Features

- Low on resistance
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100% ΔVDS test
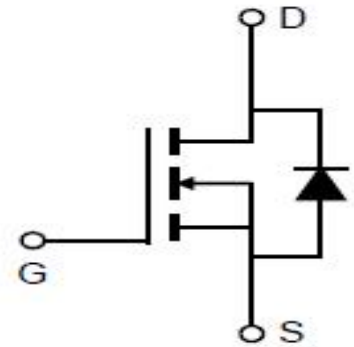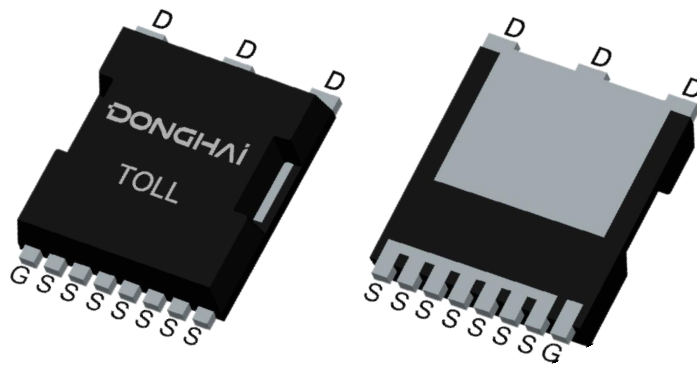- Pb-Free plating / Halogen-Free / RoHS compliant

Applications

- Power switching applications
- DC-DC converters
- Full bridge control

Key Parameters

V_{DS}	40V
$R_{DS(on)typ.}$	0.8mΩ
$I_{D（Silicon\ limit）}$	426A
$I_{D（Package\ limit）}$	300A
$Ciss_{@10V}$	9864pF
Qgd	26nC

TOLL

Marking & Packing Information

Part #	Package	Marking	Tube/Reel	Qty(pcs)
DHS010N04U	TOLL	DHS010N04U	Tape & Reel	1800/box

DHS010N04U
40V/0.8mΩ/300A N-MOSFET

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	40	V
Gate-Source voltage	V_{GS}	±20	V

Continuous drain current
  T_C = 25°C （Silicon limit）
  T_C = 25°C （Package limit）
  T_C = 100°C （Package limit）
	I_D	426
		300
		300
			A

Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	$I_{D\,pulse}$	1200	A
Avalanche energy, single pulse (L=0.5mH, Rg=25Ω)	E_{AS}	2116	mJ
Power dissipation T_C = 25°C	P_{tot}	300	W
Power dissipation T_A = 25°C	P_{tot}	2.4	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.5	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	°C/W

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Static Characteristic

Parameter	Symbol	min.	typ.	max.	Unit	Test Condition
Drain-source breakdown voltage	BV_{DSS}	40	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	1.0	-	3.0	V	V_{DS}=V_{GS},I_D=250uA
Zero gate voltage drain current	I_{DSS}	-	-	1	µA	V_{DS}=40V,V_{GS}=0V T_j=25°C
		-	-	100		T_j=125°C
Gate-source leakage current	I_{GSS}	-	-	100	nA	V_{GS}=20V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	0.8	1.0	mΩ	V_{GS}=10V, I_D=80A, Tj=25°C

Dynamic Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Input Capacitance	C_{iss}	-	9864	-	pF	V_{GS}=0V, V_{DS}=20V, f=1MHz
Output Capacitance	C_{oss}	-	3392	-		
Reverse Transfer Capacitance	C_{rss}	-	125	-		
Gate Total Charge	Q_G	-	142	-	nC	V_{GS}=10V, V_{DS}=20V, I_D=160A, f=1MHz
Gate-Source charge	Q_{gs}	-	44	-		
Gate-Drain charge	Q_{gd}	-	26	-		
Turn-on delay time	$t_{d(on)}$	-	18	-	ns	V_{GS}=10V, V_{DD}=20V, R_{G_ext}=2.5Ω，ID=160A
Rise time	t_r	-	123	-		
Turn-off delay time	$t_{d(off)}$	-	114	-		
Fall time	t_f	-	152	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Diode Max Current	I_S		-	300	A	-
Diode Forward Voltage	V_{SD}	-	-	1.2	V	V_{GS}=0V,I_{SD}=80A
Diode Reverse Recovery Time	t_{rr}	-	60	-	ns	I_F=50A, dI/dt=100A/μs
Diode Reverse Recovery Charge	Q_{rr}	-	52	-	nC	

