



DESCRIPTION

P-channel Enhancement Mode Power MOSFET

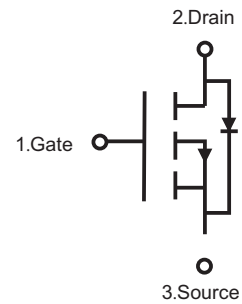
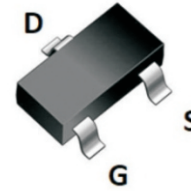
FEATURES

- $V_{DS}=-20V, I_D=-2.5A$
 $R_{DS(ON)}<160m\Omega@V_{GS}=-4.5V$
 $R_{DS(ON)}<230m\Omega@V_{GS}=-2.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

APPLICATION

- PWM Applications
- Load Switch
- Power Management

SOT-23



Absolute Maximum Ratings (TA=25°C, unless otherwise specified)

Parameter	Symbols	Ratings	Units
Drain-Source Voltage	V_{DSS}	-20	V
Gate-Source Voltage	V_{GSS}	± 12	V
Continuous Drain Current	I_D	-2.5	A
Pulsed Drain Current	I_{DM}	-10	A
Power Dissipation	P_D	1.2	W
Thermal Resistance - Junction to Case (Note3)	$R_{\theta JA}$	104	°C/W
Operation Junction Temperature and Storage Temperature	T_j, T_{stg}	-55 ~ +150	°C



Electrical Characteristics (TA=25°C, unless otherwise specified)

Parameter	Symbols	Text conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	B_{VDSS}	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$			-1	μA
Gate- Source Leakage Current	Forward	I_{GSS}			100	nA
	Reverse				-100	
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.7	-1	V
Static Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-2A$		125	160	m Ω
		$V_{GS}=-2.5V, I_D=-1A$		160	230	m Ω
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=-2.5A, V_{GS}=0V$			-1.2	V
Dynamic Characteristics (Note5)						
Input Capacitance	C_{iss}	$V_{DS}=-10V,$		285		pF
Output Capacitance	C_{oss}	$V_{GS}=0V,$		58		pF
Reverse Transfer Capacitance	C_{rss}	$f=1.0MHz$		32		pF
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS}=-10V, V_{GS}=-4.5V,$ $I_D=-2.5A$ (Note1,2)		2.9		nC
Gate-Source Charge	Q_{gs}			0.45		nC
Gate-Drain Charge	Q_{gd}			0.75		nC
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=-10V, R_{GEN}=3\Omega,$ $V_{GS}=-4.5V, R_L=5\Omega$ (Note1,2)		9.8		ns
Turn-On Rise Time	t_r			4.9		ns
Turn-Off Delay Time	$t_{d(off)}$			20.5		ns
Turn-Off Fall Time	t_f			7		ns
Turn-Off Delay Time						
Continuous Current	I_S				-2.5	A
Pulsed Current	I_{SM}				-10	A

Notes:

1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
2. Essentially independent of operating temperature typical characteristics.
3. RJA is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins mounted on a 1 inch FR-4 with 2oz. square pad of copper
4. The maximum current rating is package limited
5. Guaranteed by design, not subject to production testing



