



## PE2306A

### N-Channel Enhancement Mode Power MOSFET

#### Description

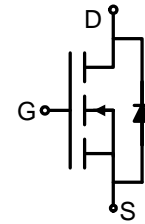
The PE2306A uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with low gate voltage. This device is suitable for use as a battery protection or in other switching application.

#### General Features

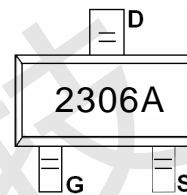
- $V_{DS} > 20V, I_D = 1.6A$   
 $R_{DS(ON)} < 85m\Omega @ V_{GS}=4.5V$   
 $R_{DS(ON)} < 110m\Omega @ V_{GS}=2.5V$
- Surface Mount Package

#### Application

- Load/ power switching cell phones pagers
- Power supply converter circuits



Schematic diagram



Marking and pin assignment



SOT-23 top view

#### 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	$V_{GS}$	$\pm 10$	V
Drain Current-Continuous	$I_D$	1.6	A
Drain Current-Pulsed <sup>(Note 1)</sup>	$I_{DM}$	3	A
Maximum Power Dissipation	$P_D$	0.75	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ\text{C}$

#### Thermal Characteristic

Thermal Resistance, Junction-to-Ambient <sup>(Note 2)</sup>	$R_{\theta JA}$	166.6	$^\circ\text{C/W}$
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#### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu\text{A}$	20	-	-	V



PE2306A

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$	-	-	100	nA
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 4.5V, V_{DS}=0V$	-	-	$\pm 1$	$\mu A$
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.75	1.2	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=0.6A$	-	70	85	m $\Omega$
		$V_{GS}=2.5V, I_D=0.3A$	-	90	110	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=10V, I_D=0.4A$	-	1	-	S
<b>Dynamic Characteristics</b> (Note 4)						
Input Capacitance	$C_{iss}$	$V_{GS} = 0 V, f = 1.0 MHz,$ $V_{DS} = 10 V$	-	96	-	pF
Output Capacitance	$C_{oss}$		-	18	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	9	-	pF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V = 10 V, R = 47\Omega$ $I_D = 200 mA,$ $V_{GEN} = 4.5 V, R_G = 10\Omega$	-	5	-	nS
Turn-on Rise Time	$t_r$		-	5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	25	-	nS
Turn-Off Fall Time	$t_f$		-	11	-	nS
Total Gate Charge	$Q_g$	$V_{DS} = 10 V, V_{GS} = 4.5 V,$ $I_D = 250 mA$	-	800	-	pC
Gate-Source Charge	$Q_{gs}$		-	75	-	pC
Gate-Drain Charge	$Q_{gd}$		-	225	-	pC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=0.2A$	-	0.75	1.2	V

