

Description

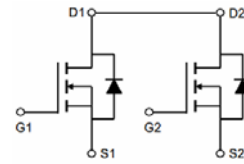
The RST2007NS uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

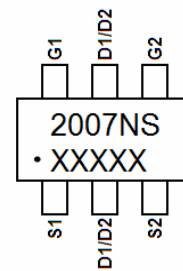
- $V_{DS} = 20V, I_D = 6.5A$
 $R_{DS(ON)} < 27m\Omega @ V_{GS}=2.5V$
 $R_{DS(ON)} < 22m\Omega @ V_{GS}=4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

Application

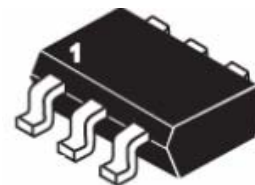
- Battery protection
- Load switch
- Power management



Schematic diagram



Marking and pin Assignment



SOT23-6L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
2007NS	RST2007NS	SOT23-6L	Ø180mm	8mm	3000 units

Absolute Maximum Ratings ($T_A=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous	I_D	6.5	A
Drain Current-Pulsed ^(Note 1)	I_{DM}	25	A
Maximum Power Dissipation	P_D	1.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^{\circ}C$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	83	$^{\circ}C/W$
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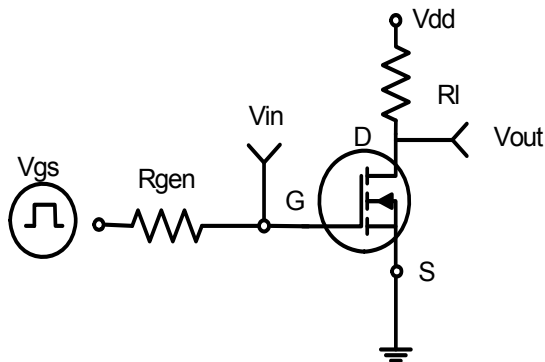
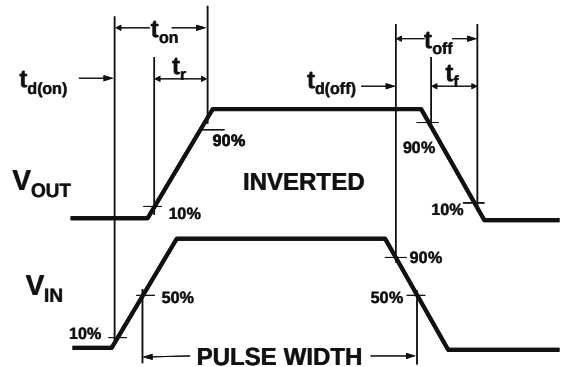
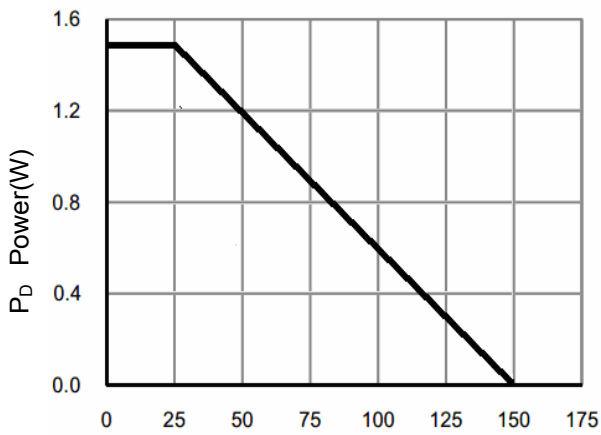
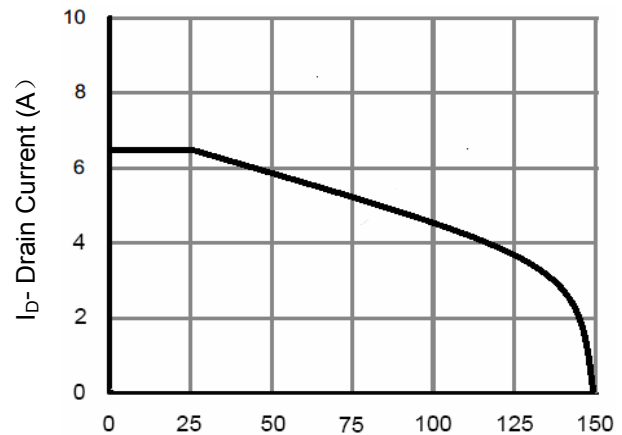
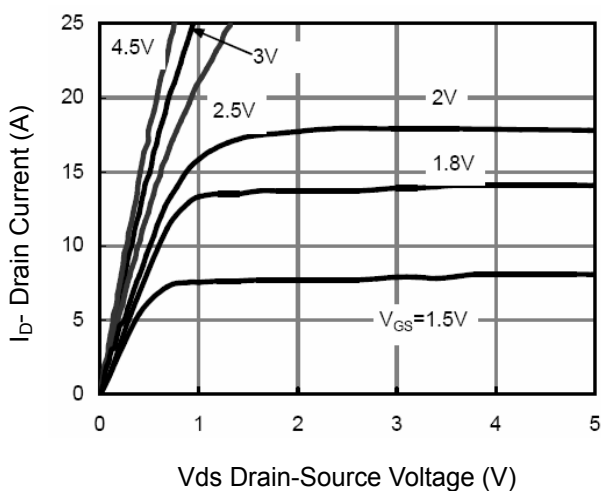
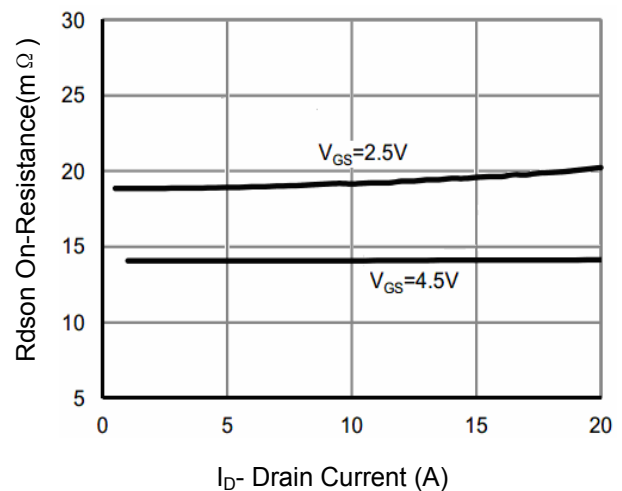
Electrical Characteristics ($T_A=25^{\circ}C$ unless otherwise noted)

