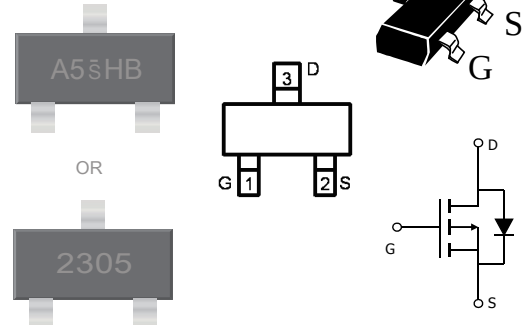


P-Channel High Density Trench MOSFET
PRIMARY CHARACTERISTICS

V_{DSS}	I_D	$R_{DS(on)Max}$
-20V	-3.5A	50m Ω @VGS=4.5V
	-1.2A	65m Ω @VGS=2.5V

SOT-23 PACKAGE

 Marking : A5 $\bar{S}$ HB / 2305

FEATURES

- High power and current handling capability
- Lead free product is acquired
- Surface mount package
- Moisture Sensitivity Level 1

MECHANICAL DATA

- Case : Molded plastic, SOT-23
- Polarity : Shown above
- Terminals : Plated terminals, solderable per MIL-STD-750, Method 2026
- Epoxy : UL94-V0 rated flame retardant

DESCRIPTION

The SE2305GD 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.

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	12	V
Drain Current-Continuous ^a @ $T_A = 25^\circ\text{C}$ -Pulse ^b	I_D	-4	A
	I_{DM}	-15	A
Maximum Power Dissipation ^a	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to 150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient ^a	R_{thJA}	100	$^\circ\text{C/W}$
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Note

 a. Surface Mounted on FR4 Board, $t \leq 10\text{sec}$.

b. Pulse width limited by maximum junction temperature.



P-Channel High Density Trench MOSFET

ELECTRICAL CHARACTERISTICS $T_A = 25\text{ }^{\circ}\text{C}$ 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} = -20V , 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	I _{GSSR}	V _{GS} = -12V, V _{DS} = 0V			-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(o n)}	V _{GS} = -4.5V , I _D = -3.5A		42	50	m Ω
		V _{GS} = -2.5V , I _D = -1.2A		57	65	m Ω
DYNAMIC CHARACTERISTICS ^c						
Forward Transconductance	g _{FS}	V _{DS} = -10V, I _D = -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}	V _{GS} = 0V, I _S = -1A			-1	V

Note

b. Pulse Test Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

c. Guaranteed by design, not subject to production testing.



