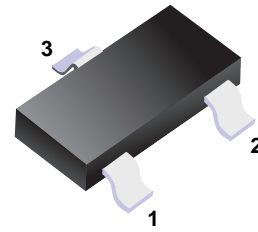
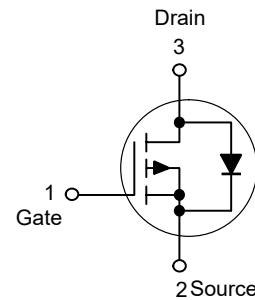


■ P-Channel Power MOSFET



- 1. Gate
- 2. Source
- 3. Drain

■ Simplified outline(SOT-23)



■ Features

- Fast switching
- Low gate charge and $R_{DS(ON)}$
- Low reverse transfer capacitances
- $V_{DS} = -20V$, $I_D = -4.1A$
 $R_{DS(ON)} < 45m\Omega @ -4.5V$

■ Applications

- Load switch and in PWM applications
- Power management

■ MARKING

Marking	3415K
---------	-------

■ Absolute Maximum Ratings $T_a = 25^\circ C$

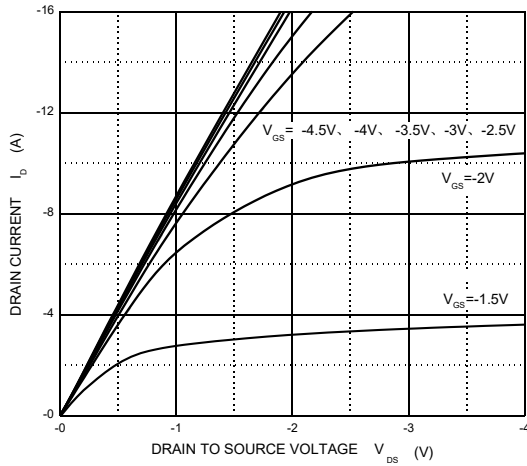
Parameter	Symbol	Value	Units
Drain-Source Voltage	$-V_{DS}$	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	$-I_D$	4.1	A
Power Dissipation	P_D	1.4	W
Junction and Storage Temperature Range	T_J, T_{STG}	150, -55 to 150	$^\circ C$
Thermal Characteristics			
Parameter	Symbol	Typ.	Units
Maximum Junction-to-Ambient	$R_{\theta JA}$	89	$^\circ C/W$

■ Electrical Characteristics Ta = 25°C

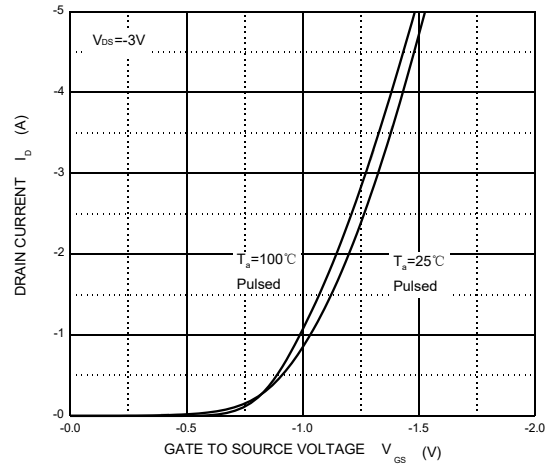
Parameter	Symbol	Test Condition	Min	Type	Max	Units
Static Characteristics						
Drain-source breakdown voltage	$-V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	20			V
Drain to Source Leakage Current	$-I_{DSS}$	$V_{DS} = -20V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 12V, V_{DS} = 0V$			± 100	nA
Gate threshold voltage ^{Note1}	$-V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	0.5	0.7	0.9	V
Drain-source on-resistance ^{Note1}	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -3.5A$		38	45	m Ω
		$V_{GS} = -2.5V, I_D = -3.0A$		50	70	m Ω
Forward tranconductance ^{Note1}	g_{FS}	$V_{DS} = -5V, I_D = -4.1A$	6			S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = -4V, V_{GS} = 0V, f = 1MHz$		740		pF
Output Capacitance	C_{oss}			290		
Reverse Transfer Capacitance	C_{riss}			190		
Switching Characteristics						
Turn-on delay time	$t_{d(on)}$	$I_D = -3.3A, V_{DD} = -4V, R_L = 1.2\Omega$ $V_{GEN} = -4.5V, R_{GEN} = 1\Omega$		13		ns
Turn-on rise time	t_r			35		
Turn-off delay time	$t_{d(off)}$			32		
Turn-off fall time	t_f			10		
Total gate charge	Q_g	$V_{DD} = -4V, V_{GS} = -2.5V, I_D = -4.1A$		4.5	9	nC
Gate-source charge	Q_{gs}			1.2		
Gate-drain charge	Q_{gd}			1.6		
Source-Drain Diode Characteristics						
Diode Forward voltage	$-V_{SD}$	$V_{GS} = 0V, I_S = -3.3A$			1.2	V
Continuous source-drain diode current	$-I_S$				1.4	A

