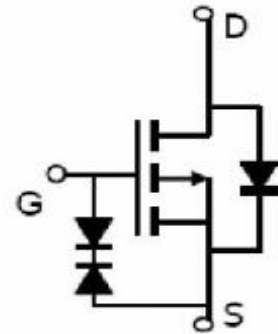




**P-Channel Enhancement Mode Power MOSFET**

**Description**

The MX2305 uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications .It is ESD protected.



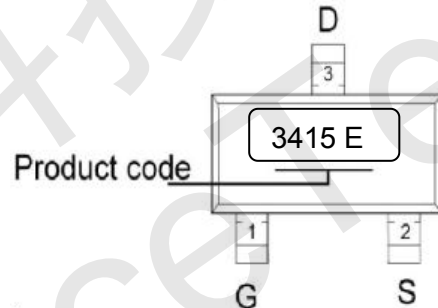
**General Features**

- V<sub>DS</sub> =-20V, I<sub>D</sub> =-4A
- RDS(ON)(Typ.) < 38mΩ @ VGS=-4.5V
- RDS(ON) (Typ.)< 54mΩ @ VGS=-2.5V
- ESD Rating: 2500V HBM
- High Power and current handing capability
- Lead free product is acquired
- Surface mount package

**Schematic diagram**

**Application**

- ◆ PWM applications
- ◆ Load switch



**Marking and pin assignment**  
SOT-23-3 (TOP VIEW)

**Absolute Maximum Ratings (TA=25°C unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	-20	V
Gate-Source Voltage	V <sub>GS</sub>	±10	V
Drain Current-Continuous	I <sub>D</sub>	-4	A
Drain Current-Pulsed (Note 1)	I <sub>DM</sub>	-25	A
Maximum Power Dissipation	P <sub>D</sub>	1.4	W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 To 150	°C

**Thermal Characteristic**

Thermal Resistance,Junction-to-Ambient (Note 2)	R <sub>θJA</sub>	89.3	°C/W
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**Electrical Characteristics (TA=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-20	-23	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V	-	-	±10	μA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.4	-0.65	-1.0	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A	-	38	47	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-4A	-	54	60	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-4A	8	-	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, F=1.0MHz	-	890	-	PF
Output Capacitance	C <sub>oss</sub>		-	160	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	125	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-10V, R <sub>L</sub> =2.5Ω V <sub>GS</sub> =-4.5V, R <sub>GEN</sub> =3Ω	-	15.6		nS
Turn-on Rise Time	t <sub>r</sub>		-	11.2		nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	23.1		nS
Turn-Off Fall Time	t <sub>f</sub>		-	32.7		nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-4A, V <sub>GS</sub> =-4.5V	-	14.2		nC
Gate-Source Charge	Q <sub>gs</sub>		-	3.2	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	5.8	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A	-	-	-0.7	V
Diode Forward Current (Note 2)	I <sub>S</sub>		-	-	-2.2	A

