

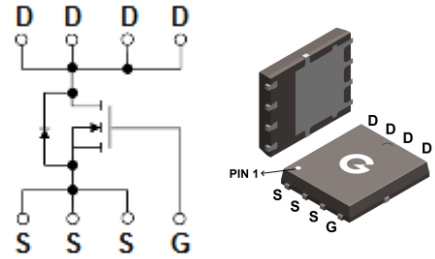
Features

- Extremely low losses due to very low FOM $R_{DS(on)} \times Q_G$
- High-speed switching
- Halogen free
- Qualified to AEC-Q101 standards for high reliability

HF

Mechanical Data

- Case: PDFN5×6-8L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



PDFN5×6-8L

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
TBL170N06T-5DL8	PDFN5×6-8L	5000 pcs / Tape & Reel	170N06T

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	60	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)	I_D	47	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)		33	A
Continuous Drain Current ($T_A = 25^\circ\text{C}$) *1		10.5	A
Continuous Drain Current ($T_A = 100^\circ\text{C}$) *1		7.5	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$)	I_{DM}	174	A
Single Pulse Avalanche Energy *3	E_{AS}	15	mJ
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	75	W
Operating Junction Temperature Range	T_J	$-55 \sim +175$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +175$	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	1.7	2	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	-	35	40	$^\circ\text{C/W}$

Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 60V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = 10V, I _D = 20A	-	13.5	17	mΩ
		V _{GS} = 4.5V, I _D = 10A	-	17.5	22	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1	-	2.5	V
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = 30V f = 1MHZ	-	820	-	pF
C _{OSS}	Output Capacitance		-	240	-	
C _{RSS}	Reverse Transfer Capacitance		-	17	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DD} = 30V V _{GS} = 15V I _D = 20A R _G = 3.3Ω	-	5	-	ns
t _r	Turn-on Rise Time		-	46	-	
t _{d(OFF)}	Turn-Off Delay Time		-	18	-	
t _f	Turn-Off Fall Time		-	55	-	
Q _G	Total Gate-Charge	V _{DD} = 30V V _{GS} = 10V I _D = 10A	-	16.2	-	nC
Q _{GS}	Gate to Source Charge		-	3.8	-	
Q _{GD}	Gate to Drain (Miller) Charge		-	2.2	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 20A, V _{GS} = 0V	-	0.9	1.2	V
t _{rr}	Reverse Recovery Time	I _F = 10A, V _{GS} = 0V	-	27	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	20	-	nC

Notes:

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.1mH$

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

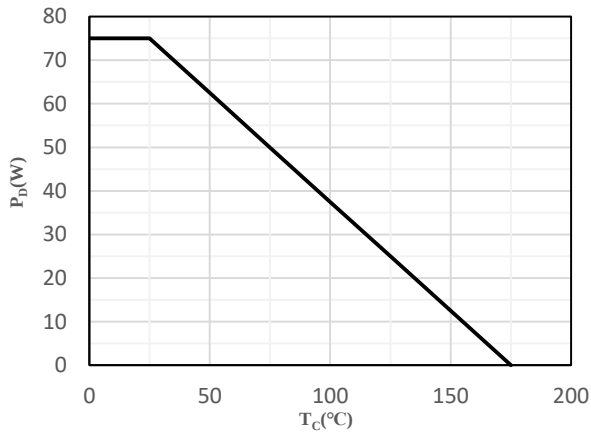


Fig 1 Power Dissipation

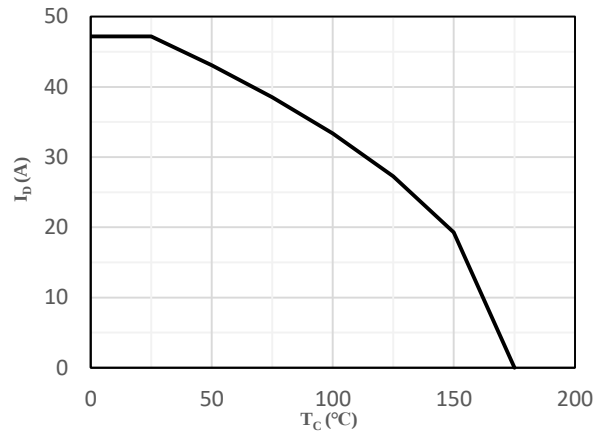


Fig 2 Drain Current

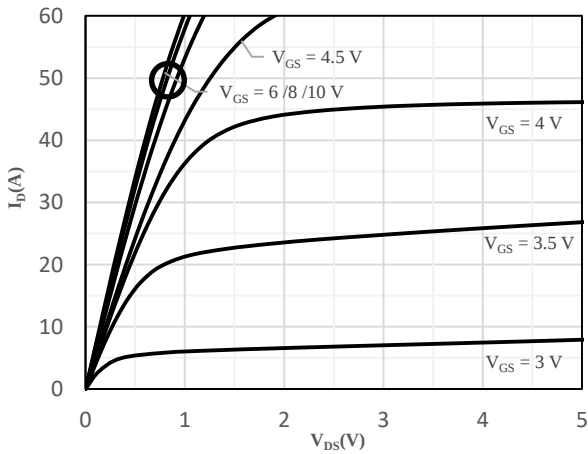


Fig 3 Typical Output Characteristics

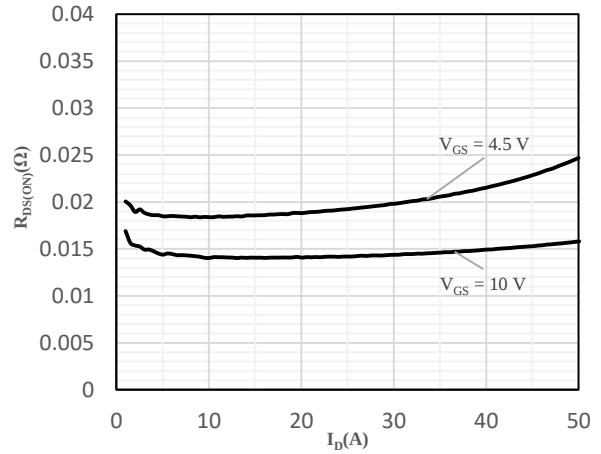


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

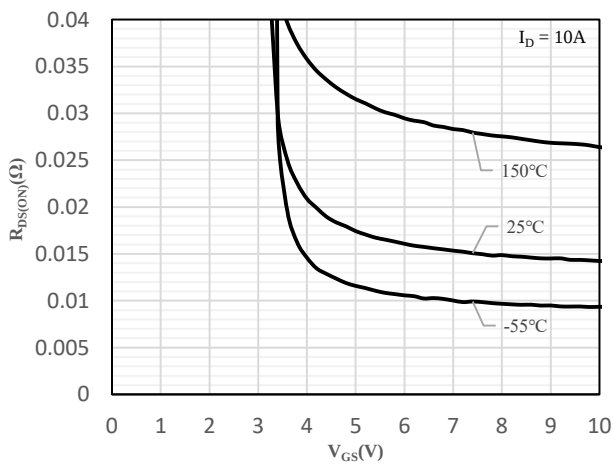


Fig 5 On-Resistance vs. Gate-Source Voltage

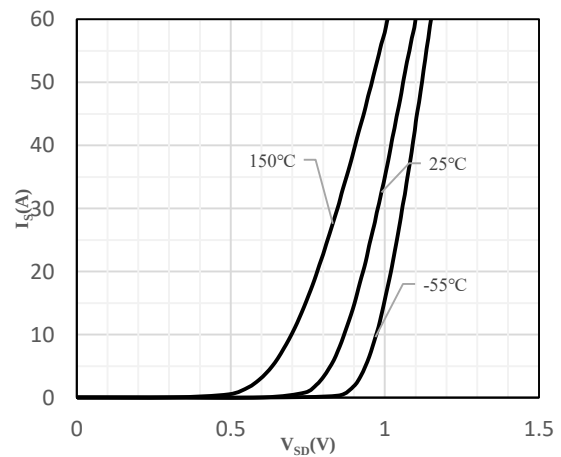


Fig 6 Body-Diode Characteristics

