

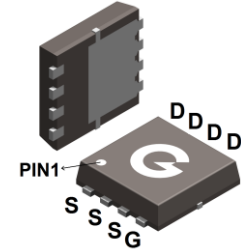
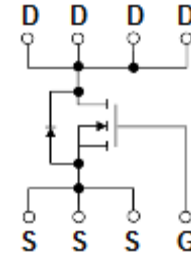
Features

- Advanced Shielded-Gate Trench technology
- Super low on-resistance
- Fast switching speed
- Excellent c_{dv} / d_t effect decline
- HBM: AEC-Q101-001: H1B (JESD22-A114-B: 1B)
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 Standards

HF

Mechanical Data

- Case: PDFN3×3-8L
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



PDFN3×3-8L

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
TBL085N06T-3DL8	PDFN3×3-8L	5000 pcs / Tape & Reel	085N06T

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	60	V
Gate-to-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)	I_D	40	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)		33	
Continuous Drain Current ($T_A = 25^\circ\text{C}$) ^{*1}		12	
Continuous Drain Current ($T_A = 100^\circ\text{C}$) ^{*1}		7.5	
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$)	I_{DM}	160	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_A = 25^\circ\text{C}$)		100	
Single Pulse Avalanche Energy ($L = 10\text{mH}$) ^{*3}	E_{AS}	53	mJ
Single Pulse Avalanche Energy ($L = 0.1\text{mH}$)		25	
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	27.8	W
Operating Junction Temperature Range	T_J	$-55 \sim +150$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	3.6	4.5	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Air ^{*1}	$R_{\theta JA}$	-	49	55	$^\circ\text{C/W}$

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} = 48V, 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	-	7.3	8.5	mΩ
		V _{GS} = 4.5V, I _D = 15A	-	10.9	14.5	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1	1.72	2.5	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	2.5	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = 15V f = 1.0MHz	-	1430	-	pF
C _{OSS}	Output Capacitance		-	724	-	
C _{RSS}	Reverse Transfer Capacitance		-	98.9	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V V _{GS} = 15V R _G = 3.3Ω I _D = 20A	-	7	-	ns
t _r	Turn-on Rise Time		-	46	-	
t _{d(OFF)}	Turn-Off Delay Time		-	30	-	
t _f	Turn-Off Fall Time		-	40	-	
Q _G	Total Gate-Charge	V _{DD} = 15V V _{GS} = 10V I _D = 20A	-	23.8	-	nC
Q _{GS}	Gate to Source Charge		-	4	-	
Q _{GD}	Gate to Drain (Miller) Charge		-	5.4	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = 40A, V _{GS} = 0V, T _J = 25°C	-	0.95	1.2	V
t _{rr}	Reverse Recovery Time	I _F = 20A, V _{GS} = 0V	-	37	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	31	-	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 $V_{DD} = 25V, V_{GS} = 10V, L = 10mH$

