银河微电 Galaxy Microelectronics

P＋N-Channel Enhancement Mode MOSFET

GBLH4402-5DL8

Features

- Reliable and Rugged
- Green device available
- RoHS compliant with Halogen-free

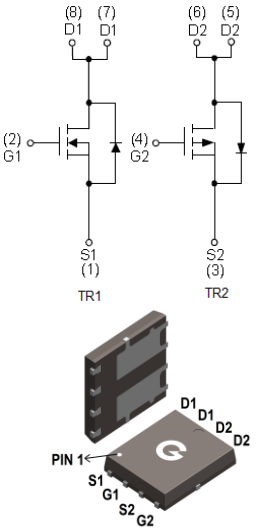
HF

Applications

- Synchronous Rectification
- Motor Control
- Portable equipment application

Mechanical Data

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



PDFN5×6-8LC

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
GBLH4402-5DL8	PDFN5×6-8LC	5000 pcs / Tape & Reel	GBLH4402

Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Parameter	Symbol	N Channel	P Channel	Unit
Drain-to-Source Voltage	V_{DSS}	40	-40	V
Gate-to-Source Voltage	V_{GSS}	±20	±20	V
Continuous Drain Current (T_C = 25°C)	I_D	18	-14	A
Continuous Drain Current (T_C = 100°C)		11	-9	A
Continuous Drain Current (T_A = 25°C) *1		8	-5.1	A
Continuous Drain Current (T_A = 100°C) *1		5	-3.2	A
Pulsed Drain Current (t_p = 10μs, T_C = 25°C)	I_{DM}	72	-56	A
Single Pulse Avalanche Energy *3	E_{AS}	30	40	mJ
Power Dissipation (T_C = 25°C)	P_D	13		W
Power Dissipation (T_A = 25°C) *1		2.5		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	$R_{\theta JC}$	-	-	10	°C/W
Thermal Resistance Junction-to-Air *1	$R_{\theta JA}$	-	-	50	°C/W

Electrical Characteristics-N (@ T_C = 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	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 40V, 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 = 4A	-	17	21	mΩ
		V_{GS} = 4.5V,I_D = 3A	-	21	27	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1	1.4	2.5	V
R_G	Gate Resistance	V_{GS} = 0V, f = 1MHz	-	4.5	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = 20V f = 1.0MHz	-	732	-	pF
C_{OSS}	Output Capacitance		-	59	-	
C_{RSS}	Reverse Transfer Capacitance		-	46	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time *4	V_{DD} = 20V V_{GS} = 10V I_D = 8A R_G = 3Ω，R_L = 1Ω	-	10	-	ns
t_r	Turn-on Rise Time *4		-	12	-	
$t_{d(OFF)}$	Turn-Off Delay Time *4		-	32	-	
t_f	Turn-Off Fall Time *4		-	8	-	
Q_G	Total Gate-Charge	V_{DD} = 20V V_{GS} = 10V I_D = 5A	-	16.7	-	nC
Q_{GS}	Gate to Source Charge		-	2.6	-	
Q_{GD}	Gate to Drain (Miller) Charge		-	2.5	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *2	I_{SD} = 8A, V_{GS} = 0V	-	0.8	1.2	V
trr	Reverse Recovery Time	I_S = 8A, V_{GS} = 0V di/dt = 100A/μs	-	17	-	ns
Qrr	Reverse Recovery Charge		-	6.2	-	nC