**Notes:**

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



### Typical Performance Characteristics

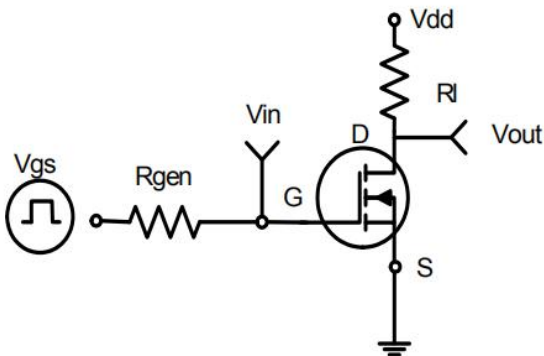


Figure 1: Switching Test Circuit

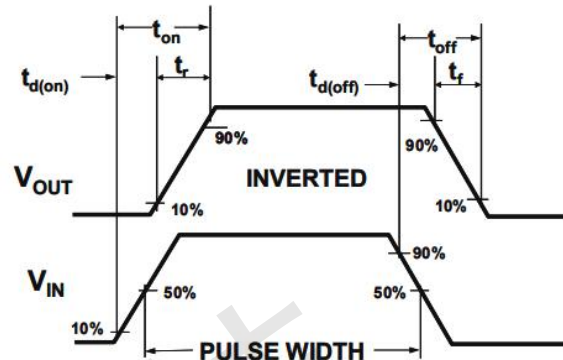


Figure 2: Switching Waveforms

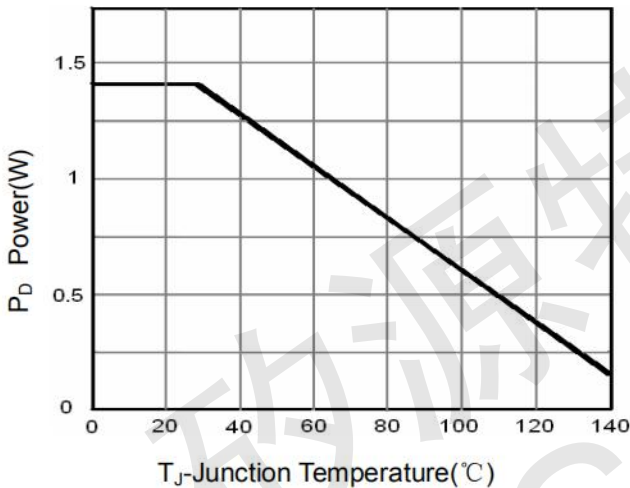


Figure 3 Power Dissipation

