

### Features

- Reliable and Rugged
- Green device available

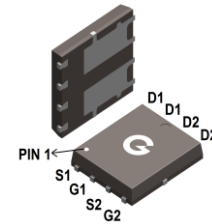
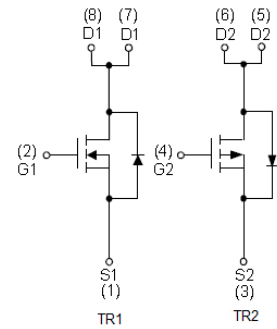
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### Applications

- Synchronous Rectification
- Motor Control
- Portable equipment application

### Mechanical Data

- Case: PDFN5x6-8LC
- 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
GBLH4403-5DL8	PDFN5x6-8LC	5000 pcs / Tape & Reel	GBLH4403

## Maximum Ratings (@ T<sub>C</sub> = 25°C unless otherwise specified)

Parameter	Symbol	TR1	TR2	Unit
Drain-to-Source Voltage	V <sub>DSS</sub>	40	-40	V
Gate-to-Source Voltage	V <sub>GSS</sub>	±20	±20	V
Continuous Drain Current (T <sub>C</sub> = 25°C)	I <sub>D</sub>	40	-25	A
Continuous Drain Current (T <sub>C</sub> = 100°C)		25	-16	A
Single Pulse Avalanche Energy <sup>*3</sup>	E <sub>AS</sub>	20	20	mJ
Pulsed Drain Current (t <sub>p</sub> = 10μs, T <sub>C</sub> = 25°C)	I <sub>DM</sub>	120	-100	A
Power Dissipation (T <sub>C</sub> = 25°C)	P <sub>D</sub>	36	36	W
Operating Junction Temperature Range	T <sub>J</sub>	-55 ~ +150		°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ +150		°C

## Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case	R <sub>θJC</sub>	-	-	3.5	°C/W
Thermal Resistance Junction-to-Air <sup>*1</sup>	R <sub>θJA</sub>	-	-	40	°C/W

### Electrical Characteristics-TR1 (@ T<sub>A</sub> = 25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
V <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	40	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 40V, V <sub>GS</sub> = 0V	-	-	1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
<b>On Characteristics</b>						
R <sub>DS(ON)</sub>	Drain-Source On-resistance *2	V <sub>GS</sub> = 10V, I <sub>D</sub> = 8A	-	-	13	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A	-	-	20	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1	-	2.5	V
<b>Dynamic Characteristics</b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>GS</sub> = 0V V <sub>DS</sub> = 20V f = 1.0MHz	-	1125	-	pF
C <sub>OSS</sub>	Output Capacitance		-	103	-	
C <sub>RSS</sub>	Reverse Transfer Capacitance		-	77	-	
<b>Switching Characteristics</b>						
t <sub>d(ON)</sub>	Turn-on Delay Time *4	V <sub>DD</sub> = 20V V <sub>GS</sub> = 10V R <sub>G</sub> = 5Ω I <sub>D</sub> = 8A	-	9	-	ns
t <sub>r</sub>	Turn-on Rise Time *4		-	8	-	
t <sub>d(OFF)</sub>	Turn-Off Delay Time *4		-	29	-	
t <sub>f</sub>	Turn-Off Fall Time *4		-	14	-	
Q <sub>G</sub>	Total Gate-Charge	V <sub>DD</sub> = 20V V <sub>GS</sub> = 10V I <sub>D</sub> = 8A	-	20	-	nC
Q <sub>GS</sub>	Gate to Source Charge		-	3.2	-	
Q <sub>GD</sub>	Gate to Drain (Miller) Charge		-	3.8	-	
<b>Source-Drain Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage *2	I <sub>SD</sub> = 8A, V <sub>GS</sub> = 0V	-	-	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> = 8A, V <sub>GS</sub> = 0V di/dt=100A/μs	-	20	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	10	-	nC

