

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent Cdv/dt effect decline
- ★ Advanced high cell density Trench technology

## Product Summary

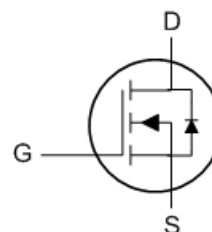
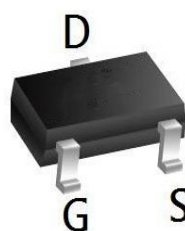


BVDSS	RDSON	ID
100V	91 mΩ	4.5 A

## Description

The XRS1005 is the high cell density trenched N-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications. The XRS1005 meet the RoHS and Green Product requirement with full function reliability approved.

## SOT23 Pin Configuration

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		$V_{DS}$	100	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$T_A = 25^\circ\text{C}$	$I_D$	4.5	A
Pulsed Drain Current <sup>1</sup>		$I_{DM}$	13.2	A
Power Dissipation	$T_A = 25^\circ\text{C}$	$P_D$	1.5	W
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

## Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction to Ambient <sup>2</sup>	$R_{\theta JA}$	83.3	$^\circ\text{C/W}$

**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	100	-	-	V
Gate-body Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1	1.65	2.5	V
Drain-Source On-state Resistance <sup>3</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3A	-	91	130	mΩ
		V <sub>GS</sub> = 6V, I <sub>D</sub> = 2A	-	105	160	
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 1A	-	120	190	
Dynamic Characteristics <sup>4</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 50V, f = 1MHz	-	200	-	pF
Output Capacitance	C <sub>oss</sub>		-	35	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	2.5	-	
Switching Characteristics <sup>4</sup>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 50V, V <sub>GS</sub> =10V, I <sub>D</sub> =3A	-	4	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	0.6	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	1.4	-	
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 50V, V <sub>GS</sub> =10V, I <sub>D</sub> =3A, R <sub>G</sub> =3Ω	-	12.5	-	ns
Turn-on Rise Time	t <sub>r</sub>		-	19.5	-	
Turn-off Delay Time	t <sub>d(off)</sub>		-	20	-	
Turn- off Fall Time	t <sub>f</sub>		-	29	-	
Source-Drain Diode characteristics						
Body Diode Voltage <sup>3</sup>	V <sub>SD</sub>	I <sub>S</sub> = 3A, V <sub>GS</sub> = 0V	-	-	1.2	V
Continuous Source Current	I <sub>S</sub>		-	-	4.5	A

**Notes:**

1. Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)}=150^\circ\text{C}$ .
2. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ .
4. This value is guaranteed by design hence it is not included in the production test.

