

Description

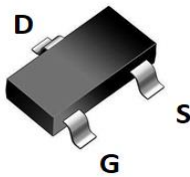
JMT N-channel Enhancement Mode Power MOSFET

Features

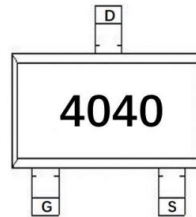
- 40V, 5A
 $R_{DS(ON)} < 39m\Omega @ V_{GS} = 4.5V$
 $R_{DS(ON)} < 52m\Omega @ V_{GS} = 2.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free

Applications

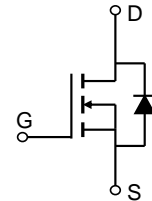
- Load Switch
- PWM Application
- Power Management



SOT-23 Top View



Marking and Pin



Schematic

Package Marking and Ordering Information

Device Marking	Device	Outline	Package	Reel Size	Reel(pcs)	Per Carton (pcs)
4040	JMTL400N04A	TAPING	SOT-23	7"	3000	120000

Absolute Maximum Ratings (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Units
V_{DS}	Drain-to-Source Voltage	40	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_A = 25^\circ\text{C}$	5
		$T_A = 100^\circ\text{C}$	3
I_{DM}	Pulsed Drain Current ⁽¹⁾	20	A
P_D	Power Dissipation	$T_A = 25^\circ\text{C}$	1.3
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ⁽²⁾	100	$^\circ\text{C/W}$
T_J, T_{STG}	Junction & Storage Temperature Range	-55 to 150	$^\circ\text{C}$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 40V, V _{GS} = 0V	-	-	1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.9	2.5	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽³⁾	V _{GS} = 10V, I _D = 4A	-	30	39	mΩ
		V _{GS} = 4.5V, I _D = 3A	-	40	52	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 20V, f = 1MHz	-	536	-	pF
C _{oss}	Output Capacitance		-	42	-	pF
C _{rss}	Reverse Transfer Capacitance		-	33	-	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DD} = 20V, I _D = 3A	-	11	-	nC
Q _{gs}	Gate Source Charge		-	2	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	2	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{GS} = 10V, V _{DD} = 20V I _D = 3A, R _{GEN} = 3Ω	-	4	-	ns
t _r	Turn-On Rise Time		-	2	-	ns
t _{d(off)}	Turn-Off Delay Time		-	15	-	ns
t _f	Turn-Off Fall Time		-	2	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	5	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	20	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S = 5A	-	-	1.2	V
t _{rr}	Body Diode Reverse Recovery Time	I _F = 3A, di/dt = 100A/us	-	9	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	4	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. R_{θJA} is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
 3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%.