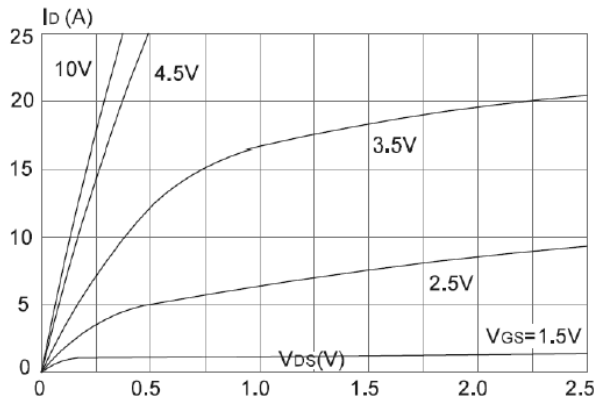
### Electrical Characteristics-TR2 (@ T<sub>A</sub> = 25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
V <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-40	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V	-	-	-1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
<b>On Characteristics</b>						
R <sub>DS(ON)</sub>	Drain-Source On-resistance *2	V <sub>GS</sub> = -10V, I <sub>D</sub> = -5A	-	-	35	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3A	-	-	50	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1.0	-	-2.5	V
<b>Dynamic Characteristics</b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>GS</sub> = 0V	-	1034	-	pF
C <sub>OSS</sub>	Output Capacitance	V <sub>DS</sub> = -20V	-	107	-	
C <sub>RSS</sub>	Reverse Transfer Capacitance	f = 1.0MHz	-	80	-	
<b>Switching Characteristics</b>						
t <sub>d(ON)</sub>	Turn-on Delay Time *4	V <sub>DD</sub> = -20V	-	8	-	ns
t <sub>r</sub>	Turn-on Rise Time *4	V <sub>GS</sub> = -10V	-	15	-	
t <sub>d(OFF)</sub>	Turn-Off Delay Time *4	R <sub>G</sub> = 5Ω	-	23	-	
t <sub>f</sub>	Turn-Off Fall Time *4	I <sub>D</sub> = -5A	-	9	-	
Q <sub>G</sub>	Total Gate-Charge	V <sub>DD</sub> = -20V	-	20	-	nC
Q <sub>GS</sub>	Gate to Source Charge	I <sub>D</sub> = -5A	-	3.5	-	
Q <sub>GD</sub>	Gate to Drain (Miller) Charge	V <sub>GS</sub> = -10V	-	4.2	-	
<b>Source-Drain Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage *2	I <sub>SD</sub> = -5A, V <sub>GS</sub> = 0V	-	-	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> = -5A, V <sub>GS</sub> = 0V	-	29	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs	-	20	-	nC

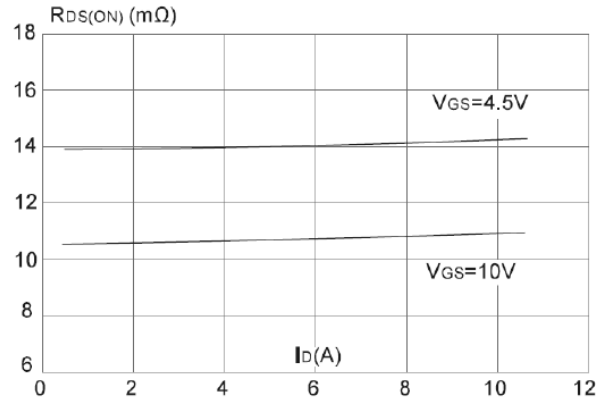
Notes:

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper
- The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
- The E<sub>AS</sub> data shows Max. rating. N: The test condition is V<sub>DD</sub> = 20V, V<sub>GS</sub> = 10V, L = 0.5mH  
P: The test condition is V<sub>DD</sub> = -20V, V<sub>GS</sub> = -10V, L = 0.5mH
- Guaranteed by design, not subject to production

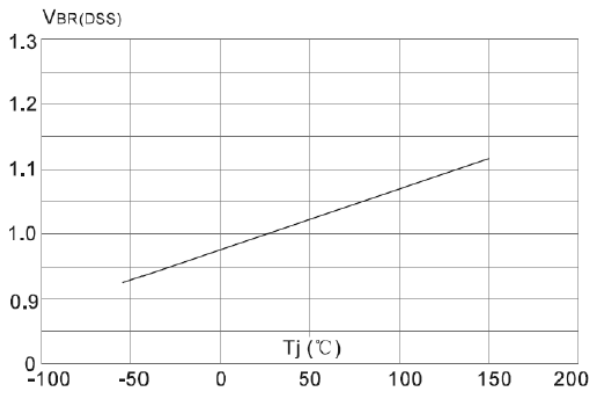
**Ratings and Characteristics Curves-TR1** (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)