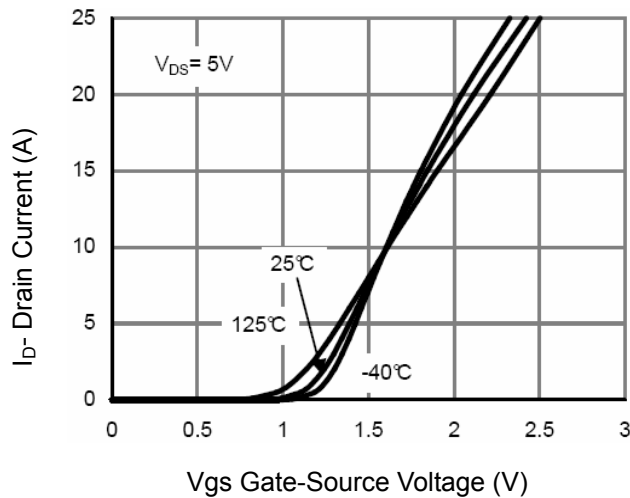
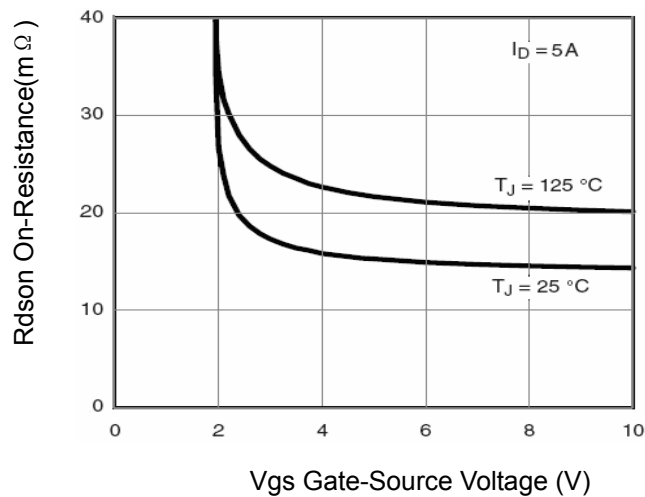
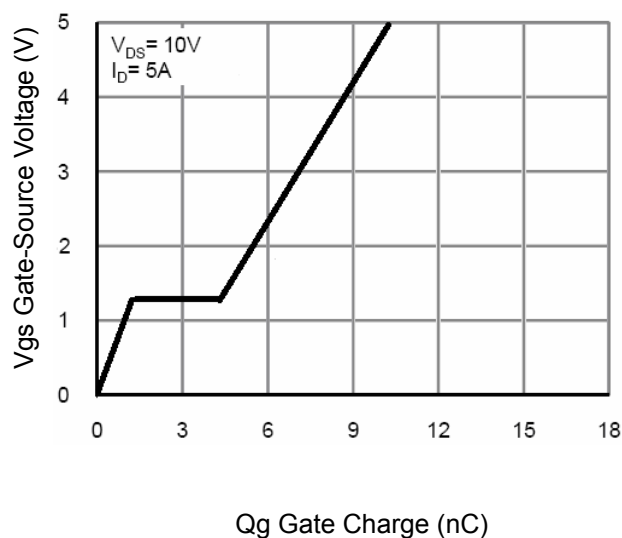
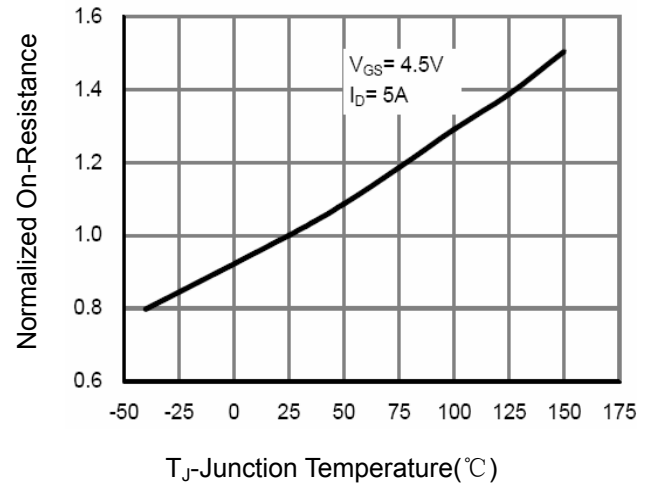
