



# P-Channel Enhancement Mode Field Effect Transistor

## ECY2305B

### Product Summary

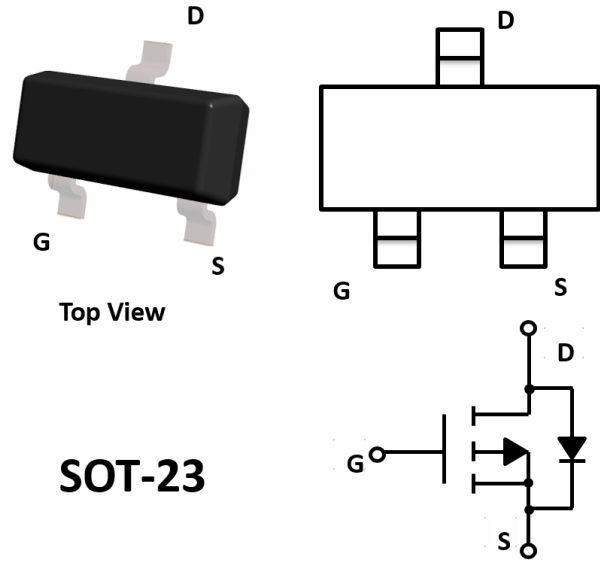
- ◆  $V_{DS}$  -20V
- ◆  $I_D$  -5.4A
- ◆  $R_{DS(ON)}$  ( at  $V_{GS}=-4.5V$  ) < 42 mohm
- ◆  $R_{DS(ON)}$  ( at  $V_{GS}=-2.5V$  ) < 55 mohm
- ◆  $R_{DS(ON)}$  ( at  $V_{GS}=-1.8V$  ) < 75 mohm

### General Description

- ◆ Trench Power LV MOSFET technology
- ◆ High Density Cell Design for Low  $R_{DS(ON)}$
- ◆ High Speed switching

### Application

- ◆ Battery protection
- ◆ Load switch
- ◆ Power management



**SOT-23**

### Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise noted)

Parameter	Symbol	Maximum	Unit
Drain-source Voltage	$V_{DS}$	-20	V
Gate-source Voltage	$V_{GS}$	±10	V
Drain Current	$I_D$	$T_A=25^\circ\text{C}$ Steady State	-5.4
		$T_A=70^\circ\text{C}$ Steady State	-4.4
Pulsed Drain Current <sup>A</sup>	$I_{DM}$	-22	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$ Steady State	$P_D$	1.2	W
Thermal Resistance Junction-to-Ambient @ Steady State <sup>B</sup>	$R_{\theta JA}$	104	°C/W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~+150	°C

### Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE (pcs)	INNER BOX QUANTITY (pcs)	OUTER CARTON QUANTITY (pcs)	DELIVERY MODE
ECY2305BBFR	F2	S5B.	3000	30000	120000	7" reel



# P-Channel Enhancement Mode Field Effect Transistor

## ECY2305B

### Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =-250μA	-20			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, T <sub>C</sub> =25°C			-1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±10V, V <sub>DS</sub> =0V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.4	-0.62	-1.0	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -4.5V, I <sub>D</sub> =-5.4A		33	42	mΩ
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> =-4.0A		39	55	
		V <sub>GS</sub> = -1.8V, I <sub>D</sub> =-3.0A		49	75	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =-5.4A, V <sub>GS</sub> =0V		-0.8	-1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>				-5.4	A
Dynamic Parameters						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, f=1MHZ		830		pF
Output Capacitance	C <sub>oss</sub>			132		
Reverse Transfer Capacitance	C <sub>rss</sub>			85		
Switching Parameters						
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-4A		7.2		nC
Gate Source Charge	Q <sub>gs</sub>			1.2		
Gate Drain Charge	Q <sub>gd</sub>			1.6		
Turn-on Delay Time	t <sub>D(on)</sub>	V <sub>GS</sub> =-4.5V, V <sub>DD</sub> =-10V, R <sub>L</sub> =2.5Ω, R <sub>GEN</sub> =3Ω		15		ns
Turn-on Rise Time	t <sub>r</sub>			63		
Turn-off Delay Time	t <sub>D(off)</sub>			21		
Turn-off Fall Time	t <sub>f</sub>			12		

