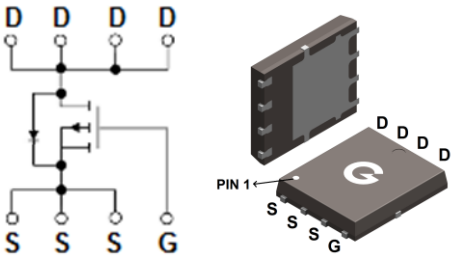
P-Channel Enhancement Mode MOSFET

TBL250P06-5DL8

Features

- Super low gate charge
- Excellent C_{dv}/d_t effect decline
- Advanced high cell density Trench technology
- JESD22-A114-B ESD rating of class 3A per human body model
- Halogen free
- Qualified to AEC-Q101 standards for high reliability

HF



PDFN5×6-8L

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

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
TBL250P06-5DL8	PDFN5×6-8L	5000 pcs / Tape & Reel	250P06

Maximum Ratings (@ T_A = 25°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°C)	I_D	-29	A
Continuous Drain Current (T_C = 100°C)		-18	A
Pulsed Drain Current (t_p = 10μs, T_C = 25°C)	I_{DM}	-175	A
Single Pulse Avalanche Energy *3	E_{AS}	39	mJ
Power Dissipation (T_C = 25°C)	P_D	40	W
Operating Junction Temperature Range	T_J	-55 ~ +150	°C
Storage Temperature Range	T_{STG}	-55 ~ +150	°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	-	-	3.1	°C/W
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	-	-	25	°C/W

Electrical Characteristics (@ T_A = 25°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, T_C = 25°C	-	-	-1	μA
		V_{DS} = -48V, V_{GS} = 0V, T_C = 55°C	-	-	-5	μA
		V_{DS} = -48V, V_{GS} = 0V, T_C = 125°C	-	-	-10	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 = -18A	-	18	25	mΩ
		V_{GS} = -4.5V, I_D = -12A	-	23	33	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-1	-1.9	-2.5	V
R_G	Gate Resistance	V_{GS} = 0V, f = 1MHz	-	5.6	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = -15V f = 1.0MHz	-	5309	-	pF
C_{OSS}	Output Capacitance		-	271	-	
C_{RSS}	Reverse Transfer Capacitance		-	257	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time *4	V_{GS} = -10V V_{DD} = -15V I_D = -1A R_G = 3.3Ω	-	38	-	ns
t_r	Turn-on Rise Time *4		-	23.6	-	
$t_{d(OFF)}$	Turn-Off Delay Time *4		-	100	-	
t_f	Turn-Off Fall Time *4		-	6.8	-	
Q_G	Total Gate-Charge	V_{GS} = -4.5V V_{DD} = -12V I_D = -12A	-	31.5	-	nC
Q_{GS}	Gate to Source Charge		-	13	-	
Q_{GD}	Gate to Drain (Miller) Charge		-	10	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *2	I_{SD} = -1A, V_{GS} = 0V	-	-0.7	-1.2	V
trr	Reverse Recovery Time	I_F = -5A, V_{GS} = 0V d_{IF}/d_t = 100A/us	-	34.5	-	ns
Qrr	Reverse Recovery Charge		-	34.6	-	nC

Notes:

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper
2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
3. The E_{AS} data shows Max. rating. The test condition is V_{DD} = -30V, V_{GS} = -10V, L = 0.1mH
4. Guaranteed by design, not subject to production testing

Ratings and Characteristics Curves (@ T_A = 25°C unless otherwise specified)

