LGE2305
P-Channel 20-V(D-S) Mosfe
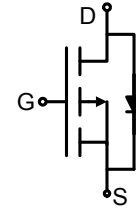
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DESCRIPTION

The 2305 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 load switch or in PWM applications.
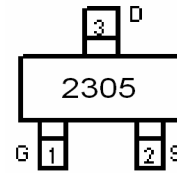
GENERAL FEATURES

- V_{DS} = -20V, I_D = -4.1A

  $R_{DS(ON)}$ <75mΩ @ V_{GS}=-2.5V

  $R_{DS(ON)}$ < 52mΩ @ V_{GS}=-4.5V

- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management

Schematic diagram

2305

Marking and pin Assignment

SOT-23 top view

Package Marking And Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
2305	2305	SOT-23	Ø180mm	8 mm	3000 units

Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±8	V
Drain Current -Continuous	I_D	-4.1	A
Drain Current -Pulsed (Note 1)	I_{DM}	-15	A
Maximum Power Dissipation	P_D	1.7	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	74	℃/W

Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250µA	-20	-21	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V, V_{GS}=0V	-	-	-1	µA

Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm8V, V_{DS}=0V$	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.45	-0.7	-1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-4.1A$	-	45	52	mΩ
		$V_{GS}=-2.5V, I_D=-3A$	-	60	75	
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-3.5A$	-	8.5	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{Iss}	$V_{DS}=-4V, V_{GS}=0V,$ F=1.0MHz	-	740	-	PF
Output Capacitance	C_{oss}		-	290	-	PF
Reverse Transfer Capacitance	C_{rss}		-	190	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-4V, I_D=-3.3A$, $R_L=-1.2\Omega, V_{GEN}=-4.5V, R_g=1\Omega$	-	12	-	nS
Turn-on Rise Time	t_r		-	35	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	t_f		-	10	-	nS
Total Gate Charge	Q_g	$V_{DS}=-4V, I_D=-4.1A, V_{GS}=-4.5V$	-	7.8	-	nC
Gate-Source Charge	Q_{gs}		-	1.2	-	nC
Gate-Drain Charge	Q_{gd}		-	1.6	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=-1.6A$	-	-	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	1.6	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 ELECTRICAL AND THERMAL CHARACTERISTICS
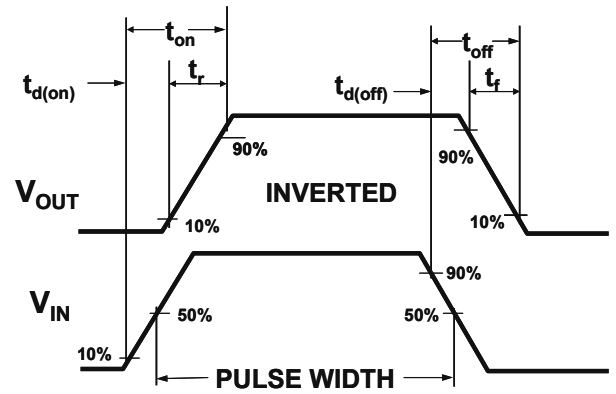