 Note: 1. Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

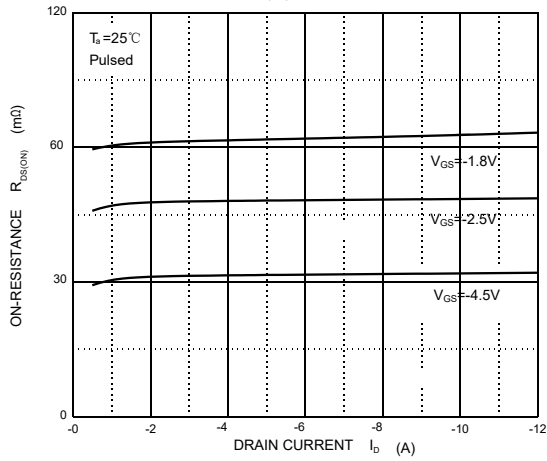
Output Characteristics



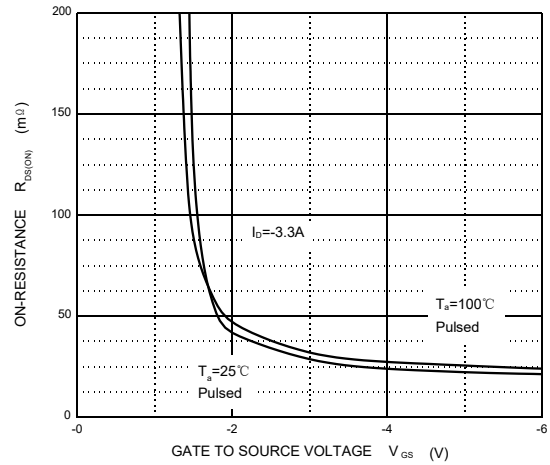
Transfer Characteristics



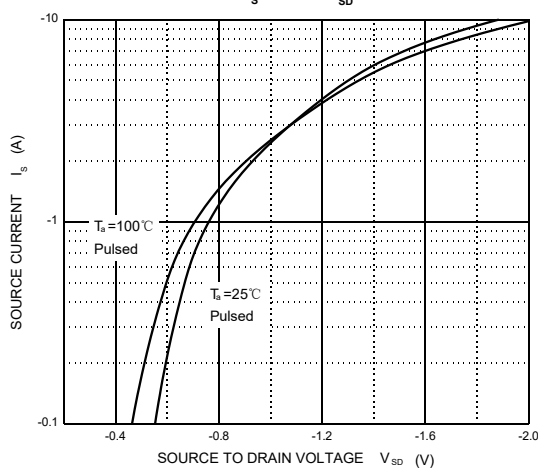
$R_{DS(ON)}$ — I_D



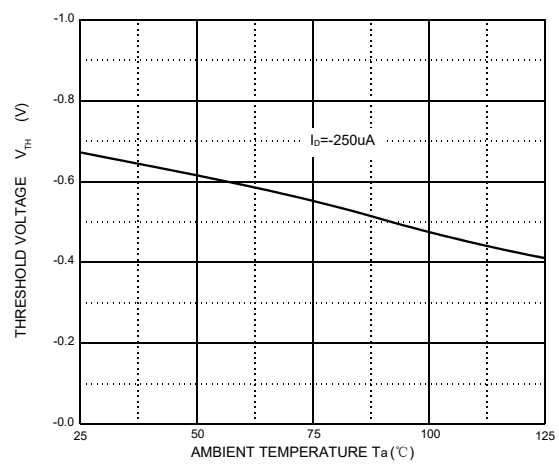
$R_{DS(ON)}$ — V_{GS}



I_S — V_{SD}

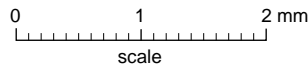