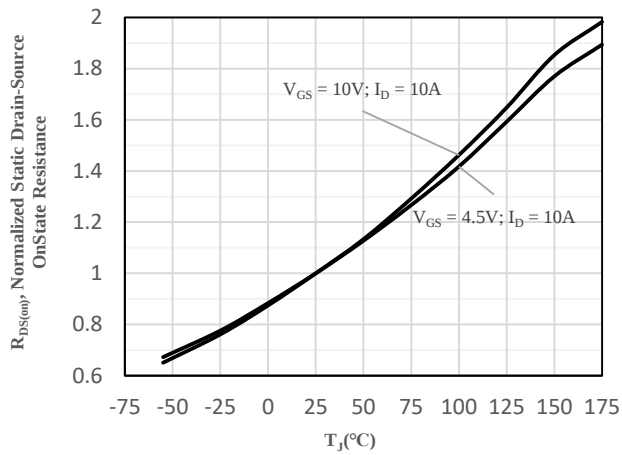


Fig 7 Normalized On-Resistance vs. Junction Temperature

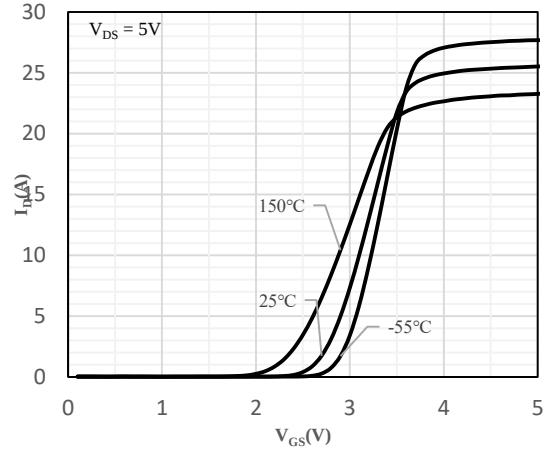


Fig 8 Transfer Characteristics

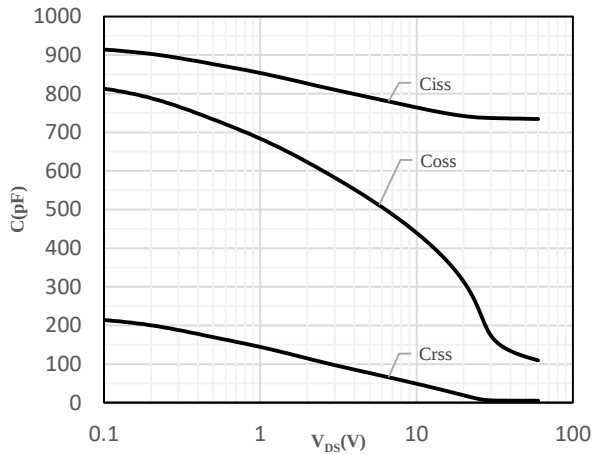


Fig 9 Capacitance Characteristics

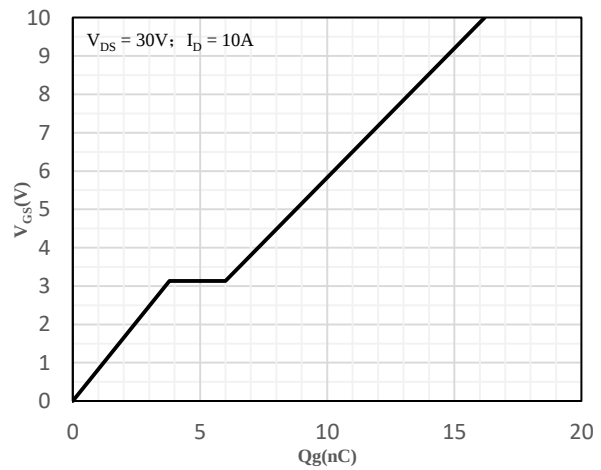


Fig 10 Gate-Charge Characteristics

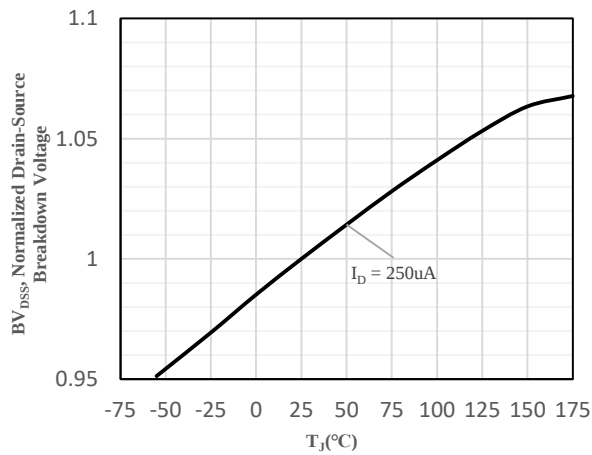


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

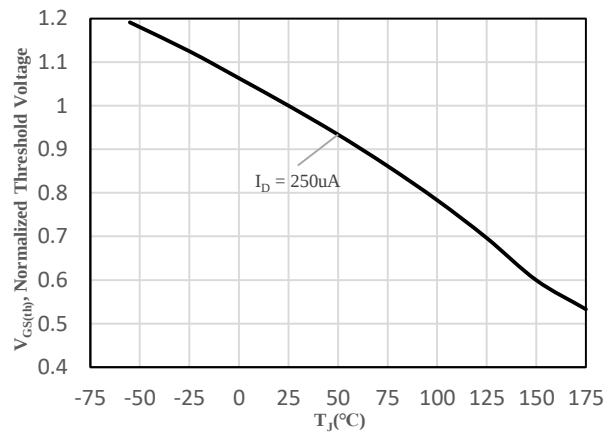


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

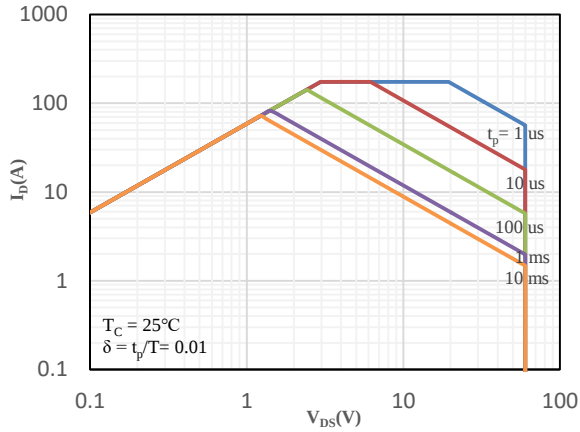