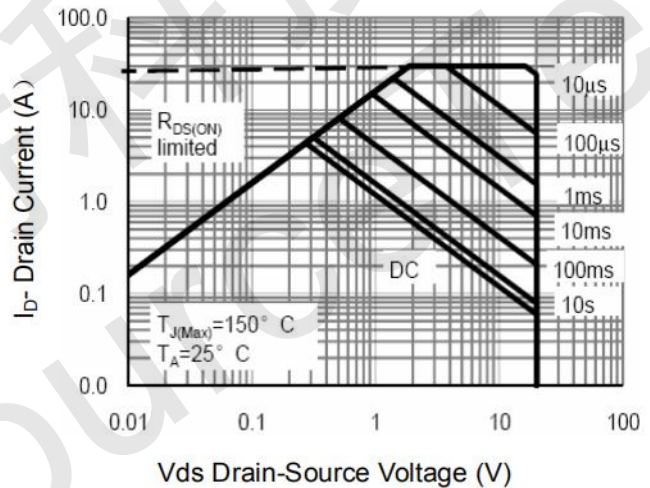


Figure 4 Safe Operation Area

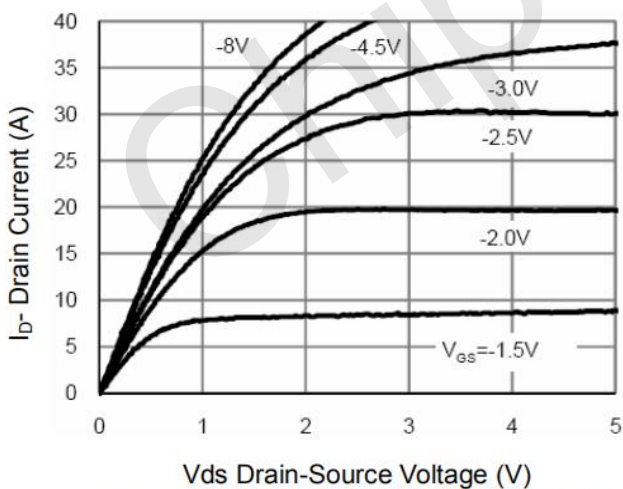


Figure 5 Output CHARACTERISTICS

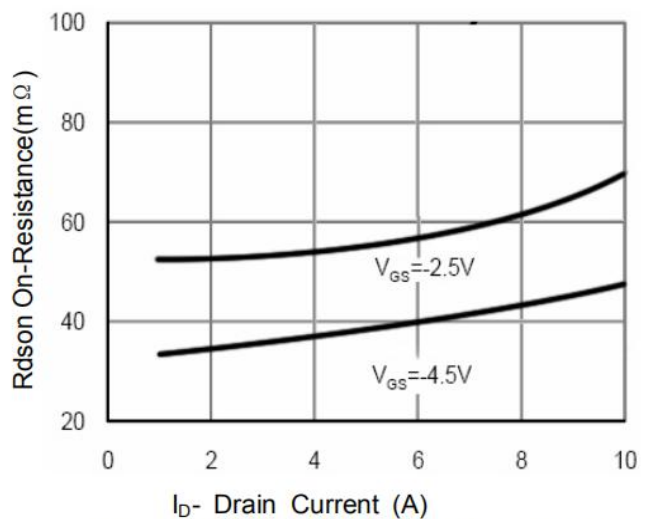


Figure 6 Drain-Source On-Resistance

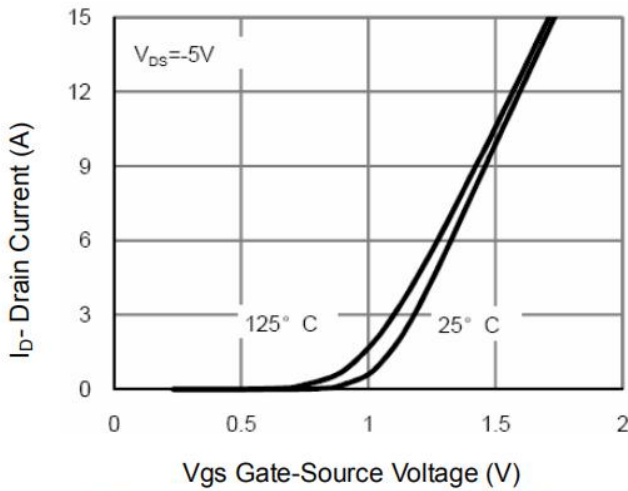


Figure 7 Transfer Characteristics