Typical Performance Characteristics

Figure1: Output Characteristics

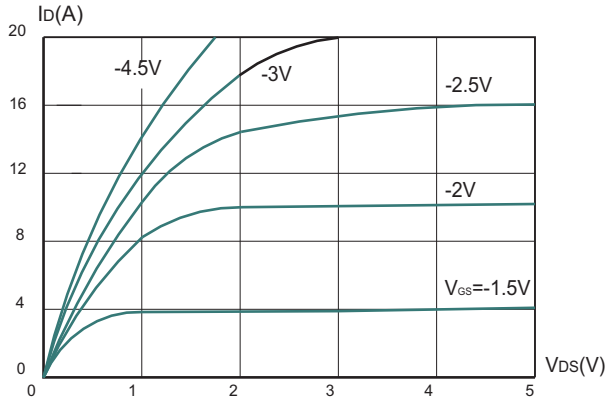


Figure2: Typical Transfer Characteristics

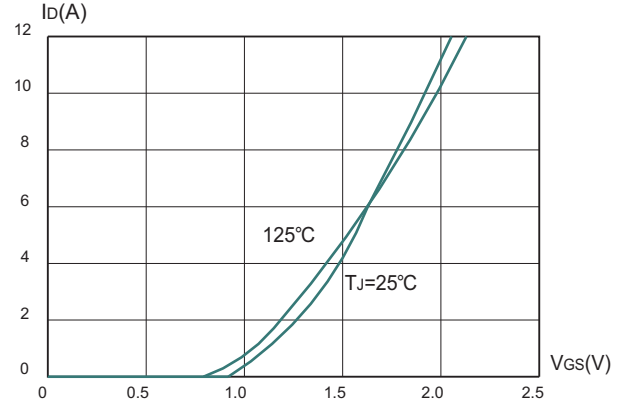


Figure 3: On-resistance vs. Drain Current

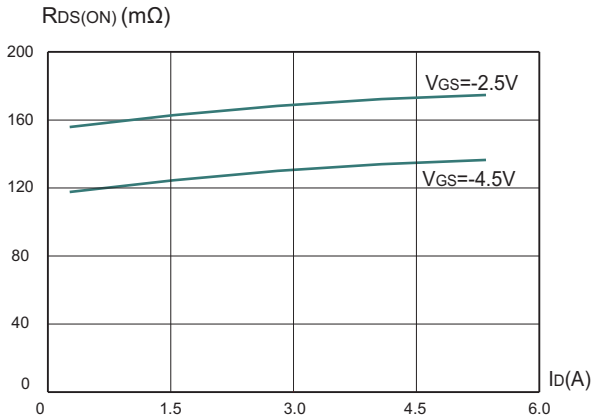


Figure4 : Body Diode Characteristics

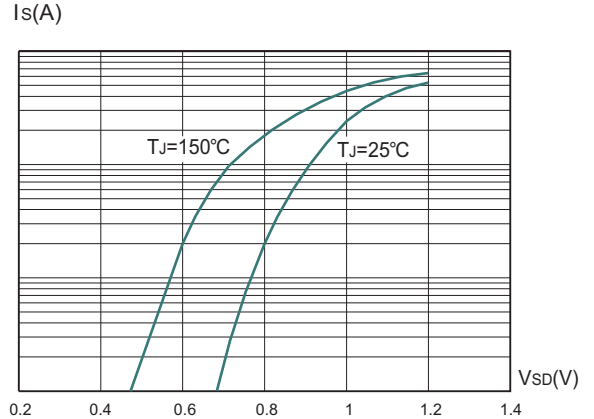


Figure 5: Gate Charge Characteristics

