

TNG40N60DN

N-Channel Enhancement Mode Power MOSFET

PDFN5x6-8L

Product Summary

- $V_{DS} = 60V, I_D = 40A$
- $R_{DS(on)} = 15m\Omega @ V_{GS} = 10V$
- $R_{DS(on)} = 20m\Omega @ V_{GS} = 4.5V$

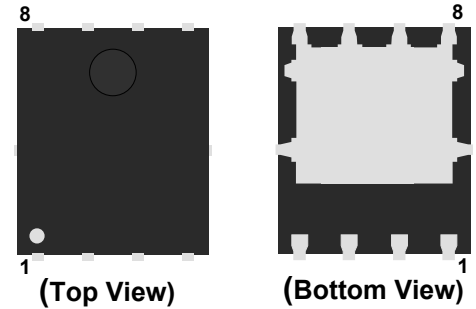
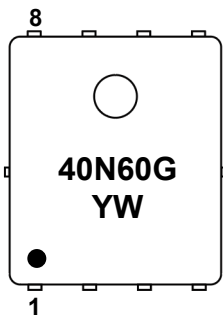
Features

- Advanced Split Gate Trench Technology
- 100% Avalanche Tested
- RoHS Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

Application

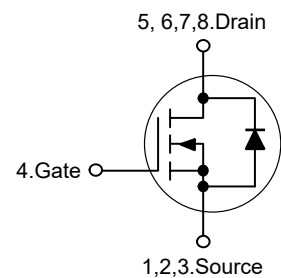
- Switching application
- Li-battery protection
- Uninterruptible Power supply

Marking Code



Pin	Description
1,2,3	Source
4	Gate
5,6,7,8	Drain

Schematic Diagram



Absolute Maximum Ratings

Ratings at 25°C case temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Continuous Drain Current	$T_C = 25^\circ C$	40	A
	$T_C = 100^\circ C$	25	
Pulsed Drain Current (note1)	I_{DM}	160	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	62	W
Single pulse avalanche energy (note2)	E_{AS}	56	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	°C

Thermal Characteristics

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2	°C/W
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Electrical Characteristics

(T_J=25°C unless otherwise specified)**Specifications** T_J = 25°C, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	60	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60V, V _{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.4	2.5	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 14A	--	9	14	mΩ
		V _{GS} = 4.5V, I _D = 10A	--	12	18	
Forward Transconductance	g _{FS}	V _{GS} = 5V, I _D = 14A	--	24	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 30V, f = 1.0MHz	--	1050	--	pF
Output Capacitance	C _{oss}		--	300	--	
Reverse Transfer Capacitance	C _{rss}		--	25	--	
Total Gate Charge	Q _g	V _{DD} = 30V, I _D = 14A, V _{GS} = 10V	--	22	--	nC
Gate-Source Charge	Q _{gs}		--	3	--	
Gate-Drain Charge	Q _{gd}		--	5	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 30V, I _D = 14A, R _G = 10Ω	--	9	--	ns
Turn-on Rise Time	t _r		--	4	--	
Turn-off Delay Time	t _{d(off)}		--	29	--	
Turn-off Fall Time	t _f		--	4	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	40	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 14A, V _{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = 14A, V _{GS} = 0V di/dt=500A/us	--	65	--	nC
Reverse Recovery Time	T _{rr}		--	19	--	ns

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : T_J=25°C ,V_{DD}=50V,V_{GS}=10V,L=0.5mH,R_G=25Ω

The table shows the minimum avalanche energy, which is 156mJ when the device is tested until failure

