

Description

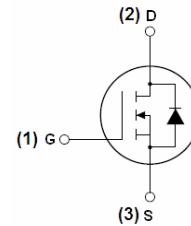
The RST2006Y uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

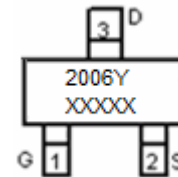
- $V_{DS} = 20V, I_D = 6A$
 $R_{DS(ON)} < 13m\Omega @ V_{GS} = 4.5V$ (Typ: 10.5m Ω)
 $R_{DS(ON)} < 18m\Omega @ V_{GS} = 2.5V$ (Typ: 15m Ω)
- High density cell design for ultra low $R_{DS(ON)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Application

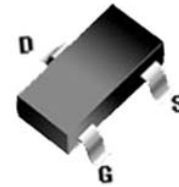
- Power switching application
- Load switching
- Uninterruptible power supply



Schematic diagram



Marking and pin Assignment



SOT-23-3L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
2006Y	RST2006Y	SOT23-3L	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	A
Drain Current-Continuous ($T_C = 100^\circ C$)	$I_D (100^\circ C)$	4.2	A
Pulsed Drain Current	I_{DM}	24	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)	$R_{\theta JA}$	83.3	$^\circ C/W$
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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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V	-	-	1	μA
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 =6A	-	10.5	13	mΩ
		V _{GS} =2.5V, I _D =5A		15	18	
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, F=1.0MHz		620		PF
Output Capacitance	C _{oss}			125		PF
Reverse Transfer Capacitance	C _{rss}			64		PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{GS} =10V, V _{DS} =10V R _L =0. 5Ω, R _G =3Ω	-	4.5	-	nS
Turn-on Rise Time	t _r		-	9.2	-	nS
Turn-Off Delay Time	t _{d(off)}		-	18.7	-	nS
Turn-Off Fall Time	t _f		-	3.3	-	nS
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =10V, I _D =6A		15		nC
Gate-Source Charge	Q _{gs}			1.8		nC
Gate-Drain Charge	Q _{gd}			2.8		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =6A	-	-	1.2	V
Diode Forward Current (Note 2)	I _S	-	-	-	6	A

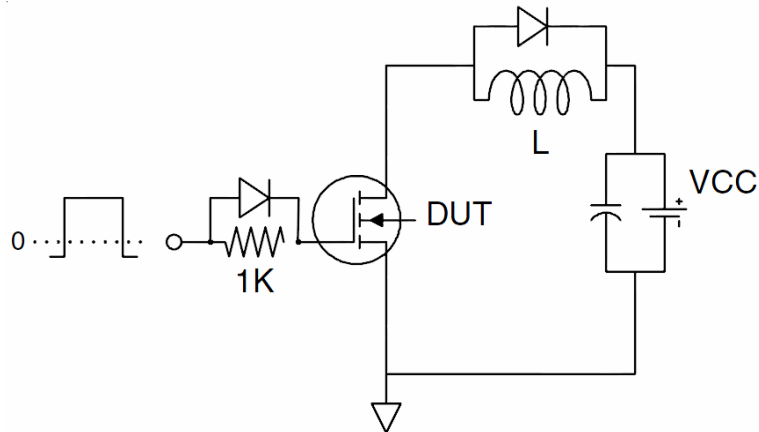
Notes:

