



## Description

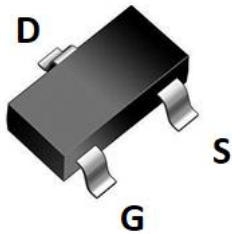
### JMT N-channel Enhancement Mode Power MOSFET

#### Features

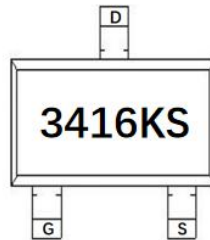
- 20V, 5A
- $R_{DS(ON)} < 22m\Omega @ V_{GS} = 4.5V$
- $R_{DS(ON)} < 36m\Omega @ V_{GS} = 2.5V$
- Advanced Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead free product is acquired
- ESD Rating: HBM 2KV

#### Application

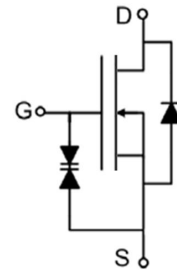
- Load Switch
- PWM Application
- Power management



SOT-23 top view



Marking and pin Assignment



Schematic Diagram

## Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
3416KS	JMTL3416KS	TAPING	SOT-23	7inch	3000	120000

## Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise specified)

Symbol	Parameter	Max.	Units
V <sub>DSS</sub>	Drain-Source Voltage	20	V
V <sub>GSS</sub>	Gate-Source Voltage	±10	V
I <sub>D</sub>	Continuous Drain Current	T <sub>A</sub> = 25°C	5
		T <sub>A</sub> = 100°C	3.3
I <sub>DM</sub>	Pulsed Drain Current <sup>note1</sup>	20	A
P <sub>D</sub>	Power Dissipation	0.9	W
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient	139	°C/W
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range	-55 to +150	°C



## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V,	-	-	1	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±10V	-	-	±10	uA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.4	0.7	1	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance <small>note2</small>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A	-	17	22	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =3A	-	26	36	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1.0MHz	-	545	-	pF
C <sub>oss</sub>	Output Capacitance		-	103	-	pF
C <sub>riss</sub>	Reverse Transfer Capacitance		-	90	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, I <sub>D</sub> =5A, V <sub>GS</sub> =4.5V	-	8	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	2.5	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	3	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =10V, R <sub>L</sub> =1.5Ω, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =5V	-	0.5	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	1	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	12	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	4	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	5	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	20	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =5A	-	-	1.2	V

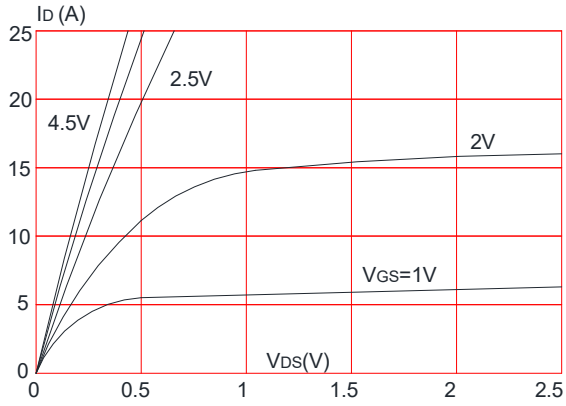
Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