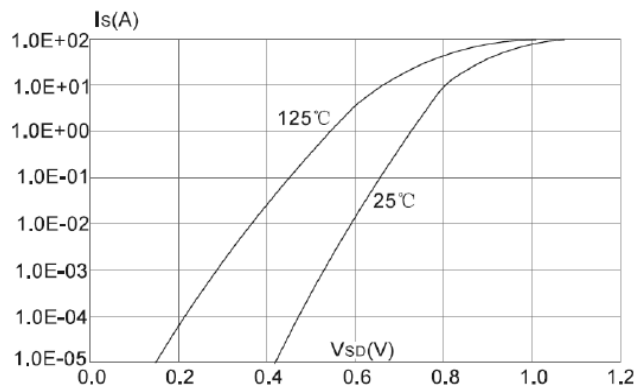
**Fig 1 Typical Output Characteristics**



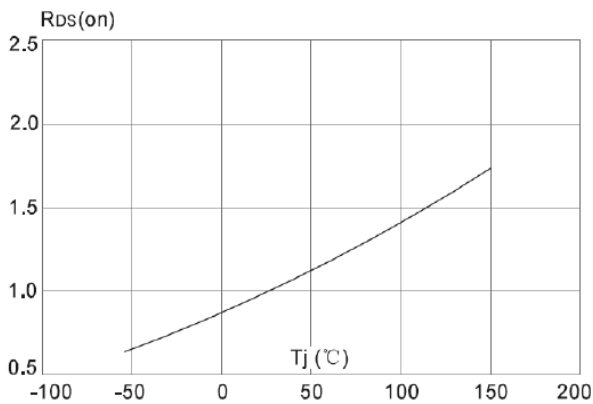
**Fig 2 On-Resistance vs. Drain Current and Gate Voltage**



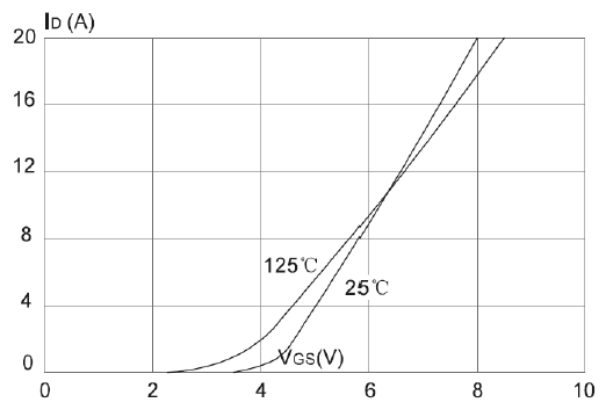
**Fig 3 Normalized Breakdown Voltage vs. Junction Temperature**