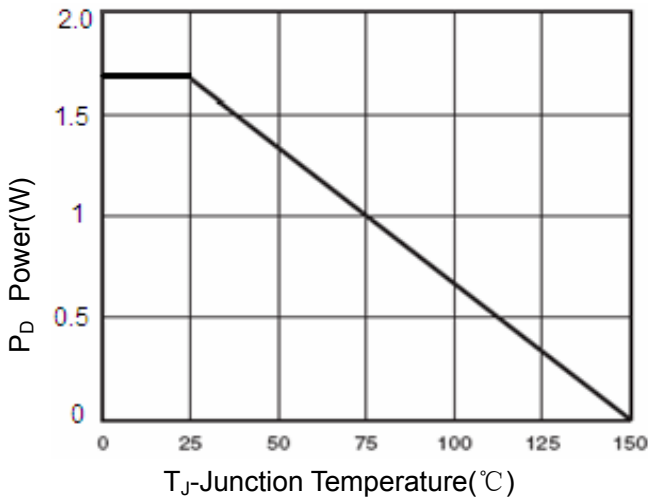**Figure 1:Switching Test Circuit**

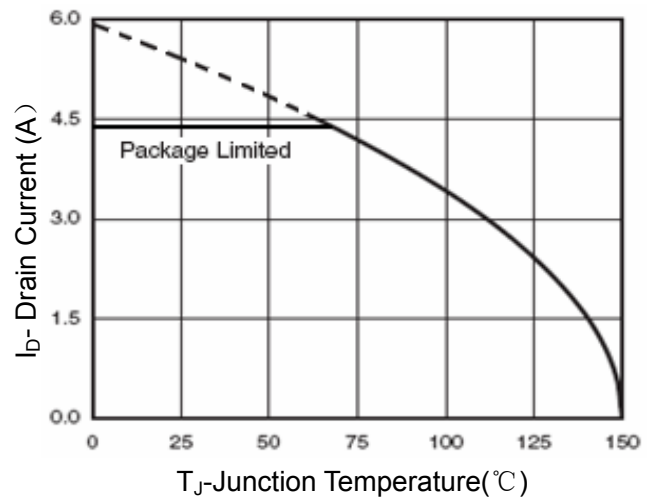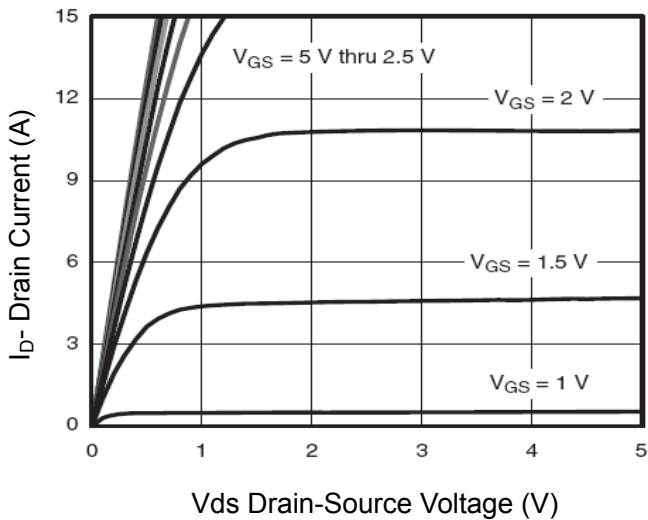**Figure 2:Switching Waveforms**