P-Channel High Density Trench MOSFET

Typical Electrical and Thermal Characteristics

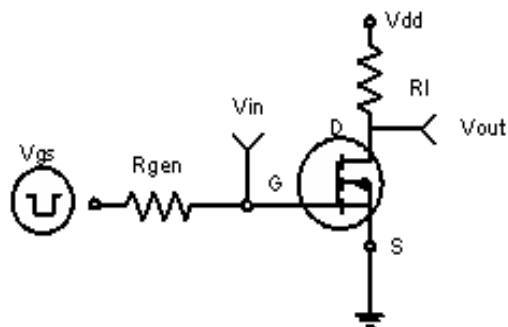


Figure 1: Switching Test Circuit

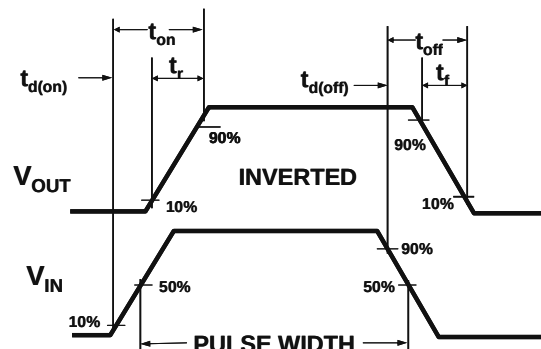


Figure 2: Switching Waveforms

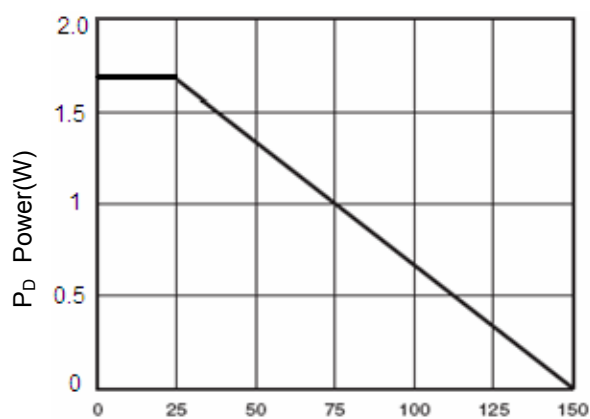