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

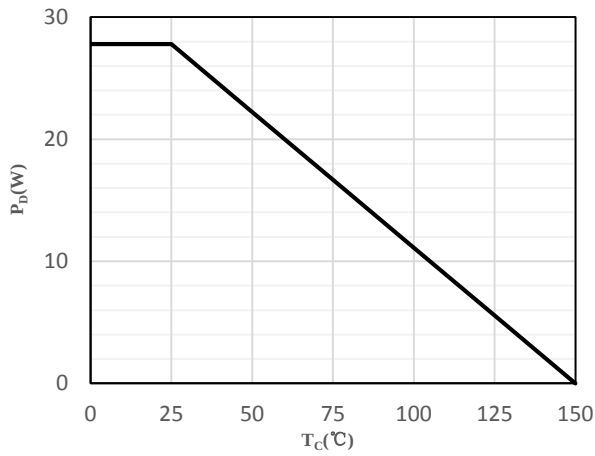


Fig 1 Power Dissipation

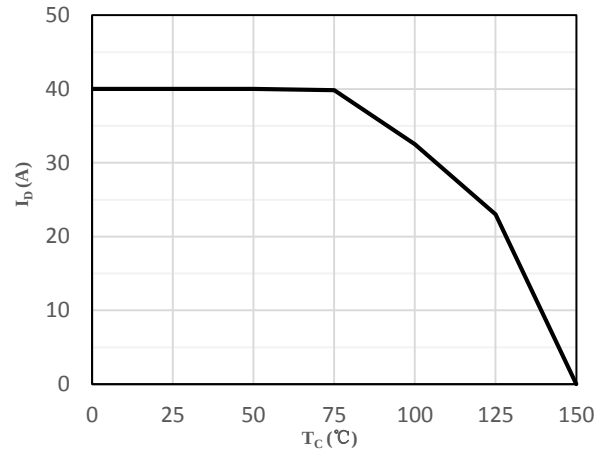


Fig 2 Drain Current

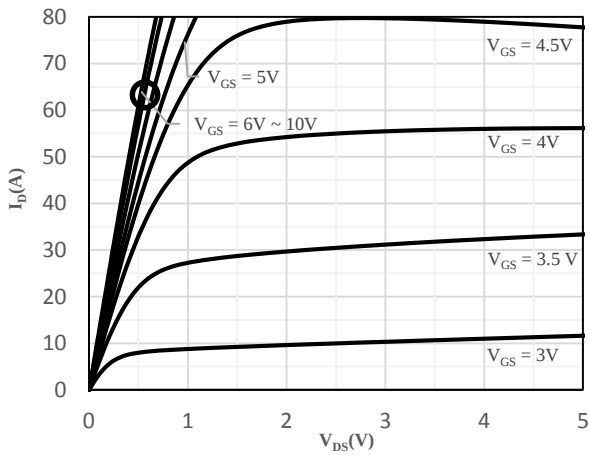


Fig 3 Typical Output Characteristics

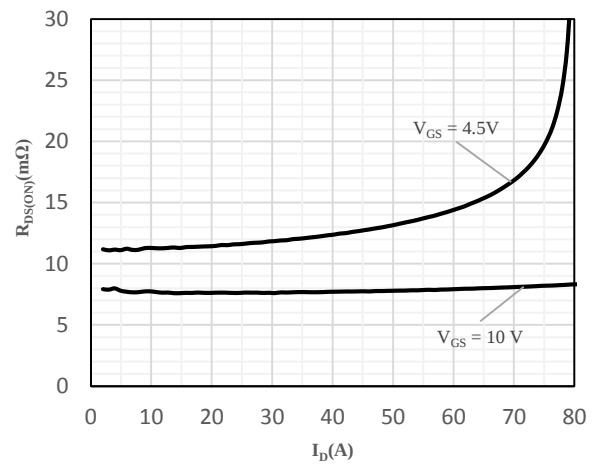


Fig 4 On-Resistance vs. Drain Current
and Gate Voltage