A. Pulse Test: Pulse Width≤300us, Duty cycle ≤2%.

B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

### Typical Performance Characteristics

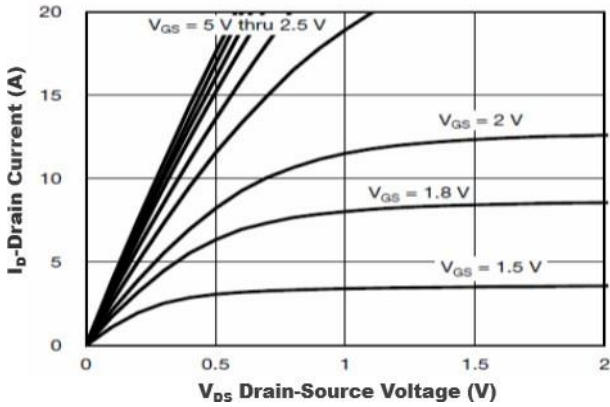


Figure1. Output Characteristics

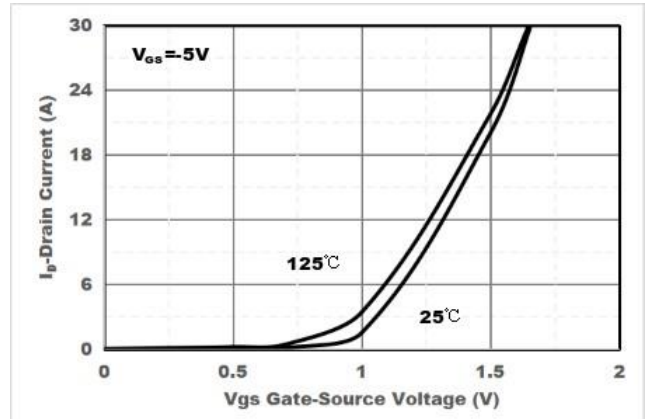


Figure2. Transfer Characteristics

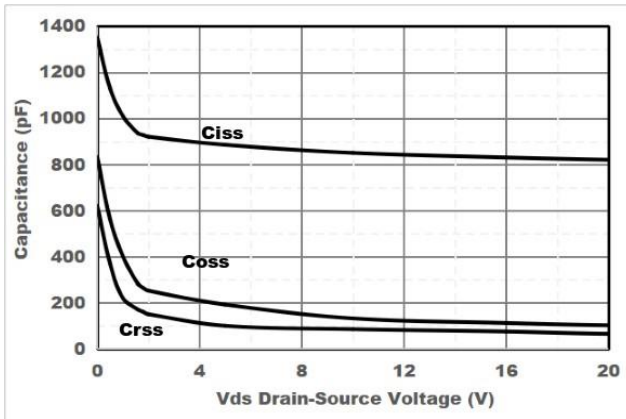


Figure3. Capacitance Characteristics

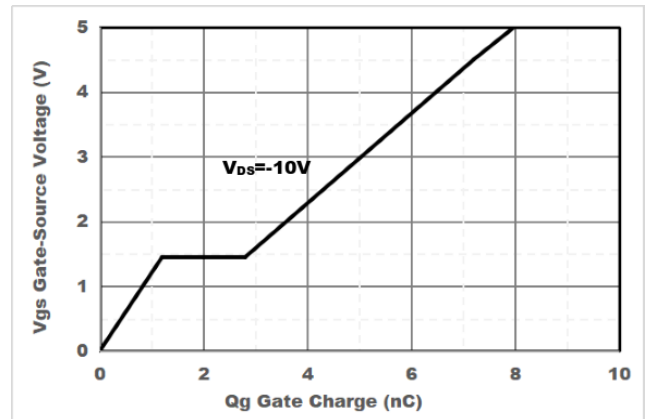


Figure4. Gate Charge

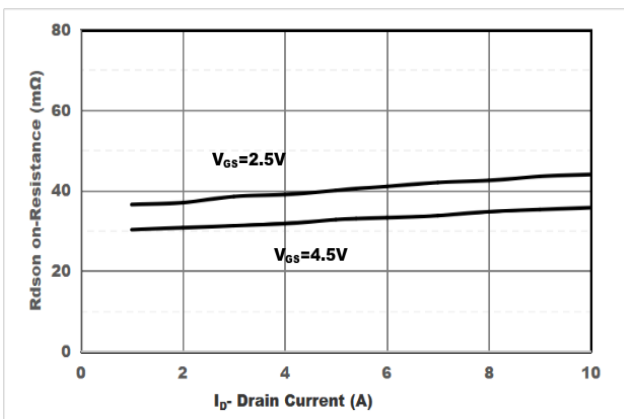


Figure5. Drain-Source on Resistance