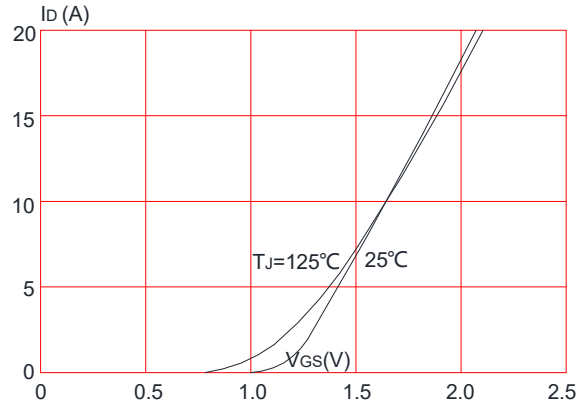


## Typical Performance Characteristics

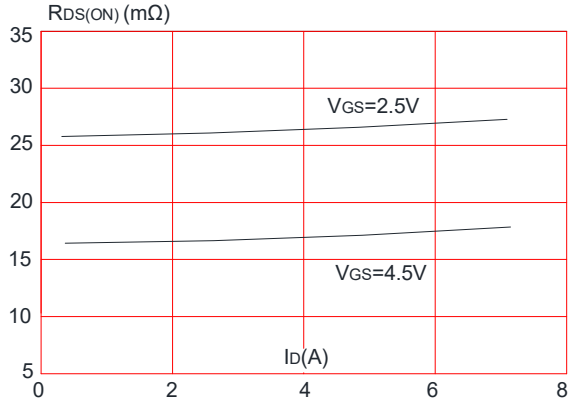
**Figure 1: Output Characteristics**



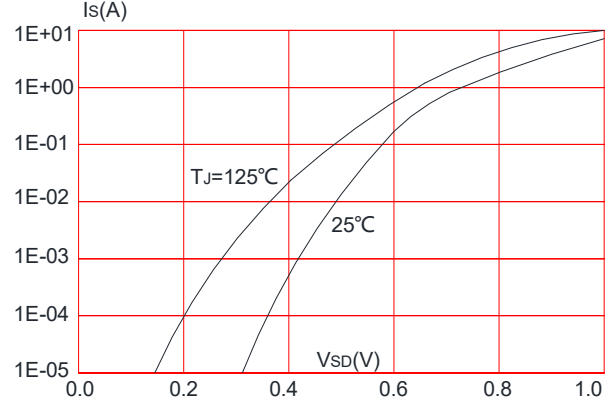
**Figure 2: Typical Transfer Characteristics**



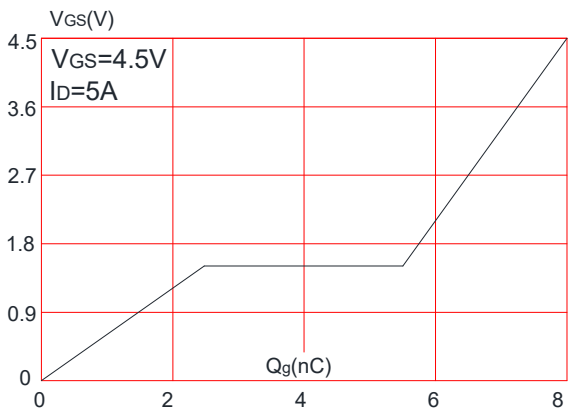
**Figure 3: On-resistance vs. Drain Current**



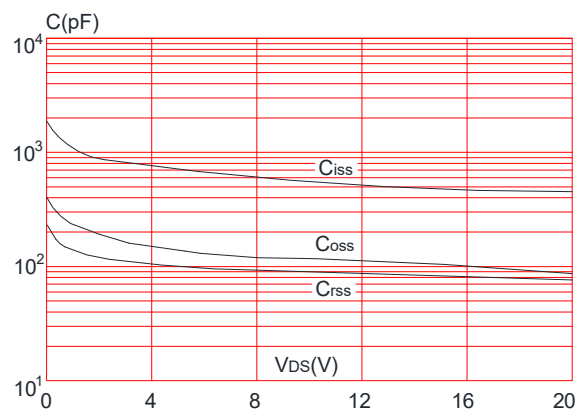
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**