**Fig 4 Body-Diode Characteristics**



**Fig 5 Normalized On-Resistance vs. Junction Temperature**



**Fig 6 Transfer Characteristics**

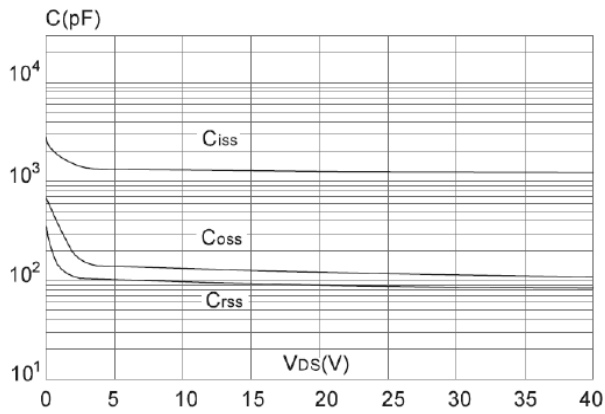


Fig 7 Capacitance Characteristics

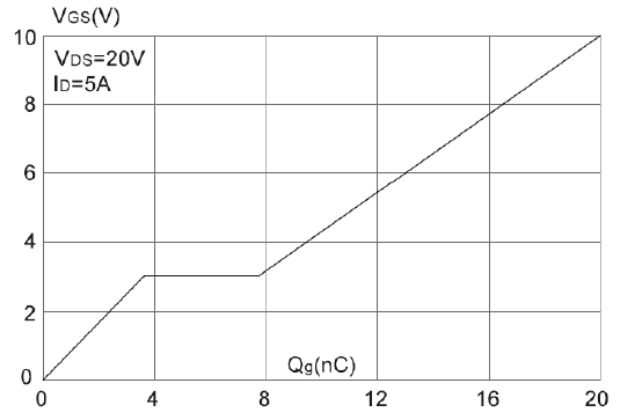
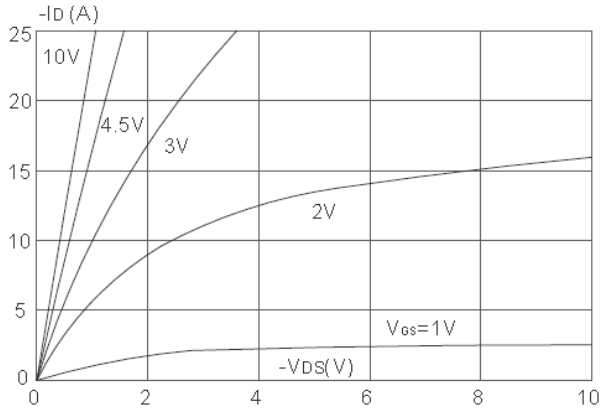
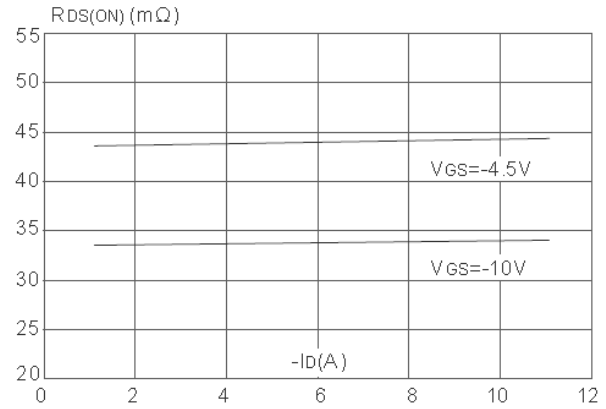


Fig 8 Gate-Charge Characteristics

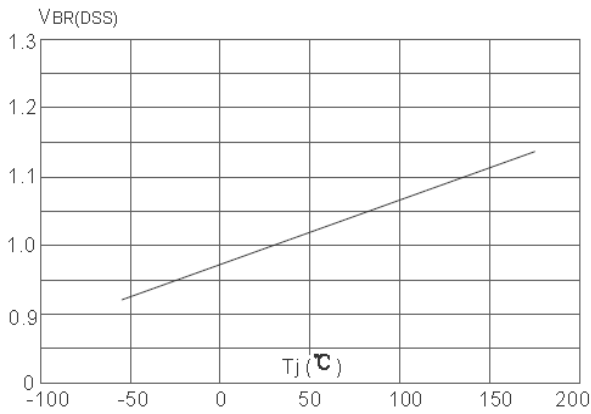
**Ratings and Characteristics Curves-TR2** (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)



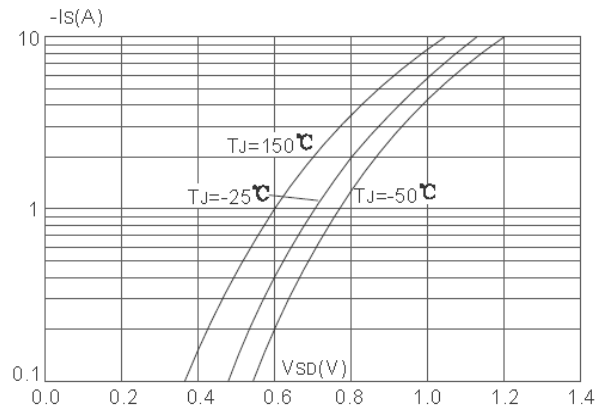
**Fig 1 Typical Output Characteristics**



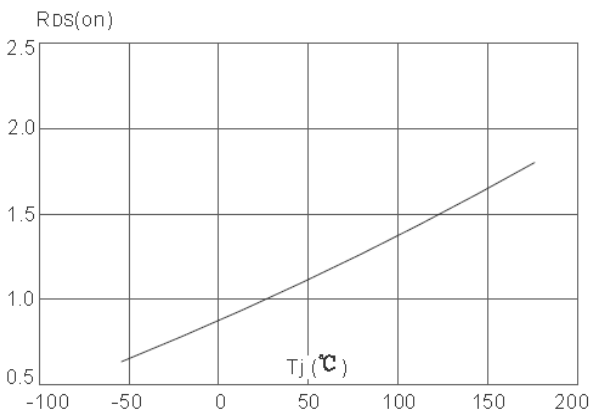
**Fig 2 On-Resistance vs. Drain Current and Gate Voltage**



