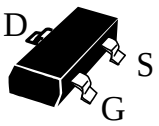
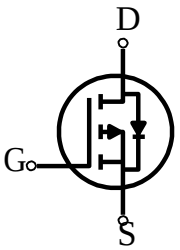
P-Channel High Density Trench MOSFET

Features:

SOT-23



- Super high dense cell trench design for low RDS(on).
- Rugged and reliable.
- Surface Mount package.



PRODUCT SUMMARY

VDSS	ID	RDS(on) (m-ohm) Max
-20V	-3.5 A	50 @ VGS = 4.5V
	-1.2 A	65 @ VGS = 2.5V

DEVICE MARKING

KL2305 = 2305 / A5SHB

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	VDS	-20	V
Gate-Source Voltage	VGS	12	V
Drain Current-Continuous[a] @ TA= 25 °C	ID	-4	A
-Pulse[b]	IDM	-15	A
Maximum Power Dissipation[a]	PD	1.25	W
Operating Junction and Storage Temperature Range	TJ,TSTG	- 55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient[a]	RthJA	100	°C/W

Note
a. Surface Mounted on FR4 Board , t ≤ 10sec .
b. Pulse width limited by maximum junction temperature.

ELECTRICAL CHARACTERISTICS (T_A = 25 ℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ[c]	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V , I_D = -250uA	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -30V , V_{GS} = 0V			-1	uA
Gate-Body Leakage Current, Forward	I_{GSSF}	V_{GS} = 12V , V_{DS} = 0V			100	nA
Gate Body Leakage Current, Reverse	IGSSR	VGS = -12V, VDS = OV			-100	nA
ON CHARACTERISTICS[C]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = -250uA	-0.7		-1.3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -10V , I_D = 4A		40	45	mΩ
		VGS = -4.5V , ID = -3.5A		45	50	mΩ
		V_{GS} = -2.5V , I_D = -1.2A		60	65	mΩ
DYNAMIC CHARACTERISTICS[c]						
Forward Transconductance	gFS	VDS = -1OV, ID = -4A		5		S
Input Capacitance	C_{ISS}	V_{DS} = -15V , V_{GS} = 0V f = 1.0MHz		900		pF
Output Capacitance	C_{OSS}			155		pF
Reverse Transfer Capacitance	C_{RSS}			205		pF
SWITCHING CHARACTERISTICS[c]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = -15V , I_D = 4A V_{GEN} = -10V R_{GEN} = 6 ohm		9	20	ns
Rise Time	t_r			4	10	ns
Turn-Off Delay Time	$t_{D(OFF)}$			42	85	ns
Fall Time	t_f			5	10	ns
Total Gate Charge	Q_g	V_{DS} = 15V I_D = -4A V_{GS} = -4.5V		8.4	11	nC
Gate-Source Charge	Q_{gs}			2.4		nC
Gate-Drain Charge	Q_{gd}			1.5		nC
Drain-Source Diode Characteristics and Maximun Ratings						
Drain-Source Diode Forward Current[b]	I_S				-4	A
Drain-Source Diode Forward Voltage[c]	V_{SD}	VGS = OV, IS = -1A			-1	V

Note
b. Pulse Test Pulse width ≤ 300us , Duty Cycle ≤ 2% .
c. Guaranteed by design , not subject to production testing .