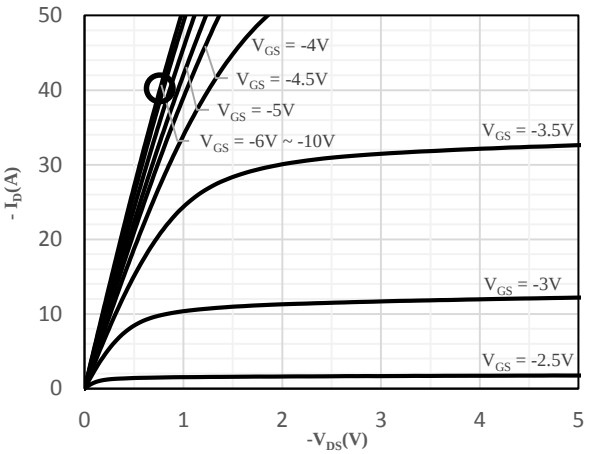


Fig 1 Typical Output Characteristics

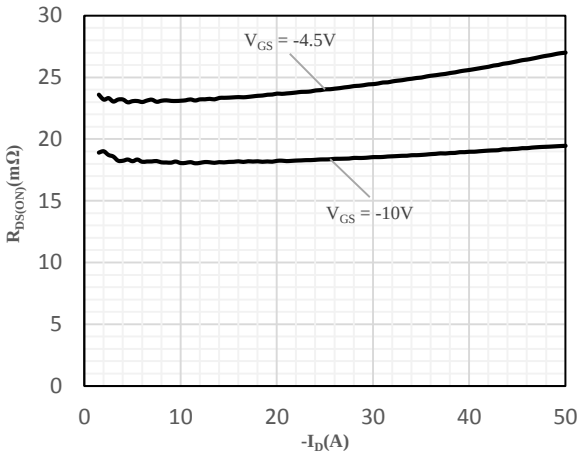


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

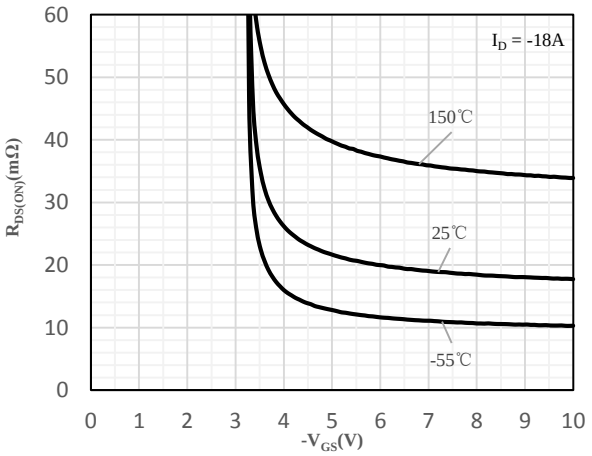


Fig 3 On-Resistance vs. Gate-Source Voltage

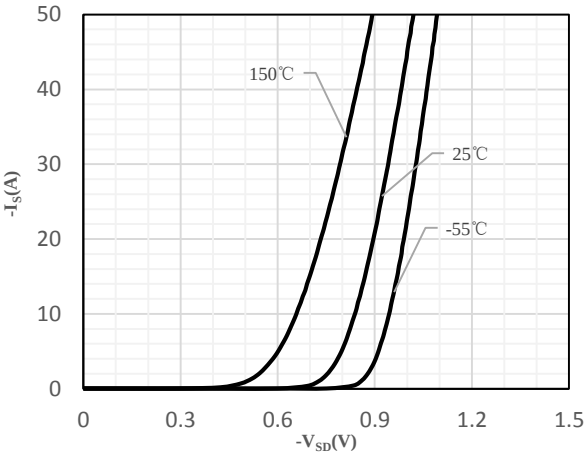


Fig 4 Body-Diode Characteristics

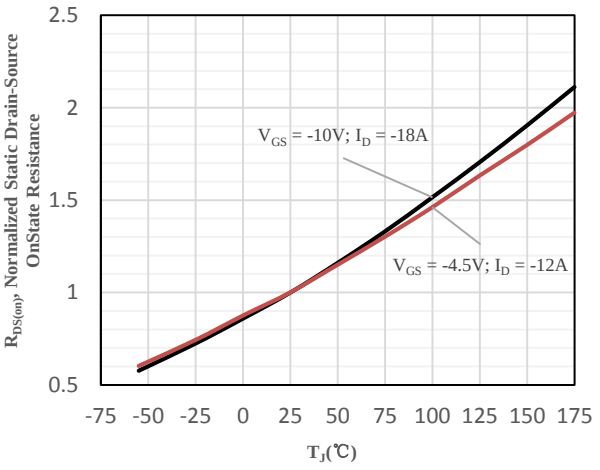


Fig 5 Normalized On-Resistance vs. Junction Temperature