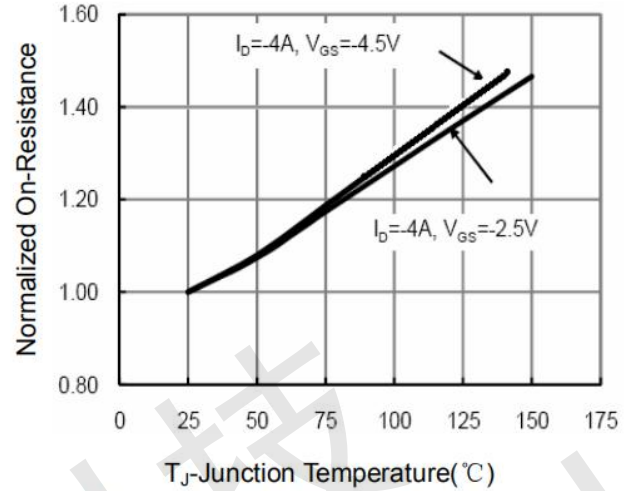


Figure 8 Drain-Source On-Resistance

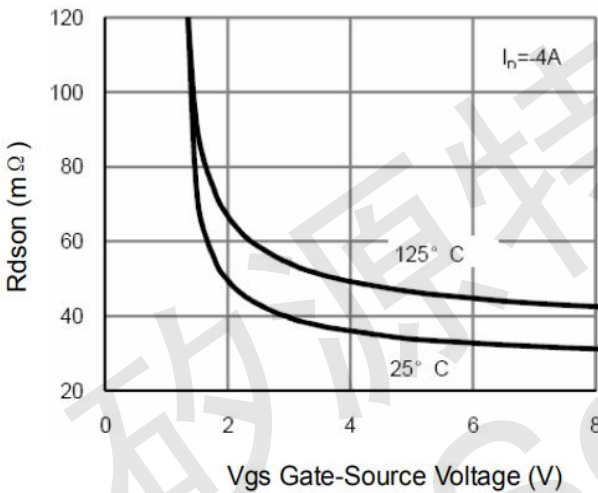


Figure 9 Rds vs Vgs

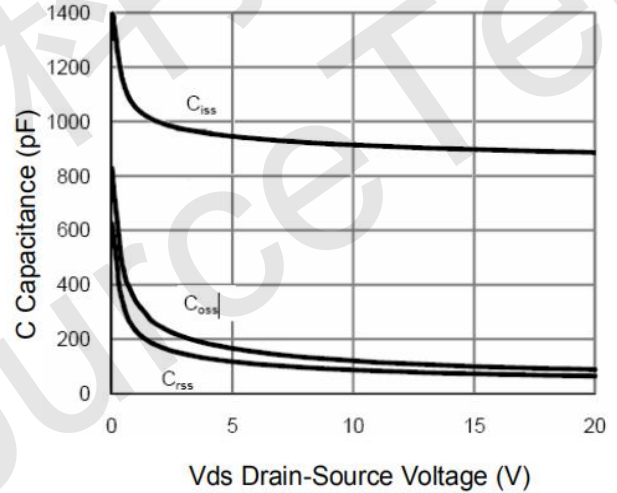


Figure 10 Capacitance vs Vds

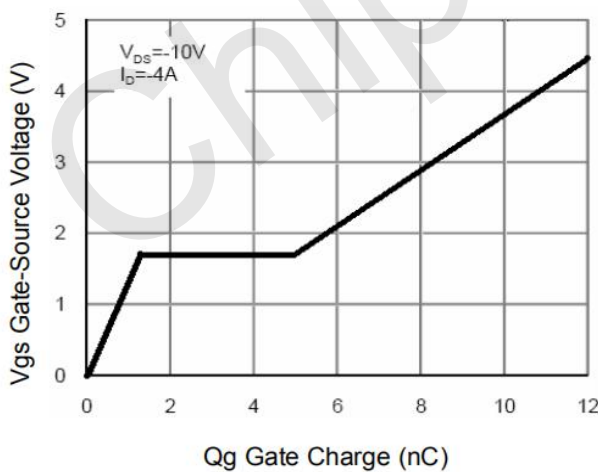


Figure 11 Gate Charge

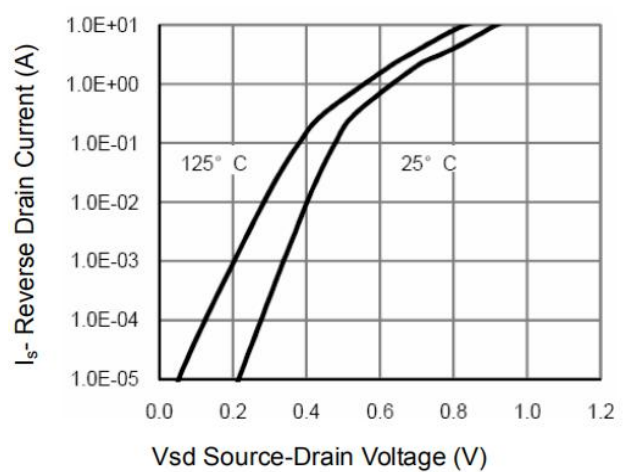