Electrical Characteristics-P (@ T_C = 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	-40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -40V, 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 = -5A	-	46	55	mΩ
		V_{GS} = -4.5V, I_D = -4A	-	56	70	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-1	-1.5	-2.5	V
R_G	Gate Resistance	V_{GS} = 0V, f = 1MHz	-	7.5	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{GS} = 0V V_{DS} = -20V f = 1.0MHz	-	882	-	pF
C_{OSS}	Output Capacitance		-	70	-	
C_{RSS}	Reverse Transfer Capacitance		-	60	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time *4	V_{GS} = -10V V_{DD} = -20V I_D = -5A R_G = 2.5Ω	-	7.2	-	ns
t_r	Turn-on Rise Time *4		-	14	-	
$t_{d(OFF)}$	Turn-Off Delay Time *4		-	21	-	
t_f	Turn-Off Fall Time *4		-	8.1	-	
Q_G	Total Gate-Charge	V_{DD} = -20V V_{GS} = -10V I_D = -5A	-	19.3	-	nC
Q_{GS}	Gate to Source Charge		-	3	-	
Q_{GD}	Gate to Drain (Miller) Charge		-	2.9	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *2	I_{SD} = -5A, V_{GS} = 0V	-	-0.9	-1.2	V
trr	Reverse Recovery Time	I_S = -5A, V_{GS} = 0V di/dt = 100A/μs	-	35	-	ns
Qrr	Reverse Recovery Charge		-	22	-	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: N channel: V_{DD} = 20V, V_{GS} = 10V, L = 10mH
   P channel: V_{DD} = -20V, V_{GS} = -10V, L = 10mH
4. Guaranteed by design, not subject to production