Figure 3 Power Dissipation

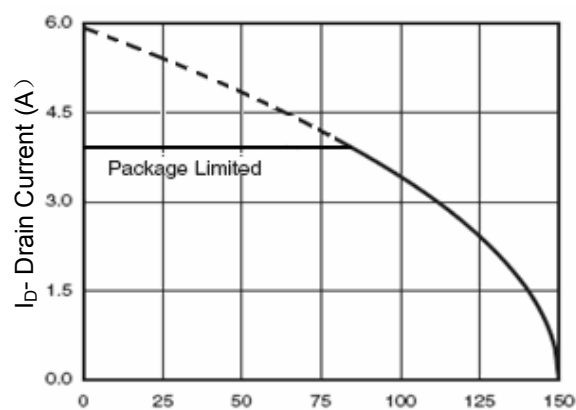


Figure 4 Drain Current

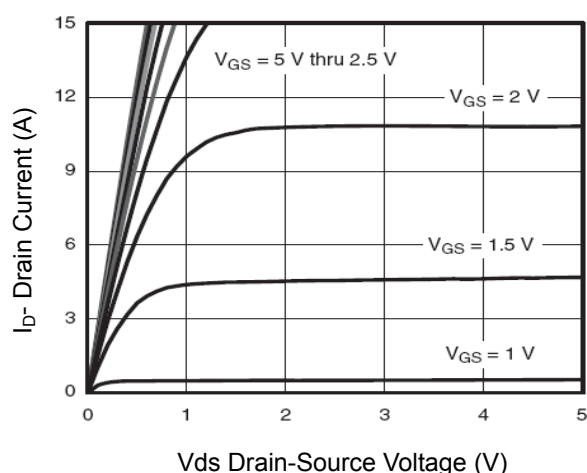


Figure 5 Output Characteristics

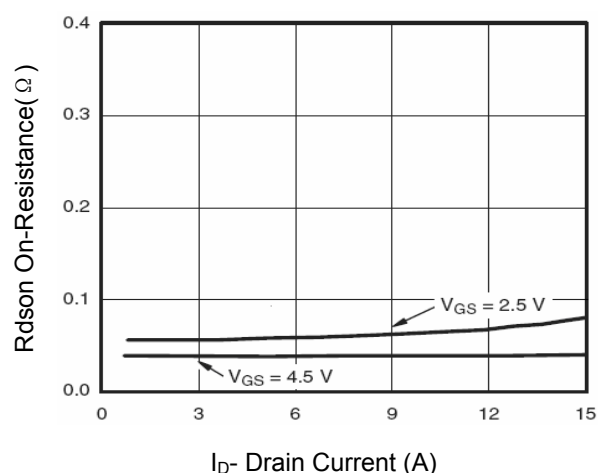


Figure 6 Drain-Source On-Resistance