Typical Characteristics Diagram

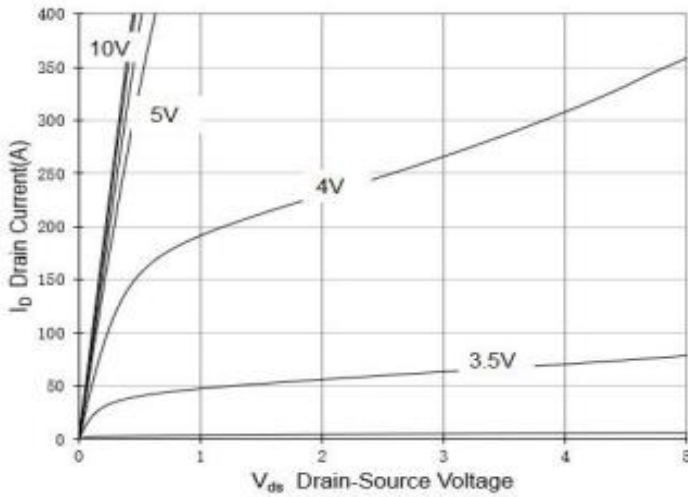### Fig1. Output Characteristics

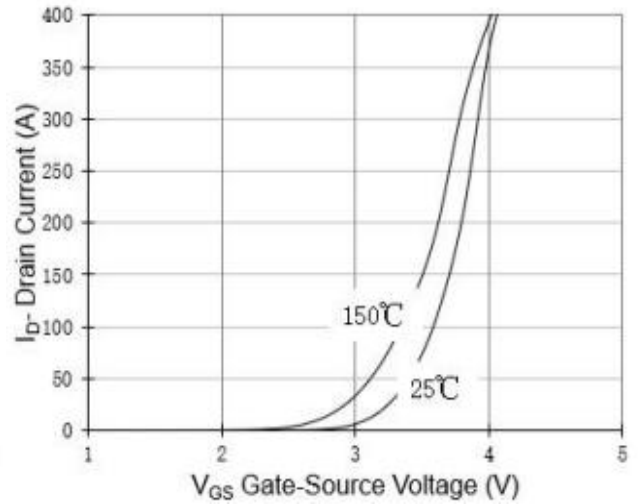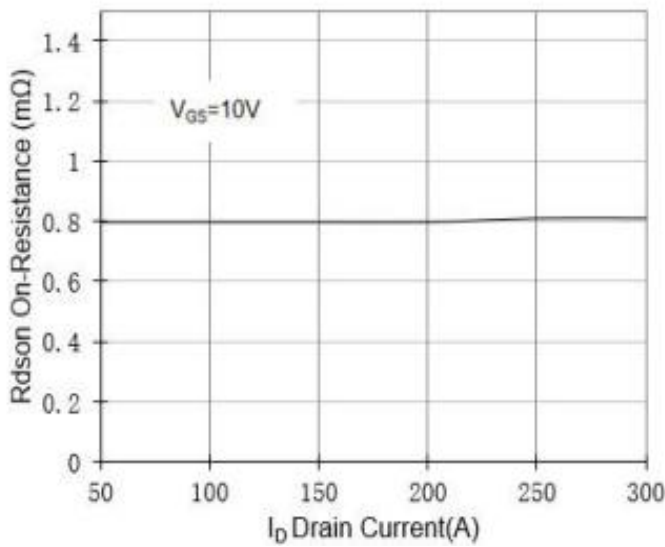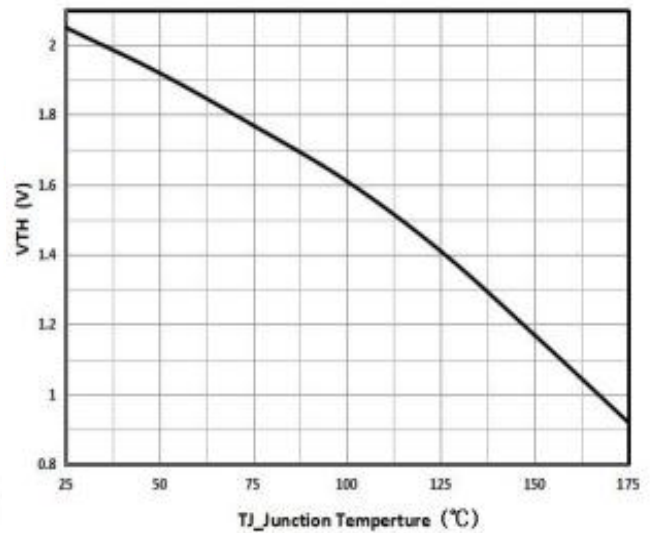### Fig2. Transfer Characteristics