3. Identical low side and high side switch with identical R_G

Typical Characteristic Curves

Figure 1. Output Characteristics

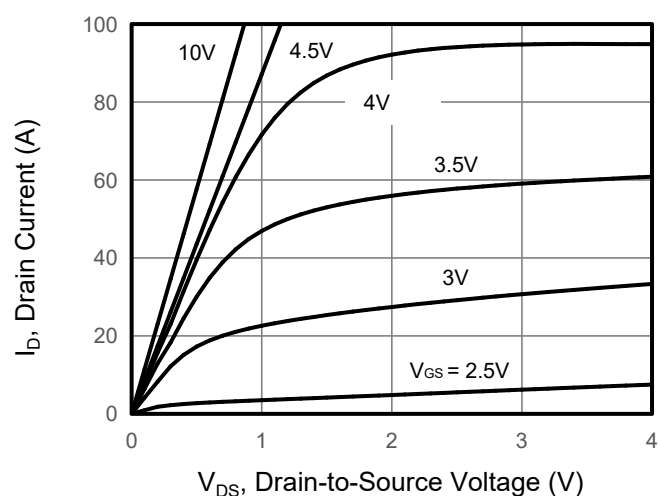


Figure 2. Transfer Characteristics

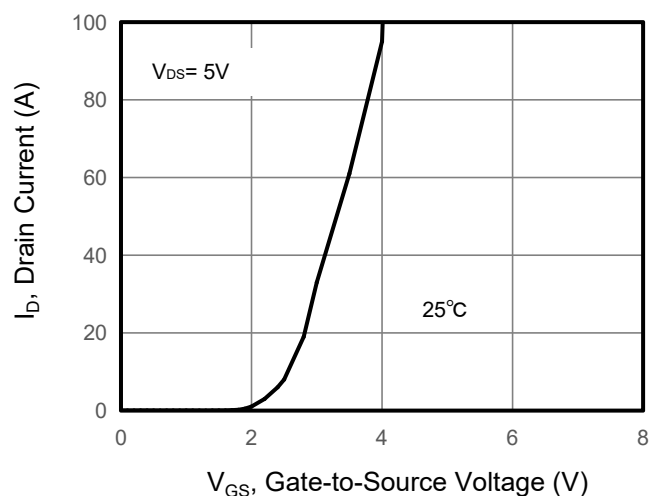


Figure 3. Drain Source On Resistance

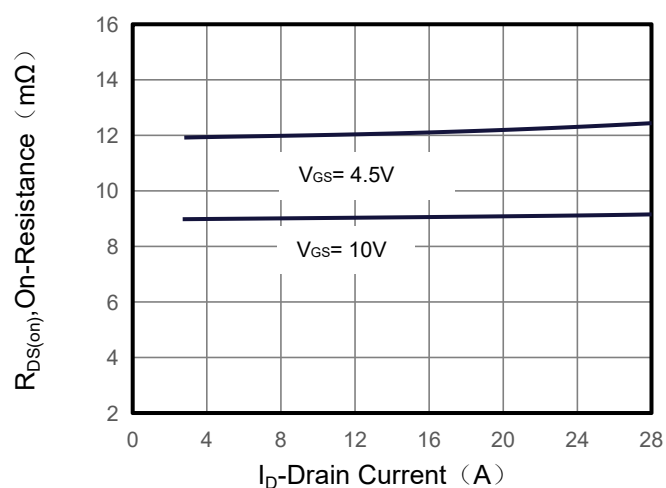


Figure 4. Gate Charge