Figure 12 Source- Drain Diode Forward

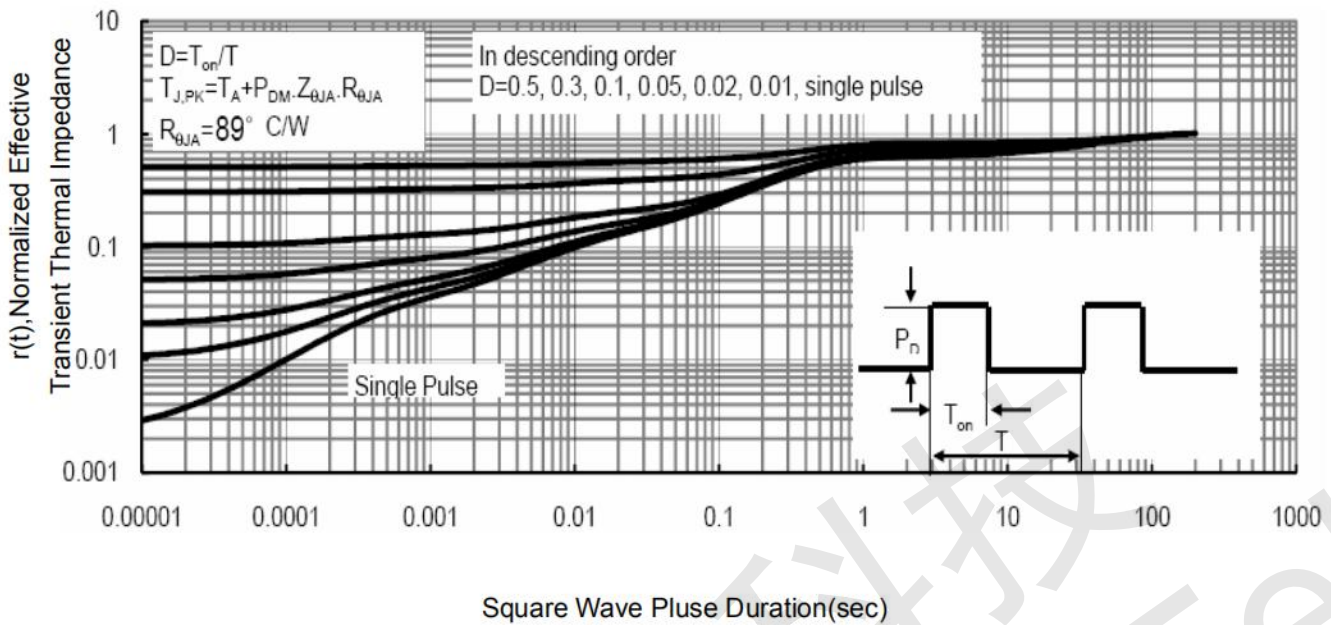
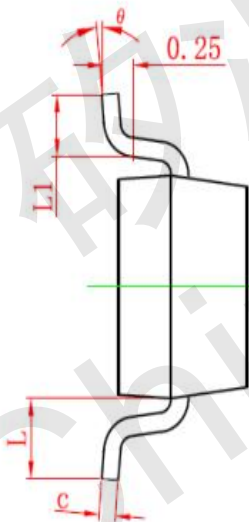
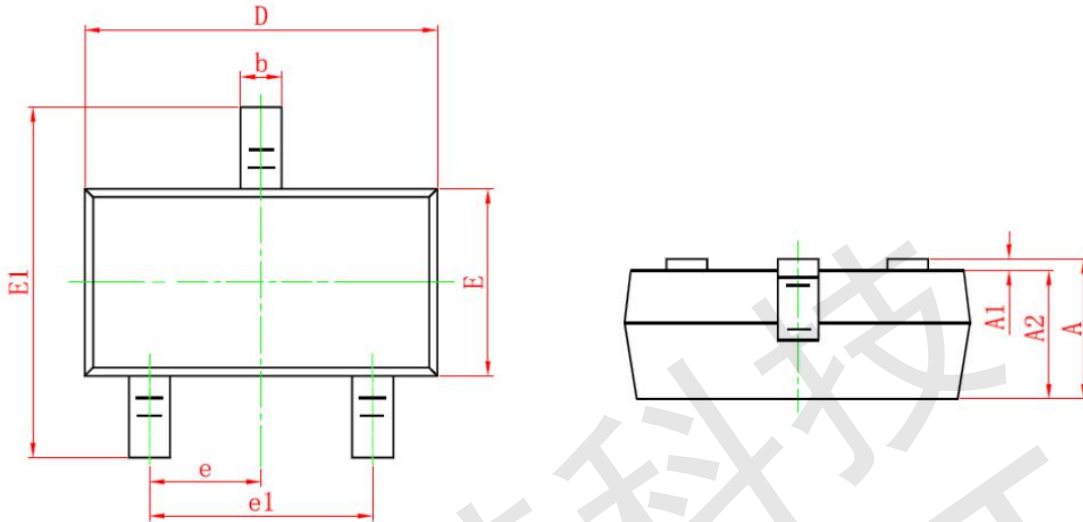


Figure 13 Normalized Maximum Transient Thermal Impedance



**SOT23-3 PACKAGE INFOR**



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500