#### Typical Characteristics

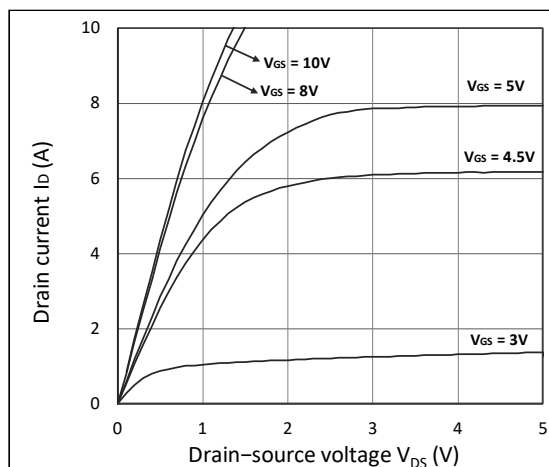


Figure 1. Output Characteristics

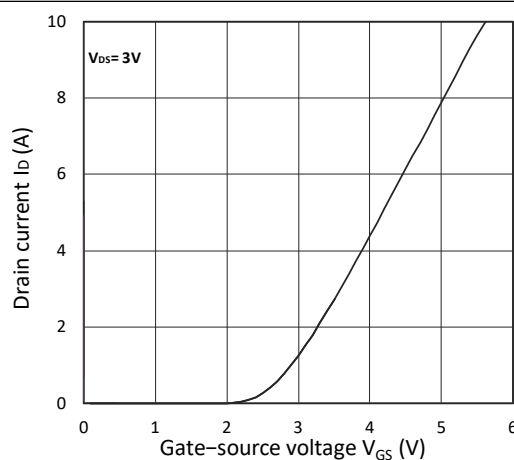


Figure 2. Transfer Characteristics

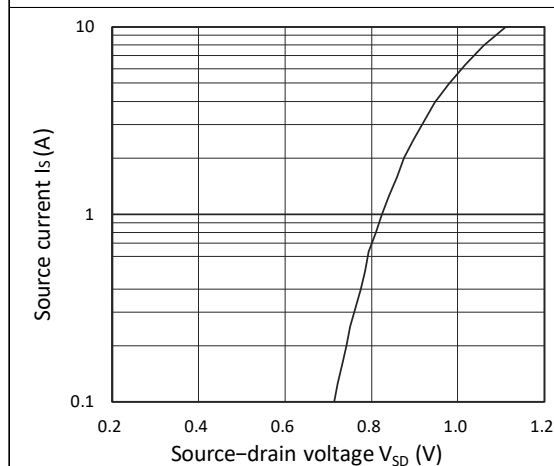


Figure 3. Forward Characteristics of Reverse

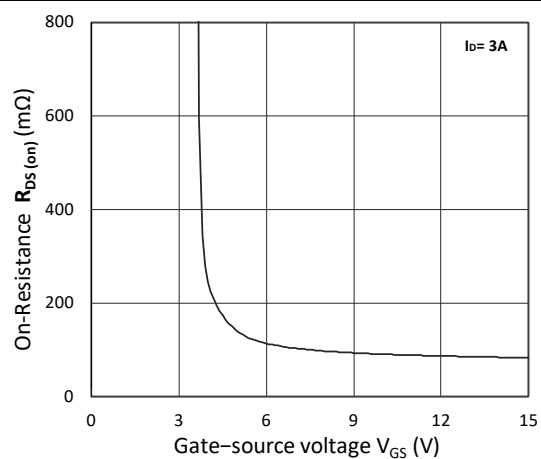


Figure 4.  $R_{DS(on)}$  vs.  $V_{GS}$

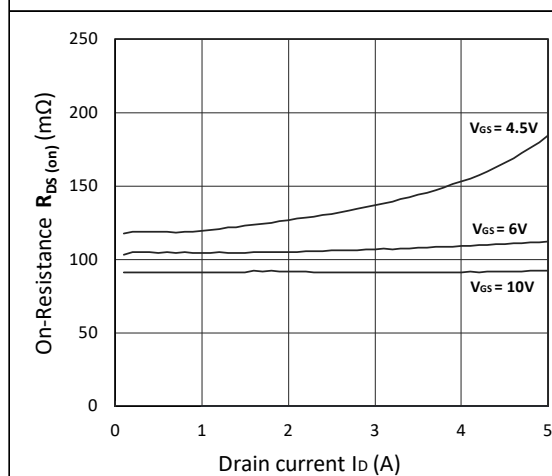


Figure 5.  $R_{DS(on)}$  vs.  $I_D$

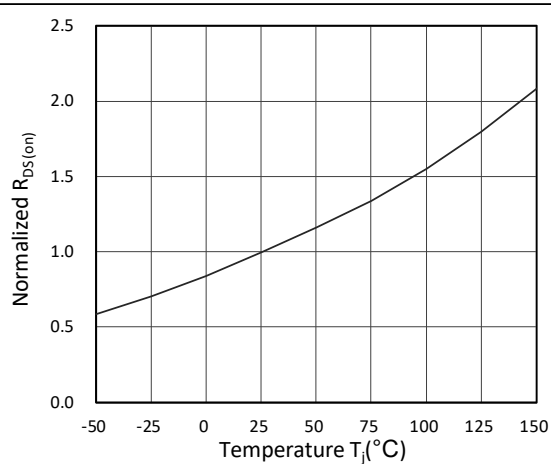


Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature

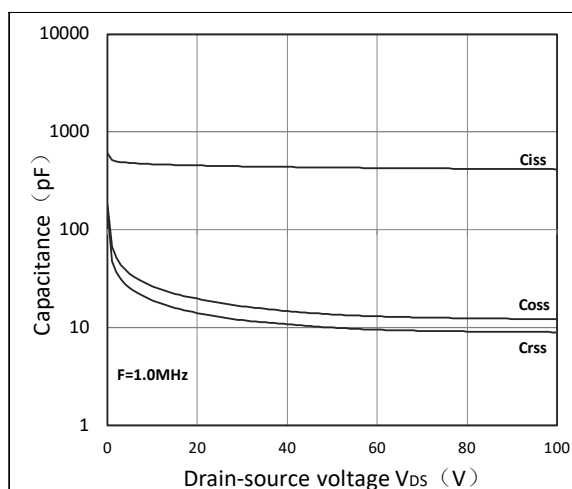


Figure 7. Capacitance Characteristics