P-Channel High Density Trench MOSFET

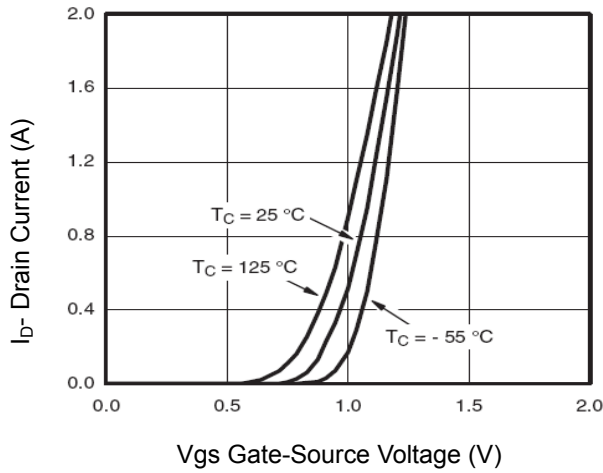


Figure 7 Transfer Characteristics

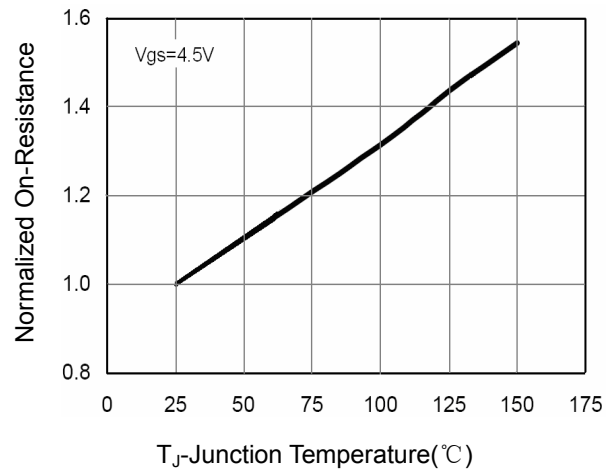


Figure 8 Drain-Source On-Resistance

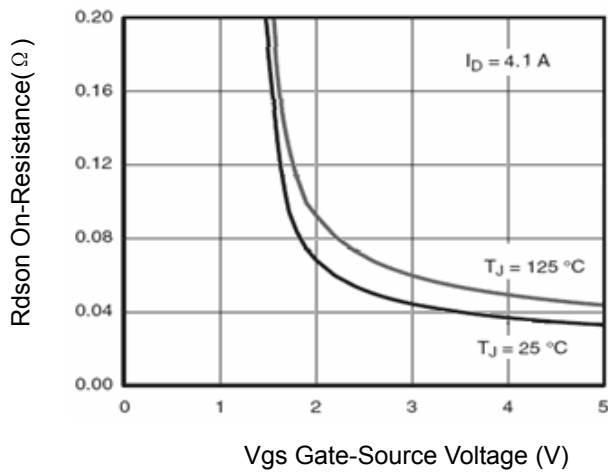


Figure 9 Rdson vs Vgs

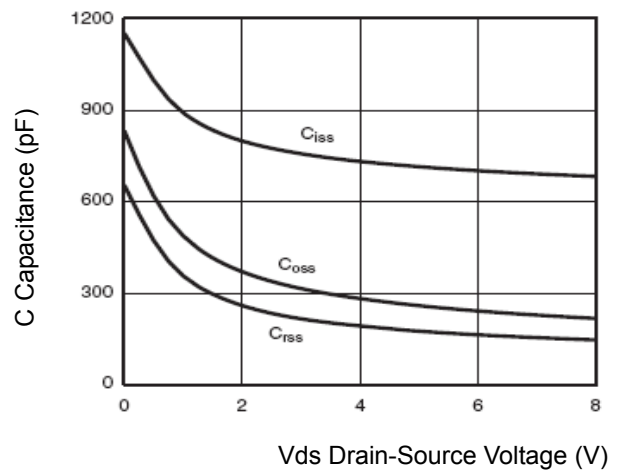