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production



Typical Electrical and Thermal Characteristics

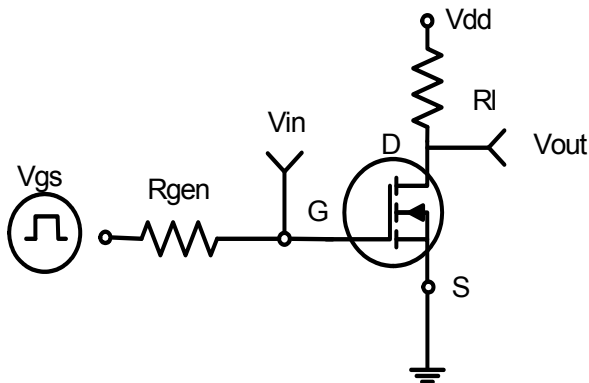


Figure 1: Switching Test Circuit

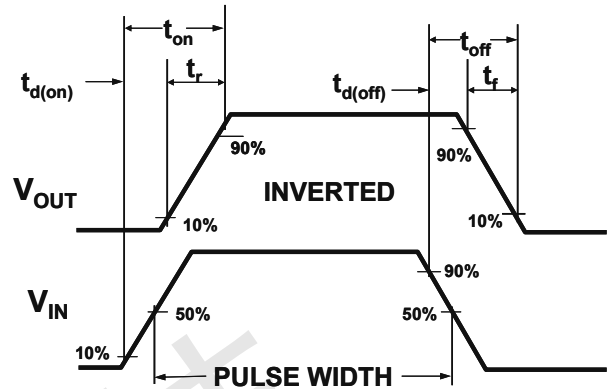


Figure 2: Switching Waveforms

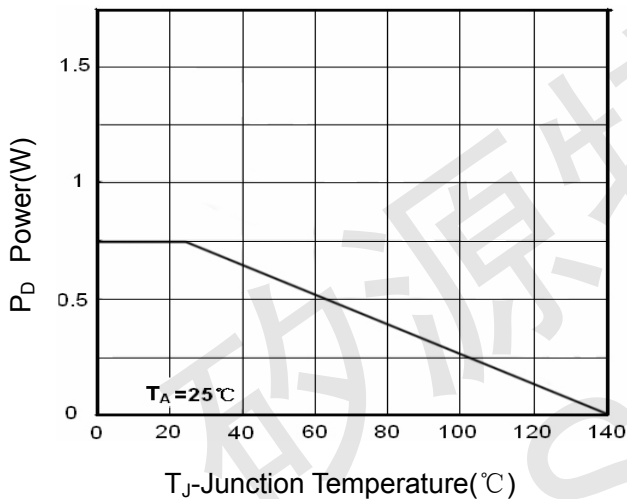