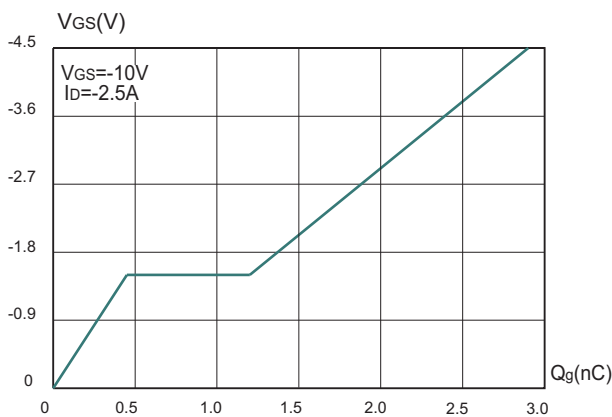


Figure 6: Capacitance Characteristics

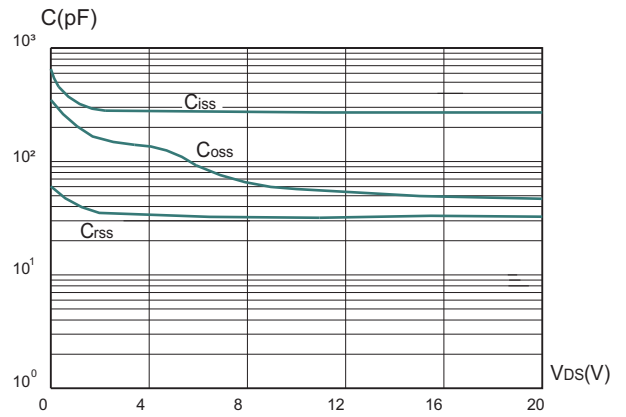




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

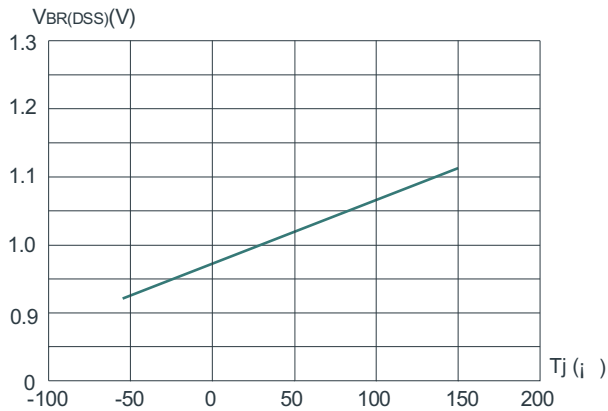


Figure 8: Normalized on Resistance vs. Junction Temperature

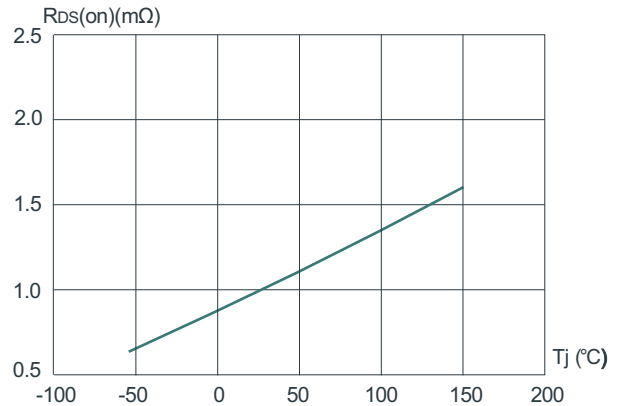


Figure 9: Maximum Safe Operating Area

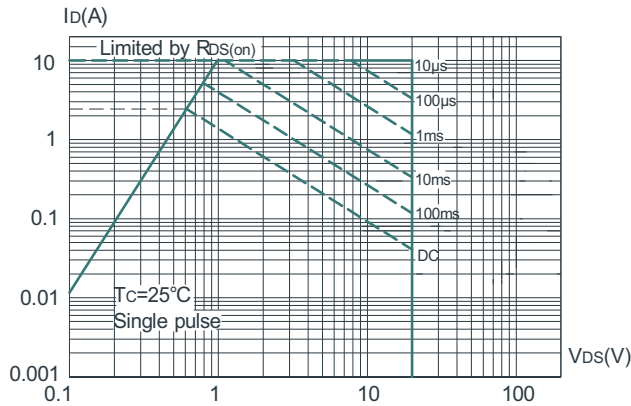


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