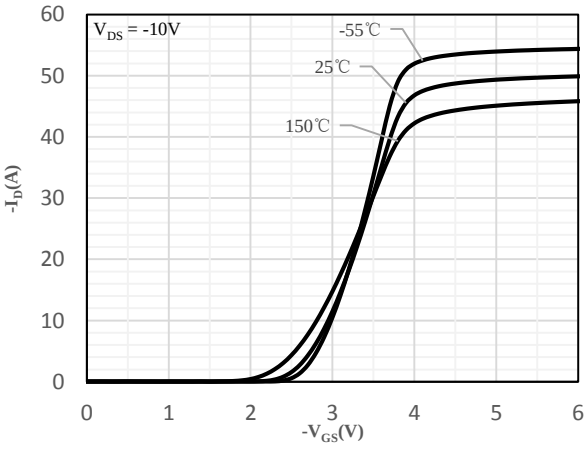


Fig 6 Transfer Characteristics

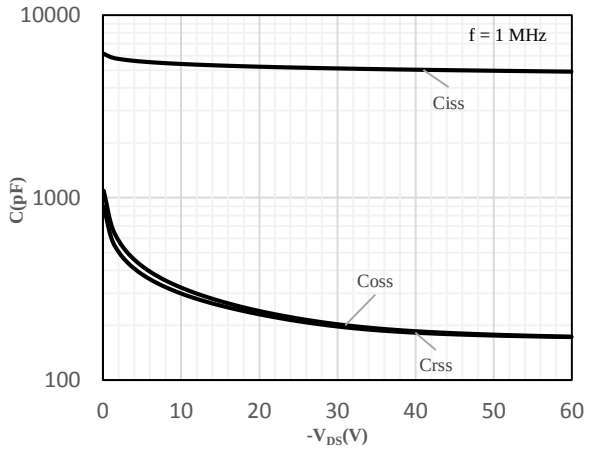


Fig 7 Capacitance Characteristics

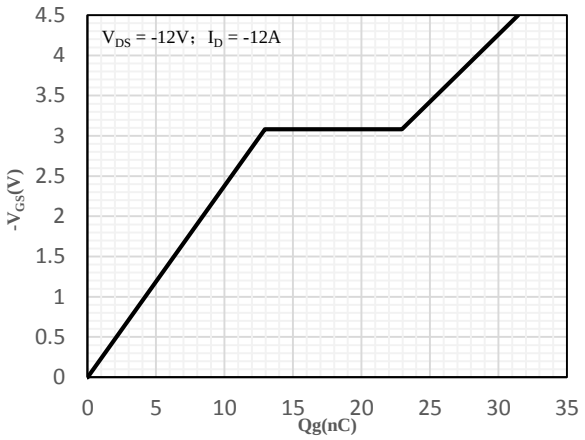


Fig 8 Gate-Charge Characteristics

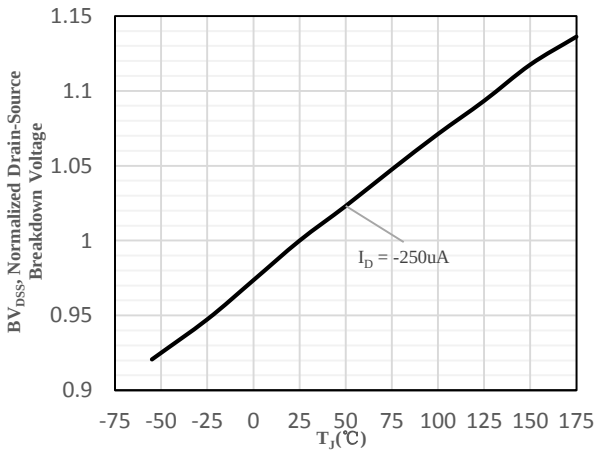


Fig 9 Normalized Breakdown Voltage vs. Junction Temperature

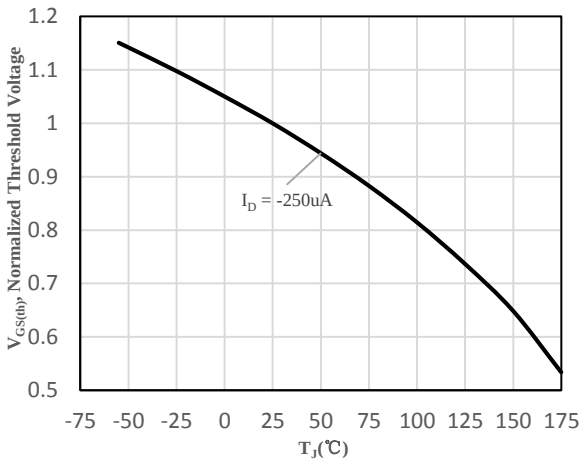


Fig 10 Normalized $V_{GS(th)}$ vs. Junction Temperature