Figure 3 Power Dissipation

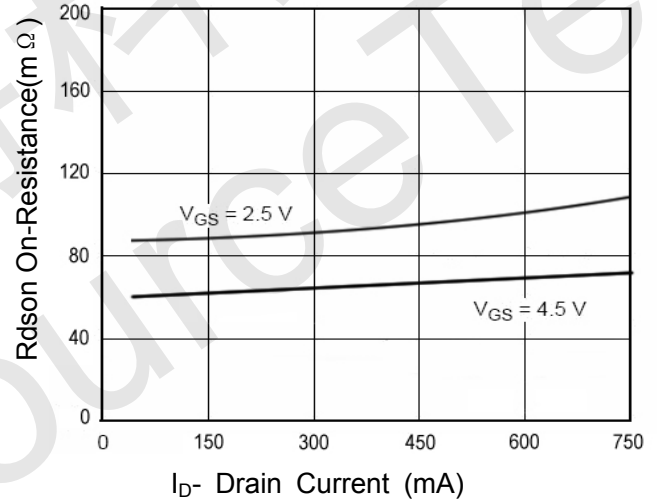


Figure 6 Drain-Source On-Resistance

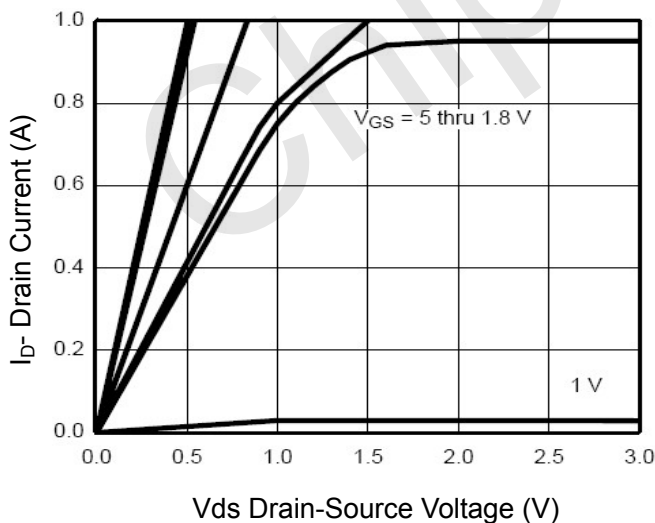


Figure 5 Output Characteristics

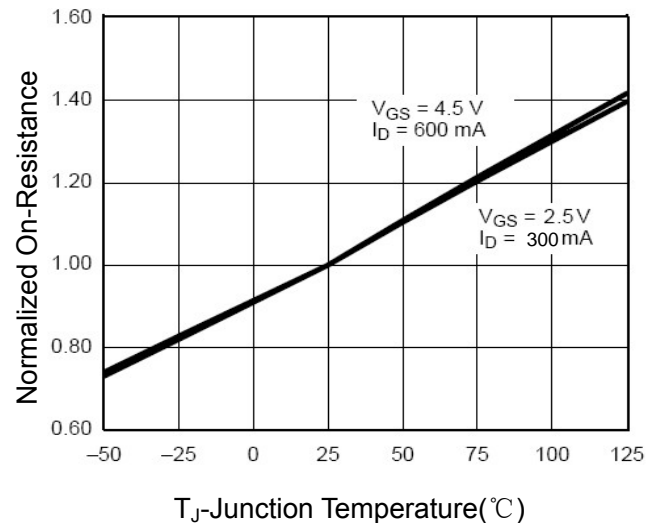
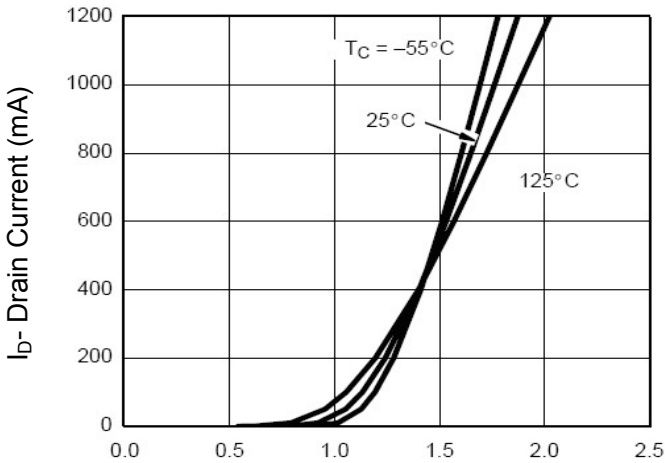