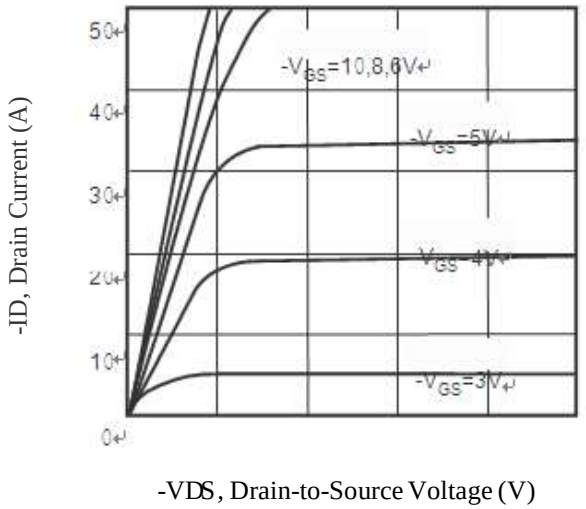


Figure 1. Output Characteristics

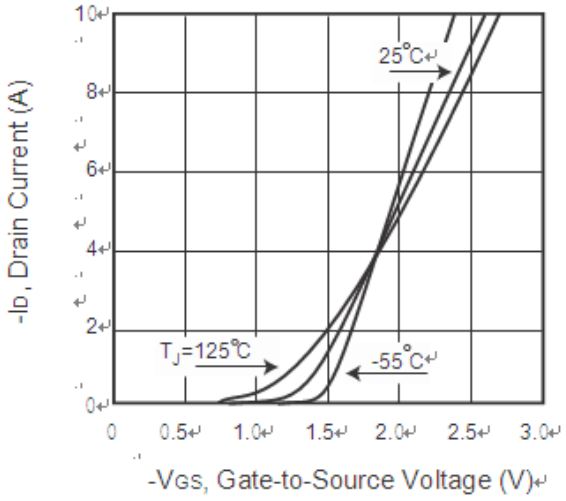


Figure 2. Transfer Characteristics

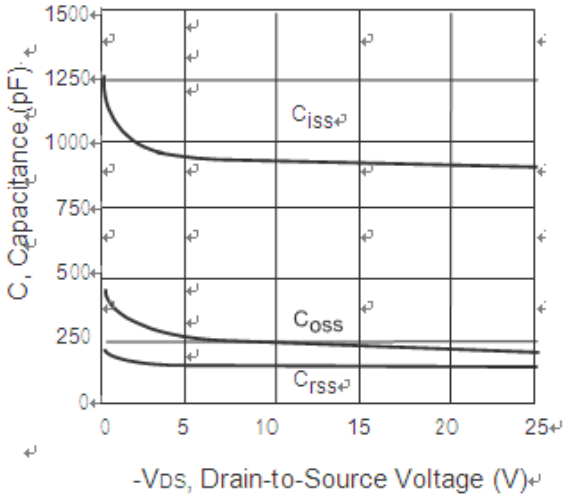


Figure 3. Capacitance

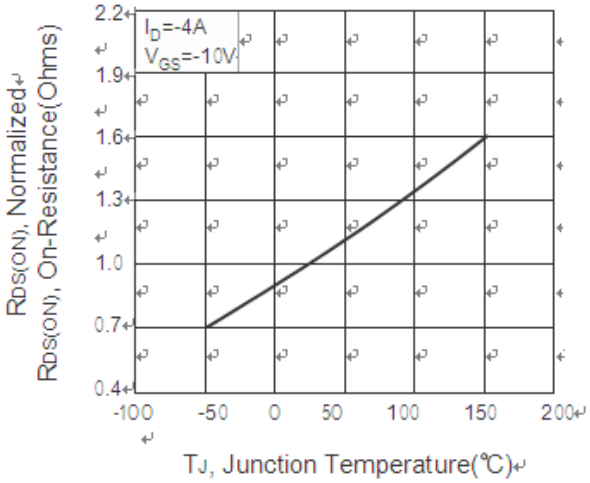


Figure 4. On-Resistance Variation with Temperature

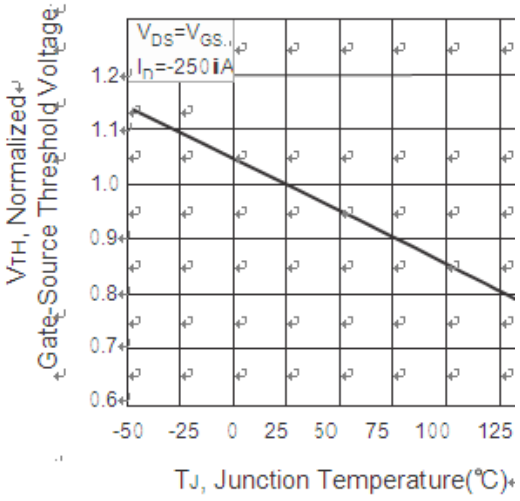


Figure 5. Gate Threshold Variation with Temperature