Typical Performance Characteristics

Figure 1: Output Characteristics

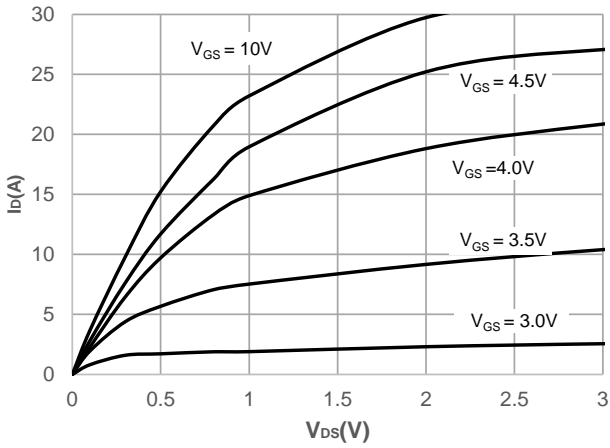


Figure 2: Typical Transfer Characteristics

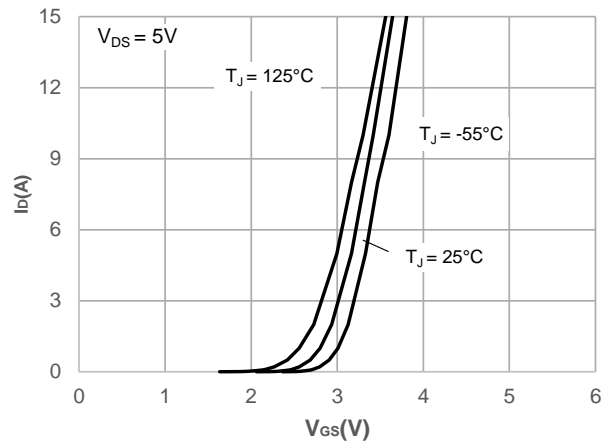


Figure 3: On-resistance vs. Drain Current

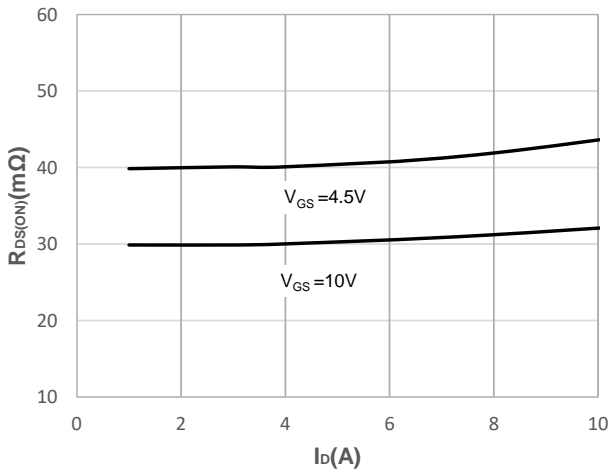


Figure 4: Body Diode Characteristics

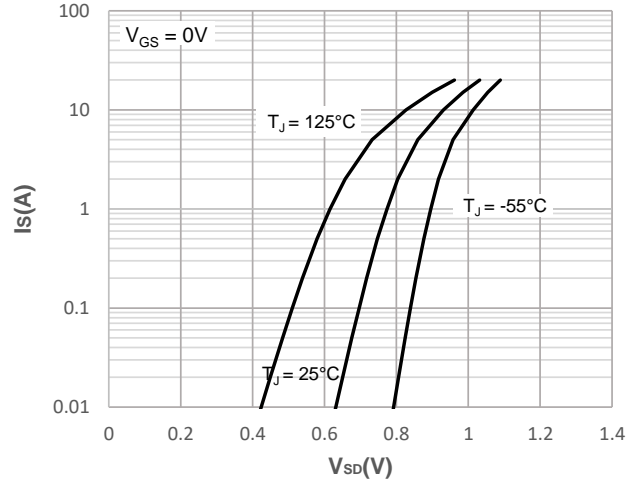


Figure 5: Gate Charge Characteristics

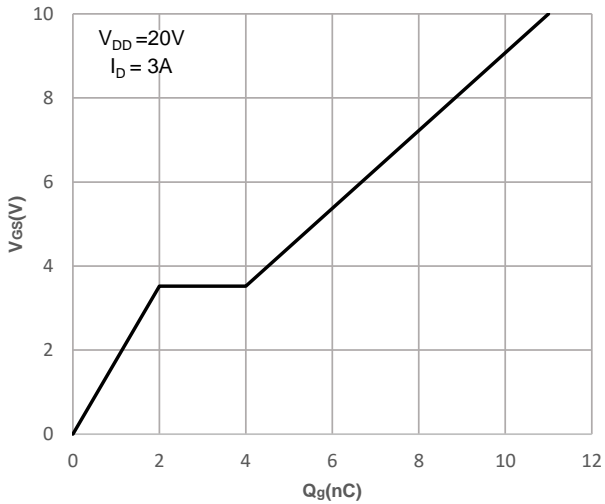
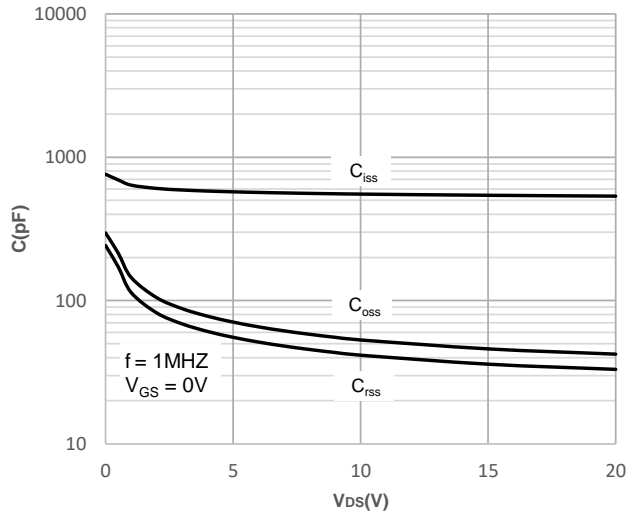