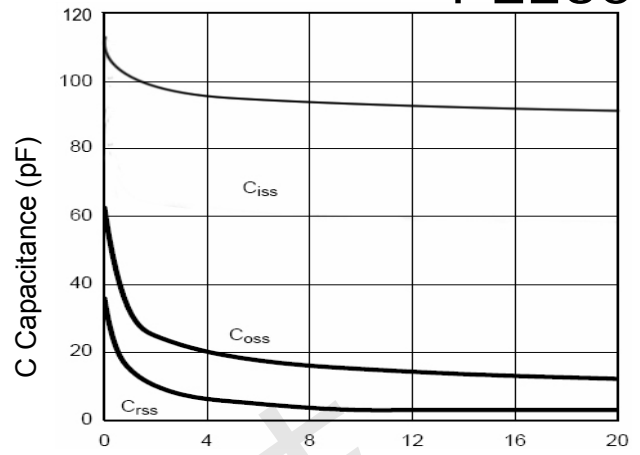
Figure 8 Drain-Source On-Resistance



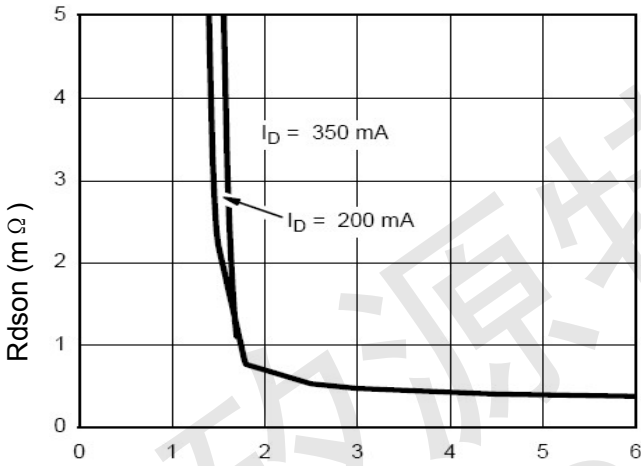
# PE2306A



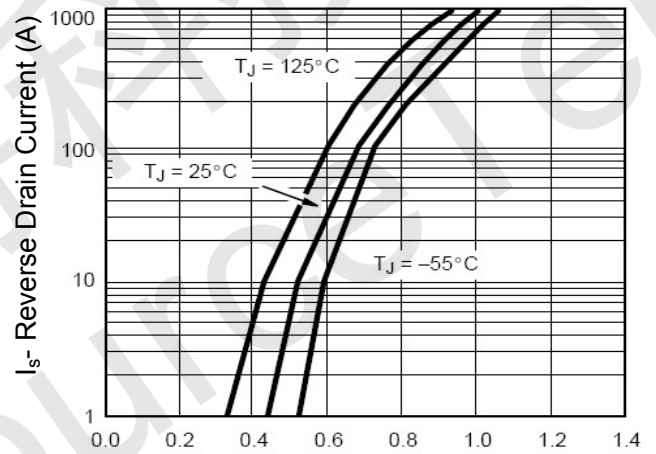
Vgs Gate-Source Voltage (V)  
**Figure 7 Transfer Characteristics**



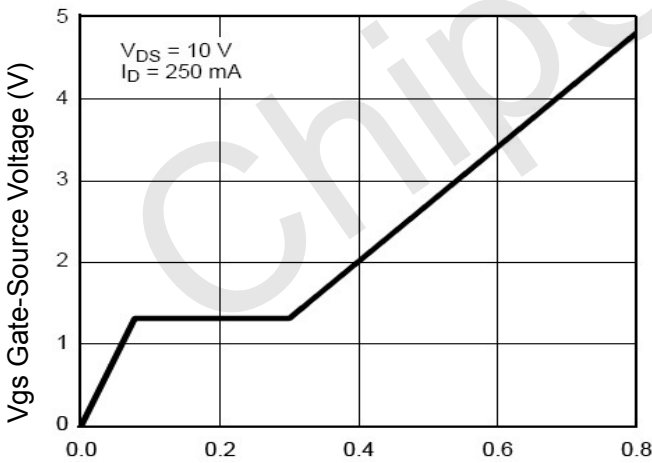
Vds Drain-Source Voltage (V)  
**Figure 8 Capacitance vs Vds**



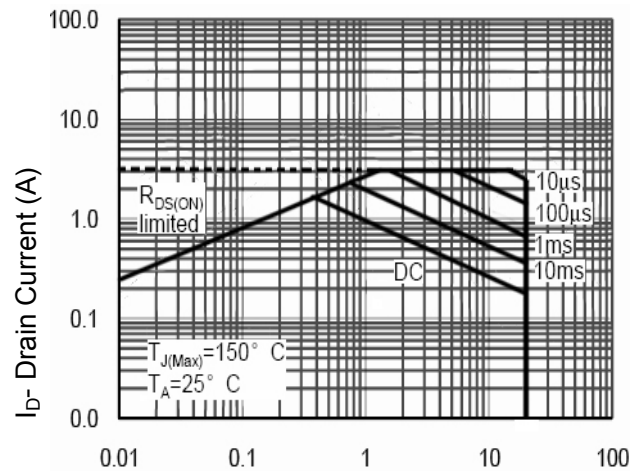
Vgs Gate-Source Voltage (V)  
**Figure 9 Rdson vs Vgs**



