

### General Description

The MDHT3N40 uses advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality.

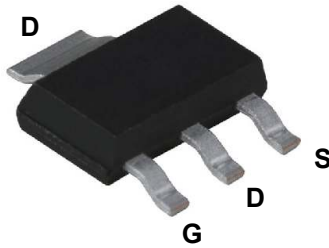
MDHT3N40 is suitable device for SMPS, HID and general purpose applications.

### Features

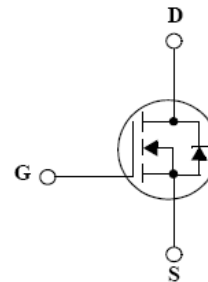
- $V_{DS} = 400V$
  - $I_D = 1.5A$
  - $R_{DS(ON)} \leq 3.4\Omega$
- @ $V_{GS} = 10V$   
 @ $V_{GS} = 10V$

### Applications

- Power Supply
- PFC
- LED TV



SOT-223



### Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		$V_{DSS}$	400	V
Gate-Source Voltage		$V_{GSS}$	±30	V
Continuous Drain Current	$T_C=25^\circ C$	$I_D$	1.5	A
	$T_C=100^\circ C$		0.9	A
Pulsed Drain Current <sup>(1)</sup>		$I_{DM}$	6.0	A
Power Dissipation	$T_C=25^\circ C$	$P_D$	2.1	W
	Derate above 25 °C		0.017	W/°C
Peak Diode Recovery $dV/dt$ <sup>(3)</sup>		$dV/dt$	4.5	V/ns
Repetitive Pulse Avalanche Energy <sup>(1)</sup>		$E_{AR}$	0.21	mJ
Avalanche current <sup>(1)</sup>		$I_{AR}$	1.5	A
Single Pulse Avalanche Energy <sup>(4)</sup>		$E_{AS}$	45	mJ
Junction and Storage Temperature Range		$T_J, T_{stg}$	-55~150	°C

### Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient <sup>(1)</sup>	$R_{\theta JA}$	60	°C/W

## Ordering Information

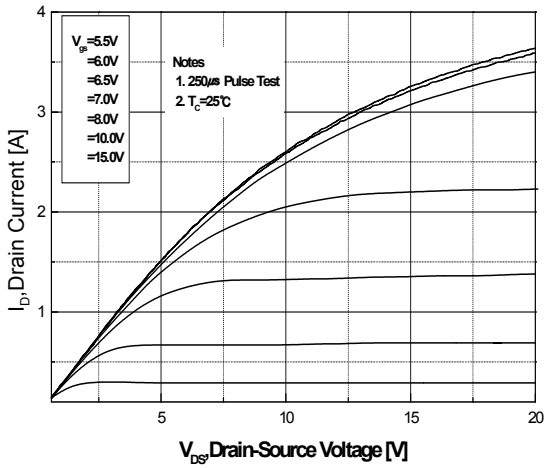
Part Number	Temp. Range	Package	Packing	RoHS Status
MDHT3N40URH	-55~150°C	SOT-223	Reel and Tape	Halogen Free

## Electrical Characteristics (Ta =25°C)

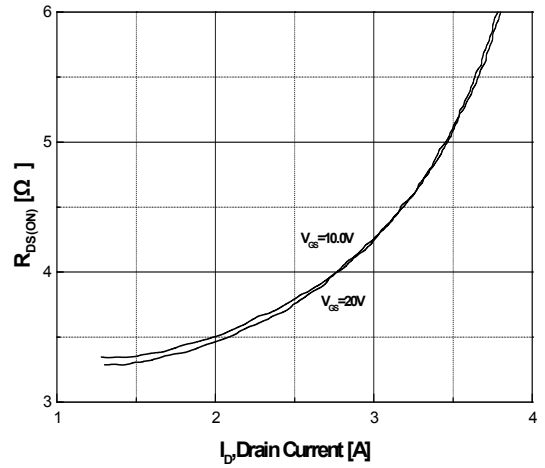
Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D = 250\mu A, V_{GS} = 0V$	400	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3.0	-	5.0	
Drain Cut-Off Current	$I_{DSS}$	$V_{DS} = 400V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	100	nA
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 0.75A$		2.8	3.4	$\Omega$
Forward Transconductance	$g_{fs}$	$V_{DS} = 30V, I_D = 0.75A$	-	2.0	-	S
<b>Dynamic Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 320V, I_D = 3.0A, V_{GS} = 10V$	-	5.1	-	nC
Gate-Source Charge	$Q_{gs}$		-	1.4	-	
Gate-Drain Charge	$Q_{gd}$		-	3.9	-	
Input Capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$	-	167	-	pF
Reverse Transfer Capacitance	$C_{riss}$		-	2	-	
Output Capacitance	$C_{oss}$		-	27	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 200V, I_D = 3.0A, R_G = 25\Omega$	-	10	-	ns
Rise Time	$t_r$		-	30	-	
Turn-Off Delay Time	$t_{d(off)}$		-	12	-	
Fall Time	$t_f$		-	25	-	
<b>Drain-Source Body Diode Characteristics</b>						
Maximum Continuous Drain to Source Diode Forward Current	$I_S$				1.5	A
Source-Drain Diode Forward Voltage	$V_{SD}$	$I_S = 1.5A, V_{GS} = 0V$	-		1.4	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 3.0A, di/dt = 100A/\mu s^{(3)}$	-	185	-	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	0.6	-	$\mu C$