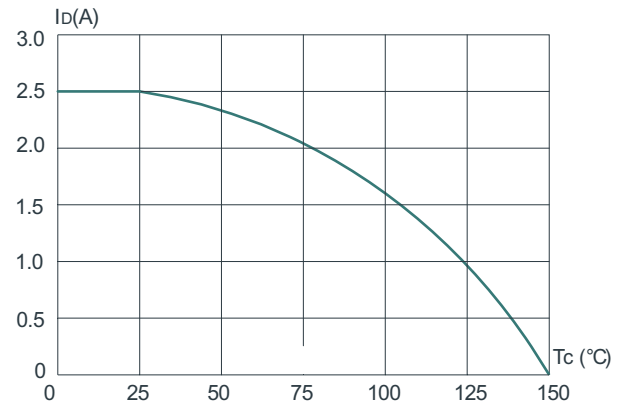
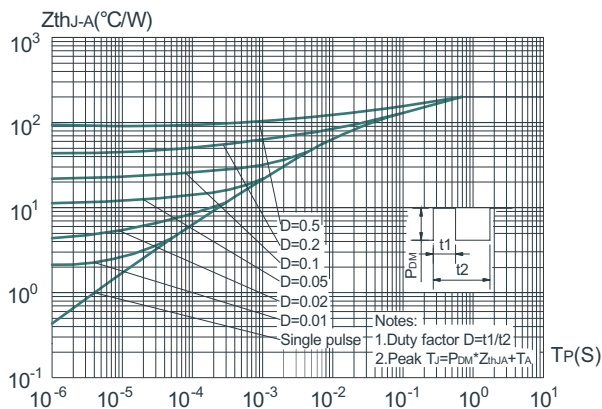
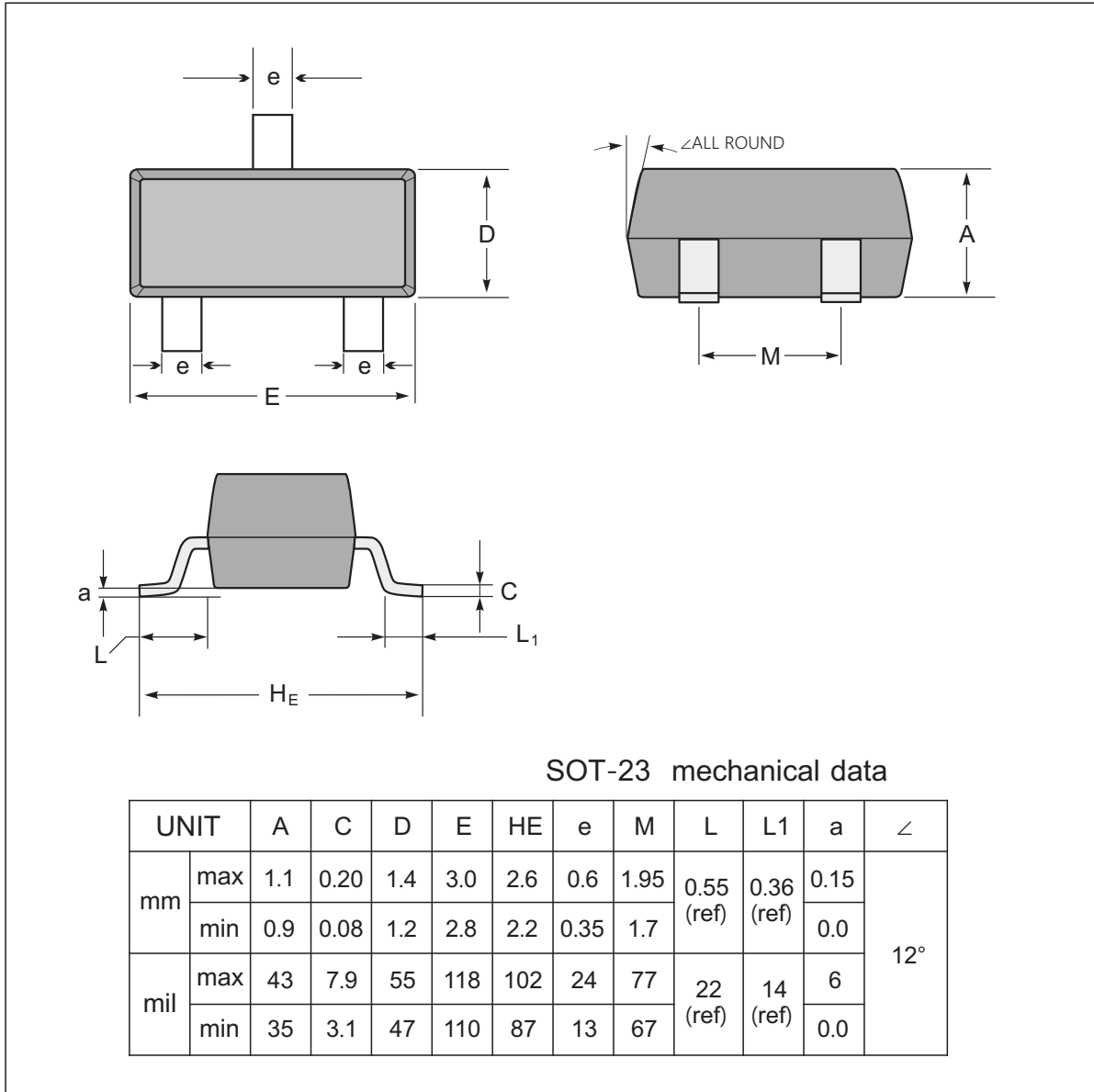


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

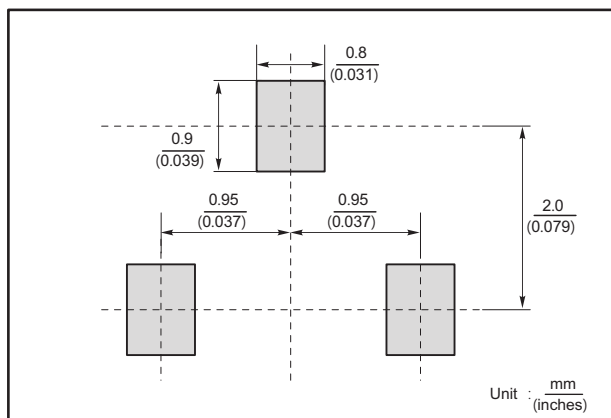




SOT-23 Package Outline Dimensions



The recommended mounting pad size



Marking

Type number	Marking code
PM2301E	2301E



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