Fig3. Rds(on) vs Drain Current

Fig 4. Gate Threshold Voltage
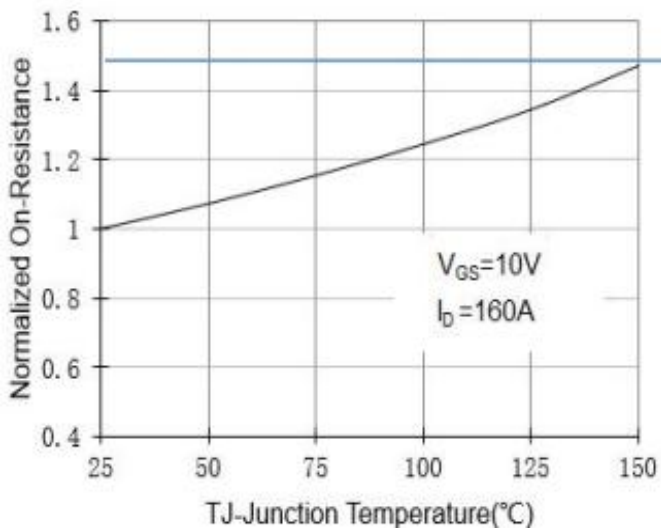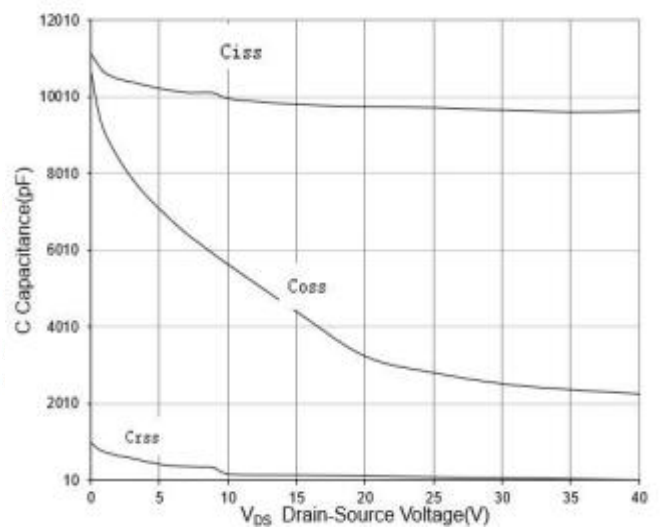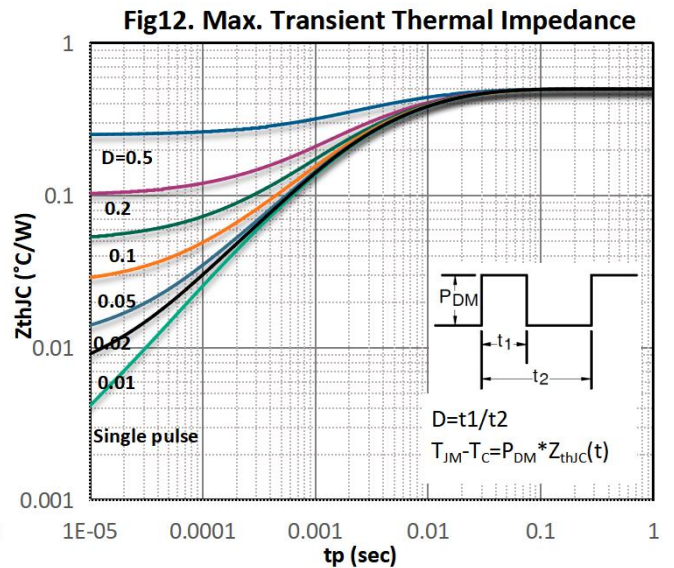