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

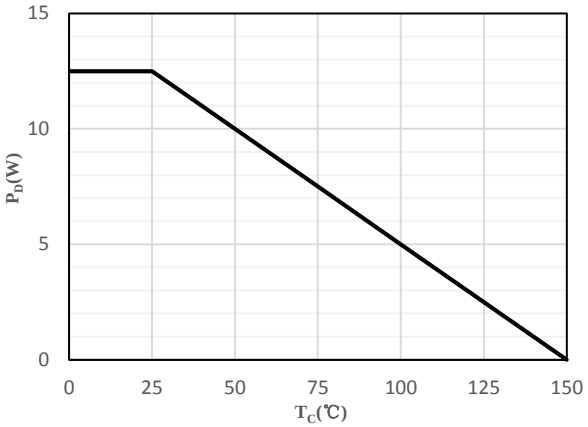


Fig 1 Power Dissipation

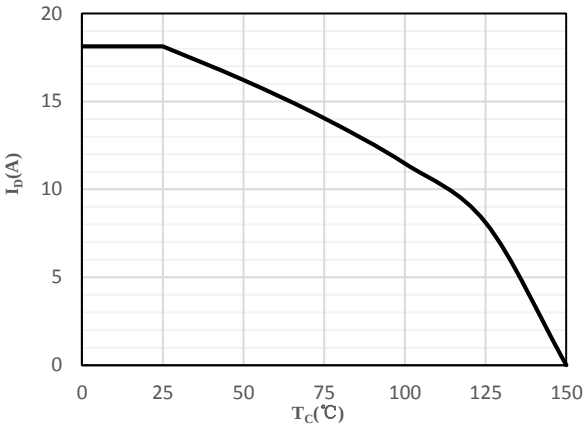


Fig 2 Drain Current

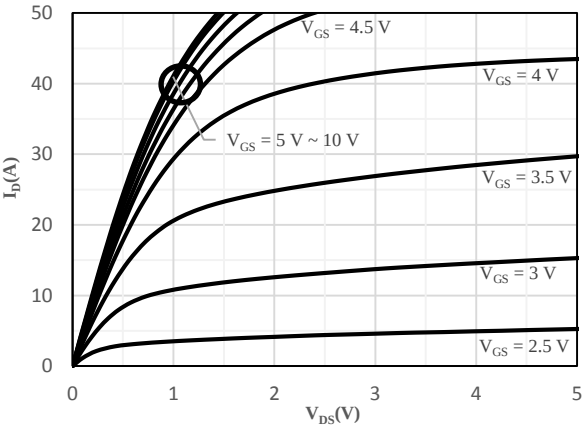


Fig 3 Typical Output Characteristics

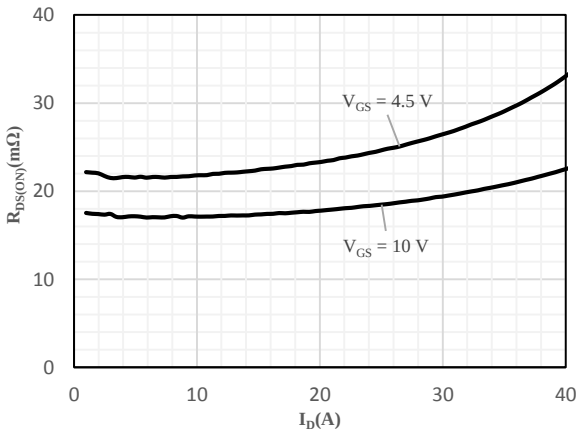


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

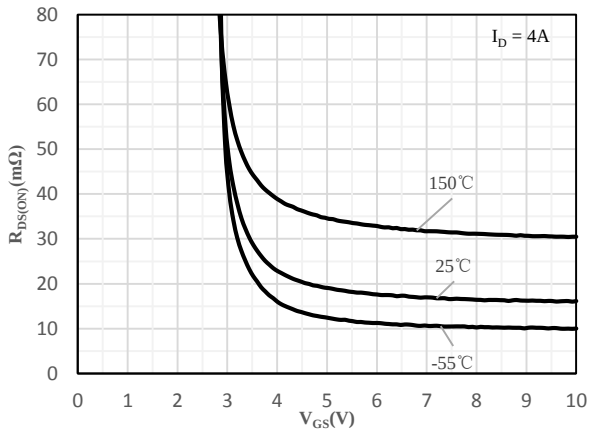


Fig 5 On-Resistance vs. Gate-Source Voltage

