

## 20V P-Channel MOSFET

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
-20V	45m $\Omega$ @-4.5V	-4.1A
	70m $\Omega$ @-2.5V	

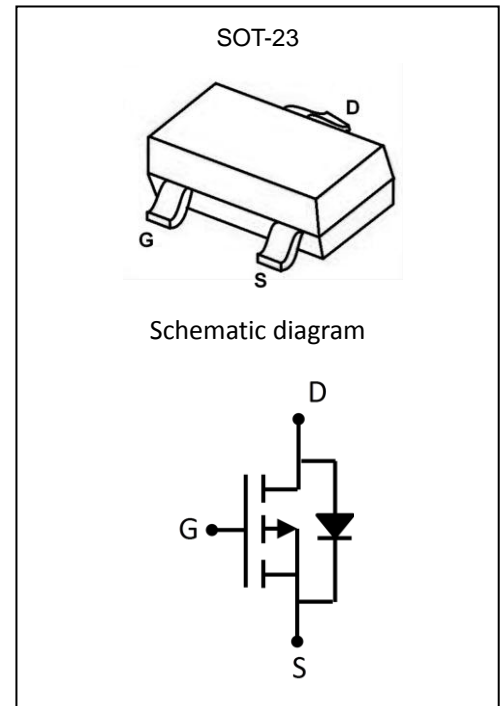
## Feature

- TrenchFET Power MOSFET
- Excellent  $R_{DS(on)}$  and Low Gate Charge
- AEC-Q101 qualified (Automotive grade with suffix "Q".)
- Exsemi technology

## Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch

MARKING: S5

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$I_D$	-4.1	A
Continuous Source-Drain Current	$I_S$	-4.1	A
Power Dissipation	$P_D$	0.9	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	139	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