Figure 3 Power Dissipation
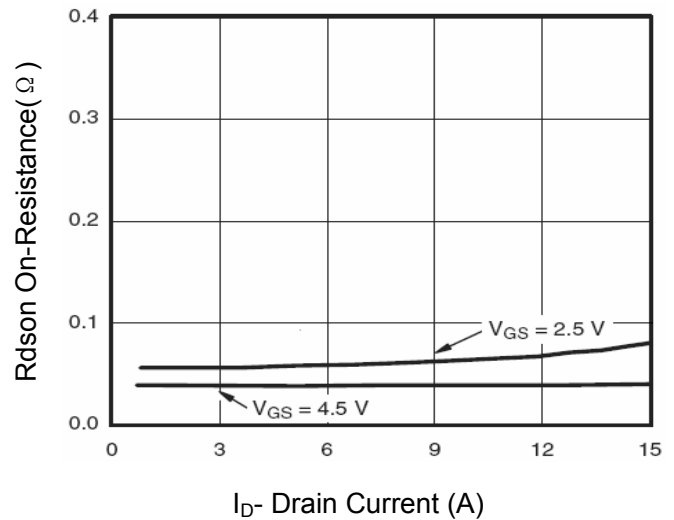

Figure 4 Drain Current

Figure 5 Output CHARACTERISTICS

Figure 6 Drain-Source On-Resistance

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Vgs Gate-Source Voltage (V)
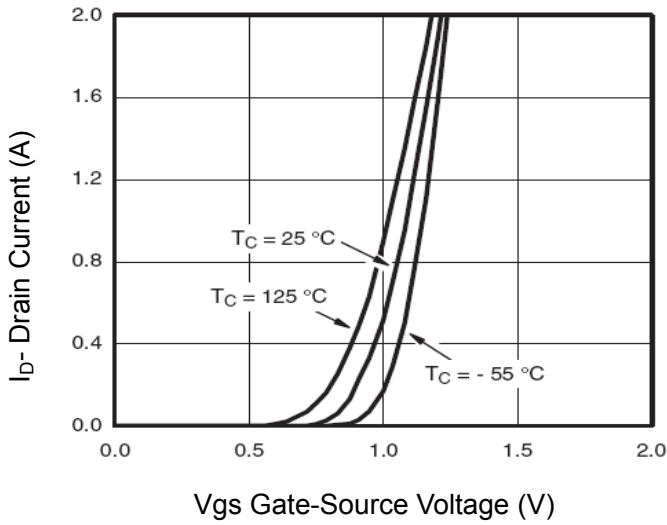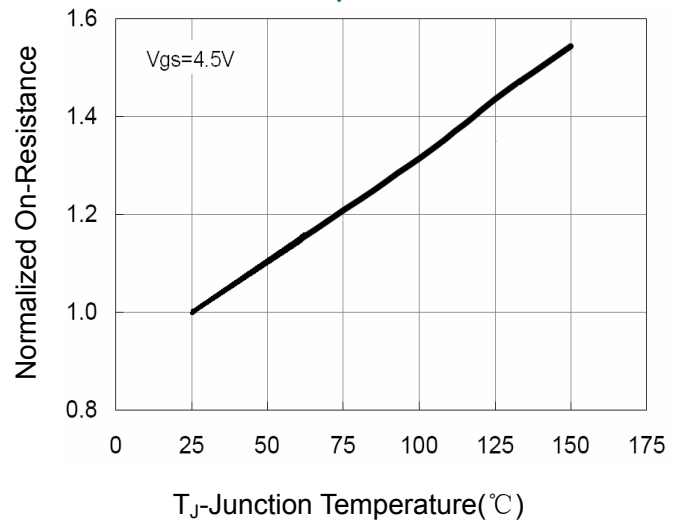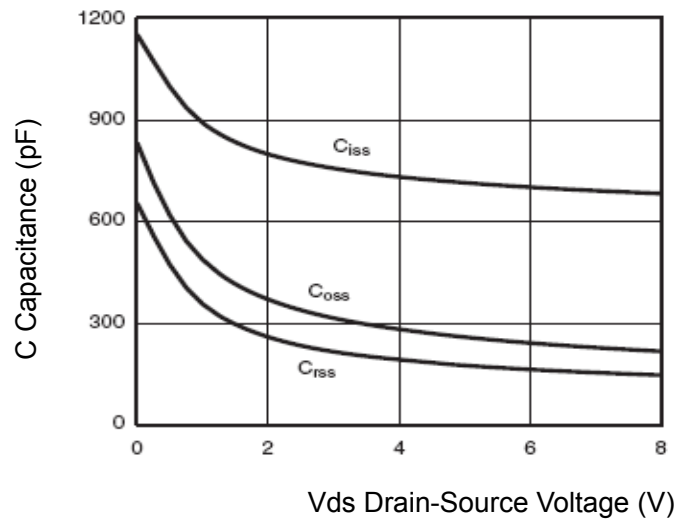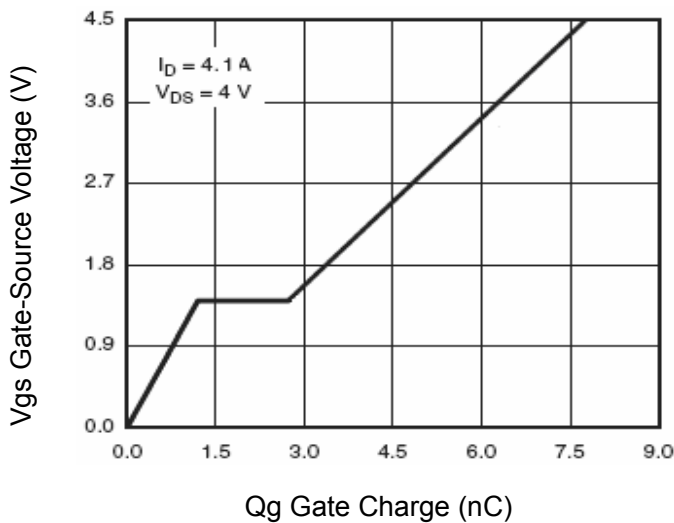**Figure 7 Transfer Characteristics**

