

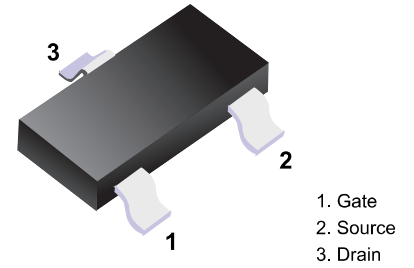
■ P-Channel MOSFET

■ Features

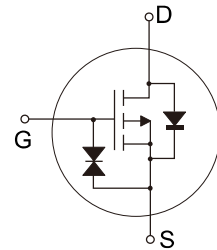
- Low Gate Charge and $R_{DS(on)}$
- ESD protected(HBM) up to 2KV

■ Application

- Load switch and in PWM applicatopns



■ Simplified outline(SOT-23)



■ Marking

Marking	3415K
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Absolute Maximum Ratings

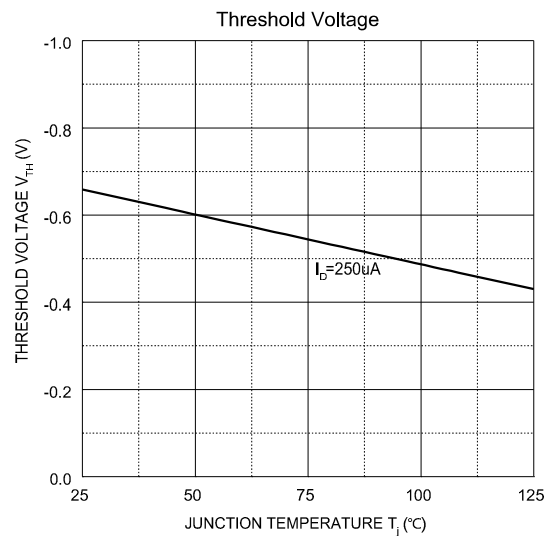
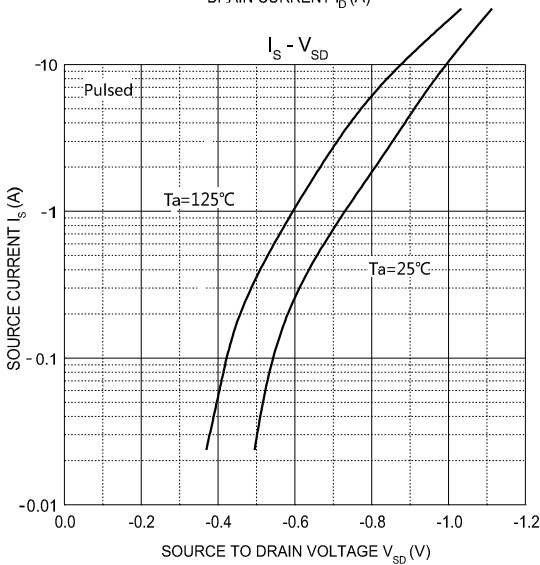
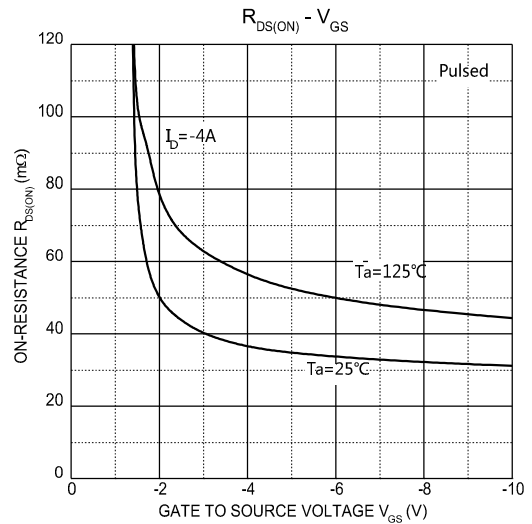
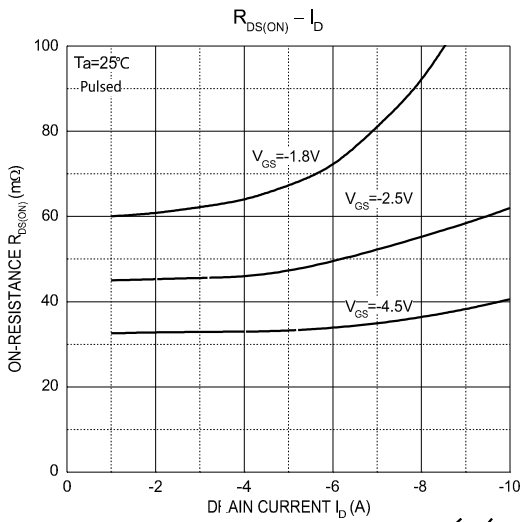
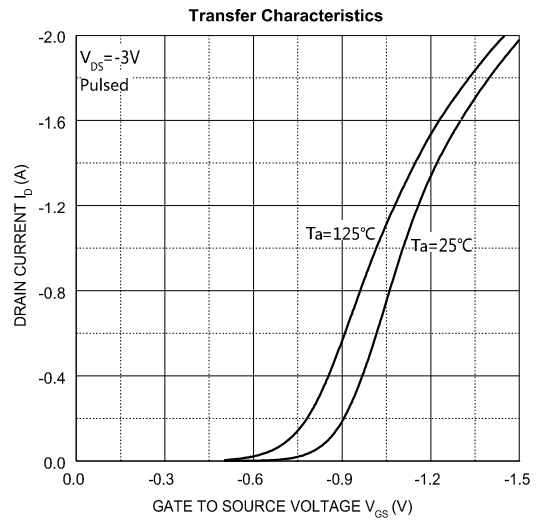
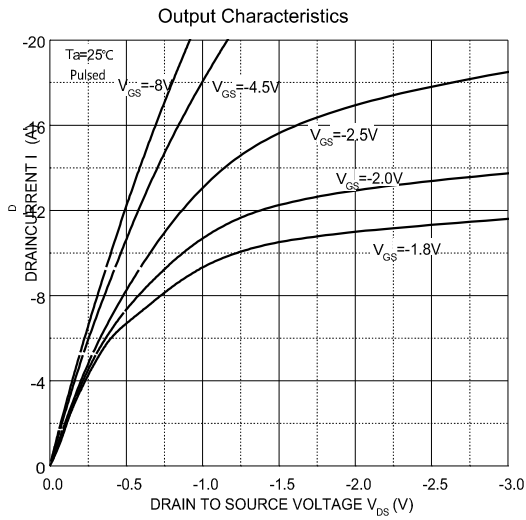
Ratings at $T_A=25^{\circ}\text{C}$ unless otherwise specified.

