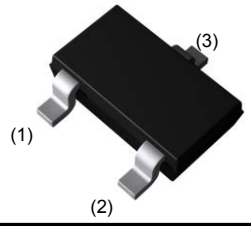
RSR020P05

V_{DSS}	−45V
$R_{DS(on)}$ (Max.)	190mΩ
I_D	−2.0A
P_D	1.0W

●Outline

TSMT3



●Features

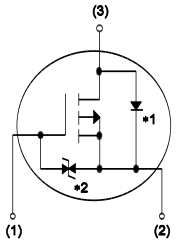
1) Low on - resistance.

2) Built-in G-S Protection Diode.

3) Small Surface Mount Package (TSMT3).

4) Pb-free lead plating ; RoHS compliant

●Inner circuit



(1) Gate
(2) Source
(3) Drain

∗1 BODY DIODE
∗2 ESD PROTECTION DIODE

●Application

DC/DC converters

●Packaging specifications

Type	Packaging	Taping
	Reel size (mm)	180
	Tape width (mm)	8
	Basic ordering unit (pcs)	3,000
	Taping code	TL
	Marking	ZH

●Absolute maximum ratings(T_a = 25°C)

Parameter	Symbol	Value	Unit
Drain - Source voltage	V_{DSS}	−45	V
Continuous drain current	I_D *1	±2.0	A
Pulsed drain current	$I_{D,pulse}$ *2	±8.0	A
Gate - Source voltage	V_{GSS}	±20	V
Power dissipation	P_D *3	1.0	W
	P_D *4	0.54	W
Junction temperature	T_j	150	°C
Range of storage temperature	T_{stg}	−55 to +150	°C

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●Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - ambient	R_{thJA} *3	-	-	125	°C/W
	R_{thJA} *4	-	-	232	°C/W

●Electrical characteristics(T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = −1mA	−45	-	-	V
Breakdown voltage temperature coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_j}$	I_D= −1mA referenced to 25°C	-	−43	-	mV/°C
Zero gate voltage drain current	I_{DSS}	V_{DS} = −45V, V_{GS} = 0V	-	-	−1	μA
Gate - Source leakage current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	-	-	±10	μA
Gate threshold voltage	$V_{GS\ (th)}$	V_{DS} = −10V, I_D = −1mA	−1.0	-	−3.0	V
Gate threshold voltage temperature coefficient	$\frac{\Delta V_{(GS)th}}{\Delta T_j}$	I_D= −1mA referenced to 25°C	-	3.2	-	mV/°C
Static drain - source on - state resistance	$R_{DS(on)}$ *5	V_{GS}= −10V, I_D= −2.0A	-	130	190	mΩ
		V_{GS}= −4.5V, I_D= −2.0A	-	180	260	
		V_{GS}= −4.0V, I_D= −2.0A	-	200	280	
		V_{GS}= −10V, I_D= −2.0A, T_j=125°C	-	200	280	
Gate input resistannce	R_G	f = 1MHz, open drain	-	21	-	Ω
Transconductance	g_{fs} *5	V_{DS}= −10V, I_D= −2.0A	1.2	4.0	-	S

*1 Limited only by maximum temperature allowed.

*2 Pw ≤ 10μs, Duty cycle ≤ 1%

*3 Mounted on a seramic board (30×30×0.8mm)

*4 Mounted on a FR4 (12×20×0.8mm)

*5 Pulsed

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●Electrical characteristics(T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{iss}	V_{GS} = 0V	-	500	-	pF
Output capacitance	C_{oss}	V_{DS} = −10V	-	80	-	
Reverse transfer capacitance	C_{rss}	f = 1MHz	-	40	-	
Turn - on delay time	$t_{d(on)}$ *5	$V_{DD} \simeq$ −25V, V_{GS} = −10V	-	8	-	ns
Rise time	t_r *5	I_D = −1.0A	-	10	-	
Turn - off delay time	$t_{d(off)}$ *5	R_L = 25Ω	-	35	-	
Fall time	t_f *5	R_G = 10Ω	-	10	-	

●Gate Charge characteristics(T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Total gate charge	Q_g *5	$V_{DD} \simeq$ −25V, I_D= −2.0A V_{GS} = −4.5V	-	4.5	-	nC
		$V_{DD} \simeq$ −25V, I_D= −2.0A V_{GS} = −10V	-	9.5	-	
Gate - Source charge	Q_{gs} *5	$V_{DD} \simeq$ −25V, I_D= −2.0A V_{GS} = −10V	-	1.6	-	
Gate - Drain charge	Q_{gd} *5		-	1.2	-	

●Body diode electrical characteristics (Source-Drain)(T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Inverse diode continuous, forward current	I_S *1	T_a = 25°C	-	-	−0.8	A
Forward voltage	V_{SD} *5	V_{GS} = 0V, I_s = −2.0A	-	-	−1.2	V