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



Qg Gate Charge (nC)  
**Figure 11 Gate Charge**



Vds Drain-Source Voltage (V)  
**Figure 13 Safe Operation Area**

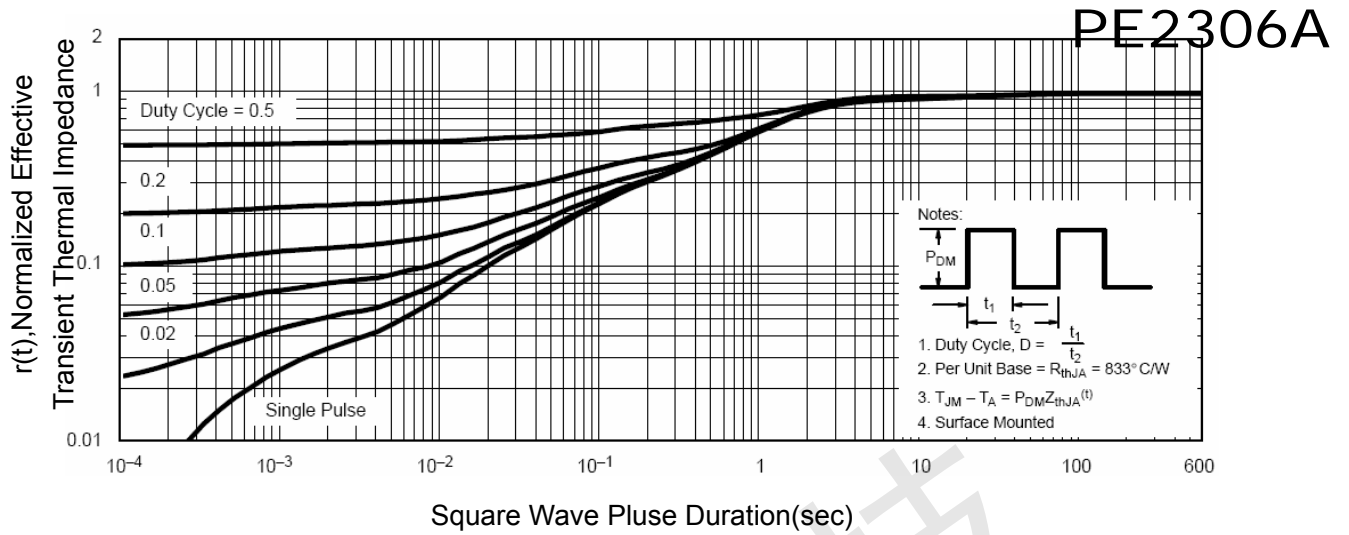


Figure 14 Normalized Maximum Transient Thermal Impedance

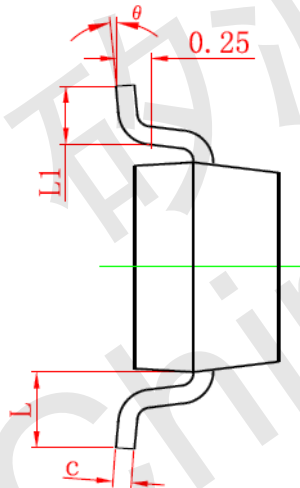
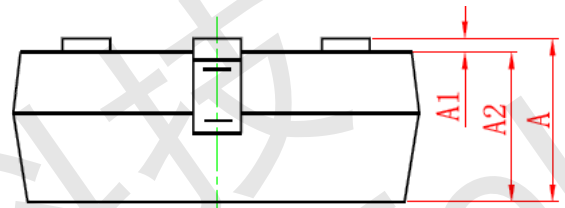
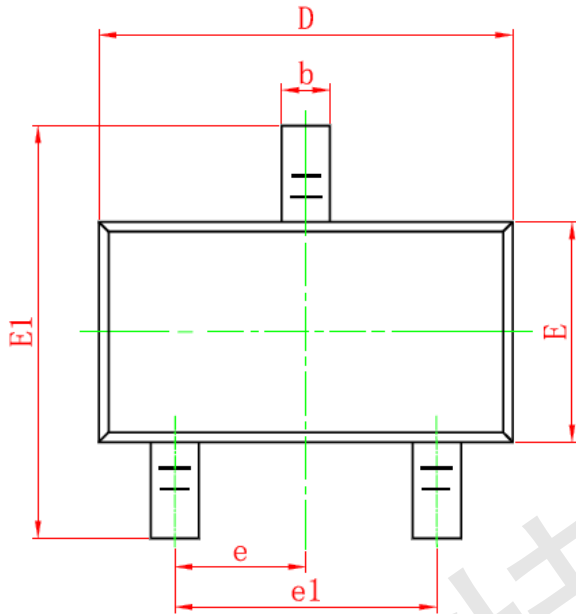
矽源特科技  
ChipSourceTek



## SOT-23 PACKAGE INFORMATION

PE2306A

Dimensions in Millimeters (UNIT:mm)



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°