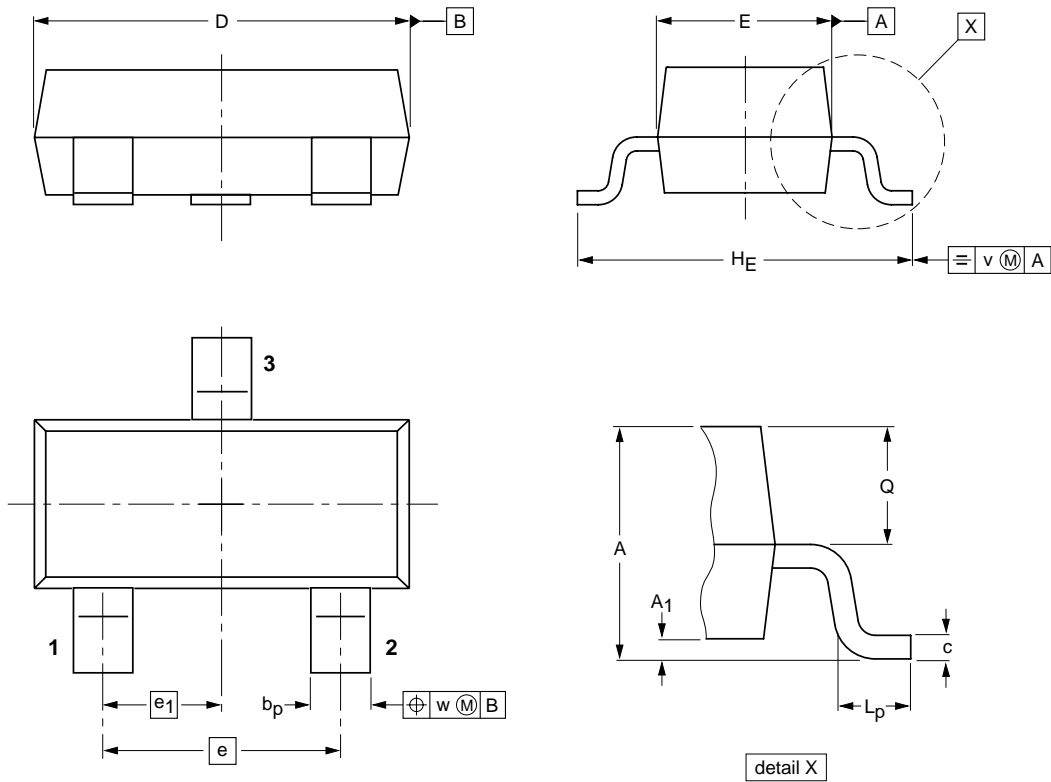


Threshold Voltage



Package Outline

SOT-23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max.	b _p	c	D	E	e	e ₁	H _E	L _p	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

Summary of Packing Options

Package	Packing Description	Packing Quantity	Industry Standard
SOT-23	Tape/Reel, 7" reel	3000	EIA-481-1