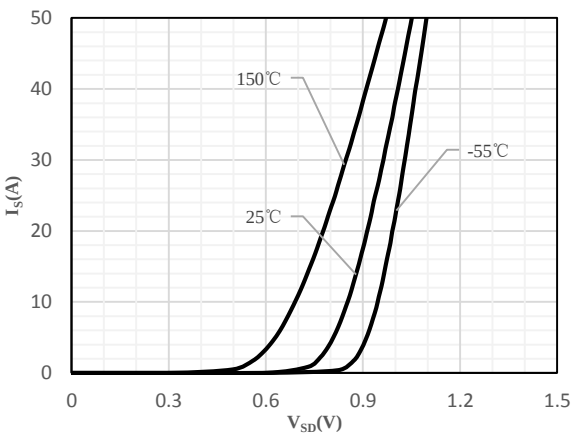


Fig 6 Body-Diode Characteristics

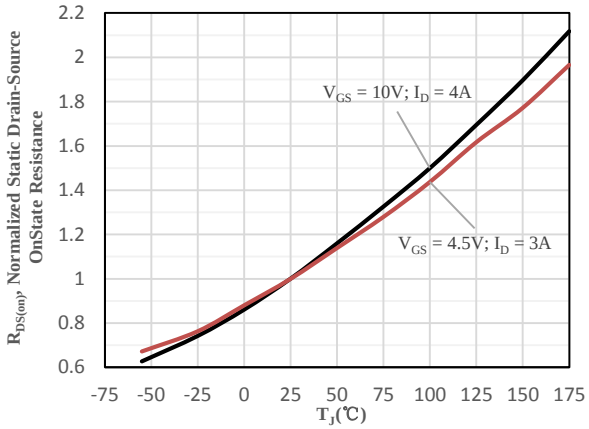


Fig 7 Normalized On-Resistance vs. Junction Temperature

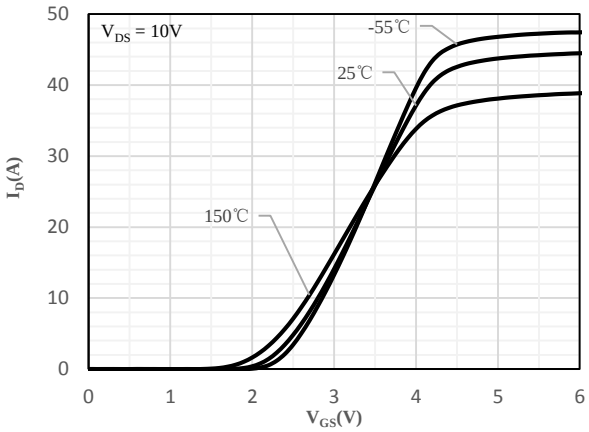


Fig 8 Transfer Characteristics

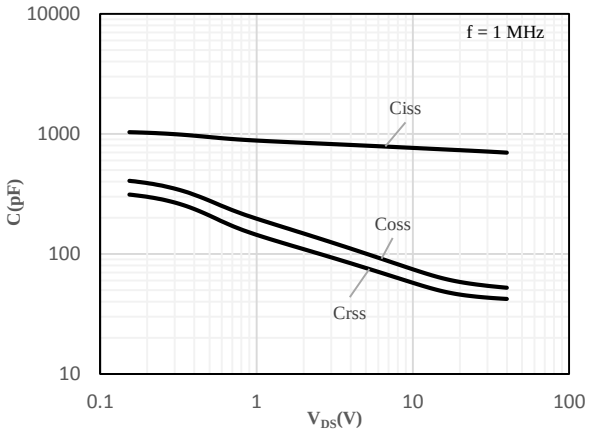


Fig 9 Capacitance Characteristics

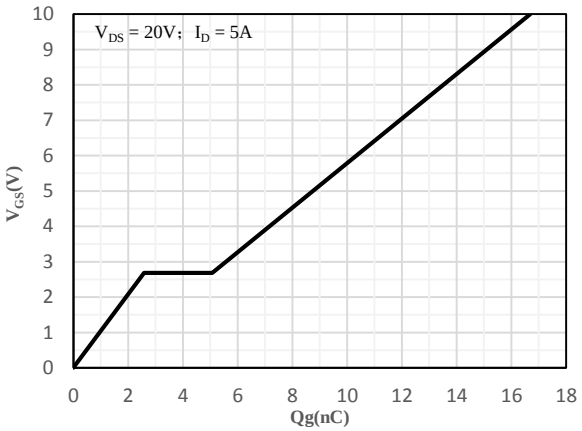


Fig 10 Gate-Charge Characteristics

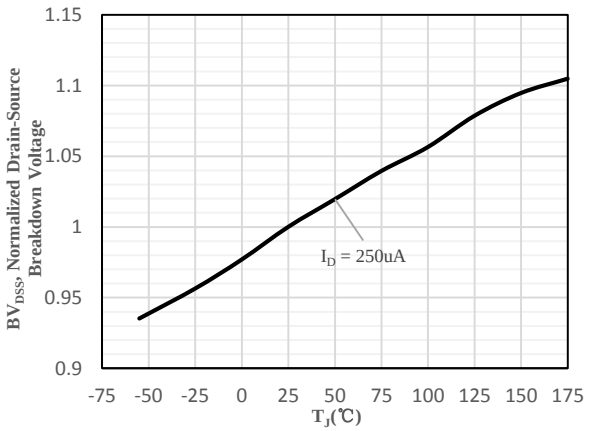


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