T$_J$-Junction Temperature(℃)
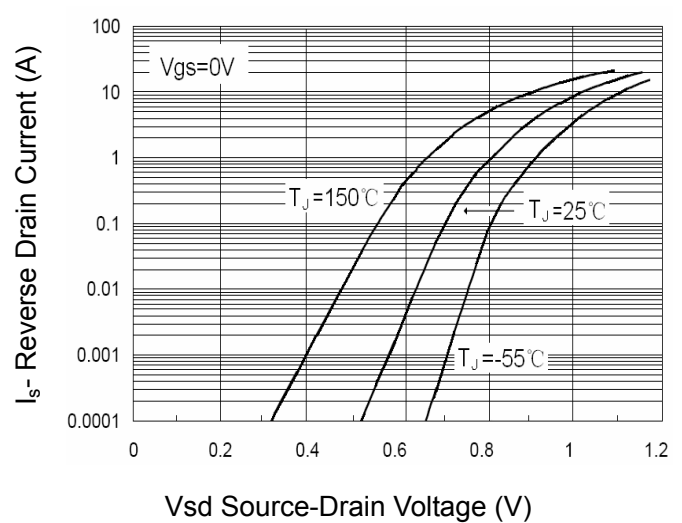**Figure 8 Drain-Source On-Resistance**

Vgs Gate-Source Voltage (V)
Figure 9 Rdson vs Vgs

Vds Drain-Source Voltage (V)
Figure 10 Capacitance vs Vds

Qg Gate Charge (nC)
Figure 11 Gate Charge

Vsd Source-Drain Voltage (V)
Figure 12 Source- Drain Diode Forward

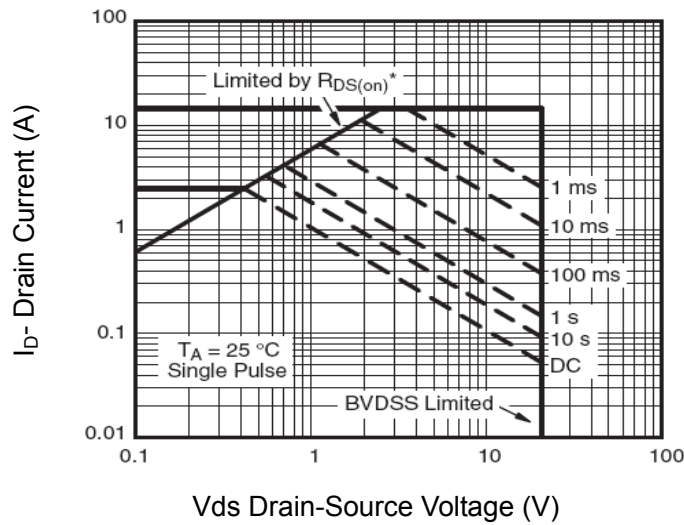**http://www.lgesemi.com**

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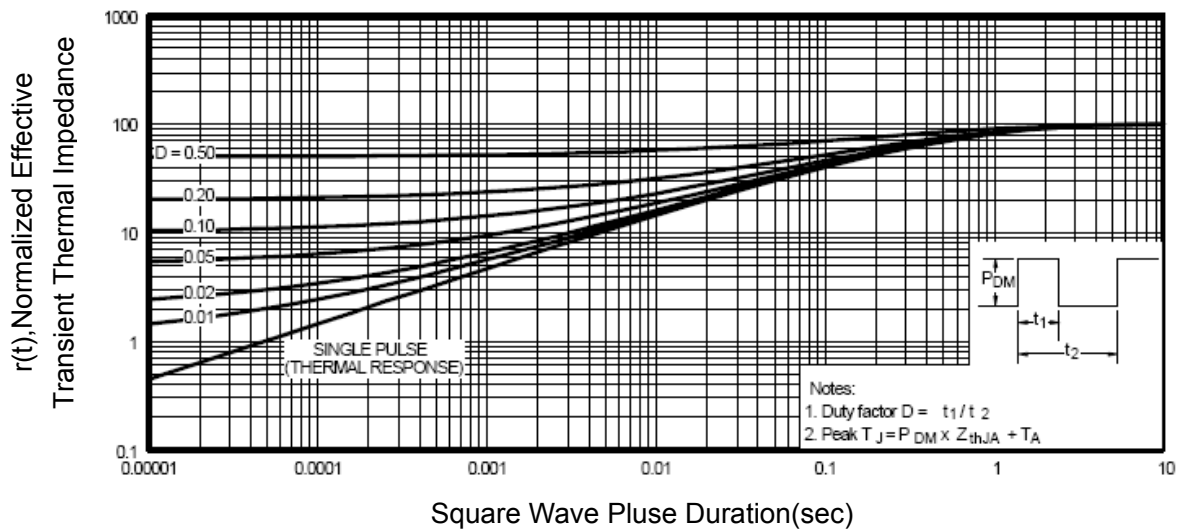
Figure 13 Safe Operation Area

Figure 14 Normalized Maximum Transient Thermal Impedance

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