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

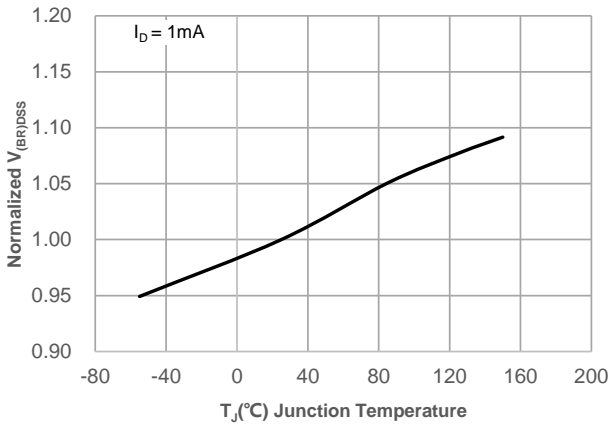


Figure 8: Normalized on Resistance vs. Junction Temperature

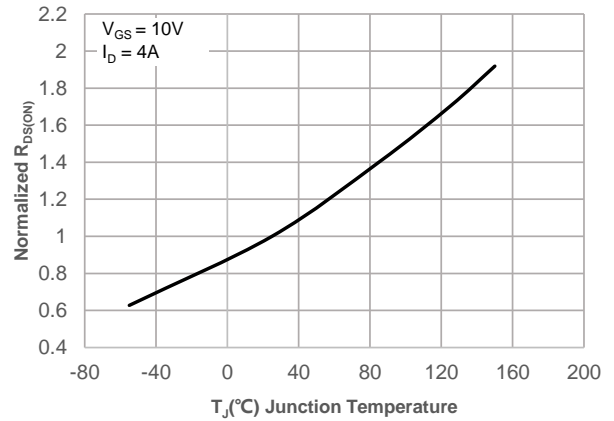


Figure 9: Maximum Safe Operating Area

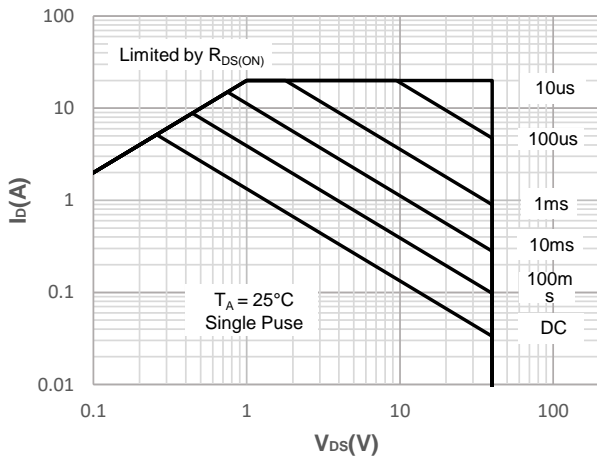


Figure 10: Maximum Continuous Driand Current vs. Ambient Temperature

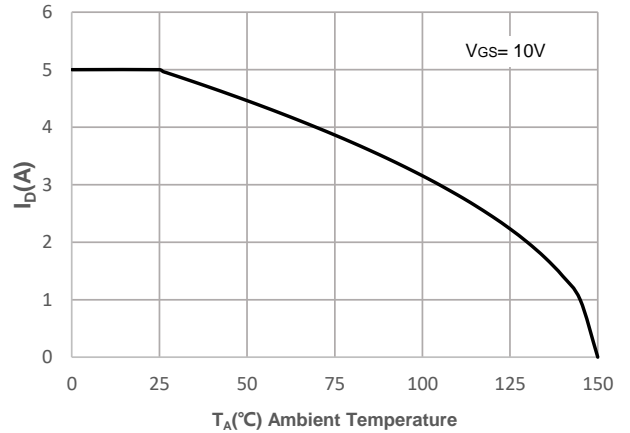


Figure 11: Normalized Maximum Transient Thermal Impedance

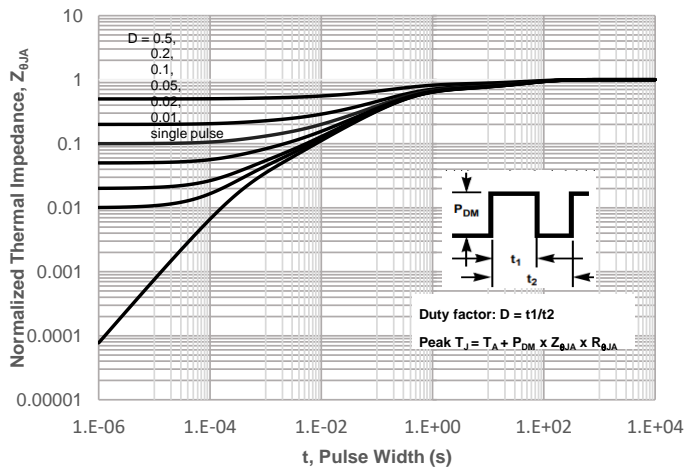
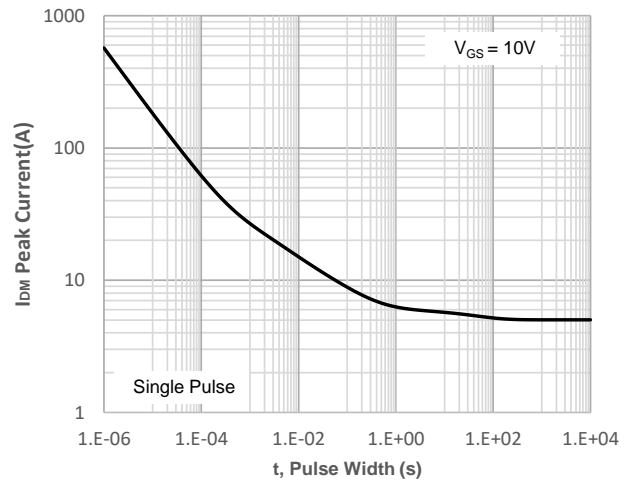