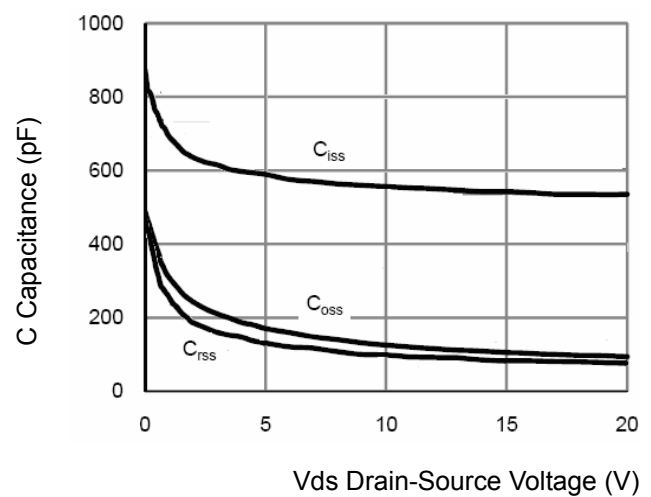
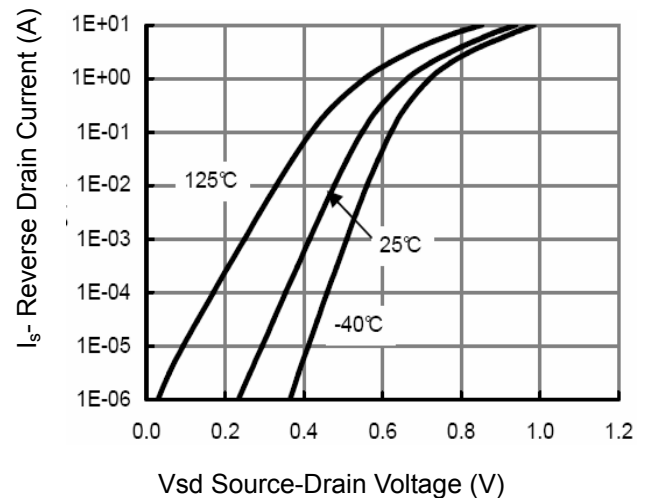
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=19.5V, V_{GS}=0V$	-	-	1	μA