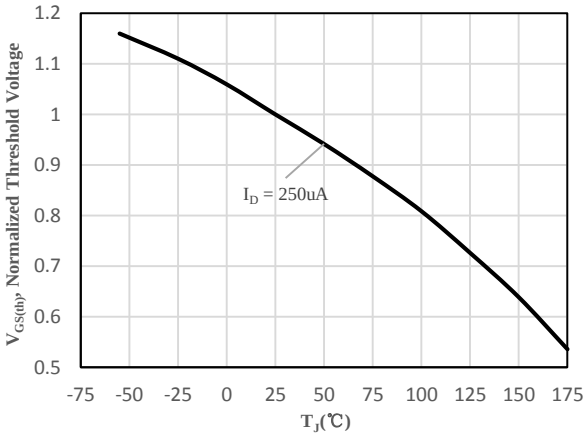


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

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

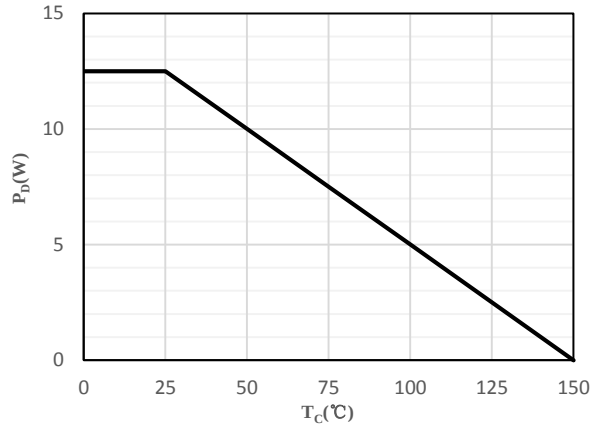


Fig 1 Power Dissipation

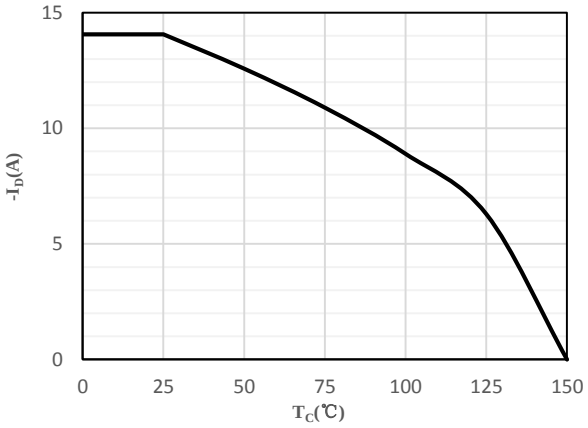


Fig 2 Drain Current

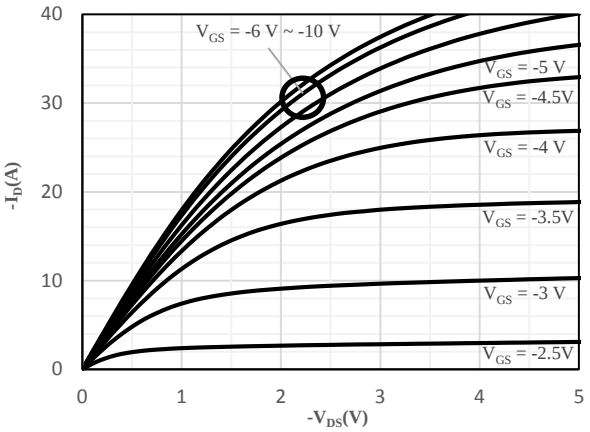


Fig 3 Typical Output Characteristics

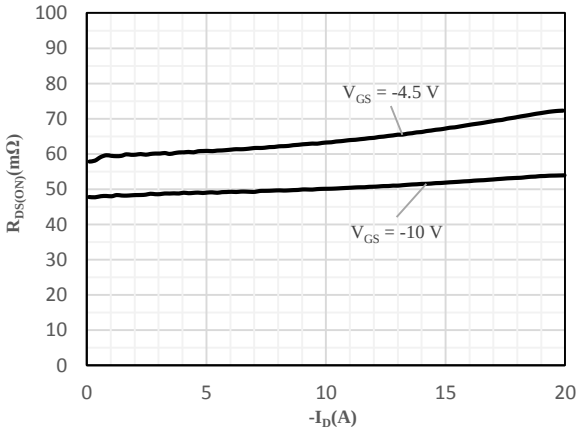


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