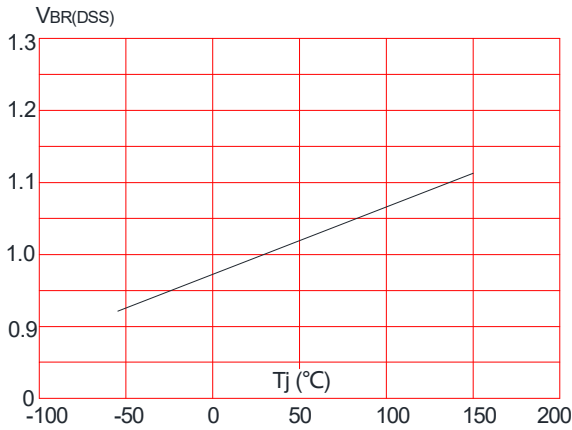


**Figure 6: Capacitance Characteristics**

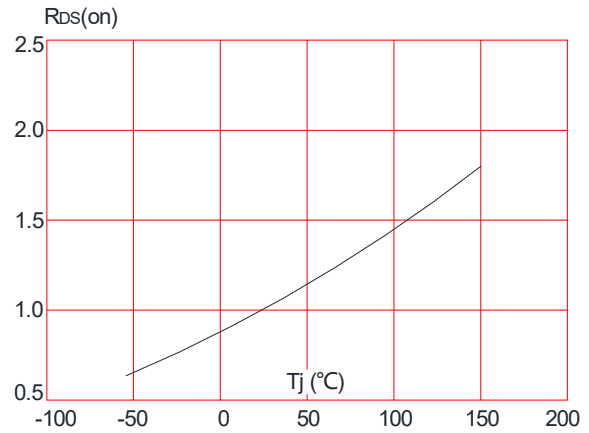




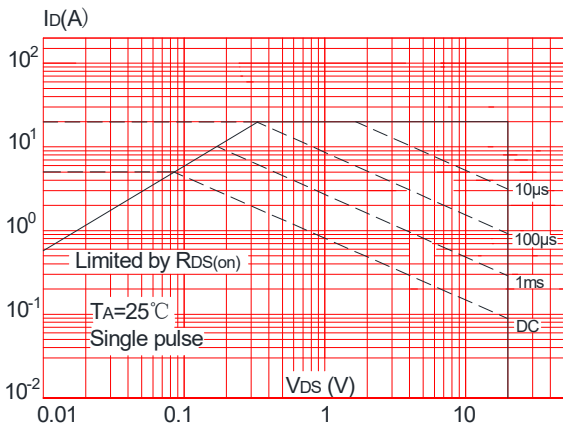
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



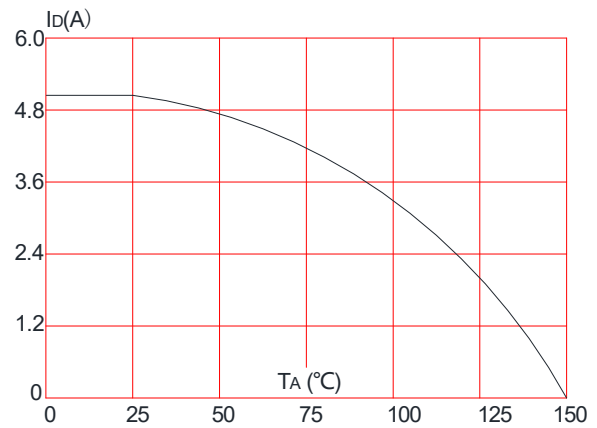
**Figure 8:** Normalized on Resistance vs. Junction Temperature



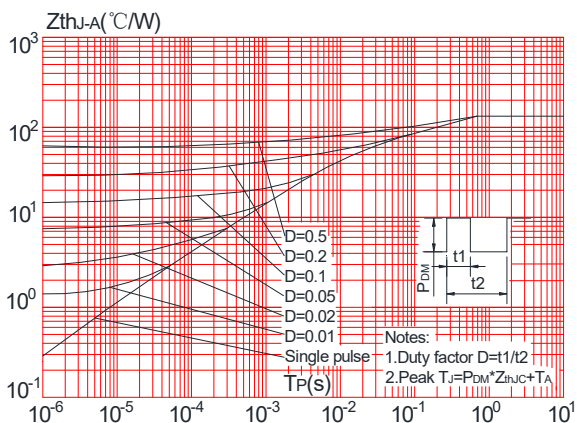
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