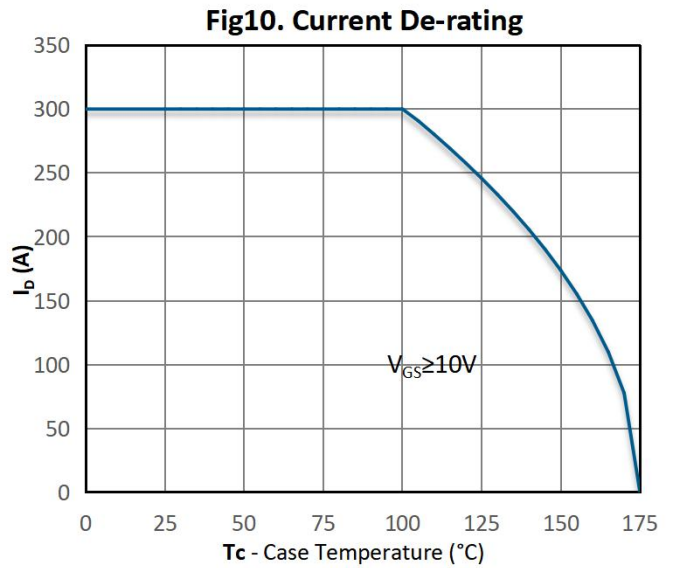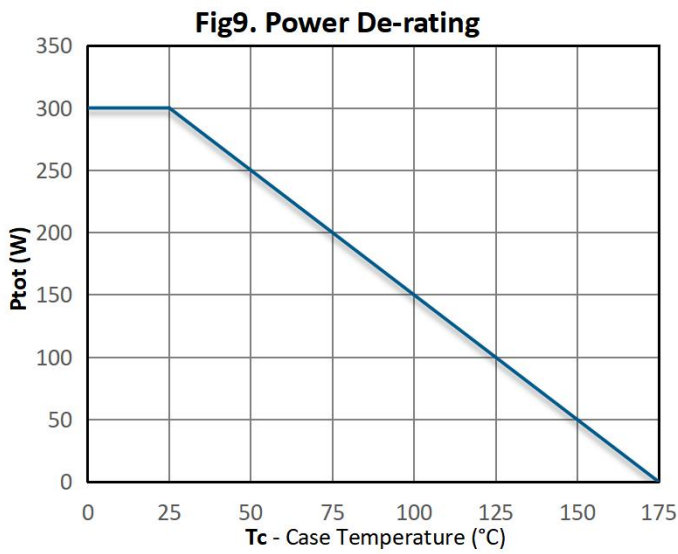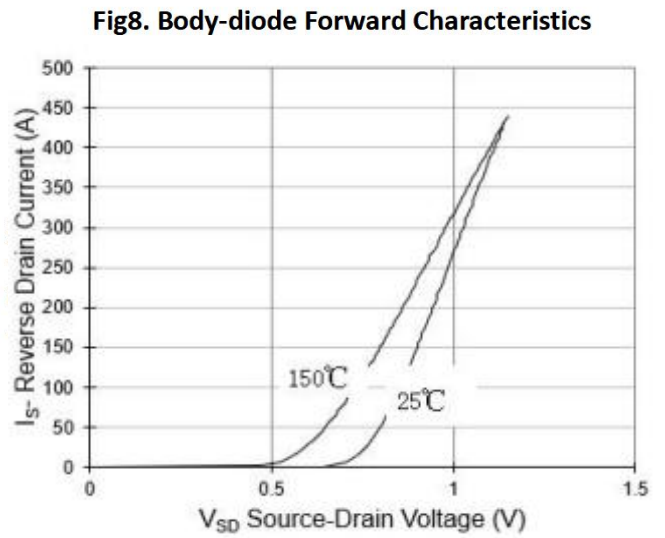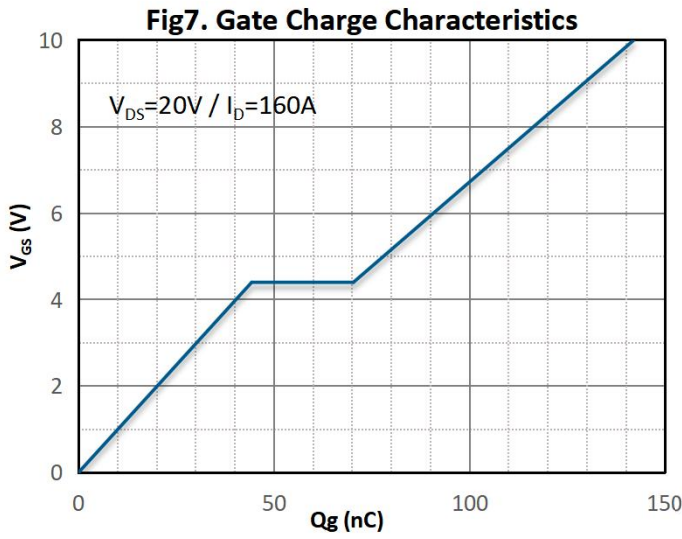
Fig5. Rds(on) vs. Temperature