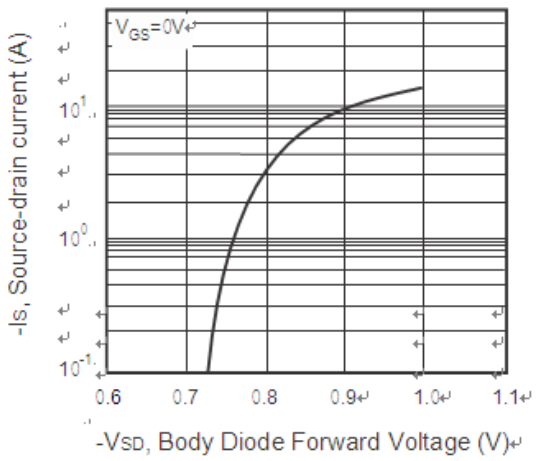


Figure 6. **Body Diode Forward Voltage Variation with Source Current**

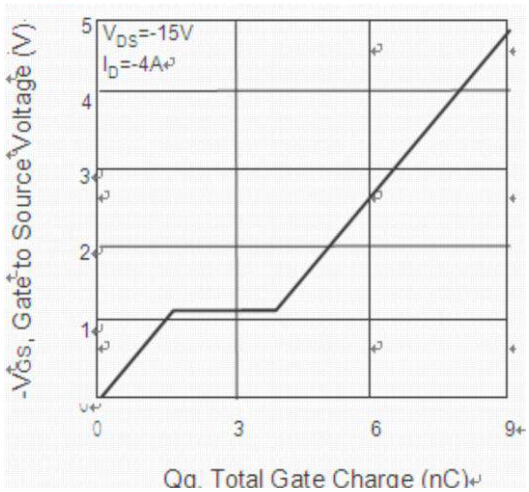


Figure 7. Gate Charge

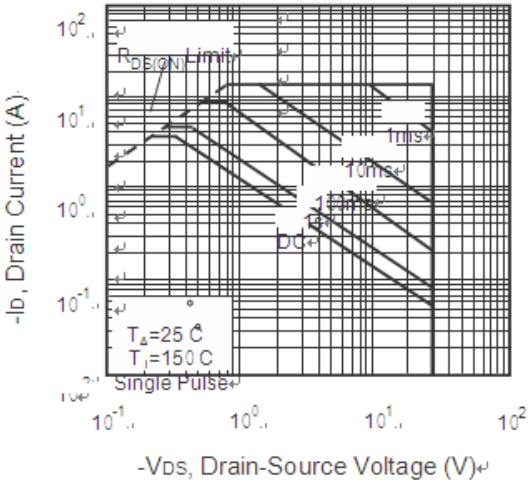


Figure 8. Maximum Safe Operating Area

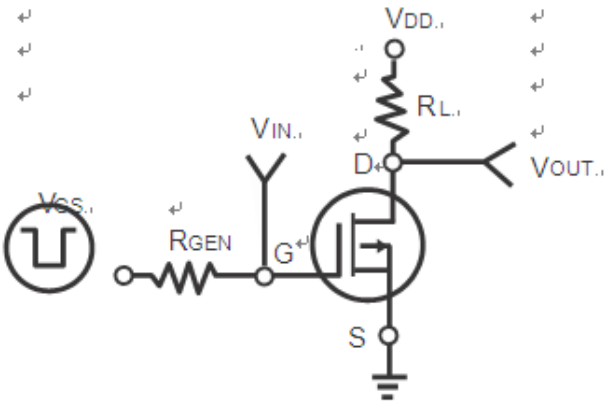


Figure 9. Switching Test Circuit

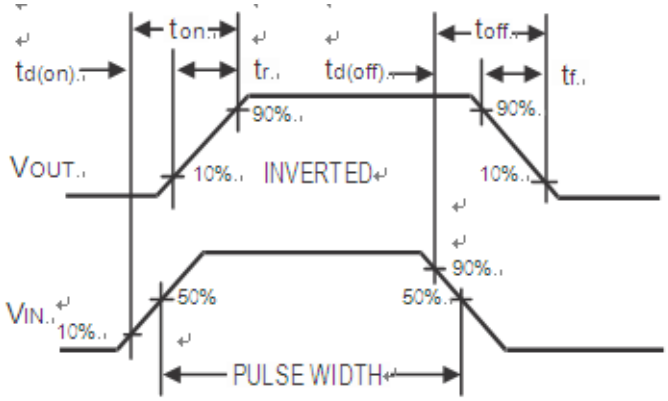


Figure 10. Switching Waveforms