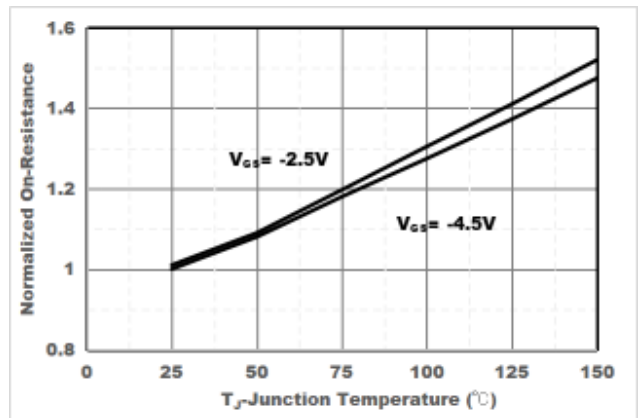


Figure6. Drain-Source on Resistance

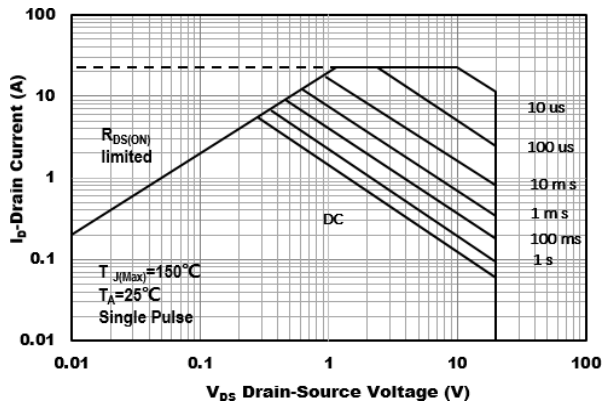


Figure7. Safe Operation Area

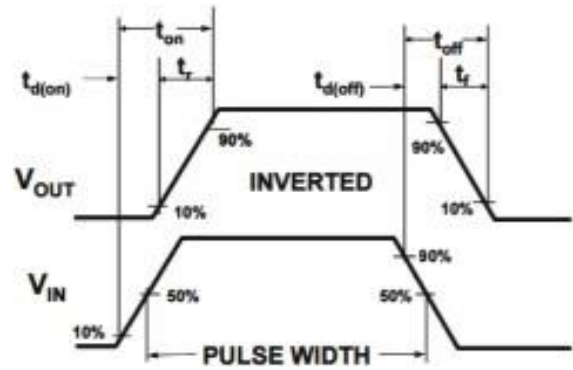
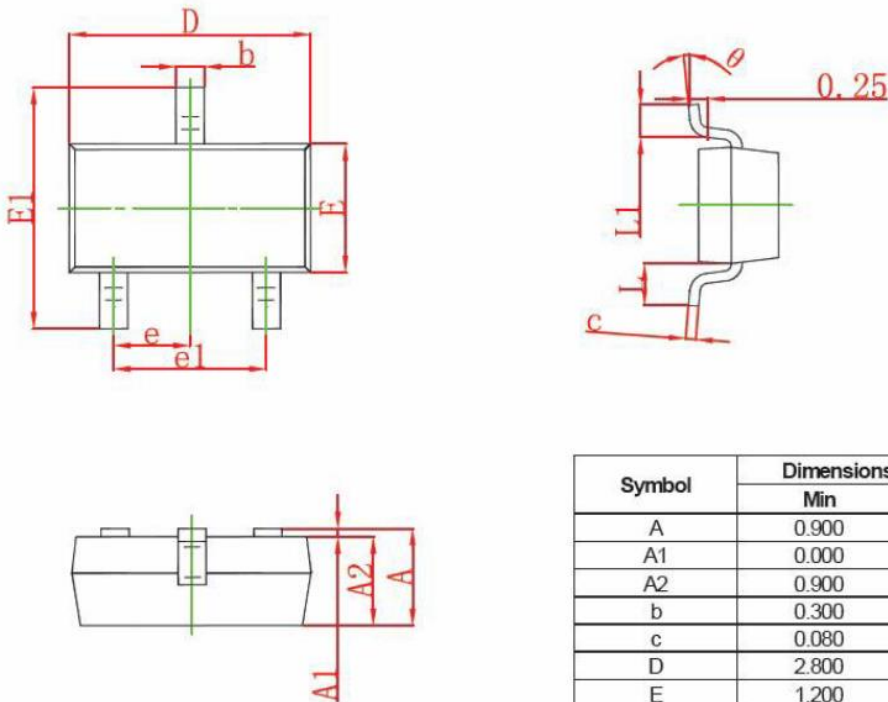


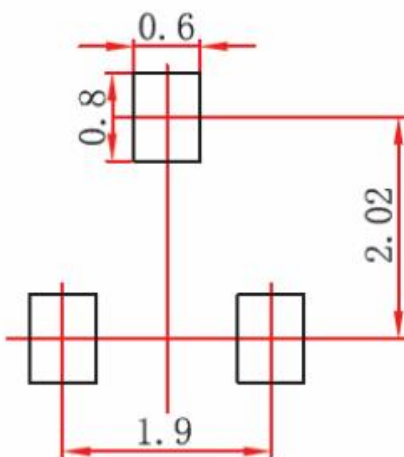
Figure8. Switching wave

### SOT-23 Package information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
$\theta$	0°	8°	0°	8°

### SOT-23 Suggested Pad Layout



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.