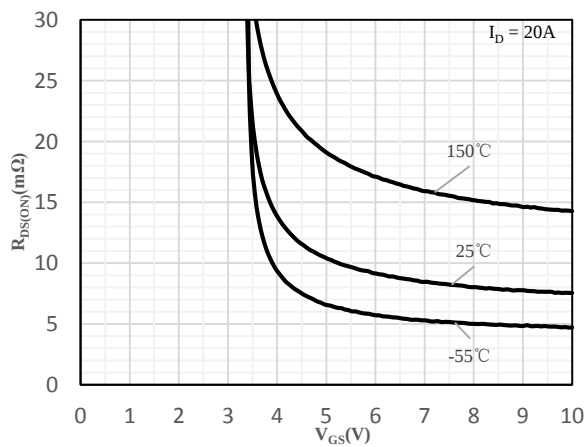


Fig 5 On-Resistance vs. Gate-Source Voltage

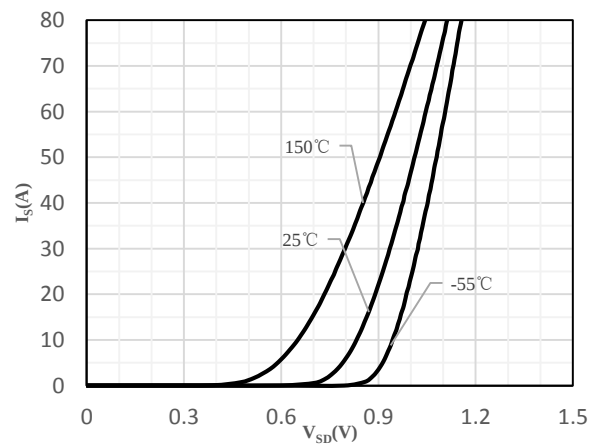


Fig 6 Body-Diode Characteristics

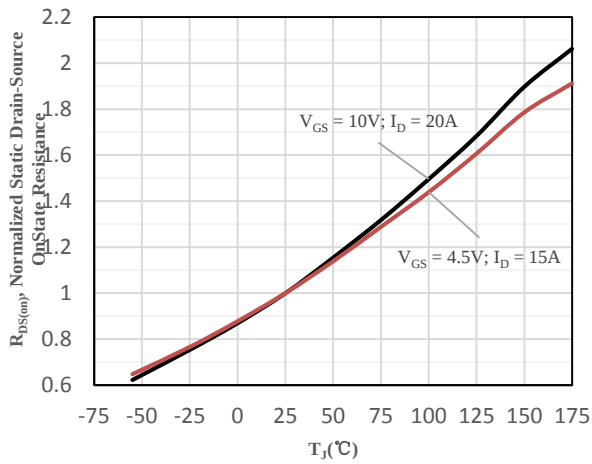


Fig 7 Normalized On-Resistance vs. Junction Temperature

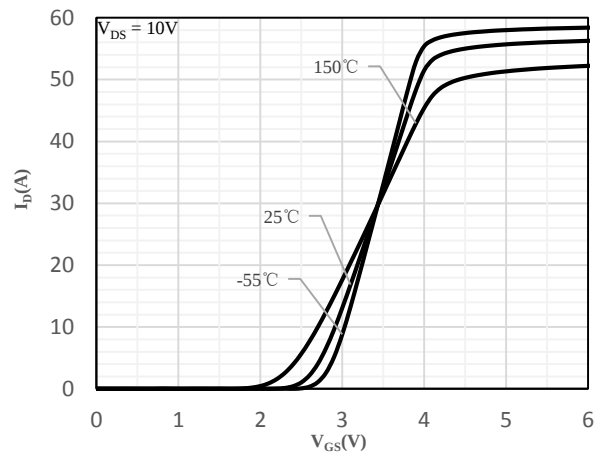


Fig 8 Transfer Characteristics

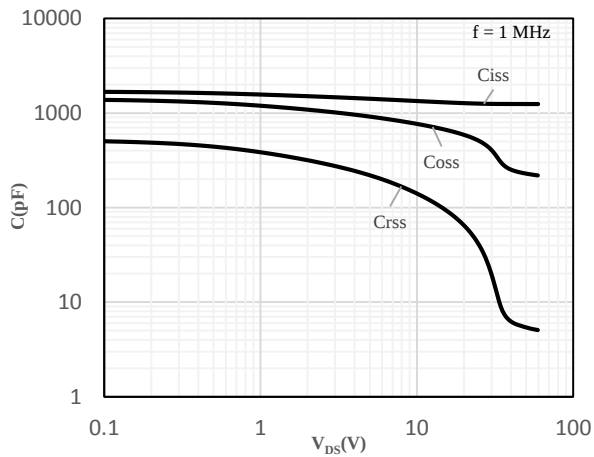