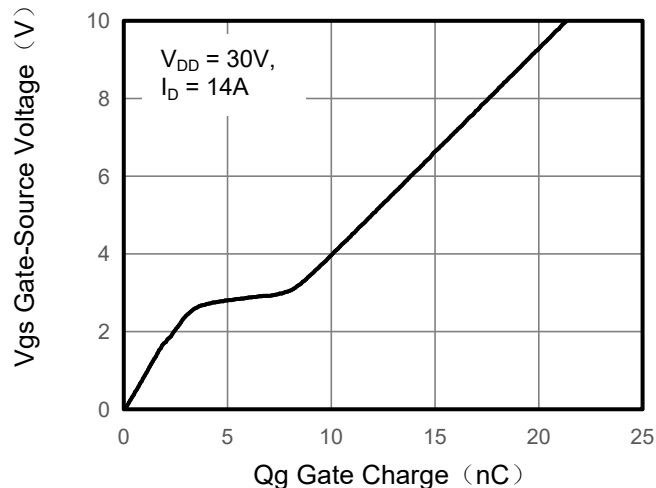


Figure 5. Capacitance

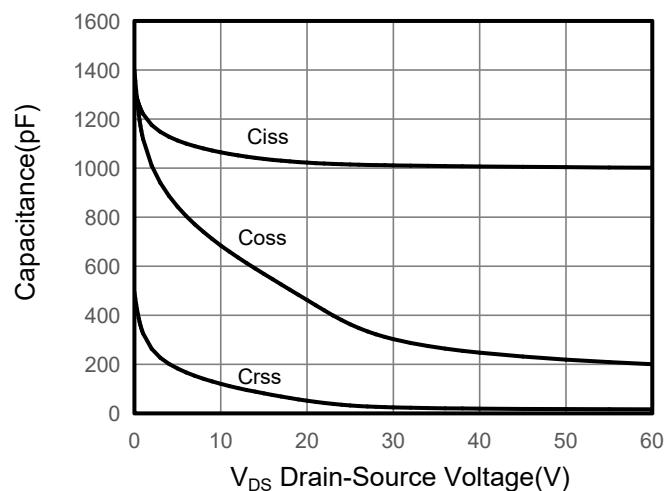


Figure 6. Source-Drain Diode Forward

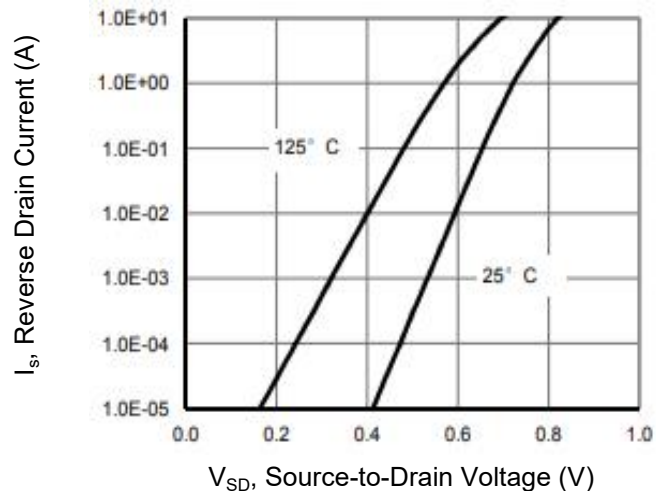


Figure 7. Drain-Source On-Resistance

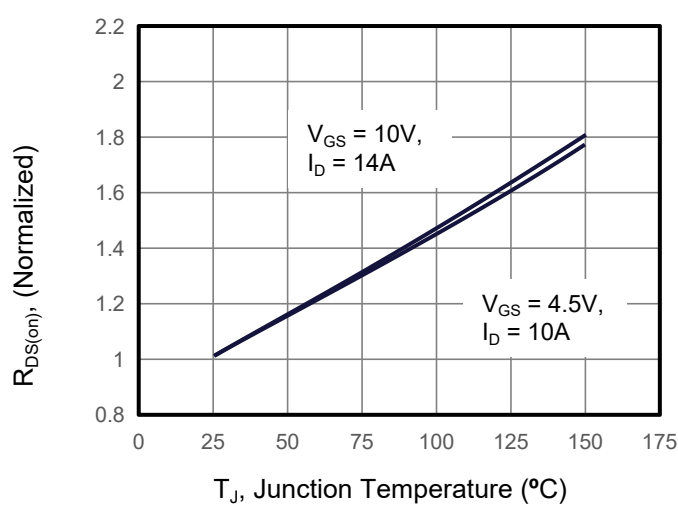


Figure 8. Safe Operation Area

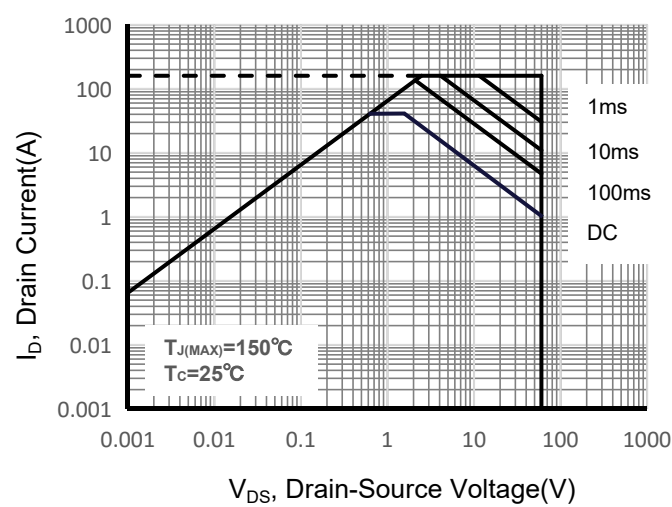


Figure 9. Maximum Continuous Drain Current vs Case Temperature