Fig6. Capacitance Characteristics

Typical Characteristics Diagram

Fig7. Gate Charge Characteristics

V_{DS}=20V / I_D=160A

V_{GS} (V) vs Qg (nC)

Fig8. Body-diode Forward Characteristics

I_S- Reverse Drain Current (A) vs V_{SD} Source-Drain Voltage (V)

150℃   25℃

Fig9. Power De-rating
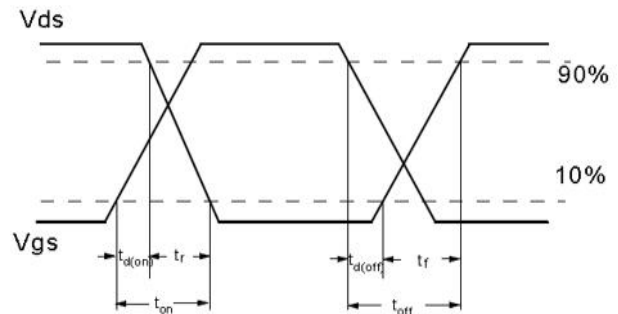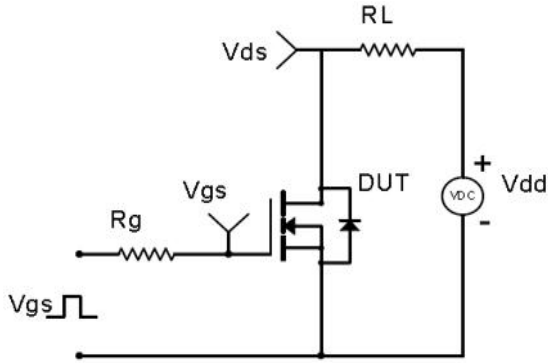
Ptot (W) vs Tc - Case Temperature (℃)

Fig10. Current De-rating

I_D (A) vs Tc - Case Temperature (℃)

V_{GS}≥10V

Fig11. Safe Operating Area

I_D (A) vs V_{DS} (V)

Limited by Rds(on)