Fig 9 Capacitance Characteristics

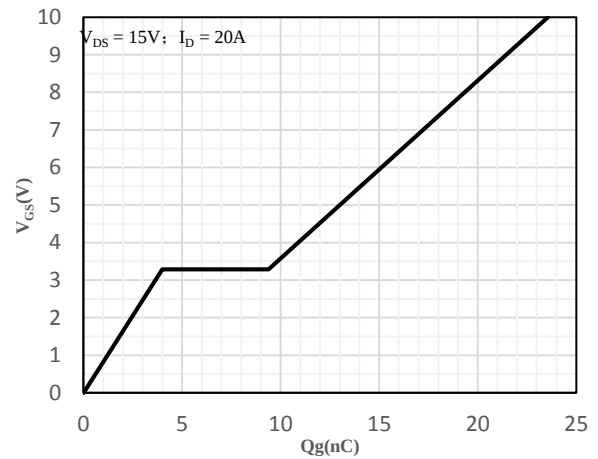


Fig 10 Gate-Charge Characteristics

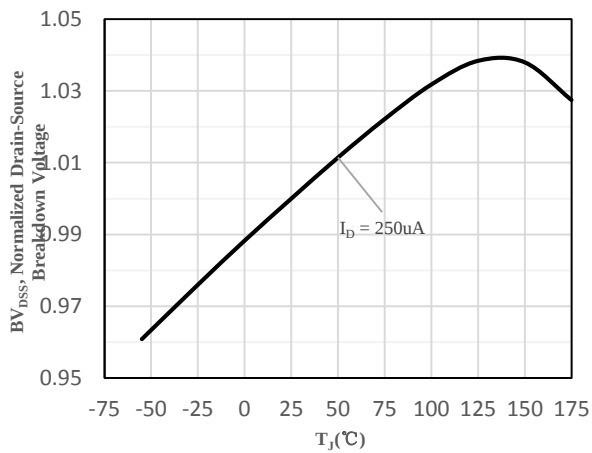


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

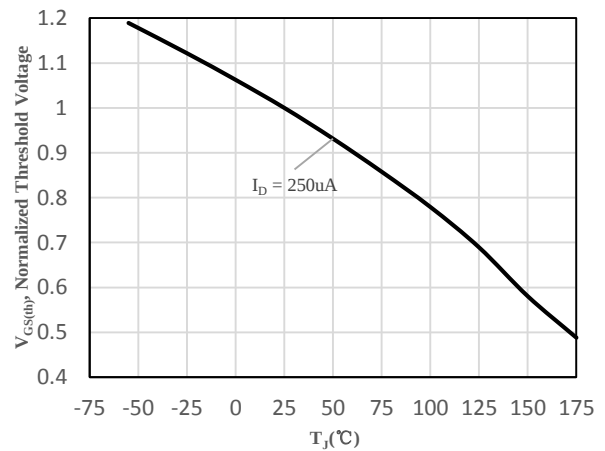


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

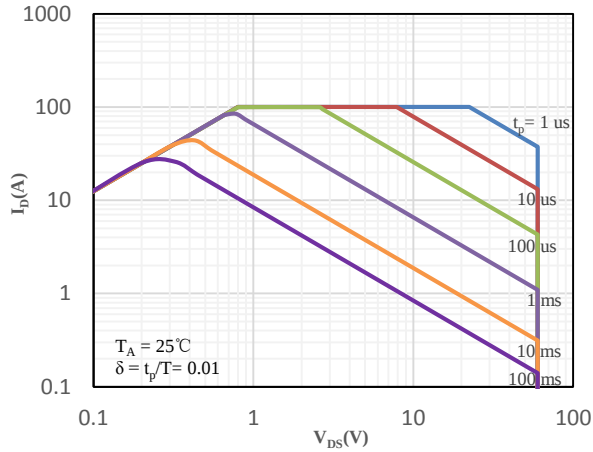


Fig 13 Safe Operation Area ($R_{\theta JA}$)