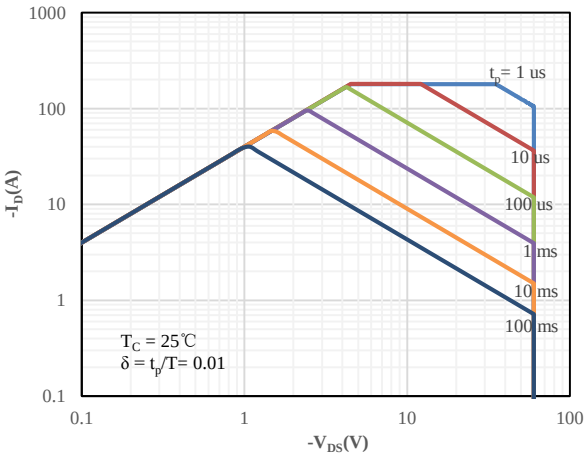


Fig 11 Safe Operation

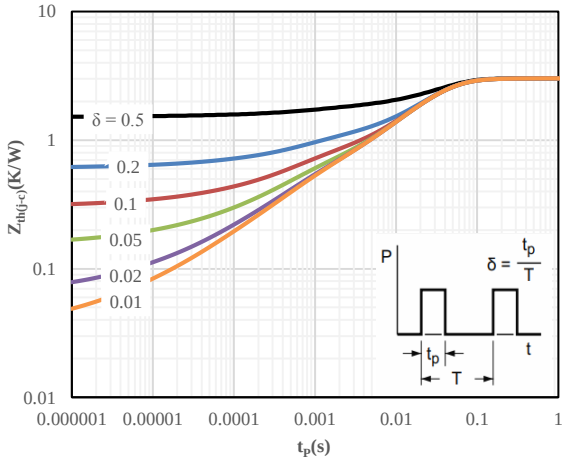
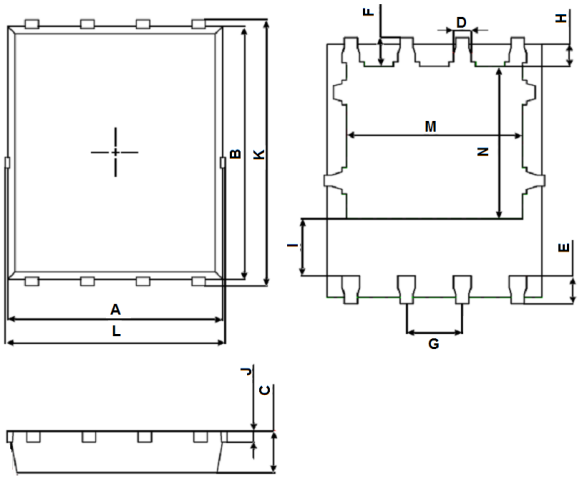


Fig 12 Maximum transient thermal impedance

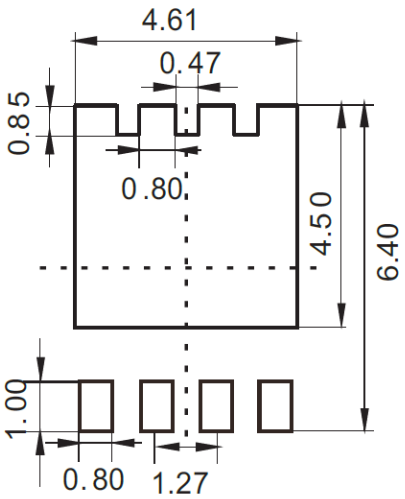
Package Outline Dimensions (Unit: mm)



PDFN5×6-8L		
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)

PDFN5×6-8L



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