

RSR020N06

V_{DSS}	60V
$R_{DS(on)}$ (Max.)	170mΩ
I_D	2A
P_D	1.0W

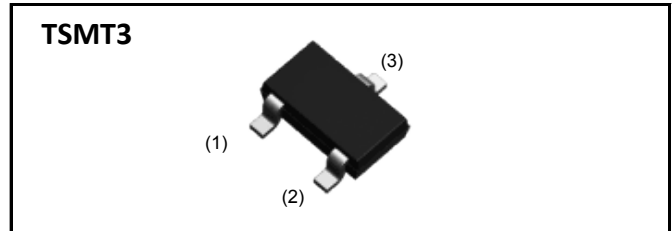
●Features

- 1) Low on - resistance.
- 2) Built-in G-S Protection Diode.
- 3) Small Surface Mount Package (TSMT3).
- 4) Pb-free lead plating ; RoHS compliant

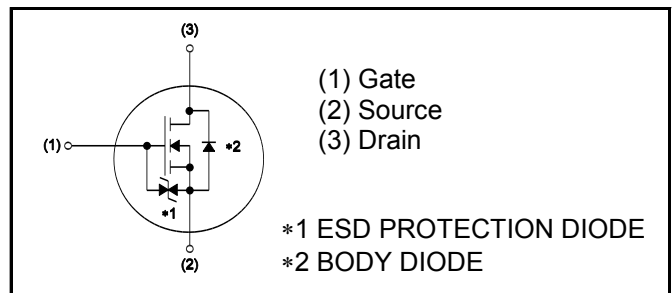
●Application

DC/DC converters

●Outline



●Inner circuit



●Packaging specifications

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

●Absolute maximum ratings($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Value	Unit
Drain - Source voltage	V_{DSS}	60	V
Continuous drain current	I_D^{*1}	±2	A
Pulsed drain current	$I_{D,pulse}^{*2}$	±8	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
Thermal resistance, junction - ambient	R_{thJA}^{*4}	-	-	231	°C/W

●Electrical characteristics($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 1mA$	60	-	-	V
Breakdown voltage temperature coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_j}$	$I_D = 1mA$ referenced to 25°C	-	67	-	mV/°C
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0V$	-	-	1	μA
Gate - Source leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 10	μA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = 10V, I_D = 1mA$	1.0	-	2.5	V
Gate threshold voltage temperature coefficient	$\frac{\Delta V_{(GS)th}}{\Delta T_j}$	$I_D = 1mA$ referenced to 25°C	-	-4.4	-	mV/°C
Static drain - source on - state resistance	$R_{DS(on)}^{*5}$	$V_{GS}=10V, I_D=2A$	-	120	170	m Ω
		$V_{GS}=4.5V, I_D=2A$	-	140	195	
		$V_{GS}=4.0V, I_D=2A$	-	150	210	
		$V_{GS}=10V, I_D=2A, T_j=125^\circ\text{C}$	-	220	310	
Gate input resistance	R_G	$f = 1MHz, \text{open drain}$	-	3.0	-	Ω
Transconductance	g_{fs}^{*5}	$V_{DS} = 10V, I_D = 2A$	1.3	3.0	-	S

*1 Limited only by maximum temperature allowed.

*2 $P_w \leq 10\mu\text{s}$, Duty cycle $\leq 1\%$

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

*4 Mounted on a FR4 (12×20×0.8mm)

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●Electrical characteristics($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input capacitance	C_{iss}	$V_{GS} = 0V$	-	180	-	pF
Output capacitance	C_{oss}	$V_{DS} = 10V$	-	50	-	
Reverse transfer capacitance	C_{rss}	$f = 1\text{MHz}$	-	22	-	
Turn - on delay time	$t_{d(on)}^{*5}$	$V_{DD} \approx 30V, V_{GS} = 10V$	-	6	-	ns
Rise time	t_r^{*5}	$I_D = 1.0A$	-	10	-	
Turn - off delay time	$t_{d(off)}^{*5}$	$R_L = 30\Omega$	-	20	-	
Fall time	t_f^{*5}	$R_G = 10\Omega$	-	6	-	

●Gate Charge characteristics($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Total gate charge	Q_g^{*5}	$V_{DD} \approx 30V, I_D = 2A$ $V_{GS} = 5V$	-	2.7	-	nC
		$V_{DD} \approx 30V, I_D = 2A$ $V_{GS} = 10V$	-	4.9	-	
Gate - Source charge	Q_{gs}^{*5}	$V_{DD} \approx 30V, I_D = 2A$	-	1.0	-	
Gate - Drain charge	Q_{gd}^{*5}	$V_{GS} = 5V$	-	0.6	-	

●Body diode electrical characteristics (Source-Drain)($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Inverse diode continuous, forward current	I_s^{*1}	$T_a = 25^\circ\text{C}$	-	-	0.8	A
Forward voltage	V_{SD}^{*5}	$V_{GS} = 0V, I_s = 2A$	-	-	1.2	V

*5 Pulsed