Figure 12: Peak Current Capacity



Test Circuit

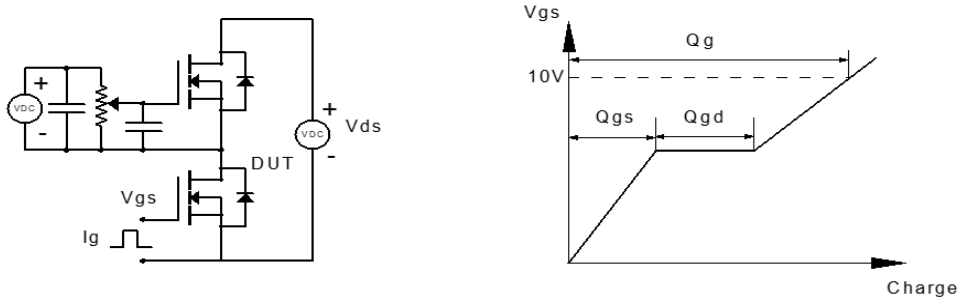


Figure 1: Gate Charge Test Circuit & Waveform

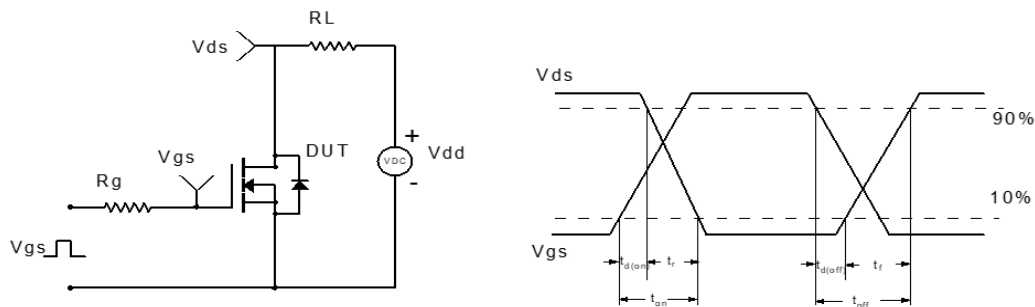


Figure 2: Resistive Switching Test Circuit & Waveform

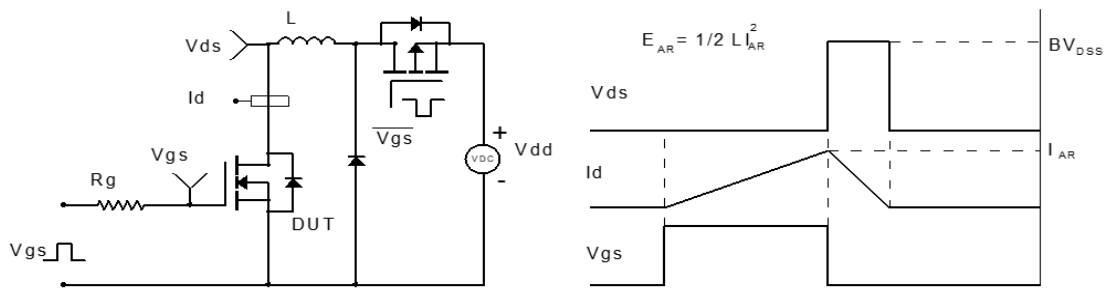


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

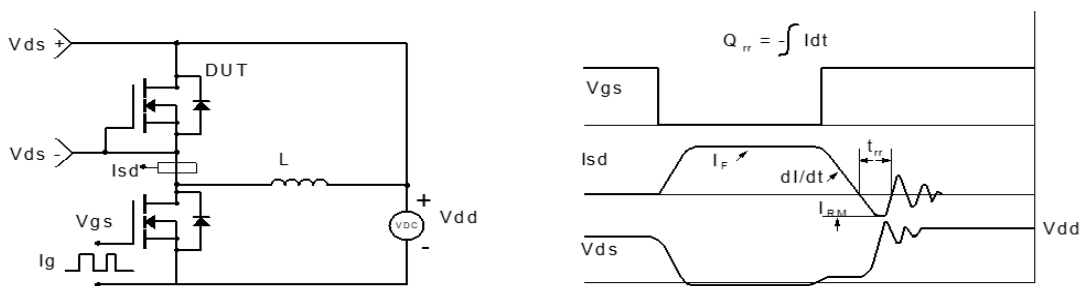