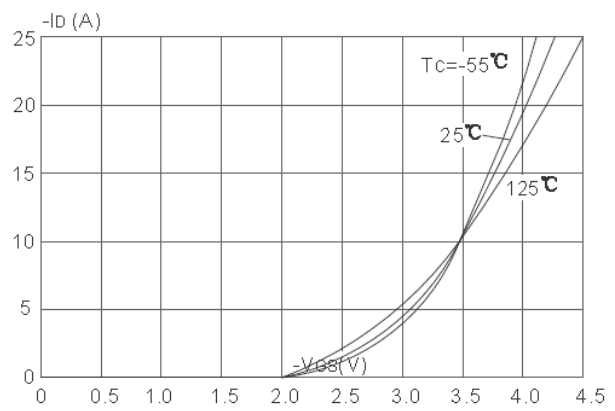
**Fig 3 Normalized Breakdown Voltage vs. Junction Temperature**



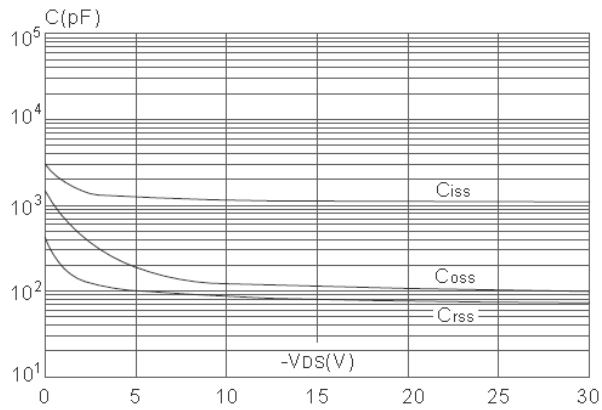
**Fig 4 Body-Diode Characteristics**



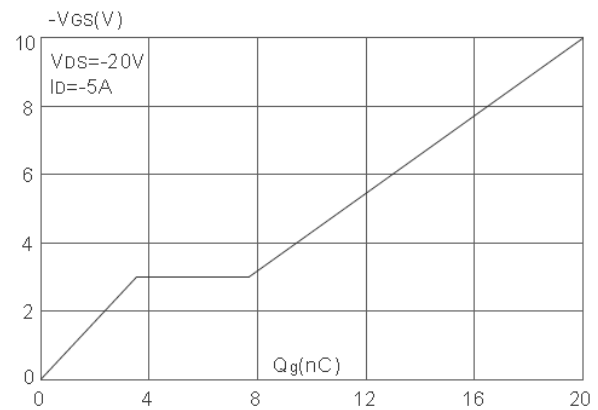
**Fig 5 Normalized On-Resistance vs. Junction Temperature**