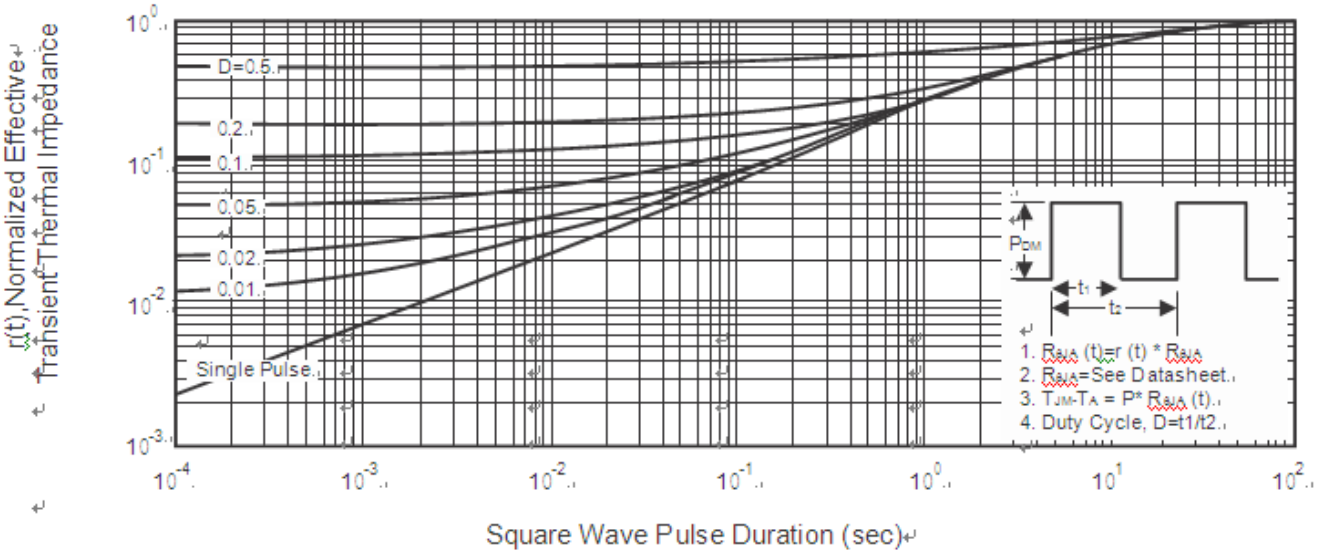
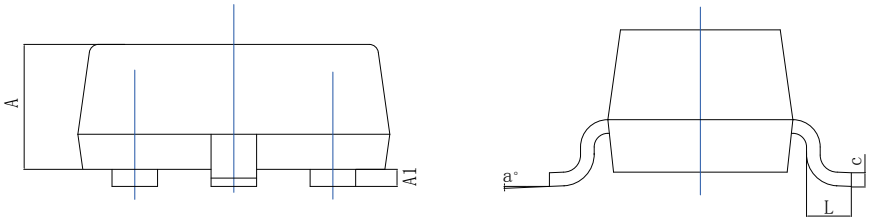
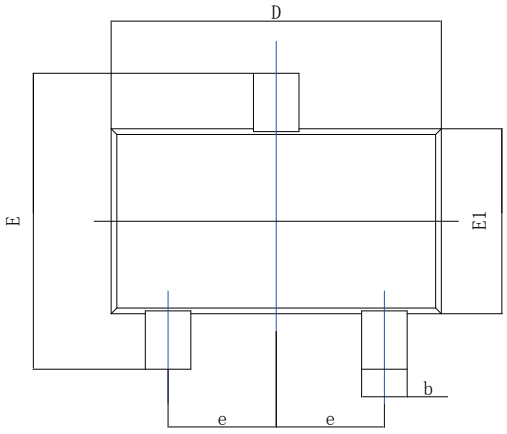


Figure 11. Normalized Thermal Transient Impedance Curve

SOT-23 Outline Dimensions

Unit:mm





SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	--	--	1.35
A1	0.04	0.07	0.15
b	0.30	0.40	0.50
c	0.08	--	0.21
D	2.72	2.92	3.12
E	2.10	2.33	2.64
E1	1.10	1.30	1.50
e	0.95BSC		
L	0.20	--	0.60
a °	0 °	--	8 °