1us
10us
100us
1ms
10ms
DC

Single pulse
Tc=25°C

Fig12. Max. Transient Thermal Impedance

ZthJC (℃/W) vs tp (sec)

D=0.5
0.2
0.1
0.05
0.02
0.01

Single pulse

P_{DM}
t_1
t_2

D=t1/t2
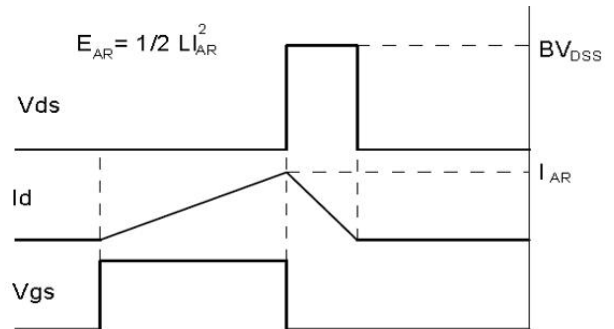$T_{JM}-T_C=P_{DM}*Z_{thJC}(t)$
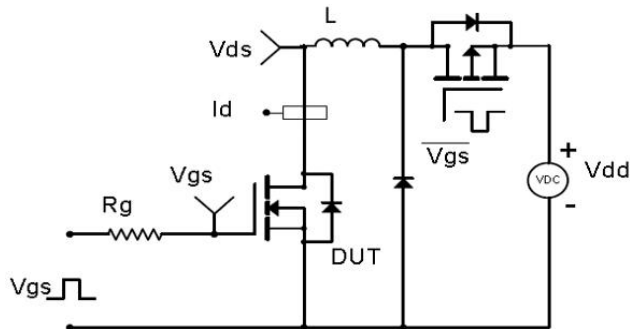
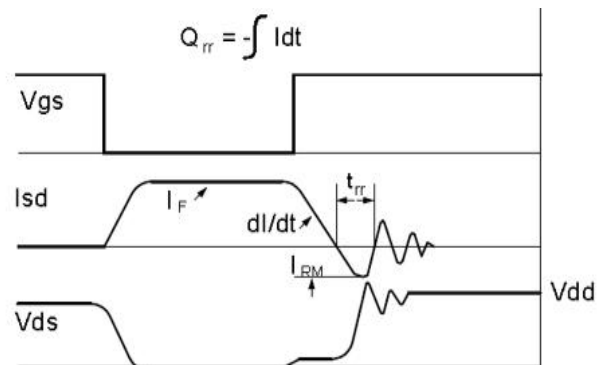## Test Circuit & Waveform

Gate Charge Test Circuit & Waveform

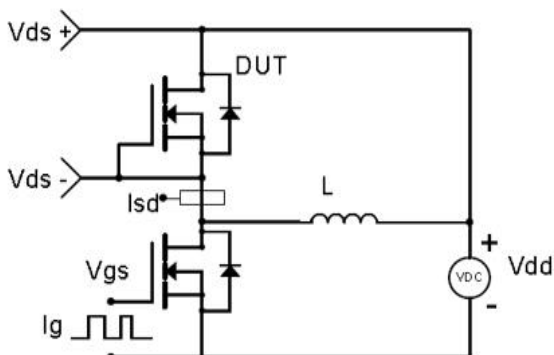### MOSFET Switching Test Circuit & Waveform

E_{AS} Test Circuit & Waveform

$$E_{AR} = 1/2\, LI_{AR}^2$$

Diode Recovery Test Circuit & Waveform

$$Q_{rr} = \int Idt$$

Package Outline : TOLL

*Dimensions in mm

9.90±0.20
9.80±0.10
0.70±0.20
11.73±0.15
10.38±0.20
3.3±0.15
0.60±0.15
TOLL
0.50±0.10
2.3±0.15
7.65 reference
6.8 reference
1.85±0.25
1.15±0.15
0.80±0.10
BSC 1.20

Revision History

Revison	Date	Major changes
1.0	2023/9/25	Release of formal version

Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qulified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as aviation, aerospace, life-support devices or systems.

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