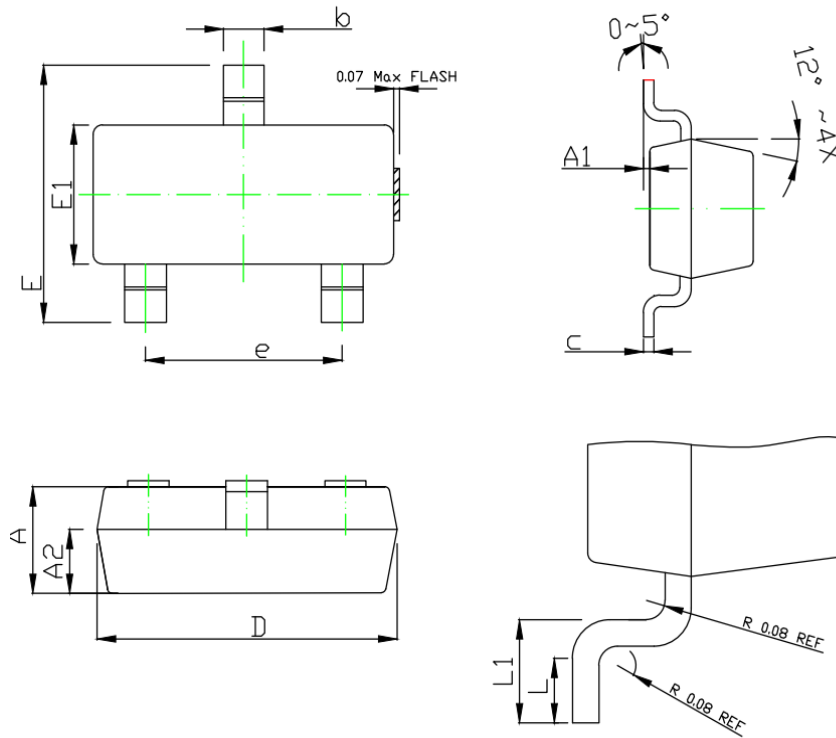


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(SOT-23)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.95	1.00	1.05
A1	0.01	0.05	0.10
b	0.35	0.40	0.45
c	0.11 BSC		
D	2.80	2.90	3.00
E	2.30	2.40	2.50
E1	1.20	1.30	1.40
e	0.95BSC		
L	0.20	-	-
L1	0.30	0.40	0.50
A2	0.60 REF		

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