Figure 10 Capacitance vs Vds

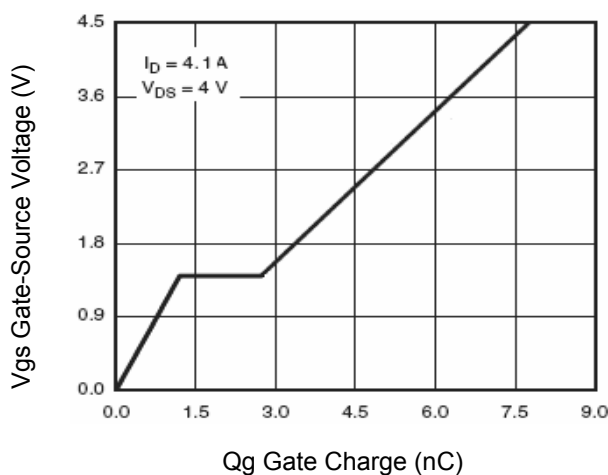


Figure 11 Gate Charge

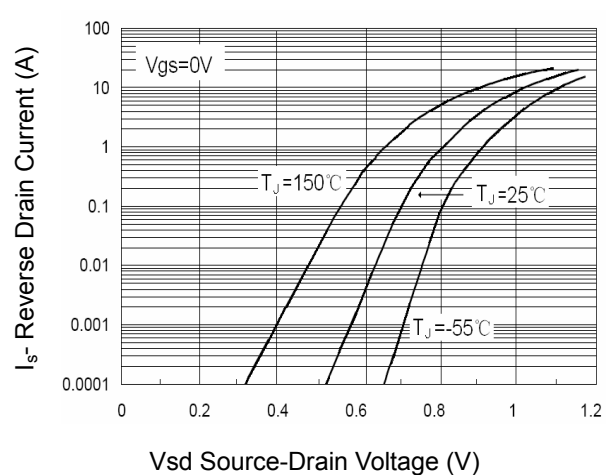
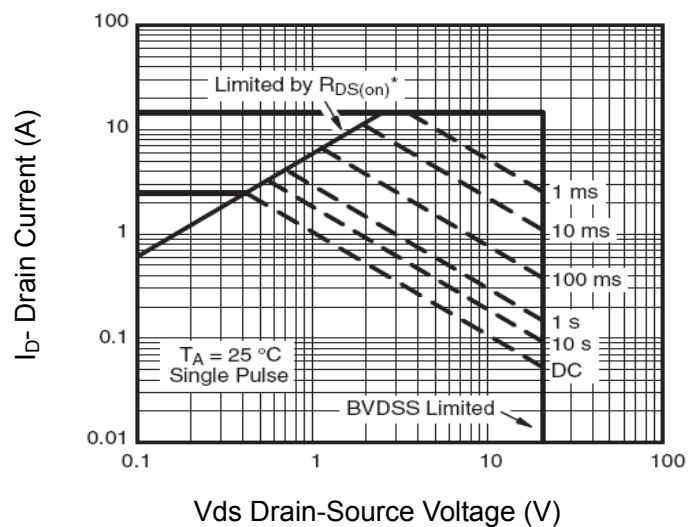
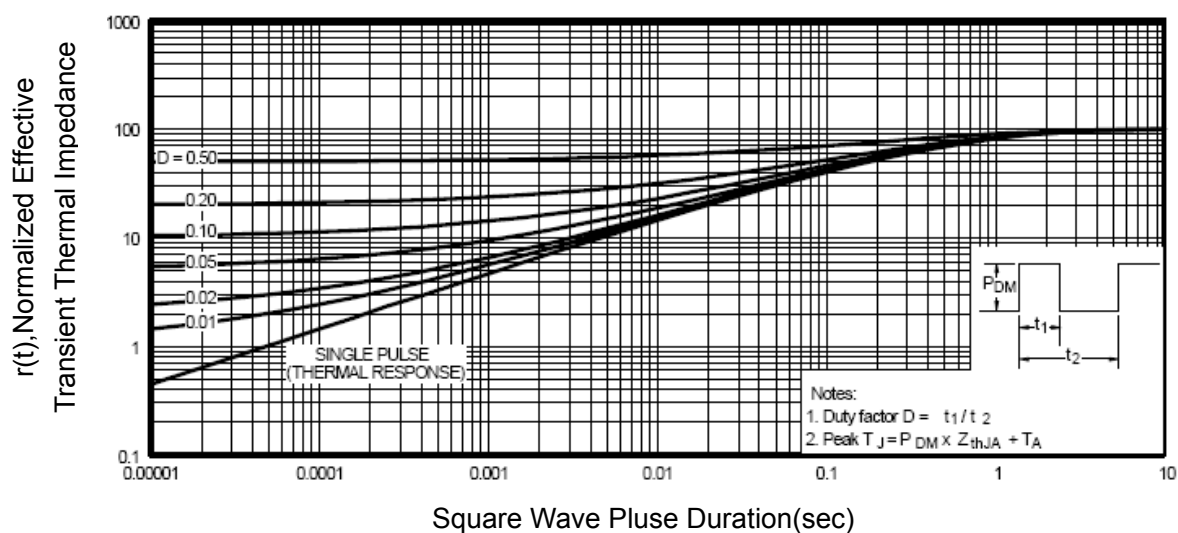
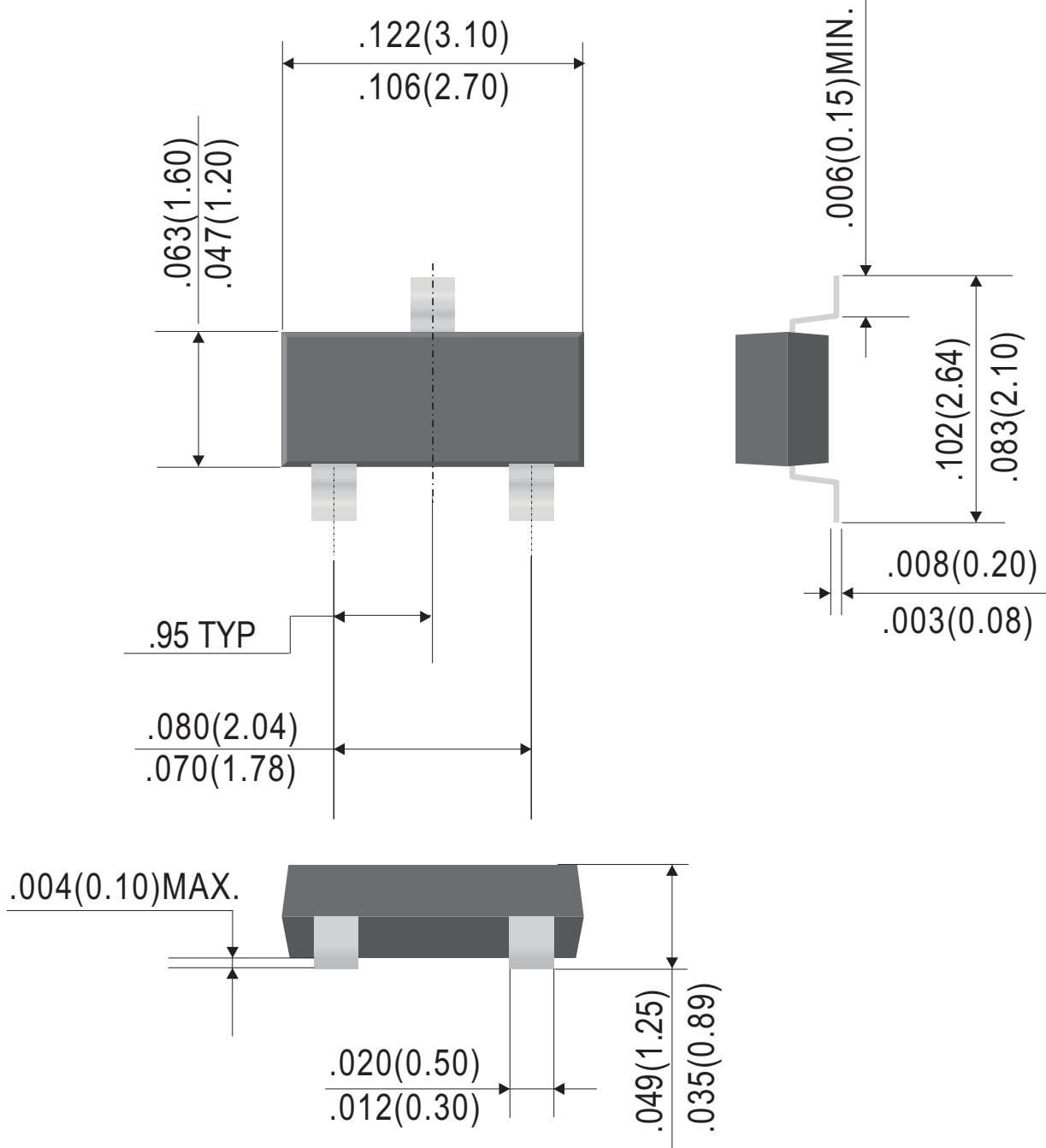