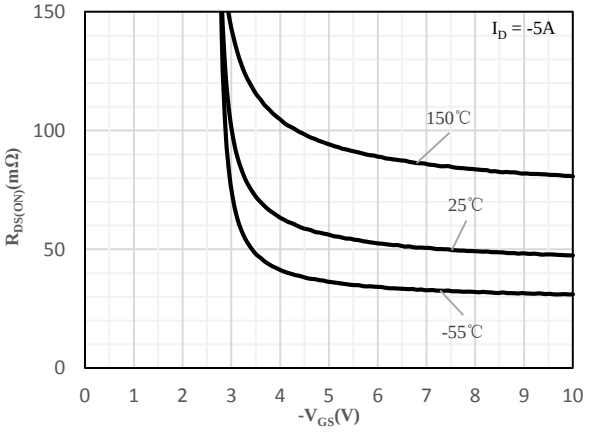


Fig 5 On-Resistance vs. Gate-Source Voltage

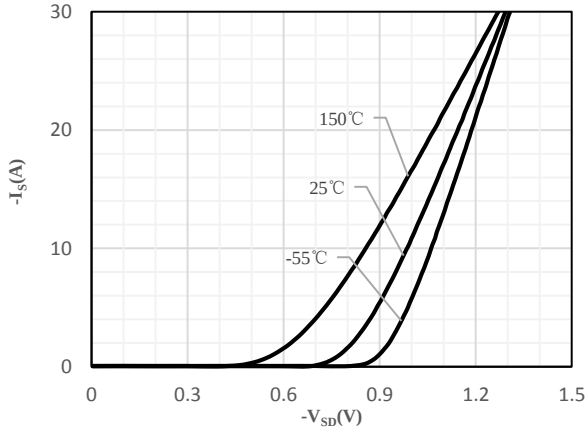


Fig 6 Body-Diode Characteristics

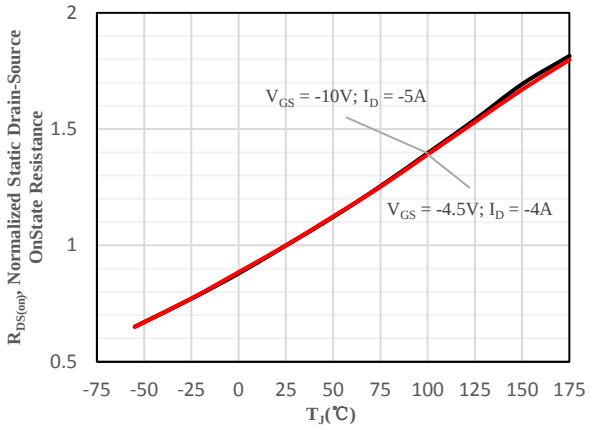


Fig 7 Normalized On-Resistance vs. Junction Temperature

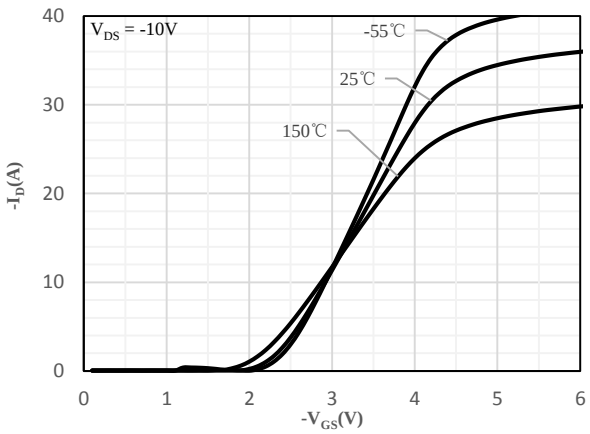


Fig 8 Transfer Characteristics

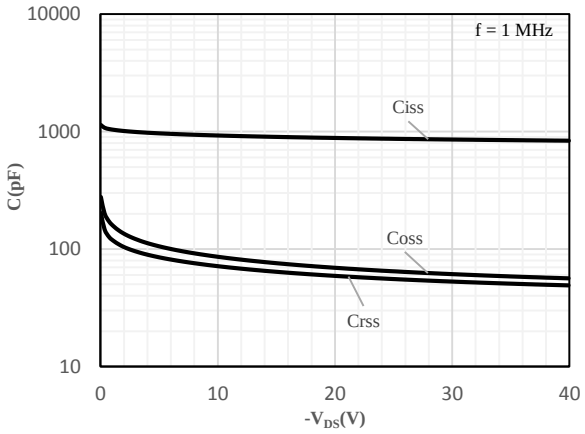


Fig 9 Capacitance Characteristics

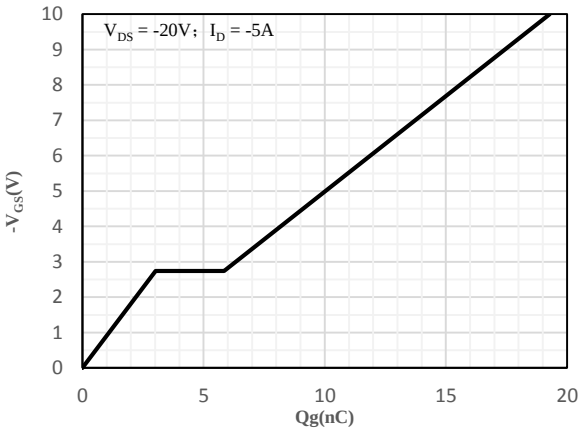