**Fig 6 Transfer Characteristics**

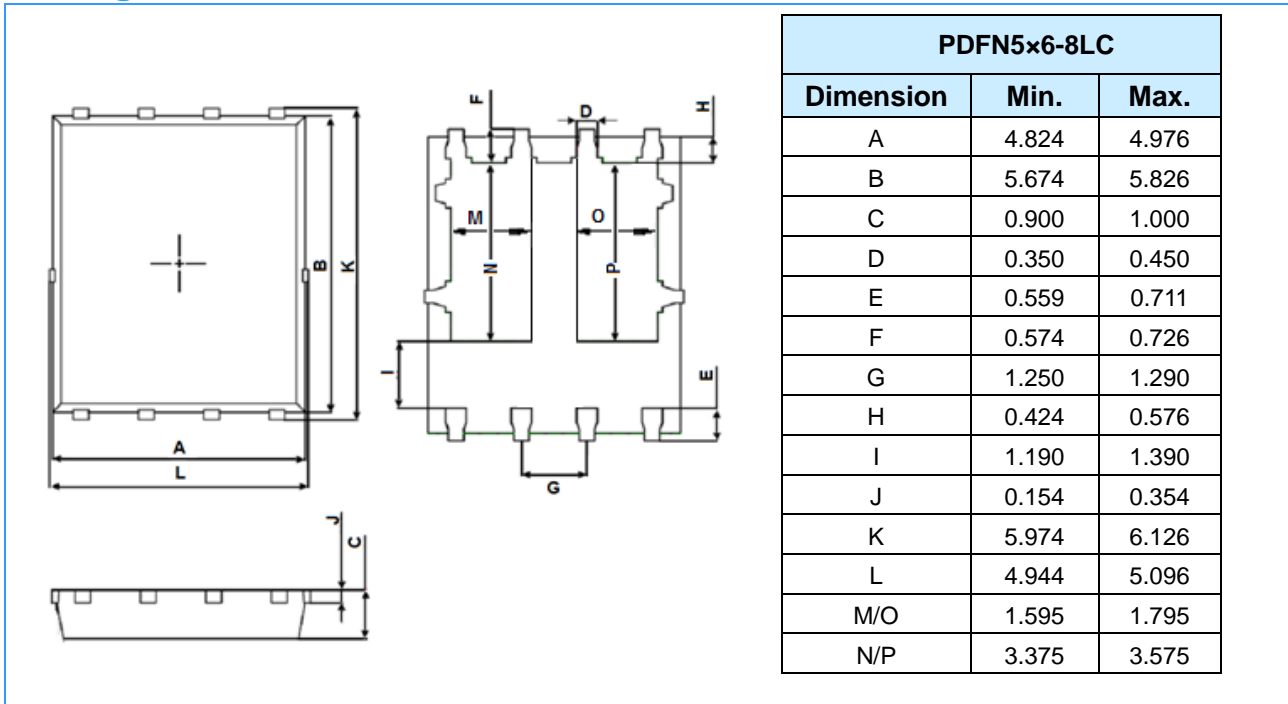


**Fig 7 Capacitance Characteristics**

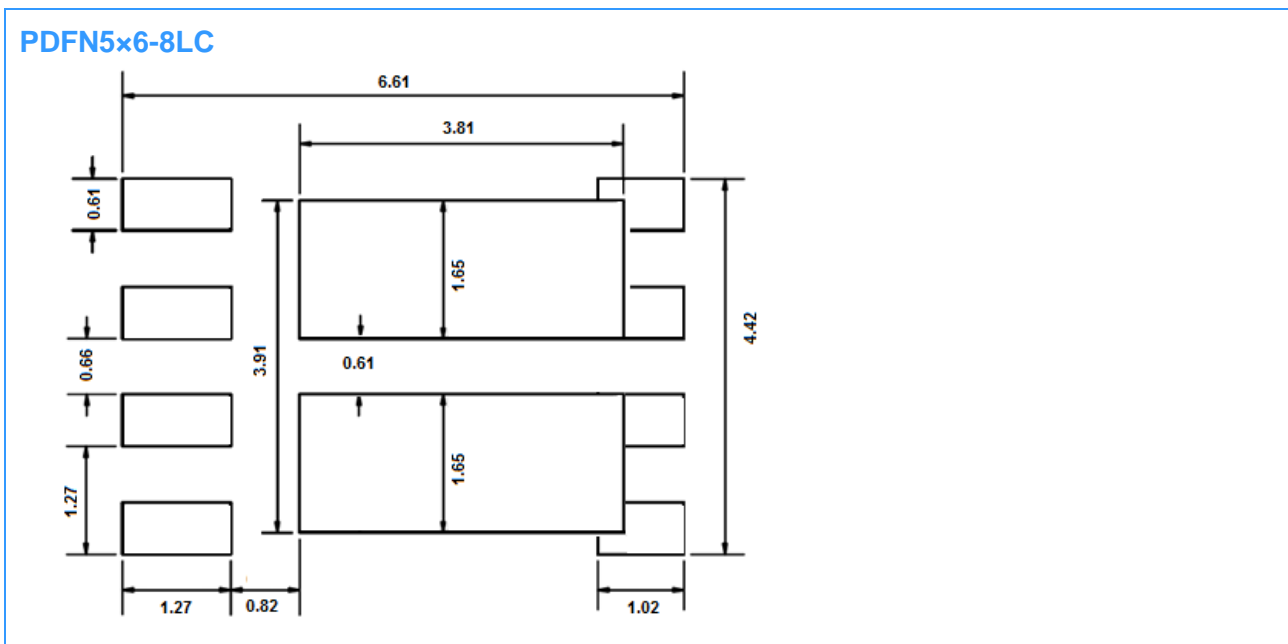


**Fig 8 Gate-Charge Characteristics**

### Package Outline Dimensions (Unit: mm)



### Mounting Pad Layout (Unit: mm)



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