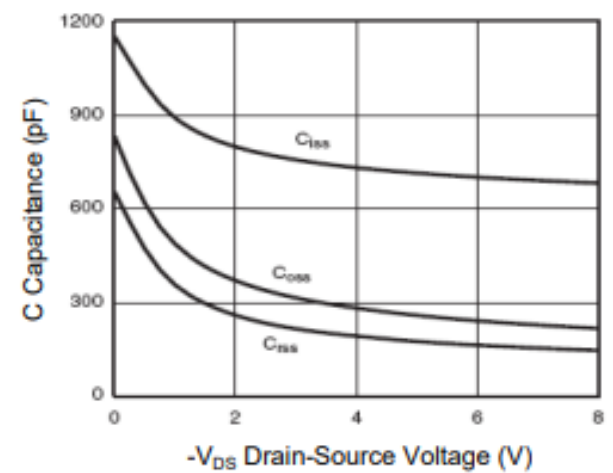
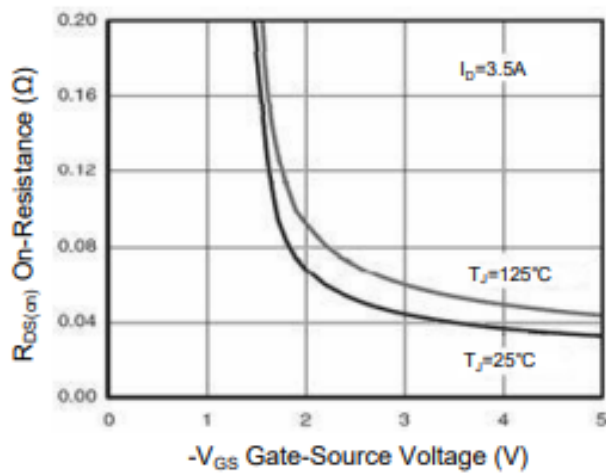
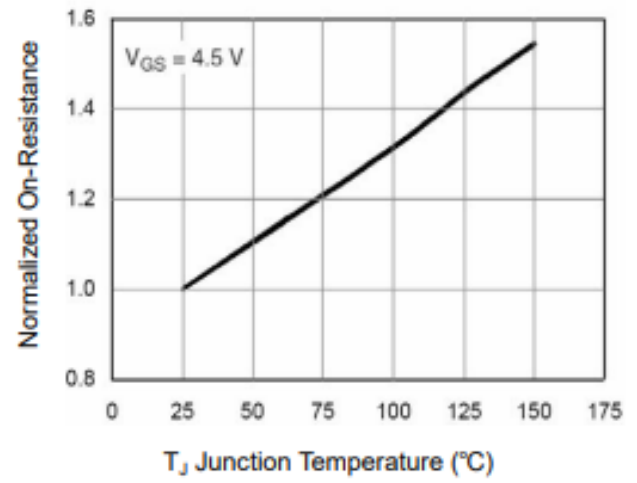
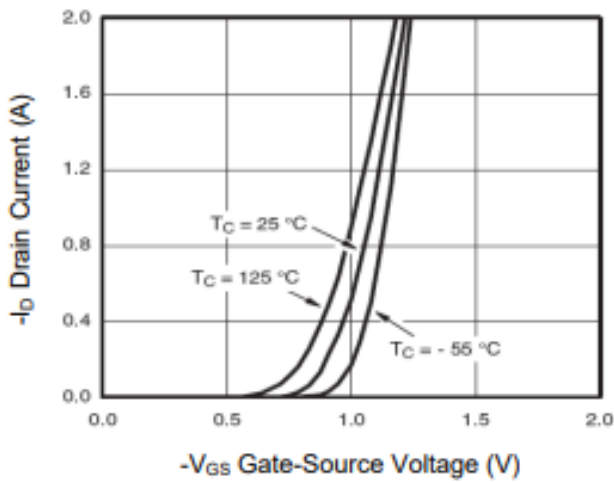
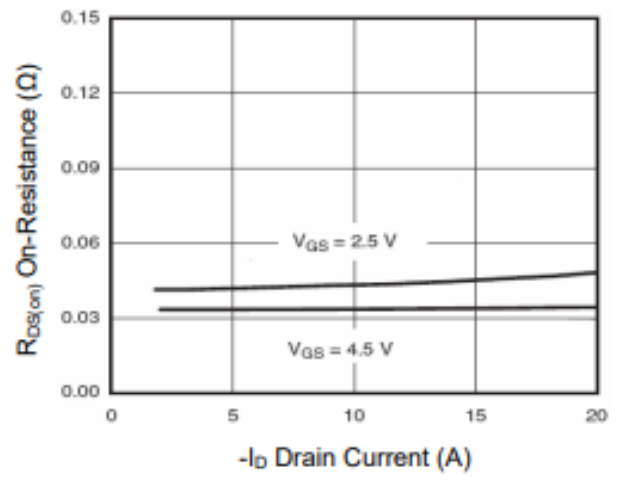
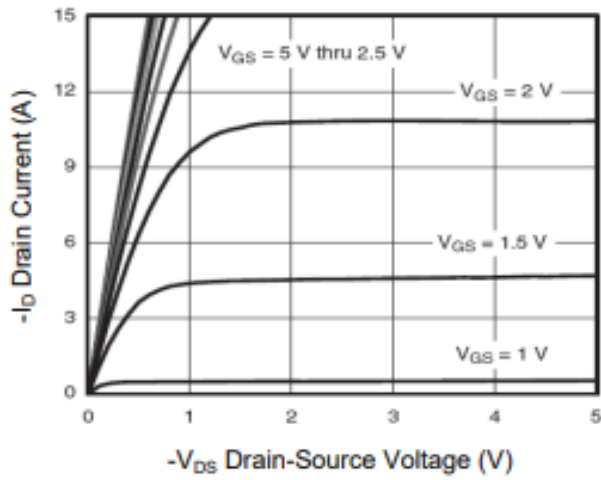
**MOSFET ELECTRICAL CHARACTERISTICS**( $T_a=25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = -20V, V_{GS} = 0V$			-1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 12V, V_{DS} = 0V$			$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.5	-0.7	-0.9	V
Drain-source on-resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -4.1A$		38	45	m $\Omega$
		$V_{GS} = -2.5V, I_D = -3A$		45	70	
Forward transconductance <sup>a</sup>	$g_{FS}$	$V_{DS} = -5V, I_D = -4.1A$		6		S
<b>Dynamic characteristics<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -4V, V_{GS} = 0V, f = 1MHz$		740		pF
Output Capacitance	$C_{oss}$			290		
Reverse Transfer Capacitance	$C_{rss}$			190		
Total Gate Charge	$Q_g$	$V_{DS} = -4V, V_{GS} = -4.5V, I_D = -4.1A$		7.8		nC
Gate-Source Charge	$Q_{gs}$			1.2		
Gate-Drain Charge	$Q_{gd}$			1.6		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -4V, V_{GS} = -4.5V$ $R_L = 1.2\Omega, R_{GEN} = 1\Omega$		12		ns
Turn-on rise time	$t_r$			35		
Turn-off delay time	$t_{d(off)}$			30		
Turn-off fall time	$t_f$			10		
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage	$V_{SD}$	$V_{GS} = 0V, I_S = -4.1A$			-1.2	V