Fig 10 Gate-Charge Characteristics

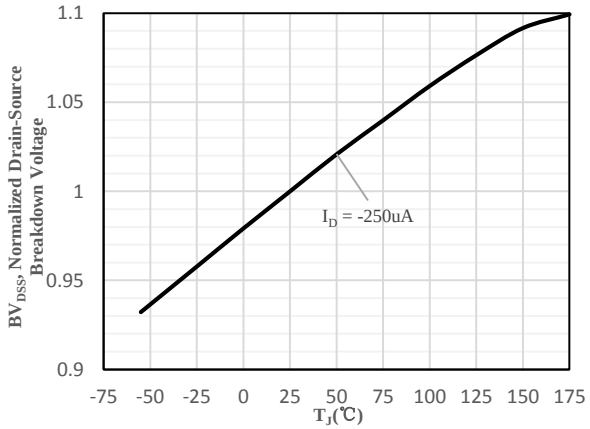


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

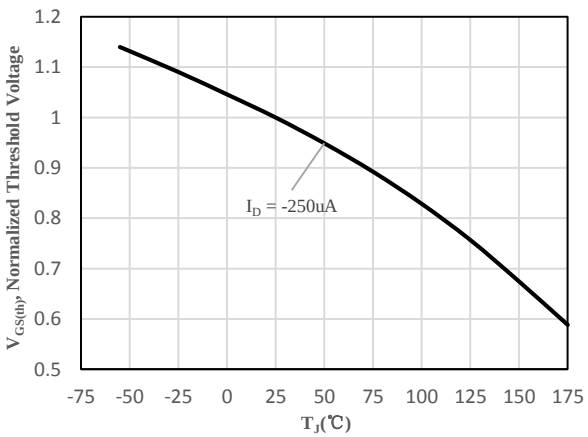
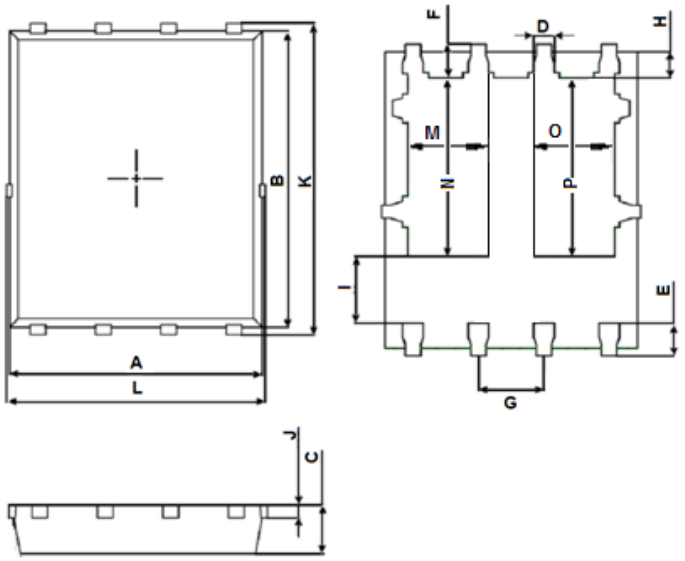


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

Package Outline Dimensions (Unit: mm)



PDFN5×6-8LC		
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/O	1.595	1.795
N/P	3.375	3.575

Mounting Pad Layout (Unit: mm)

PDFN5×6-8LC