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±12V,V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	0.5	0.7	1.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =5A	-	14.5	22	mΩ
		V _{GS} =2.5V, I _D =5A	-	19	27	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V,I _D =5A	-	10	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{iss}	V _{DS} =10V,V _{GS} =0V, F=1.0MHz	-	565	-	PF
Output Capacitance	C _{oss}		-	108	-	PF
Reverse Transfer Capacitance	C _{rss}		-	98	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V,I _D =5A V _{GS} =4V,R _{GEN} =10Ω	-	9	-	nS
Turn-on Rise Time	t _r		-	10	-	nS
Turn-Off Delay Time	t _{d(off)}		-	32	-	nS
Turn-Off Fall Time	t _f		-	24	-	nS
Total Gate Charge	Q _g	V _{DS} =10V,I _D =5A, V _{GS} =4.5V	-	9.5	-	nC
Gate-Source Charge	Q _{gs}		-	1.2	-	nC
Gate-Drain Charge	Q _{gd}		-	3.3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V,I _S =5A	-	0.8	1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	6.5	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

Figure 1: Switching Test Circuit

Figure 2: Switching Waveforms

Figure 3 Power Dissipation

Figure 4 Drain Current

Figure 5 Output Characteristics

Figure 6 Drain-Source On-Resistance


Figure 7 Transfer Characteristics

Figure 9 Rdson vs Vgs

Figure 11 Gate Charge

Figure 8 Drain-Source On-Resistance

Figure 10 Capacitance vs Vds

Figure 12 Source- Drain Diode Forward

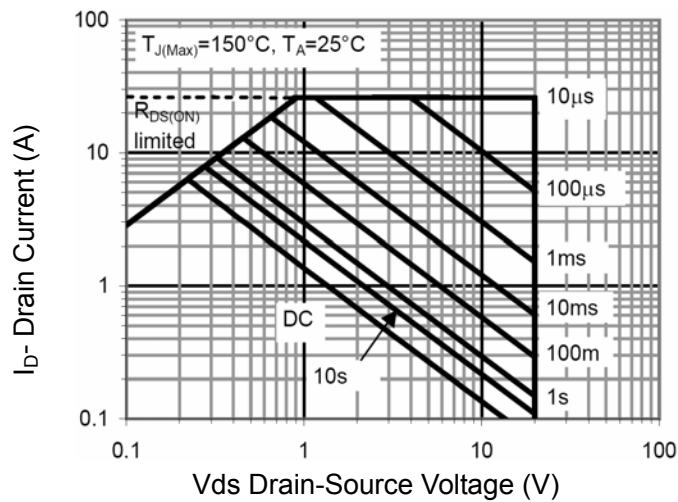


Figure 13 Safe Operation Area

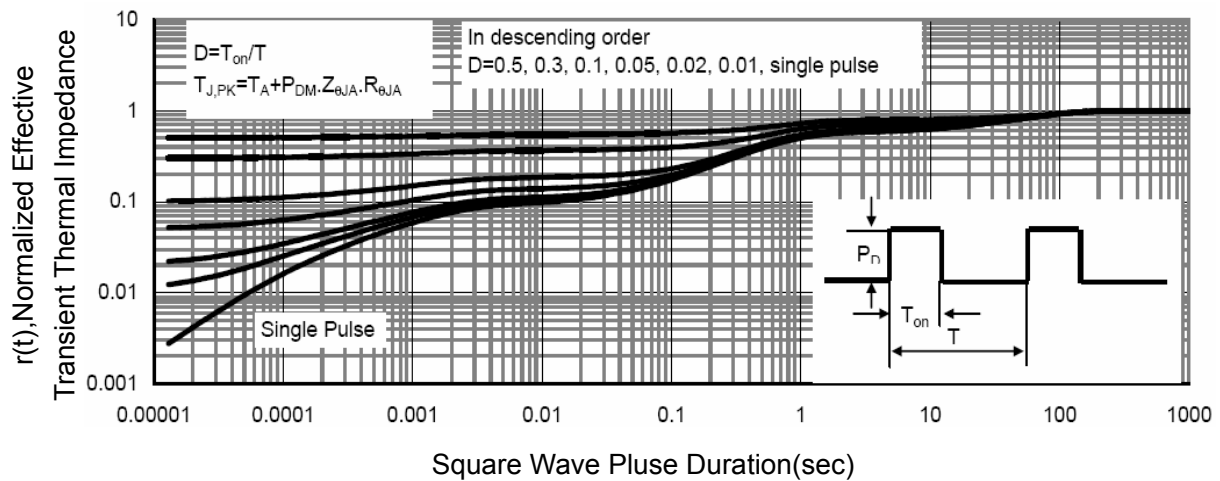
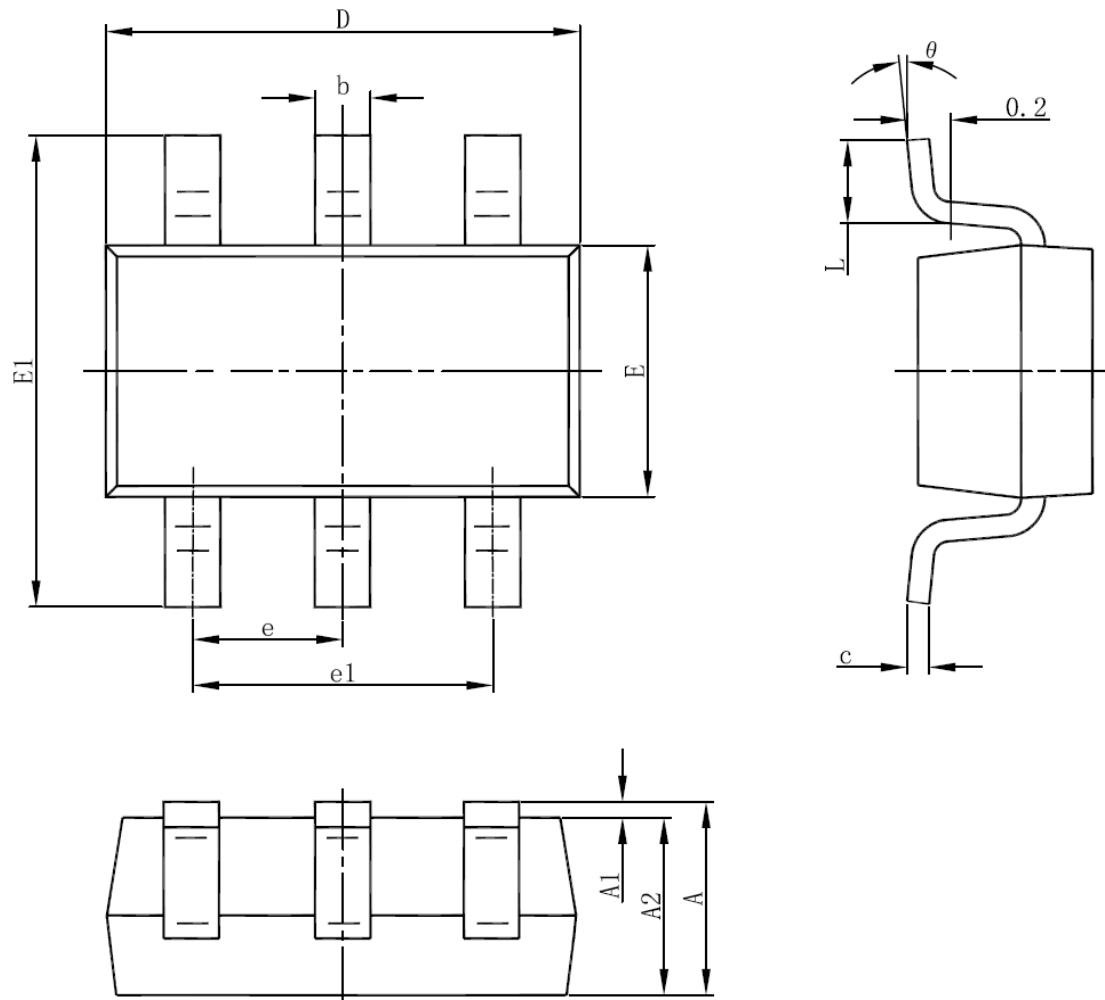


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT23-6L Package Information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°