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$-V_{DS}$	20	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current	$-I_D$	4	A
Power Dissipation	P_D	1.5	W
Junction and Storage Temperature Range	T_J, T_{STG}	150, -55 to 150	$^{\circ}\text{C}$
Thermal Characteristics			
Parameter	Symbol	Typ.	Units
Maximum Junction-to-Ambient	$R_{\theta JA}$	83	$^{\circ}\text{C/W}$

Electrical Characteristics (Ta=25°C unless otherwise specified)

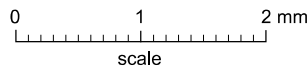
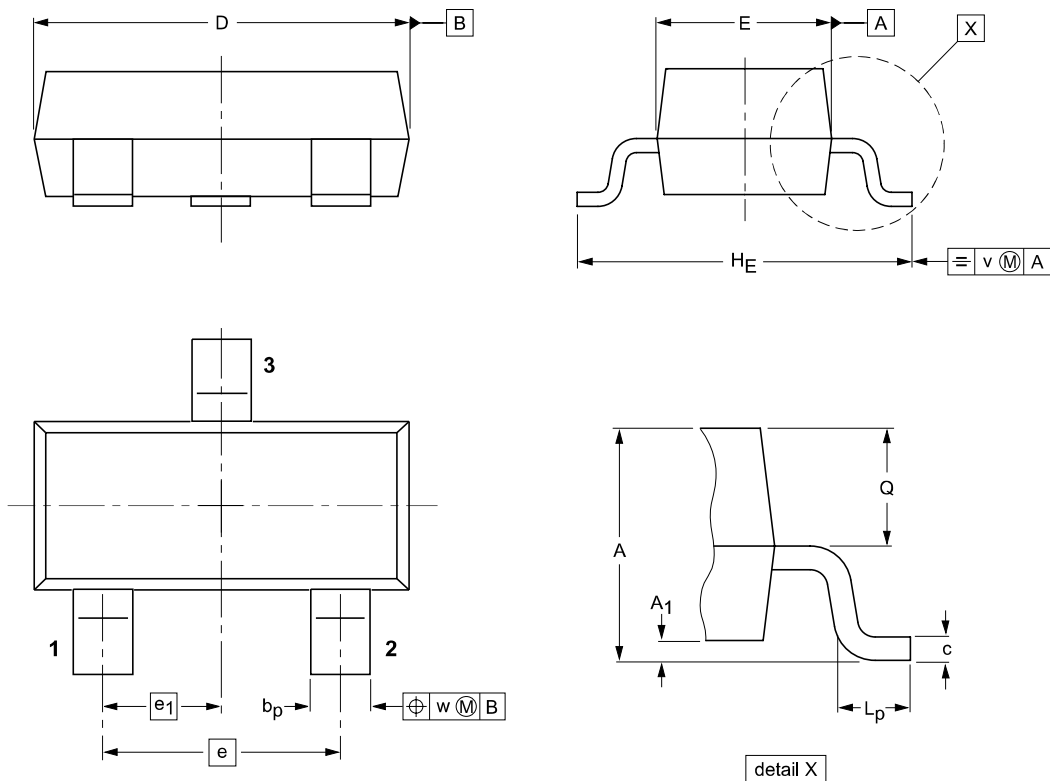
Parameter	Symbol	Test Condition	Min	Type	Max	Units
Static Characteristics						
Drain-source breakdown voltage	$-V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	20			V
Zero gate voltage drain current	$-I_{DSS}$	$V_{DS} = -16V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 8V, V_{DS} = 0V$			± 10	μA
Gate threshold voltage ^{Note1}	$-V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	0.3	0.65	1	V
Drain-source on-resistance ^{Note1}	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -4A$		33	50	m Ω
		$V_{GS} = -2.5V, I_D = -4A$		45	60	
		$V_{GS} = -1.8V, I_D = -2A$		63	90	
Forward tranconductance ^{Note1}	g_{FS}	$V_{DS} = -5V, I_D = -4A$	8			S
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = -10V, V_{GS} = 0V, f = 1MHz$		1450		pF
Output Capacitance	C_{oss}			205		
Reverse Transfer Capacitance	C_{rss}			160		
Switching Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DS} = -10V, V_{GS} = -4.5V, R_{GEN} = 3\Omega, R_L = 2.5\Omega,$		9.5		ns
Turn-on rise time	t_r			17		
Turn-off delay time	$t_{d(off)}$			94		
Turn-off fall time	t_f			35		
Total gate charge	Q_g	$V_{DS} = -10V, V_{GS} = -4.5V, I_D = -4A$		17.2		nC
Gate-source charge	Q_{gs}			1.3		
Gate-drain charge	Q_{gd}			4.5		
Source-Drain Diode characteristics						
Diode Forward voltage ^{Note1}	$-V_{DS}$	$V_{GS} = 0V, I_S = -1A$			1	V

Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.



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