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



## Test Circuit

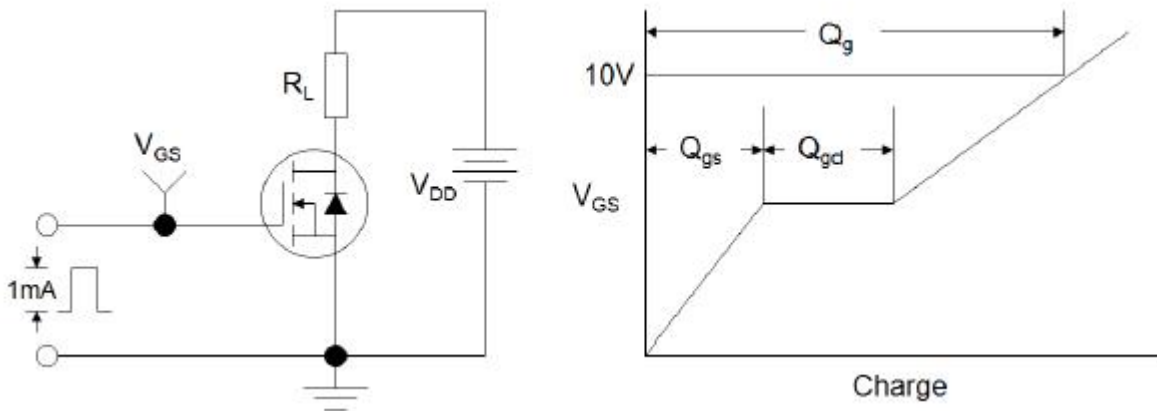


Figure1:Gate Charge Test Circuit & Waveform

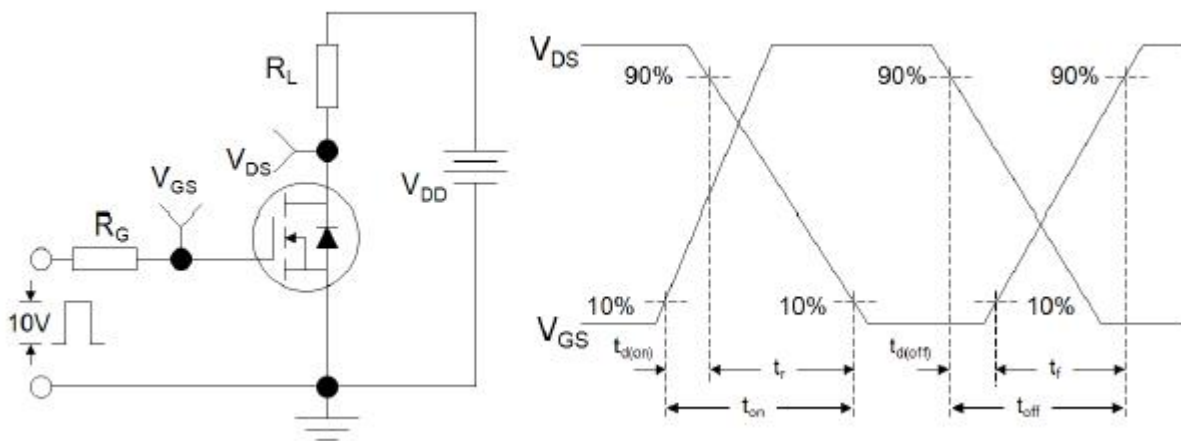


Figure 2: Resistive Switching Test Circuit & Waveforms

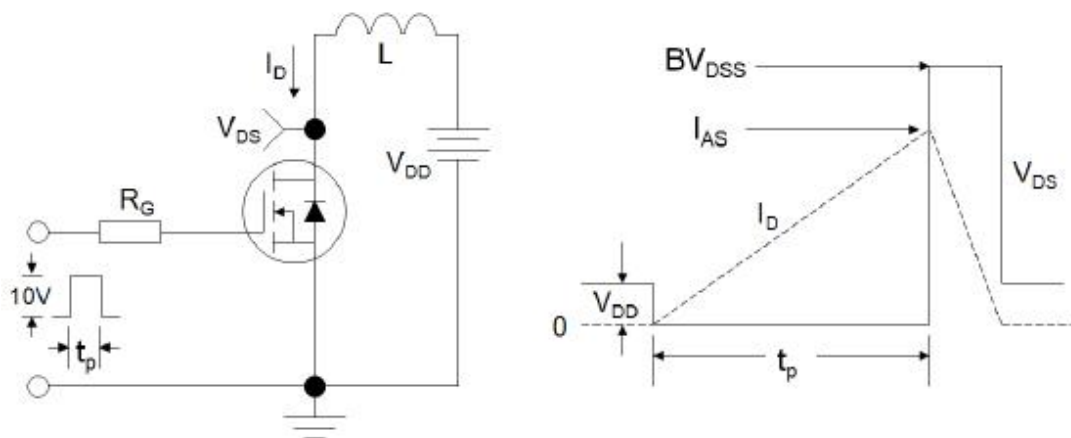
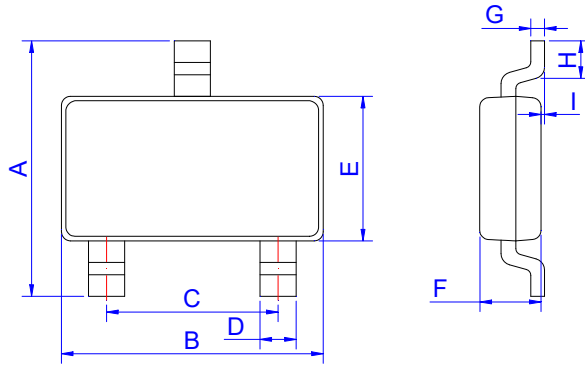


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

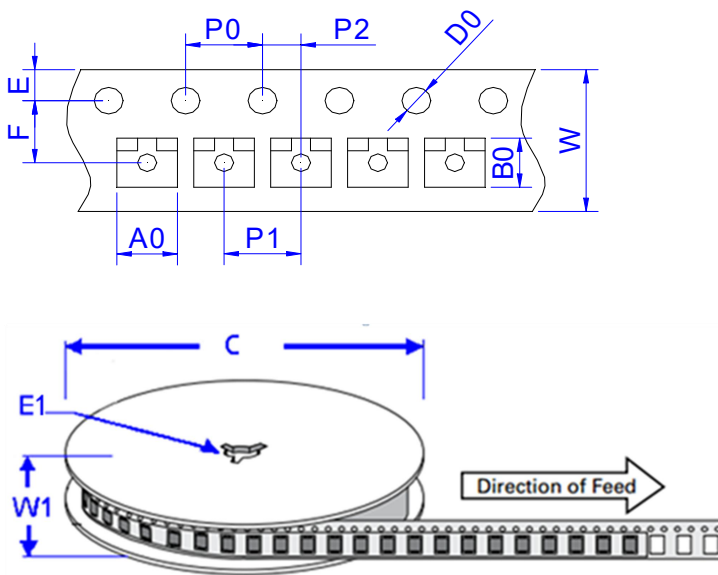
## Package Mechanical Data-SOT-23



SOT-23

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.30	2.40	2.50	0.091	0.095	0.098
B	2.80	2.90	3.00	0.110	0.114	0.118
C	1.90 REF			0.075 REF		
D	0.35	0.40	0.45	0.014	0.016	0.018
E	1.20	1.30	1.40	0.047	0.051	0.055
F	0.90	1.00	1.10	0.035	0.039	0.043
G		0.10	0.15		0.004	0.006
H	0.20			0.008		
I	0		0.10	0		0.004

## Package Information-SOT-23



Ref.	Dimensions	
	Millimeters	Inches
A0	3.15 ± 0.3	0.124 ± 0.012
B0	2.77 ± 0.3	0.109 ± 0.012
C	178	7.0
D0	1.50±0.1	0.059 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3±0.3	0.524± 0.012
F	3.5 ± 0.2	0.138 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	4.00 ± 0.2	0.157 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	8.00 ± 0.2	0.315 ± 0.008
W1	11.5±1.0	0.453 ± 0.039




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