Note :

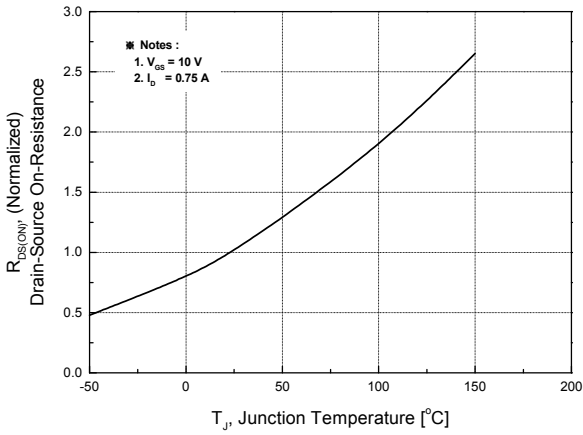
- Pulse width is based on  $R_{\theta JC}$  &  $R_{\theta JA}$  and the maximum allowed junction temperature of 150°C.
- Pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ , pulse width limited by junction temperature  $T_{J(MAX)}=150^\circ C$ .
- $I_{SD} \leq 3.0A, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^\circ C$
- $L=8.75mH, I_{AS}=3.0A, V_{DD}=50V, R_g=25\Omega$ , Starting  $T_J=25^\circ C$



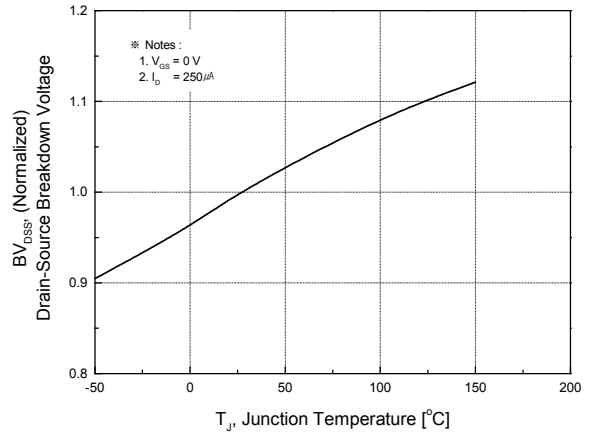
**Fig.1 On-Region Characteristics**



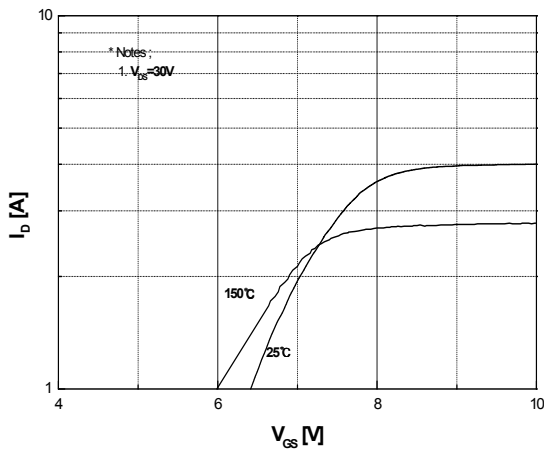
**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**