Figure 12 Source- Drain Diode Forward

P-Channel High Density Trench MOSFET

Figure 13 Safe Operation Area

Figure 14 Normalized Maximum Transient Thermal Impedance

Outline Drawing

SOT-23



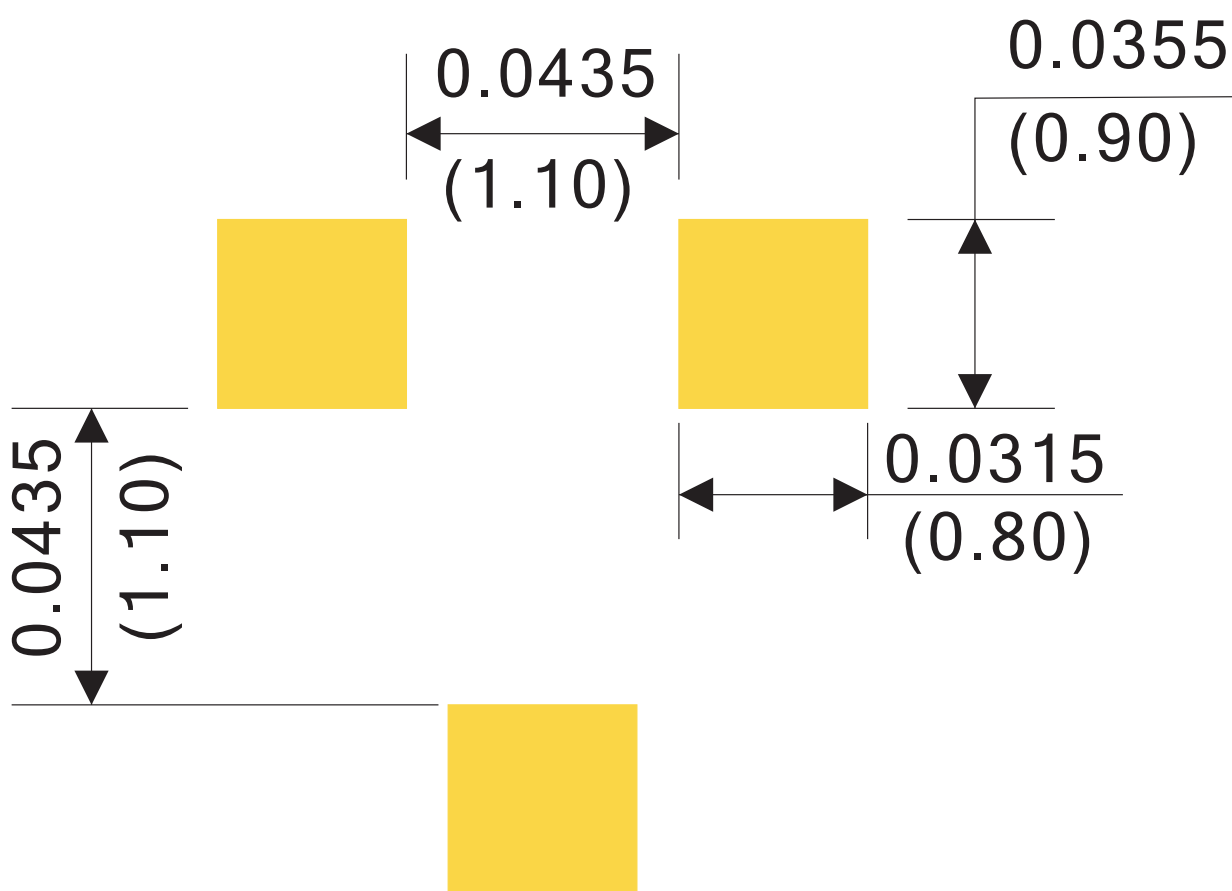
Dimensions in inches and (millimeters)

Rev.E



Suggested Soldering Pad Layout

SOT-23



Dimensions in inches and (millimeters)

RevA

Ordering Information:

Device PN	Packing
SE2305GD -T ⁽¹⁾ G ⁽²⁾ -WS ⁽³⁾	Tape&Reel: 3 Kpcs/Reel

Note: (1) Packing code, Tape & Reel Packing

(2) RoHS product for packing code suffix "G" ; Halogen free product for packing code suffix "H"

(3) WS : Willas brand abbreviation, Label Type does not display

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