Fig 13 Safe Operation Area

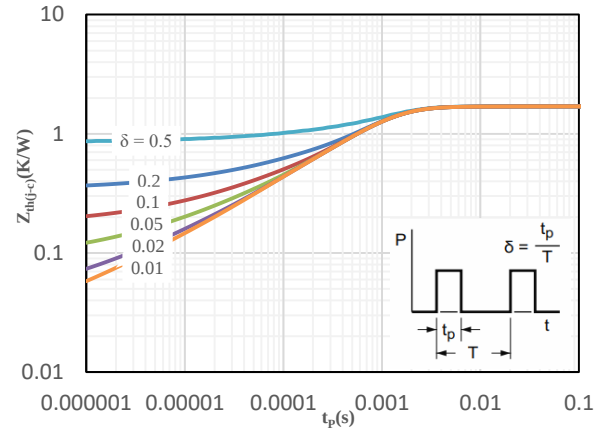
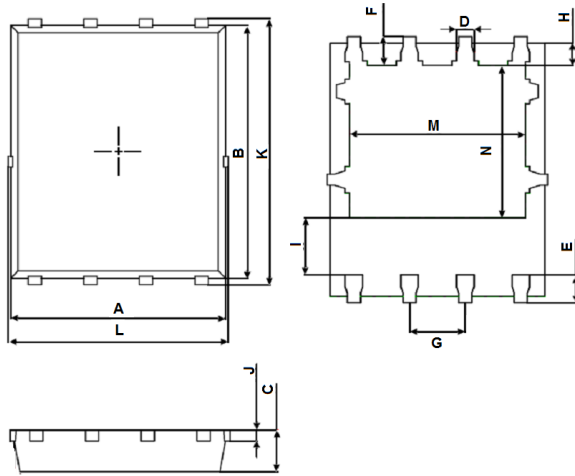


Fig 14 Maximum transient thermal impedance

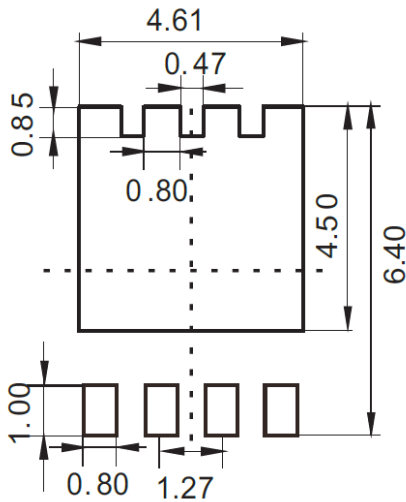
Package Outline Dimensions (Unit: mm)



PDFN5x6-8L		
Dimension	Min.	Max.
A	4.824	4.976
B	5.674	5.826
C	0.900	1.000
D	0.350	0.450
E	0.559	0.711
F	0.574	0.726
G	1.250	1.290
H	0.424	0.576
I	1.190	1.390
J	0.154	0.354
K	5.974	6.126
L	4.944	5.096
M	3.910	4.110
N	3.375	3.575

Mounting Pad Layout (Unit: mm)

PDFN5x6-8L



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