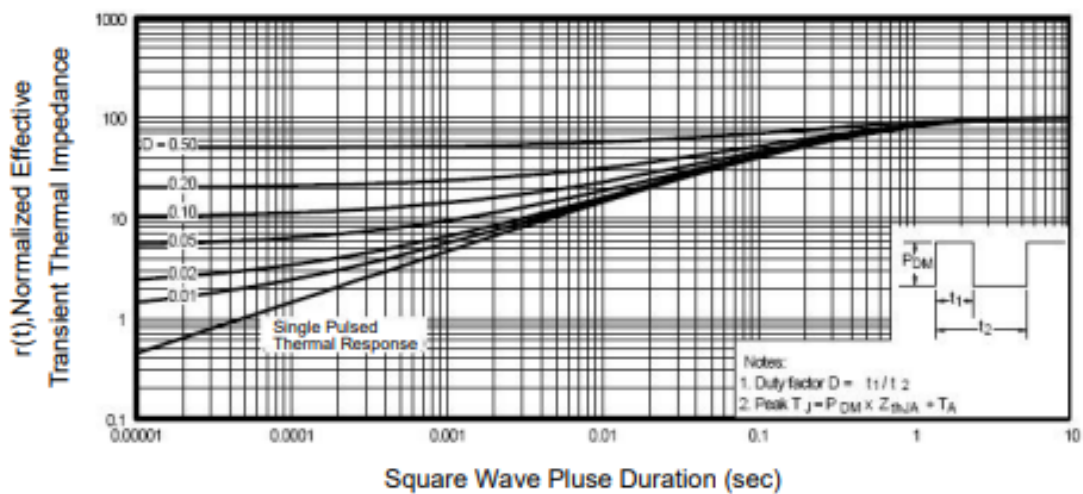
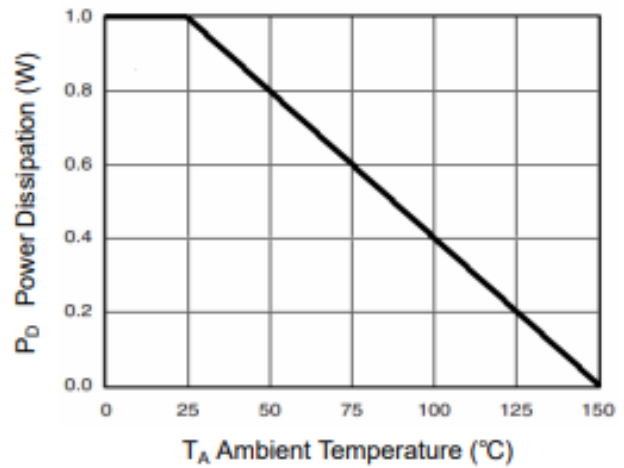
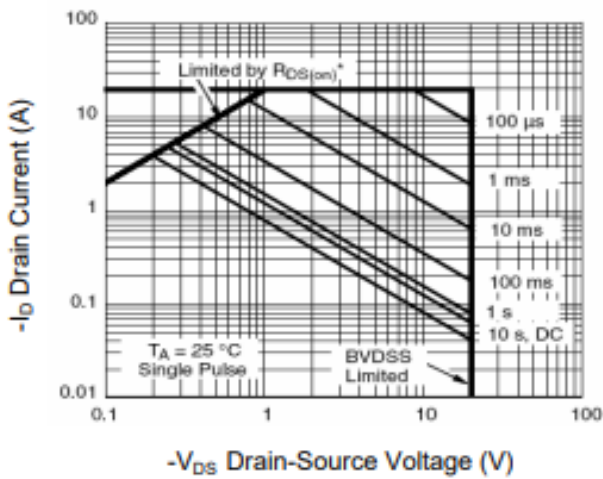
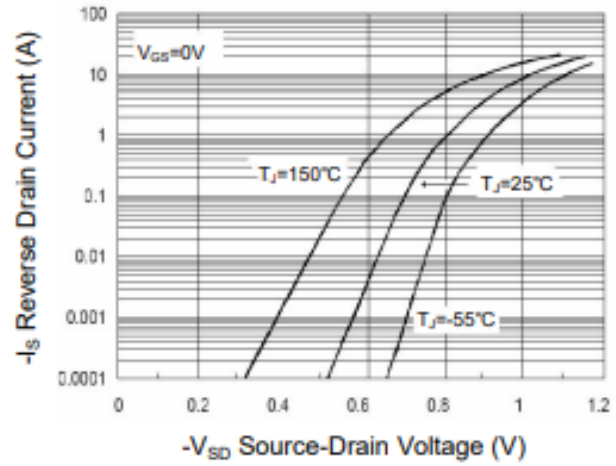
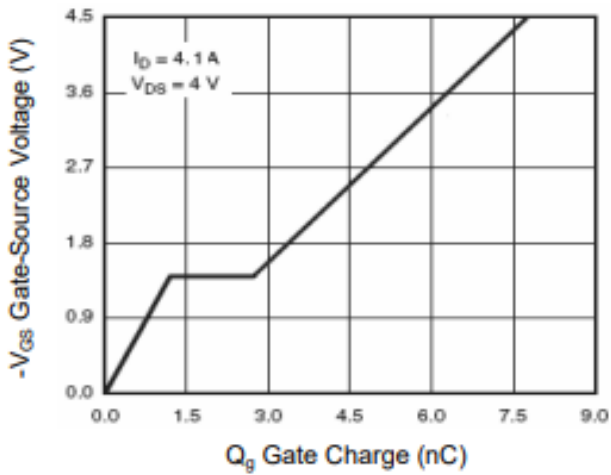
**Notes:**