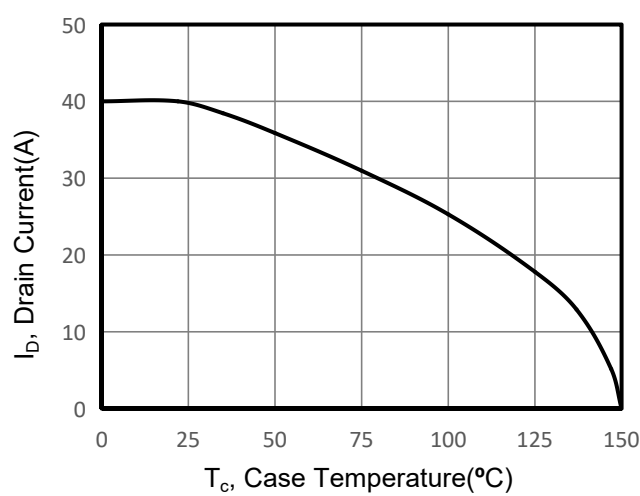
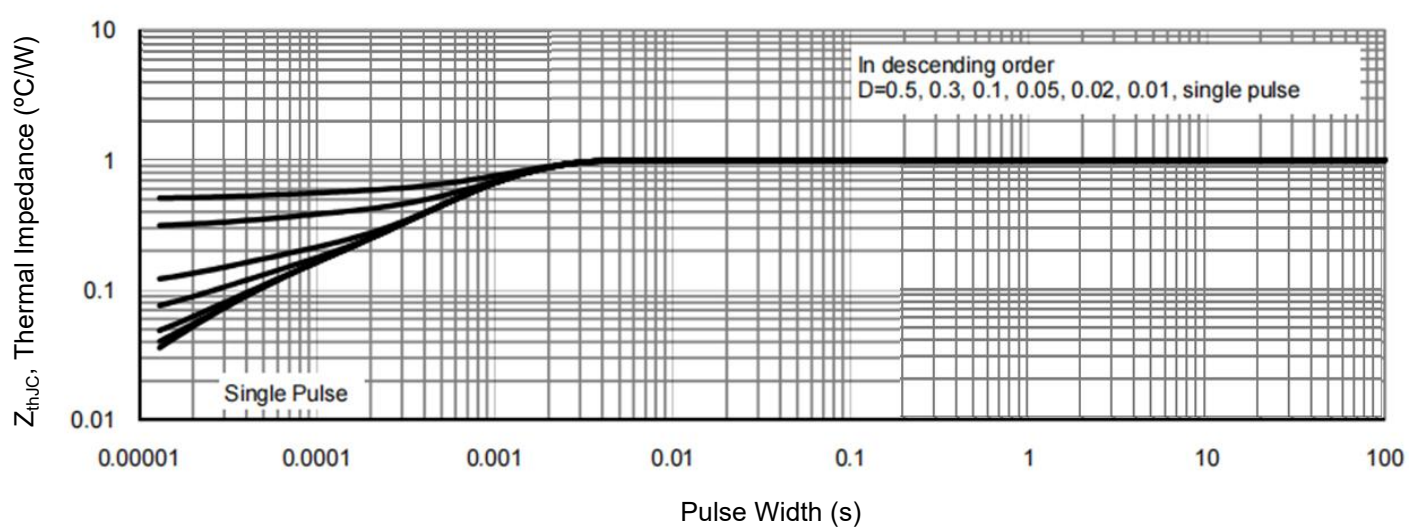
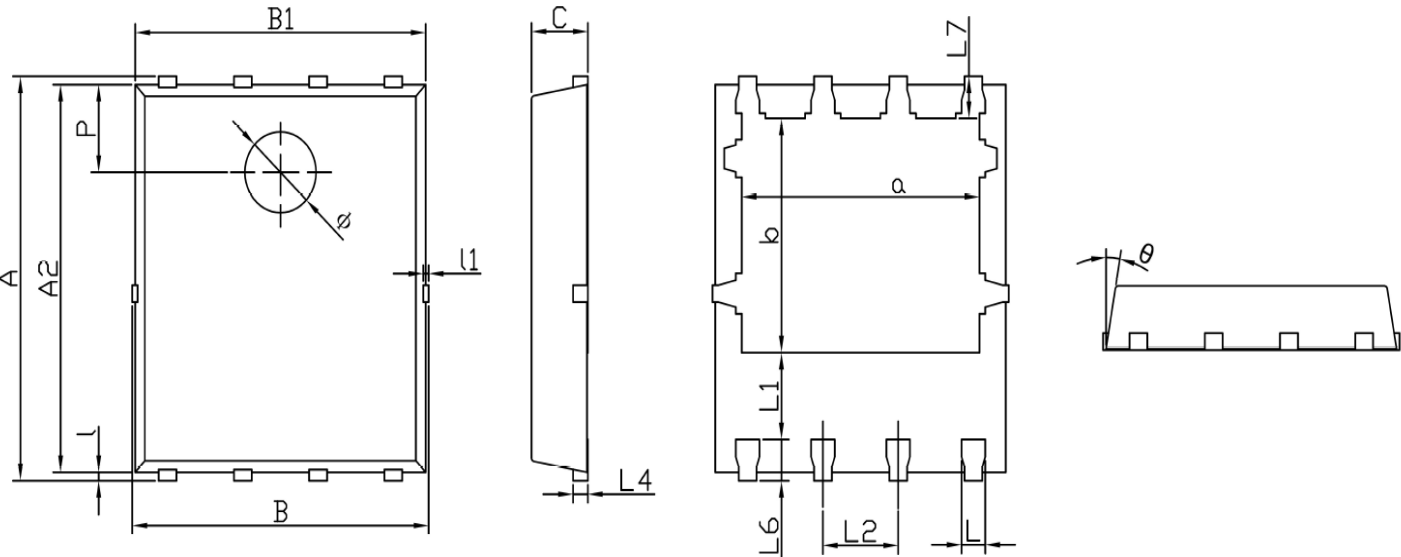


Figure 10. Normalized Maximum Transient Thermal Impedance



Package Outline

PDFN5x6-8L Dimensions in mm




Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	5.90	6.10	L1	1.10	-
a	3.91	4.11	l1	-	0.10
A2	5.70	5.80	L2	1.17	1.37
B	4.90	5.10	L4	0.21	0.34
b	3.375	3.575	L6	0.51	0.71
B1	4.80	5.00	L7	0.51	0.71
C	0.90	1.00	P	1.15	1.45
L	0.30	0.50	θ	8°	12°
l	0.06	0.20	Φ	1.10	1.30

Contact Information

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For additional information, please contact your local Sales Representative.

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