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

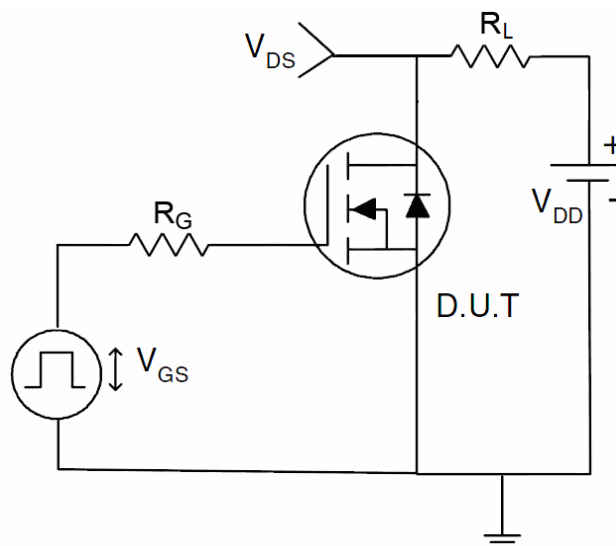
Test circuit

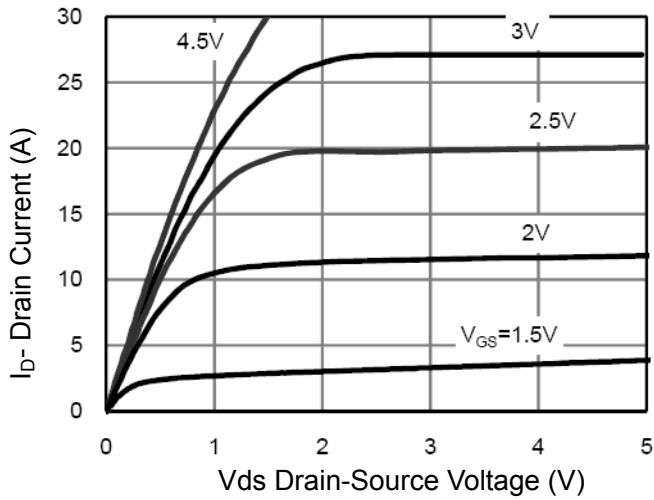
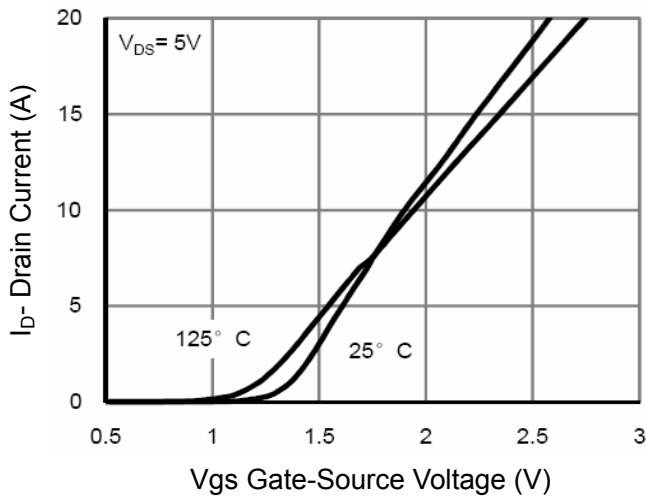
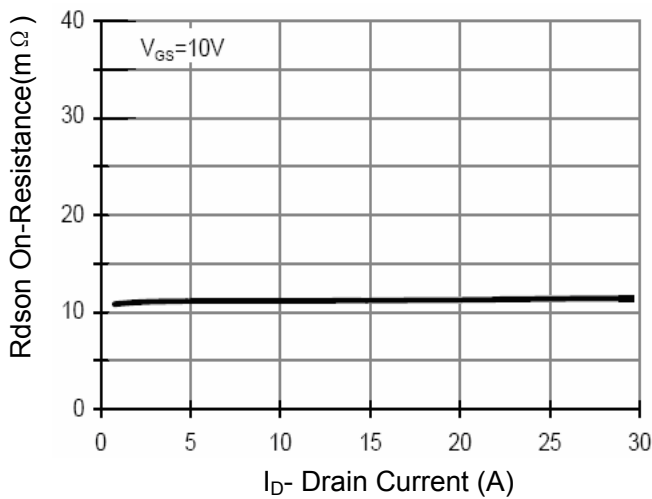