- a. Pulse Test : Pulse Width < 300 $\mu s$ , Duty Cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

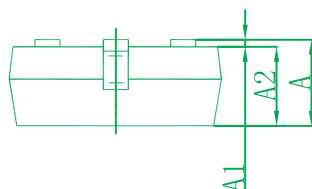
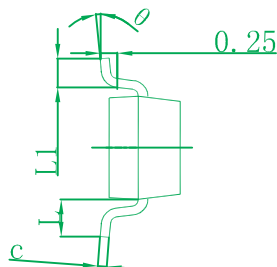
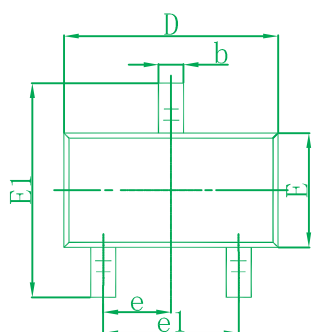
Typical Electrical and Thermal Characteristics



Typical Electrical and Thermal Characteristics

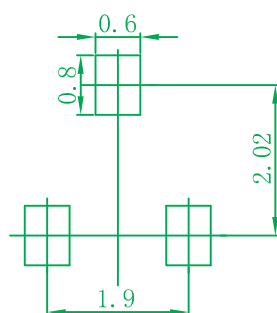


## SOT-23 Package Information



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	1.150	0.035	0.045
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.050	0.110	0.120
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	0.360 REF		0.014 REF	
θ	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.

## Ordering information

Device	Package	Shipping
EP2305	SOT-23	3000/Tape&Reel(7inches)