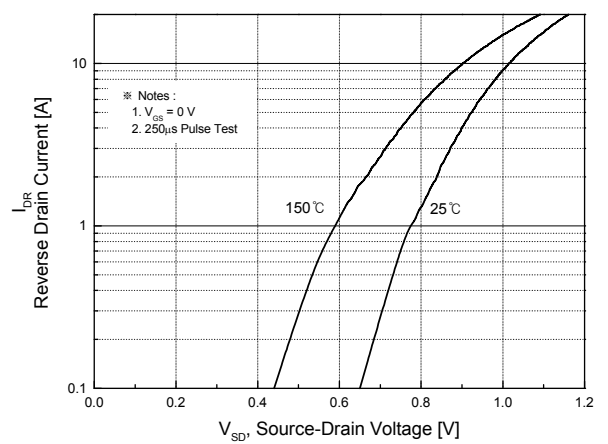
**Fig.3 On-Resistance Variation with Temperature**



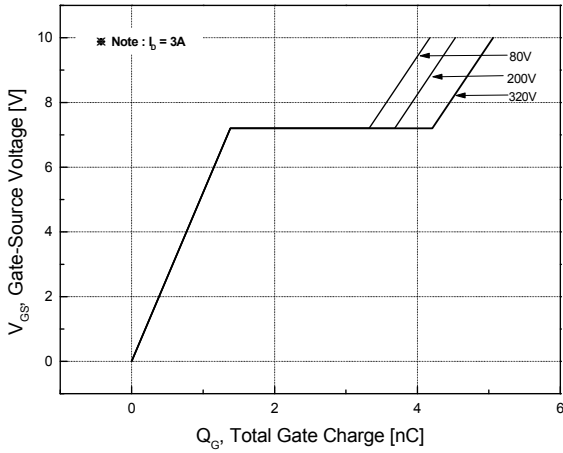
**Fig.4 Breakdown Voltage Variation vs. Temperature**



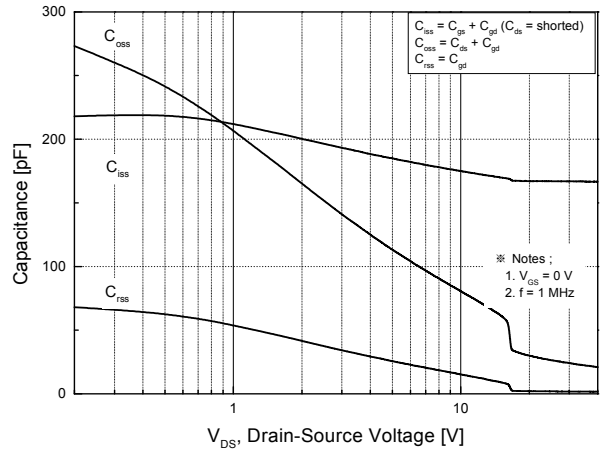
**Fig.5 Transfer Characteristics**



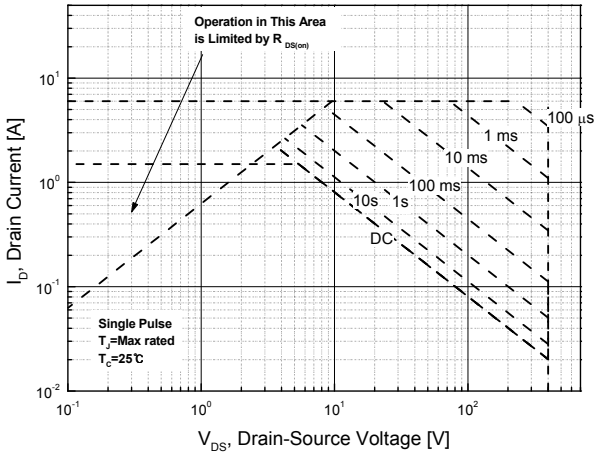
**Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature**



