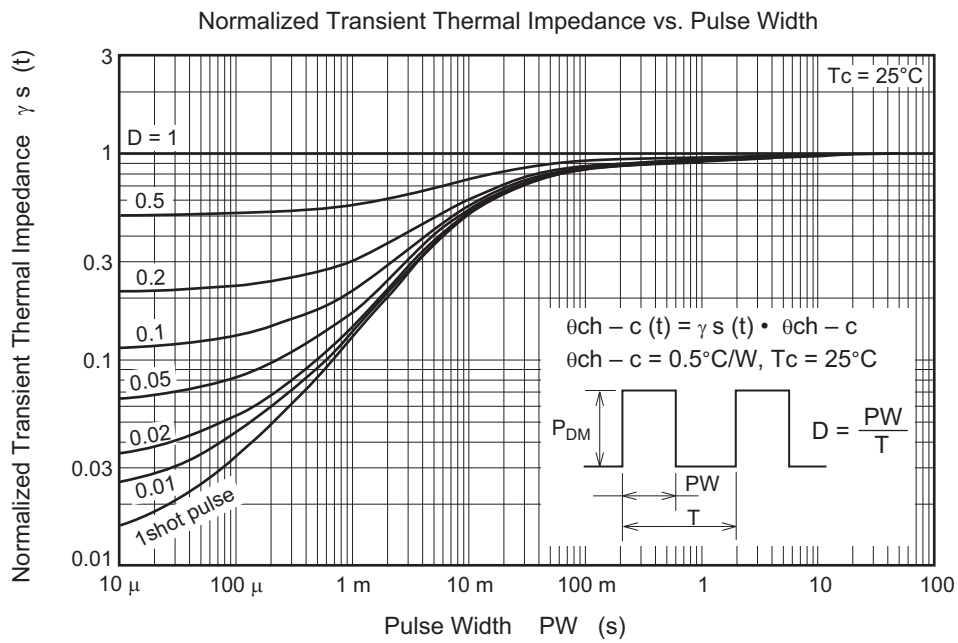


Reverse Drain Current vs.
Source to Drain Voltage (Typical)

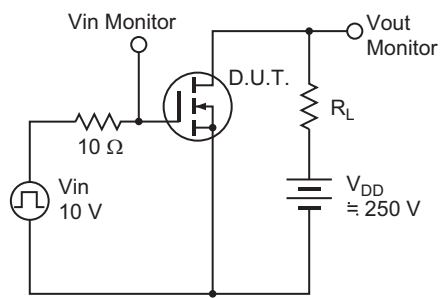


Gate to Source Cutoff Voltage
vs. Case Temperature (Typical)

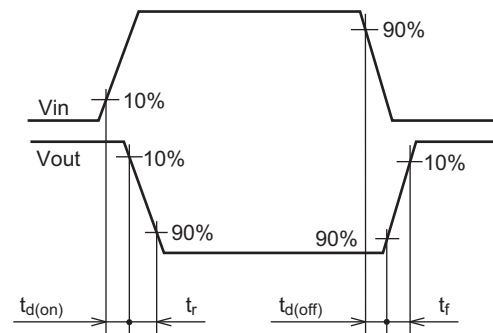




Switching Time Test Circuit



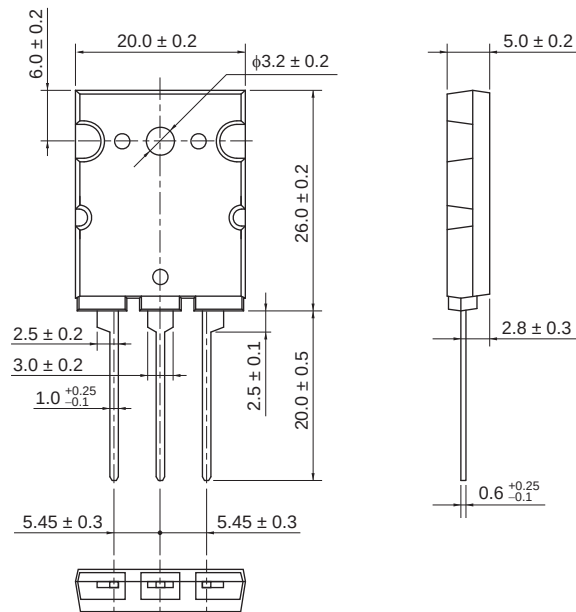
Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-264	—	PRSS0003ZC-A	TO-264S	9.48g

Unit: mm



Ordering Information

Orderable Part Number	Quantity	Shipping Container
H5N5004PL-E0-E#T2	25 pcs	Tube

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