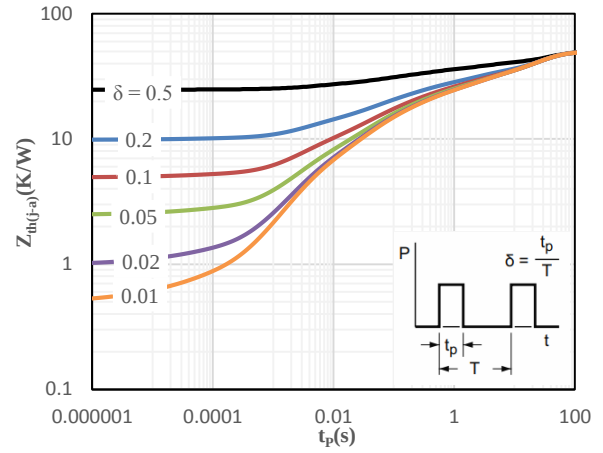


Fig 14 Maximum Transient Thermal Impedance from Junction to Air

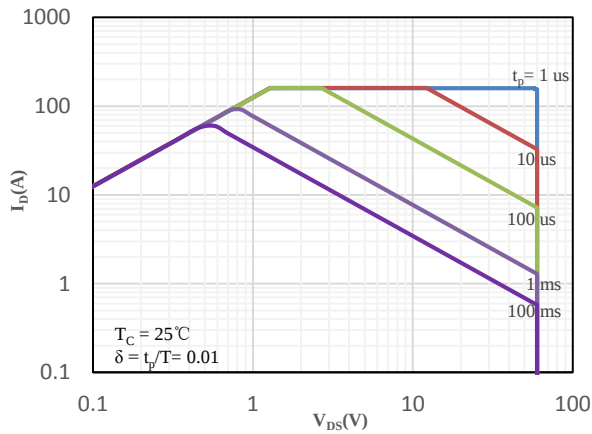


Fig 15 Safe Operation Area ($R_{\theta JC}$)

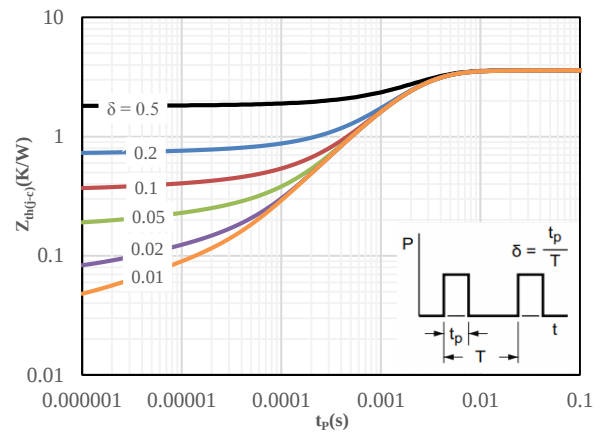
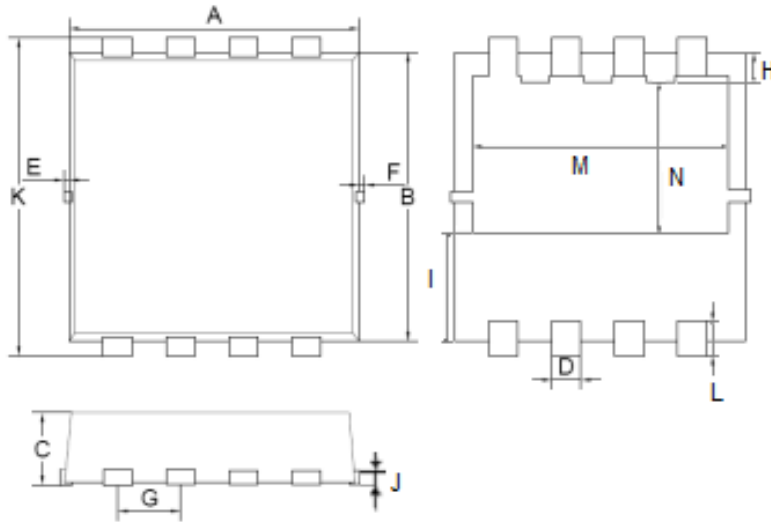


Fig 16 Maximum Transient Thermal Impedance from Junction to Case

Package Outline Dimensions (Unit: mm)



PDFN3×3-8L		
Dimension	Min.	Max.
A	2.90	3.10
B	2.90	3.10
C	0.65	0.85
D	0.20	0.40
E	0.00	0.10
F	0.00	0.10
G	0.55	0.75
H	0.20	0.40
I	0.70	1.10
J	0.10	0.20
K	3.15	3.45
L	0.20	0.40
M	2.35	2.55
N	1.500	1.900

Mounting Pad Layout (Unit: mm)

PDFN3×3-8L