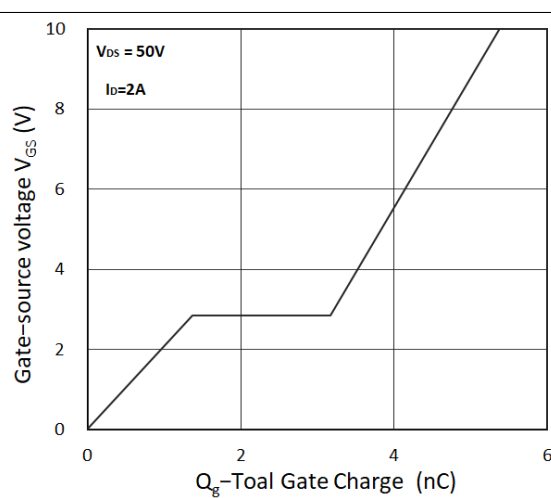
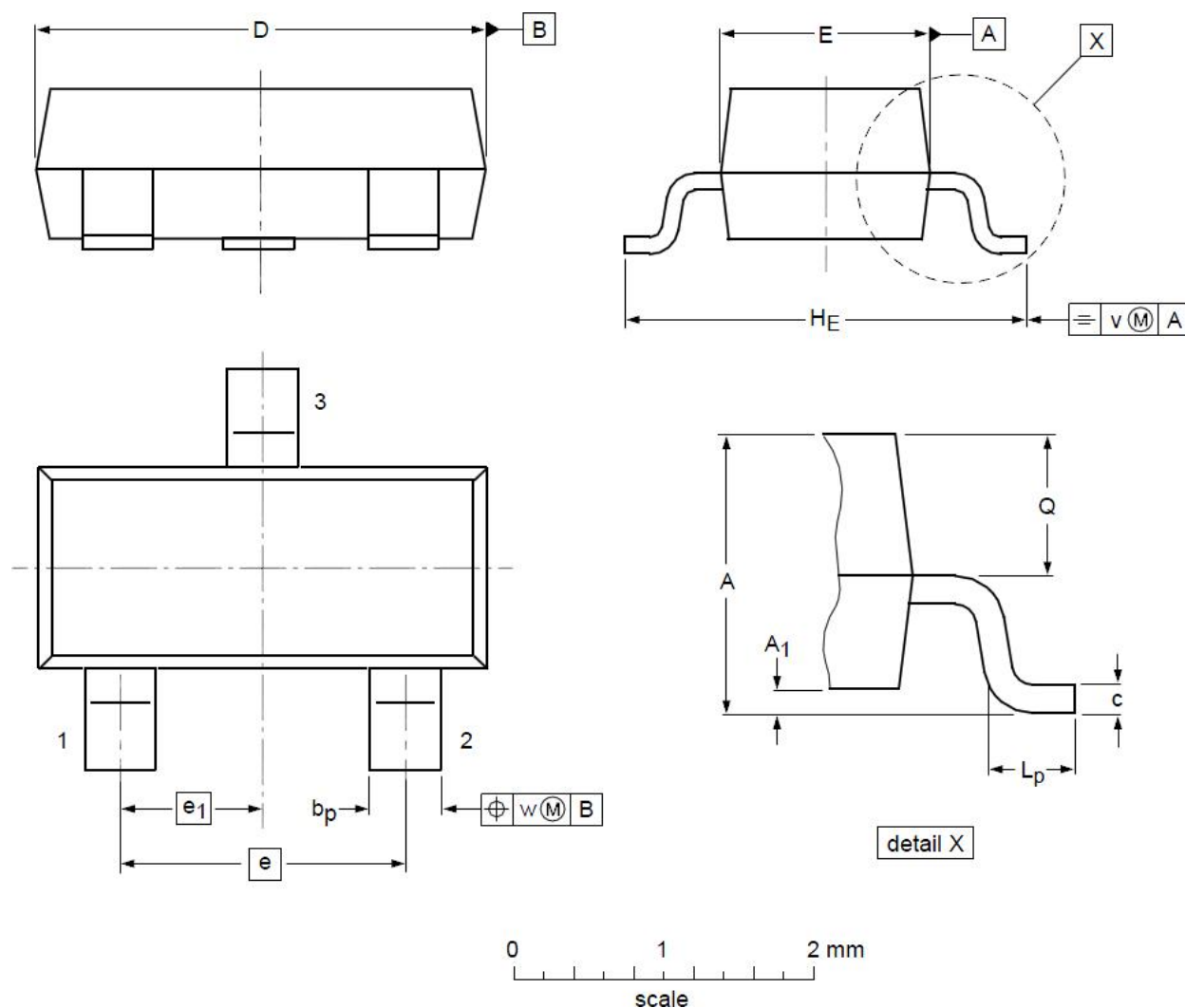


Figure 8. Gate Charge Characteristics

### SOT23 Mechanical Data



### DIMENSIONS ( unit : mm )

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
<b>A</b>	0.90	1.01	1.15	<b>A<sub>1</sub></b>	0.01	0.05	0.10
<b>b<sub>p</sub></b>	0.30	0.42	0.50	<b>c</b>	0.08	0.13	0.15
<b>D</b>	2.80	2.92	3.00	<b>E</b>	1.20	1.33	1.40
<b>e</b>	--	1.90	--	<b>e<sub>1</sub></b>	--	0.95	--
<b>H<sub>E</sub></b>	2.25	2.40	2.55	<b>L<sub>p</sub></b>	0.30	0.42	0.50
<b>Q</b>	0.45	0.49	0.55	<b>v</b>	--	0.20	--
<b>w</b>	--	0.10	--				