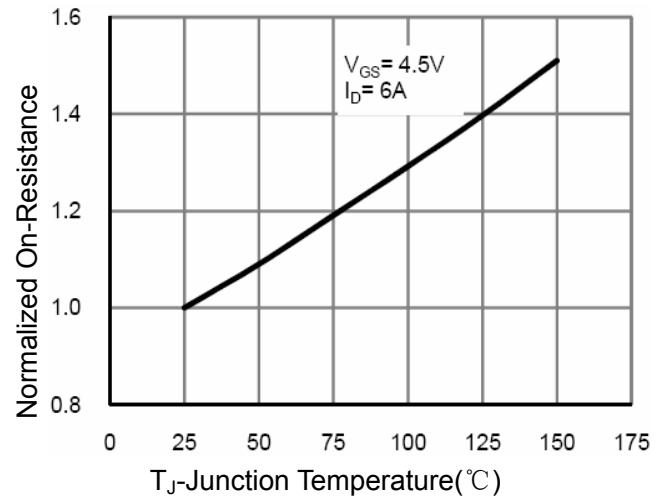
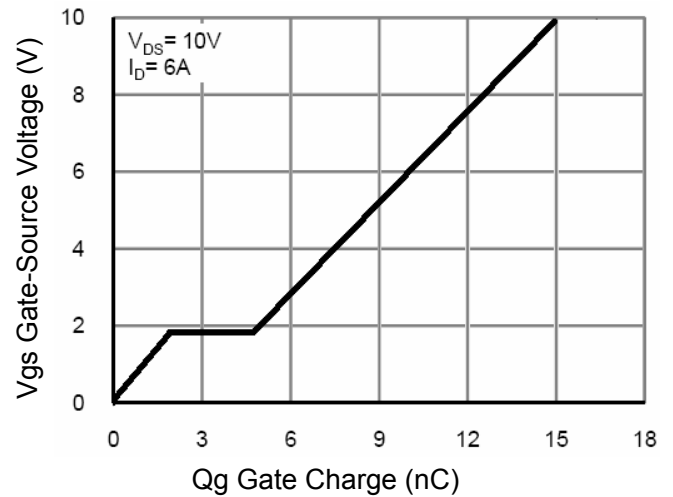
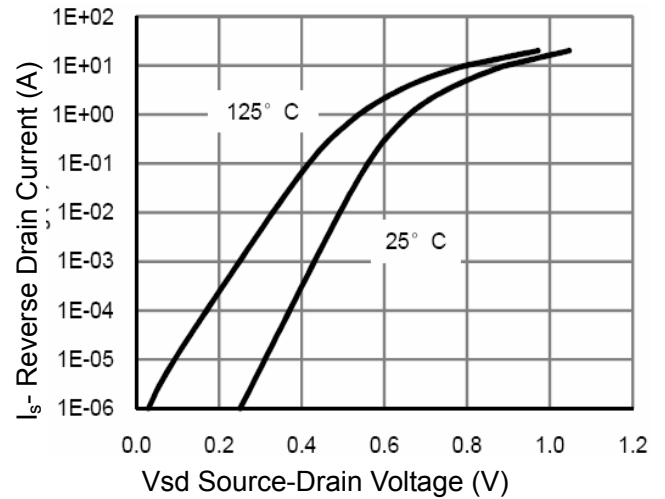
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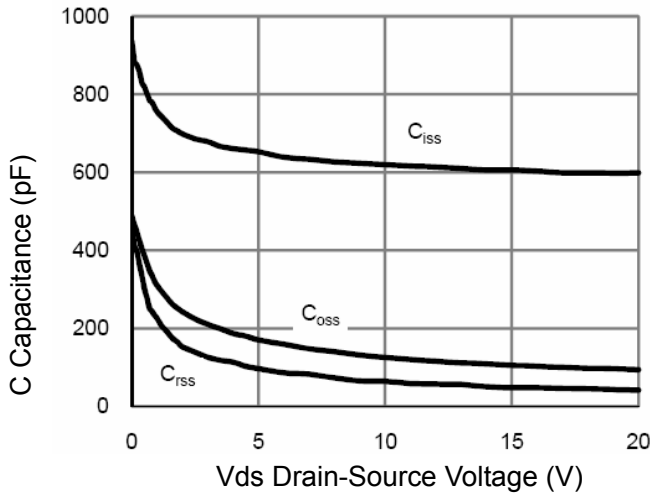