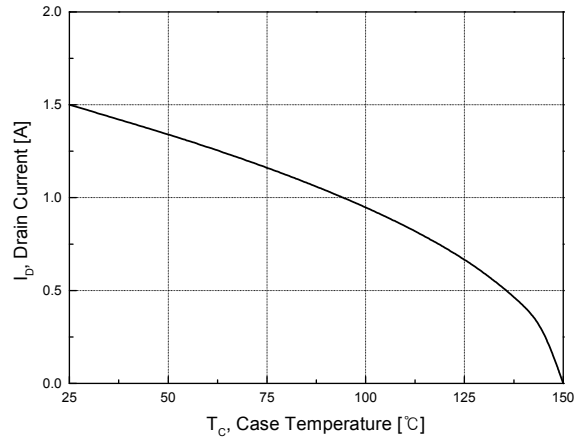
**Fig.7 Gate Charge Characteristics**



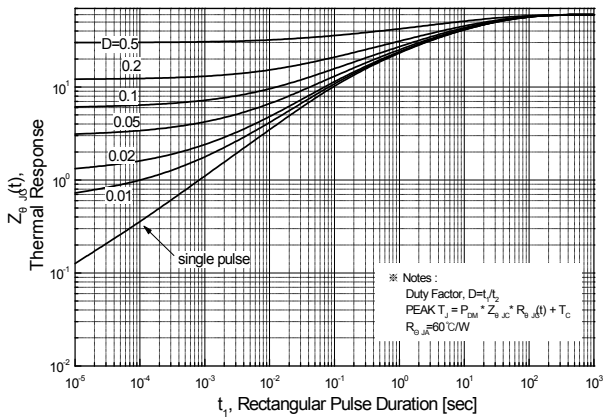
**Fig.8 Capacitance Characteristics**



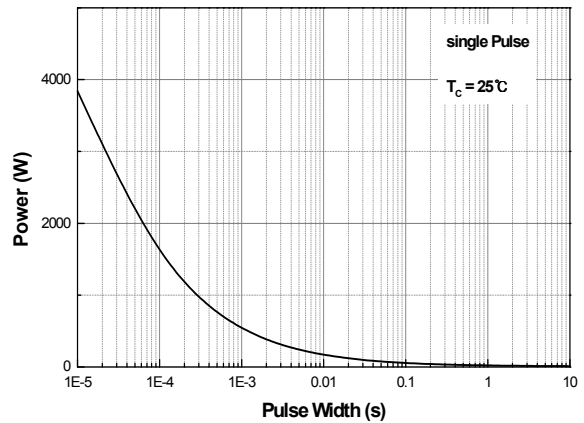
**Fig.9 Maximum Safe Operating Area**



**Fig.10 Maximum Drain Current vs. Case Temperature**



**Fig.11 Transient Thermal Response Curve**

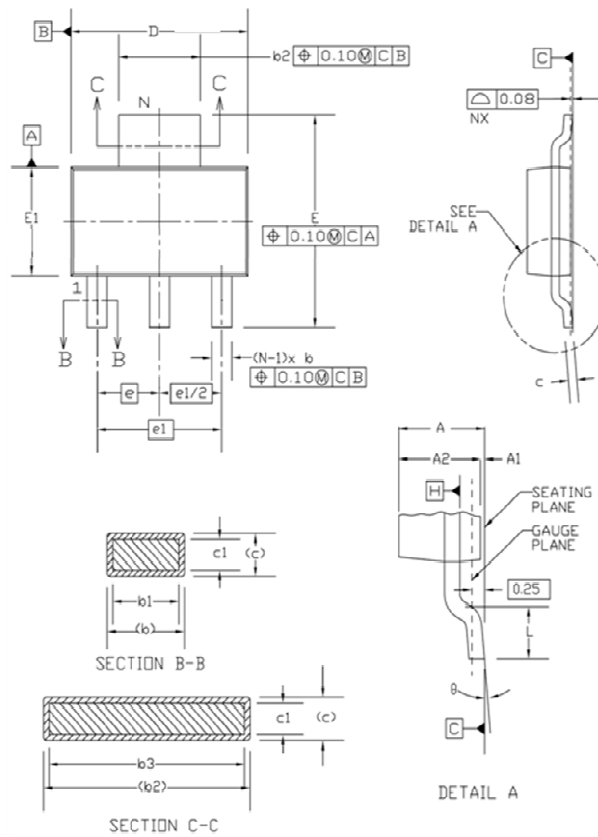


**Fig.12 Single Pulse Maximum Power Dissipation**

**Physical Dimension**

**SOT-223**


Dimensions are in millimeters, unless otherwise specified



Symbol	Min	Nom	Max
A	-	-	1.80
A1	0.00	-	0.10
A2	1.50	-	1.70
b	0.80	-	0.84
b1	0.80	-	0.79
b2	2.90	-	3.10
b3	2.84	-	3.05
c	0.23	-	0.35
c1	0.23	-	0.33
D	6.20	-	6.70
E	6.70	-	7.30
E1	3.30	-	3.70
e	2.30 BASIC		
e1	4.60 BASIC		
L	0.75	-	-
$\theta$	0°	-	10°

**DISCLAIMER:**

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