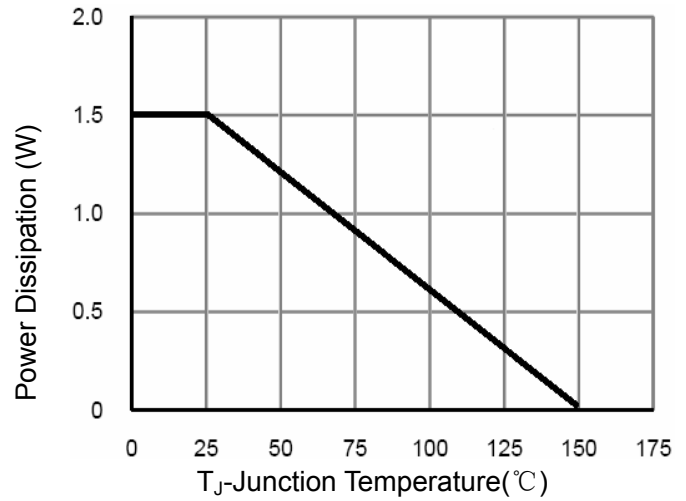
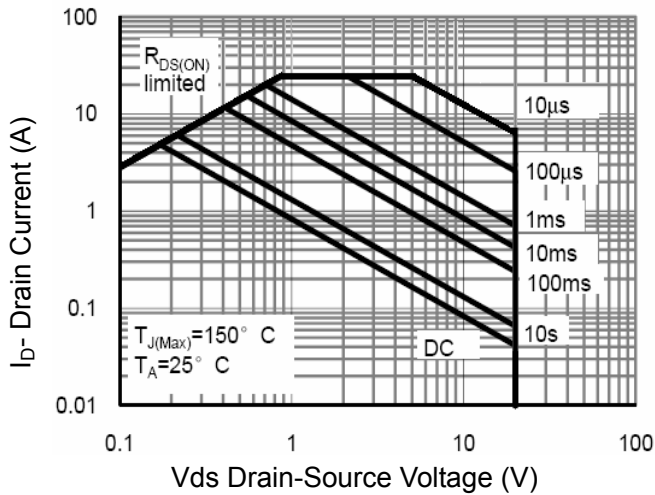
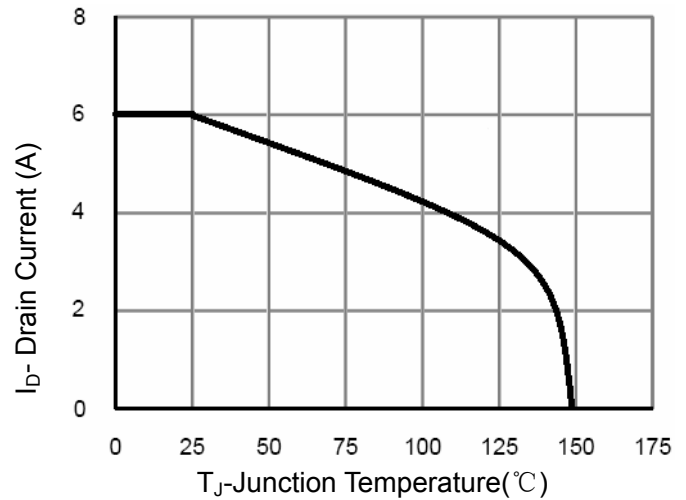
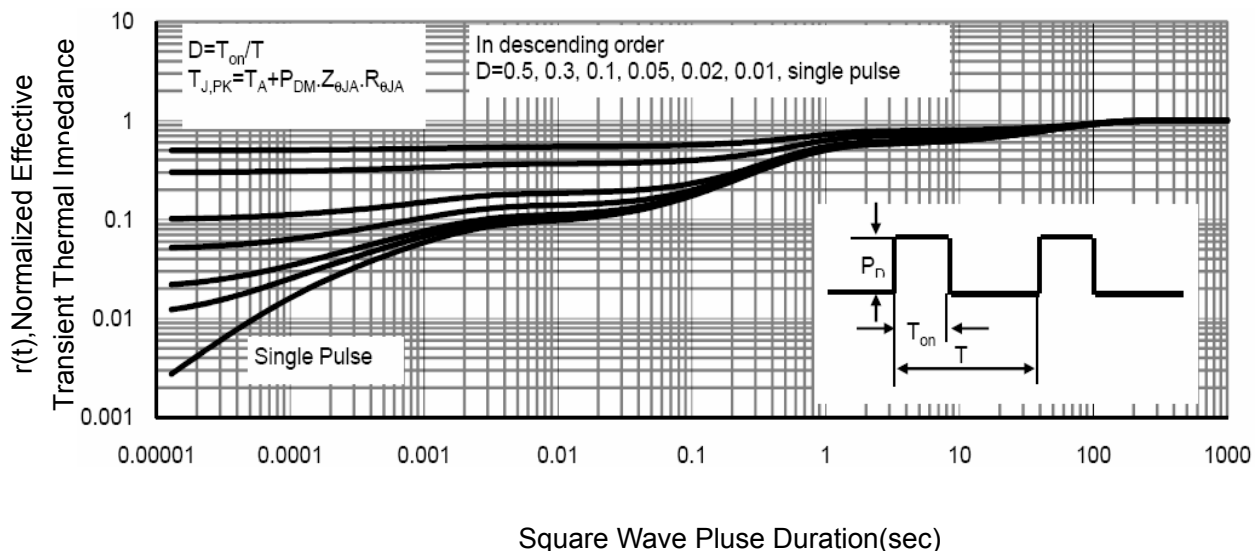
1) Gate charge test Circuit:

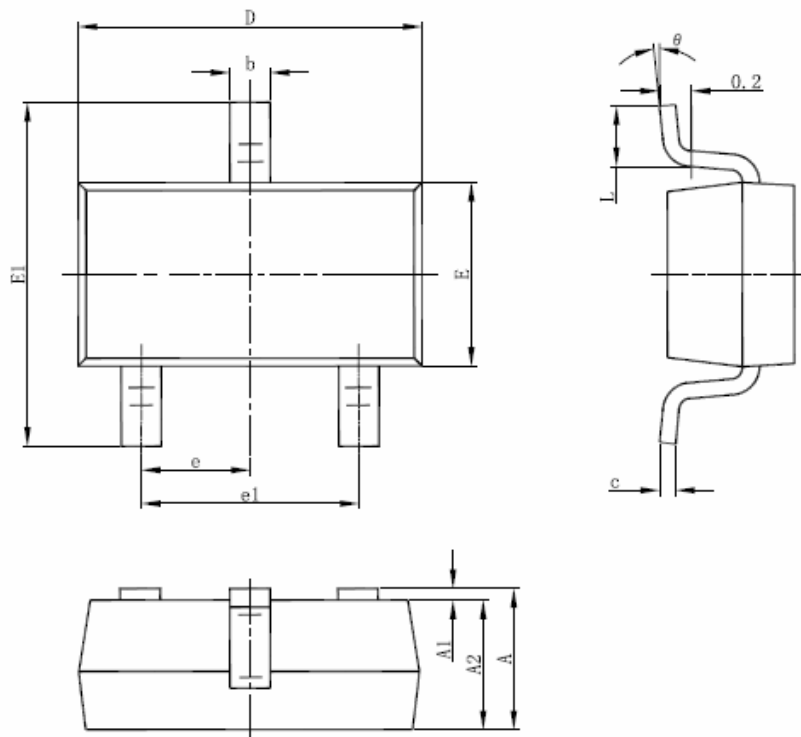


2) Switch Time Test Circuit:



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Typical Electrical and Thermal Characteristics (Curves)

Figure 1 Output Characteristics

Figure 2 Transfer Characteristics

Figure 3 $R_{DS(on)}$ - Drain Current

Figure 4 $R_{DS(on)}$ -Junction Temperature

Figure 5 Gate Charge

Figure 6 Source- Drain Diode Forward

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Figure 7 Capacitance vs Vds

Figure 9 Power De-rating

Figure 8 Safe Operation Area

Figure 10 Current De-rating

Figure 11 Normalized Maximum Transient Thermal Impedance

SOT-23-3L Package Information
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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°

Notes

1. All dimensions are in millimeters.
2. Tolerance $\pm 0.10\text{mm}$ (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact