

## Complementary Enhancement Mode MOSFET

### 1. Product Information

#### 1.1 Features

- Surface-mounted package
- Advanced trench cell design

#### 1.2 Applications

- MB and NB
- Motor drivers
- Half – bridge Drivers

#### 1.3 Quick reference

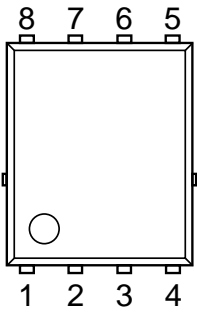
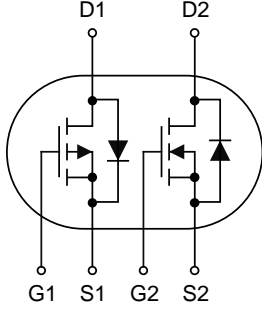
##### N-channel

- $BV \leq 30\text{ V}$
- $P_{tot} \leq 35\text{ W}$
- $I_D \leq 40\text{ A}$
- $R_{DS(ON)} \leq 13\text{ m}\Omega @ V_{GS} = 10\text{ V}$   
 $R_{DS(ON)} \leq 19\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$

##### P-channel

- $BV \leq -30\text{ V}$
- $P_{tot} \leq 35\text{ W}$
- $I_D \leq -31\text{ A}$
- $R_{DS(ON)} \leq 24\text{ m}\Omega @ V_{GS} = -10\text{ V}$   
 $R_{DS(ON)} \leq 45\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$

### 2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Source(S1)		
2	Gate(G1)		
3	Source(S2)		
4	Gate(G2)		
5,6	Drain(D2)		
7,8	Drain(D1)		

Top View  
PDFN5x6-8L

## 3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
<b>N-channel</b>					
$V_{DS}$	Drain-Source Voltage	$T_C=25^{\circ}\text{C}$	30	-	V
$V_{GS}$	Gate-Source Voltage	$T_C=25^{\circ}\text{C}$	-	$\pm 20$	V
$I_{D^{***}}$	Drain Current (DC)	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	40	A
$I_D^*$		$T_C=100^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	26	A
$I_{DM}^{***,***}$	Drain Current (Pulsed)	$T_C=25^{\circ}\text{C}, V_{GS}=10\text{ V}$	-	80	A
<b>P-channel</b>					
$V_{DS}$	Drain-Source Voltage	$T_C=25^{\circ}\text{C}$	-30	-	V
$V_{GS}$	Gate-Source Voltage	$T_C=25^{\circ}\text{C}$	-	$\pm 20$	V
$I_D^*$	Drain Current (DC)	$T_C=25^{\circ}\text{C}, V_{GS}=-10\text{ V}$	-	-31	A
		$T_C=100^{\circ}\text{C}, V_{GS}=-10\text{ V}$	-	-19	A
$I_{DM}^{***,***}$	Drain Current (Pulsed)	$T_C=25^{\circ}\text{C}, V_{GS}=-10\text{ V}$	-	-80	A
$P_{tot}$	Total Power Dissipation	$T_C=25^{\circ}\text{C}$	-	35	W
$T_{stg}$	Storage Temperature		-55	150	$^{\circ}\text{C}$
$T_J$	Junction Temperature		-	150	$^{\circ}\text{C}$
$R_{\theta JA}^*$	Thermal Resistance-Junction to Ambient		-	62.5	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}^*$	Thermal Resistance-Junction to Case		-	3.5	$^{\circ}\text{C}/\text{W}$

Notes:

- \* Surface Mounted on 1 in<sup>2</sup> pad area,  $t \leq 10\text{ sec}$
- \*\* Pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$
- \*\*\* Limited by bonding wire

## 4. Marking Information

Product Name	Marking
KJ30D40G	<div style="display: inline-block; background-color: black; color: white; padding: 2px;">30D40G</div> <div style="display: inline-block; padding: 2px;">YWWXXX: Date Code</div>

## 5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
KJ30D40G	PDFN5x6-8L			5000	

Note: KUIJIEXIN defines "Green" as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC/JEDEC J-STD-020C)

## 6. Electrical Characteristics (T<sub>A</sub>=25°C Unless Otherwise Noted)

### N-channel:

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
B <sub>V</sub> DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0 V, I <sub>D</sub> =250 μA	30	-	-	V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250 μA	1	-	2	V
I <sub>DSS</sub>	Zero Gate Voltage Source Current	V <sub>DS</sub> =24 V, V <sub>GS</sub> =0 V	-	-	1	μA
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =± 20 V, V <sub>DS</sub> =0 V	-	-	±100	nA
R <sub>DS(ON)</sub> <sup>a</sup>	Drain-Source On-State Resistance	V <sub>GS</sub> =10 V, I <sub>D</sub> =20 A	-	11	13	mΩ
		V <sub>GS</sub> =4.5 V, I <sub>D</sub> =10 A	-	15	19	
<b>Diode Characteristics</b>						
V <sub>SD</sub> <sup>a</sup>	Diode Forward Voltage	I <sub>SD</sub> =20 A, V <sub>GS</sub> =0 V	-	-	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =20 A, dI <sub>SD</sub> /dt=100 A/μs	-	11	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	4.9	-	nC
<b>Dynamic Characteristics<sup>b</sup></b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0 V, V <sub>DS</sub> =15 V, Frequency=1 MHz	-	1197	-	pF
C <sub>oss</sub>	Output Capacitance		-	108	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	94	-	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =15 V, V <sub>GEN</sub> =10 V, R <sub>G</sub> =3.9 Ω, R <sub>L</sub> =0.75 Ω, I <sub>DS</sub> =20 A	-	6.4	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	53	-	
t <sub>d(off)</sub>	Turn-off Delay Time		-	20	-	
t <sub>f</sub>	Turn-off Fall Time		-	11	-	
<b>Gate Charge Characteristics<sup>b</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =10 V, V <sub>DS</sub> =15 V, I <sub>DS</sub> =20 A	-	23	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	5.3	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	3.8	-	

Notes:

- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%
- Guaranteed by design, not subject to production testing

## 7. Electrical Characteristics (T<sub>A</sub>=25°C Unless Otherwise Noted)

### P-channel:

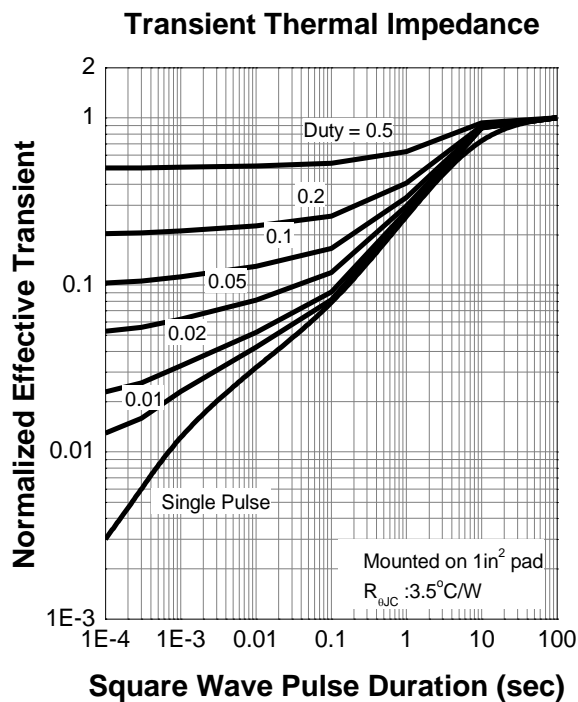
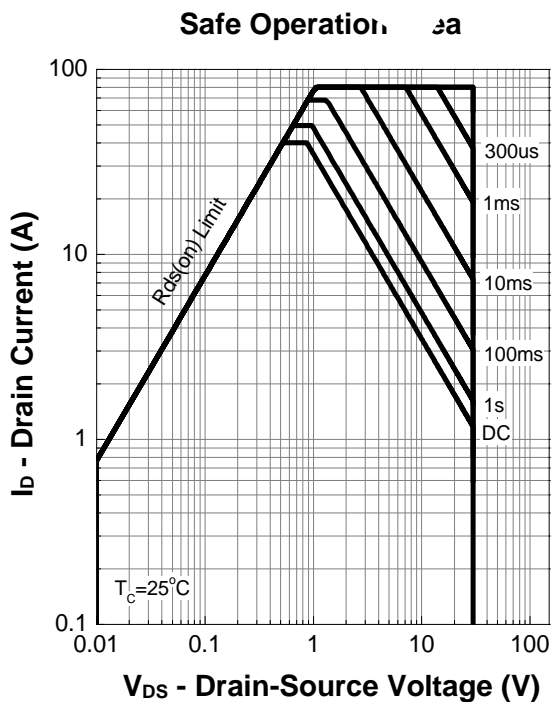
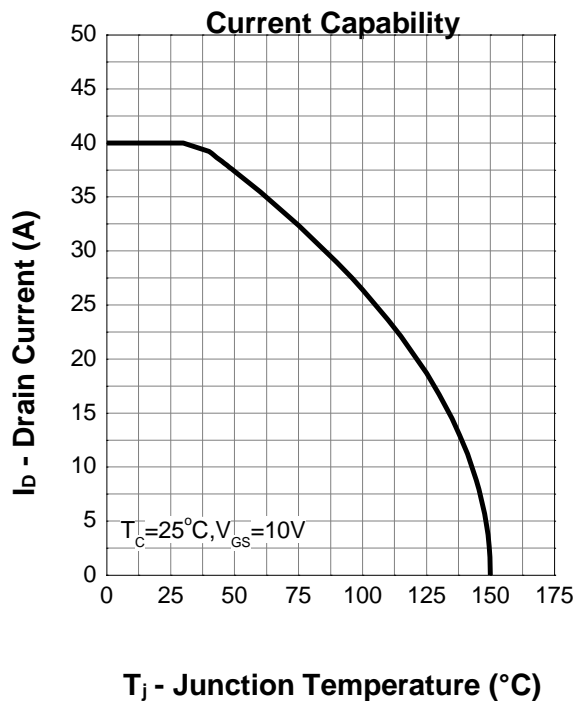
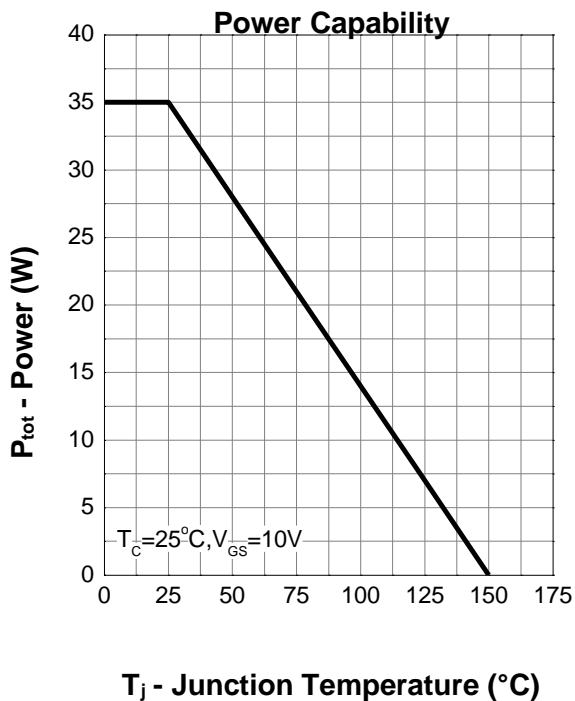
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
B <sub>V</sub> DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0 V, I <sub>D</sub> =-250 μA	-30	-	-	V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250 μA	-1	-	-2	V
I <sub>DSS</sub>	Zero Gate Voltage Source Current	V <sub>DS</sub> =-24 V, V <sub>GS</sub> =0 V	-	-	-1	μA
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =± 20 V, V <sub>DS</sub> =0 V	-	-	±100	nA
R <sub>DS(ON)</sub> <sup>a</sup>	Drain-Source On-State Resistance	V <sub>GS</sub> =-10 V, I <sub>D</sub> =-20 A	-	20	24	mΩ
		V <sub>GS</sub> =-4.5 V, I <sub>D</sub> =-10 A	-	35	45	
<b>Diode Characteristics</b>						
V <sub>SD</sub> <sup>a</sup>	Diode Forward Voltage	I <sub>SD</sub> =-20 A, V <sub>GS</sub> =0 V	-	-	-1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =-20 A, dI <sub>SD</sub> /dt=100 A/μs	-	14	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	7.5	-	nC
<b>Dynamic Characteristics<sup>b</sup></b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0 V, V <sub>DS</sub> =-15 V, Frequency=1 MHz	-	1444	-	pF
C <sub>oss</sub>	Output Capacitance		-	135	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	120	-	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =-15 V, V <sub>GEN</sub> =-10 V, R <sub>G</sub> =3.9 Ω, R <sub>L</sub> =1.5 Ω, I <sub>DS</sub> =-20 A	-	5.9	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	60	-	
t <sub>d(off)</sub>	Turn-off Delay Time		-	65	-	
t <sub>f</sub>	Turn-off Fall Time		-	45	-	
<b>Gate Charge Characteristics<sup>b</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =-10 V, V <sub>DS</sub> =-15 V, I <sub>DS</sub> =-20 A	-	24	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	7.5	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	3.8	-	

Notes:

- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%
- Guaranteed by design, not subject to production testing

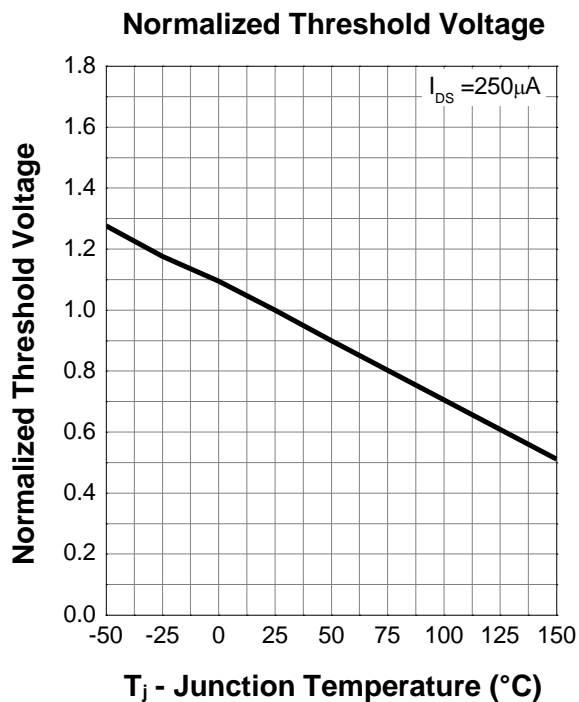
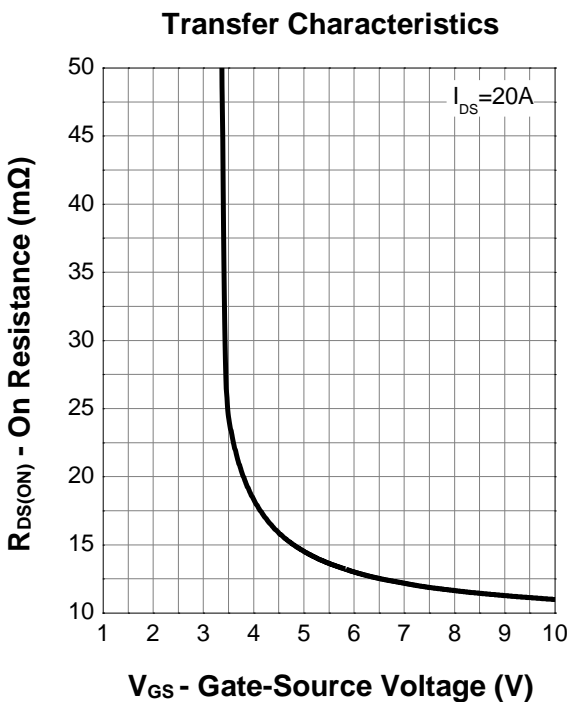
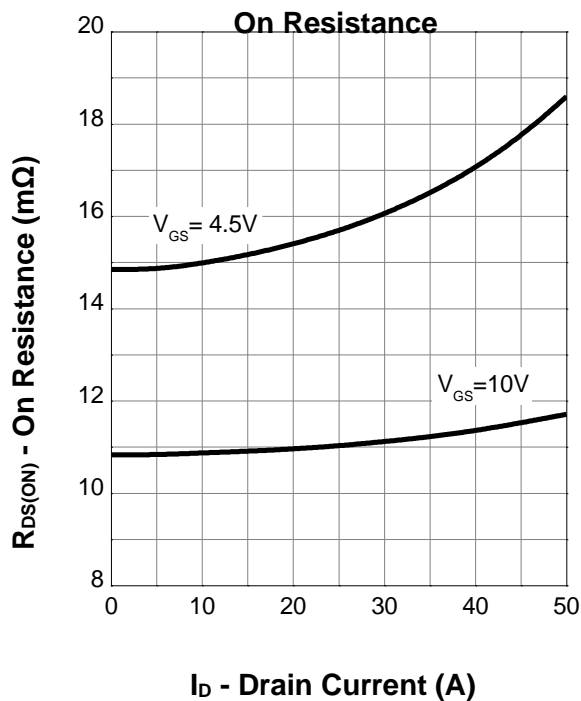
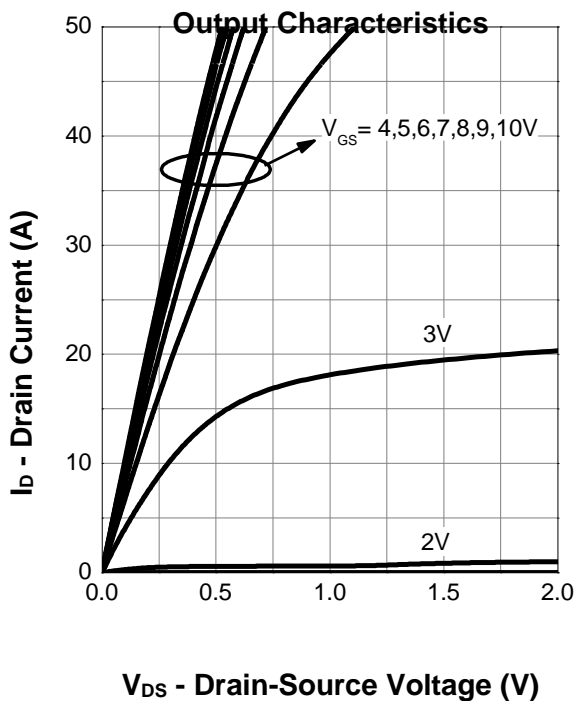
## 8. Typical Characteristics

N-channel:



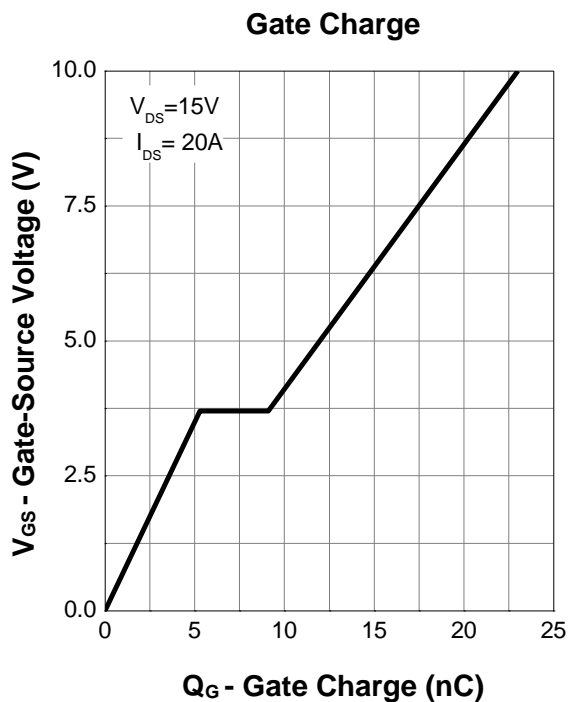
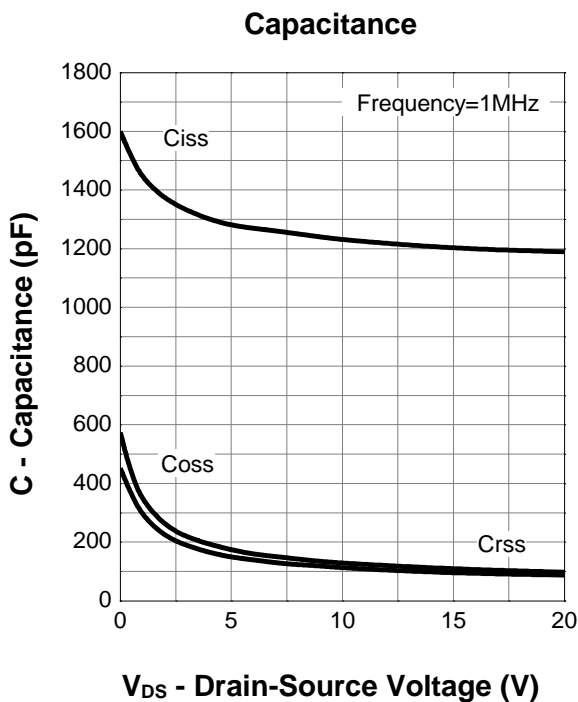
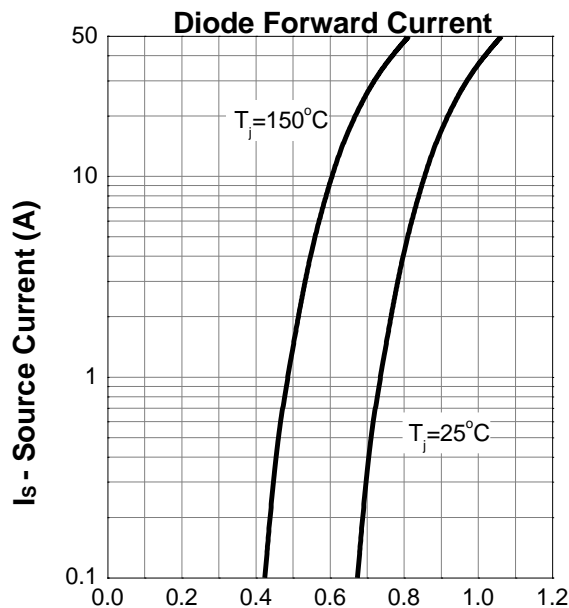
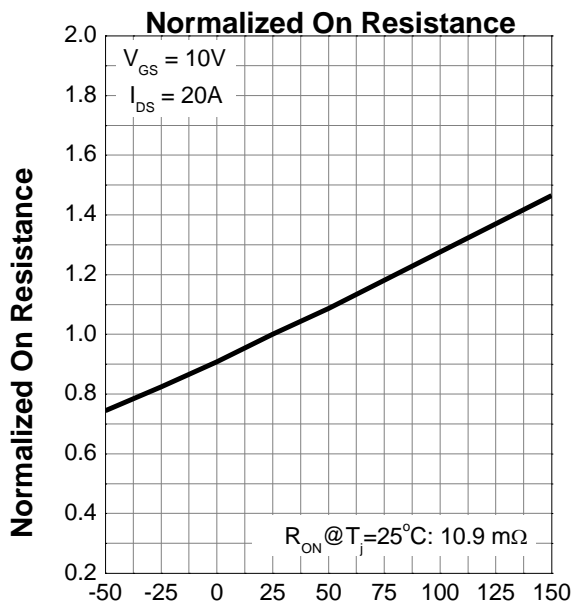
## 8. Typical Characteristics (Cont.)

N-channel:



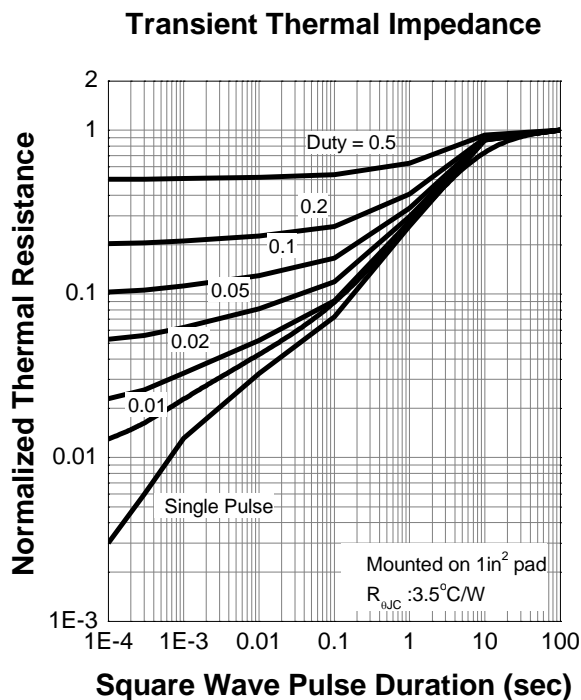
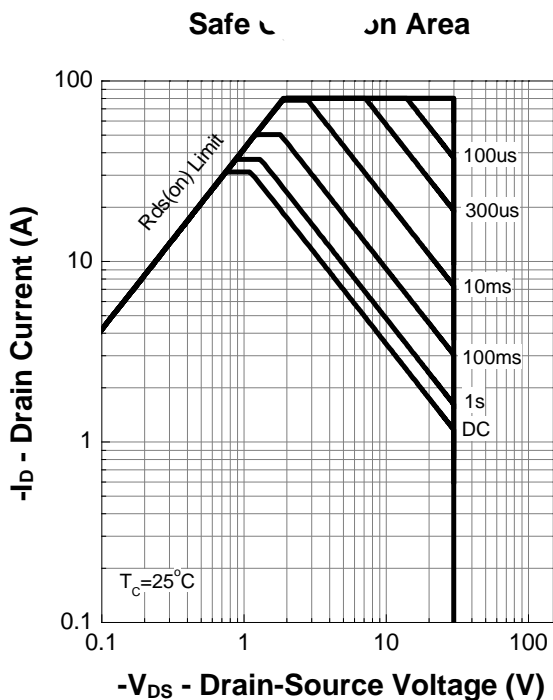
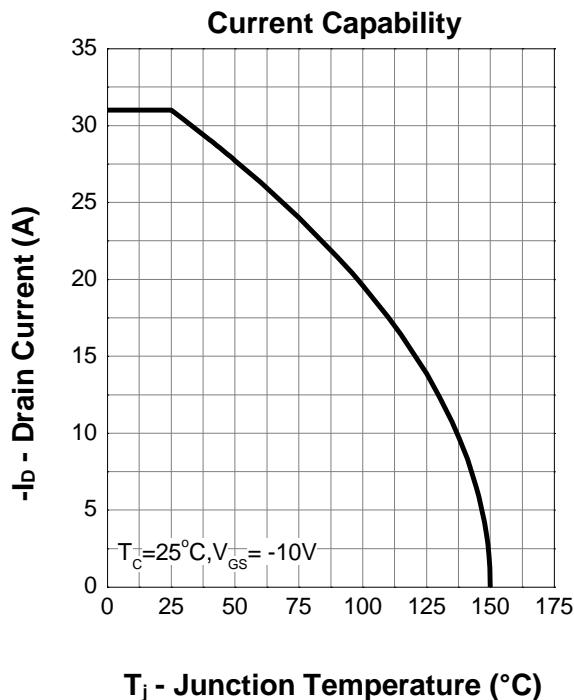
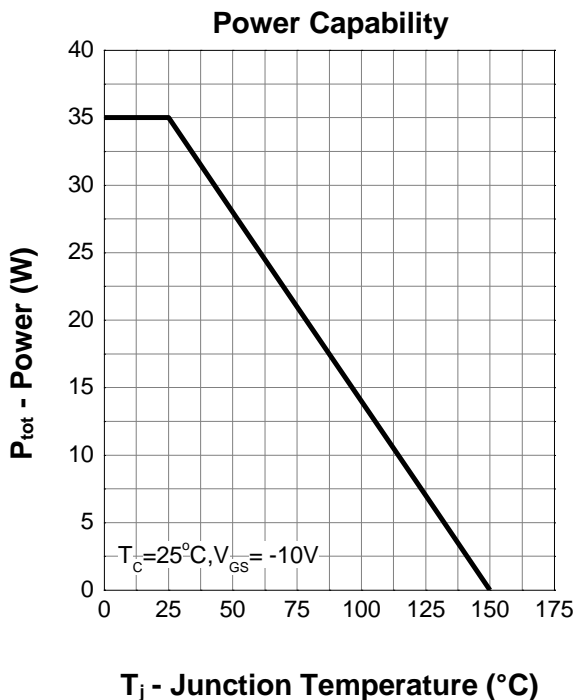
## 8. Typical Characteristics (Cont.)

N-channel:



## 8. Typical Characteristics (Cont.)

P-channel:

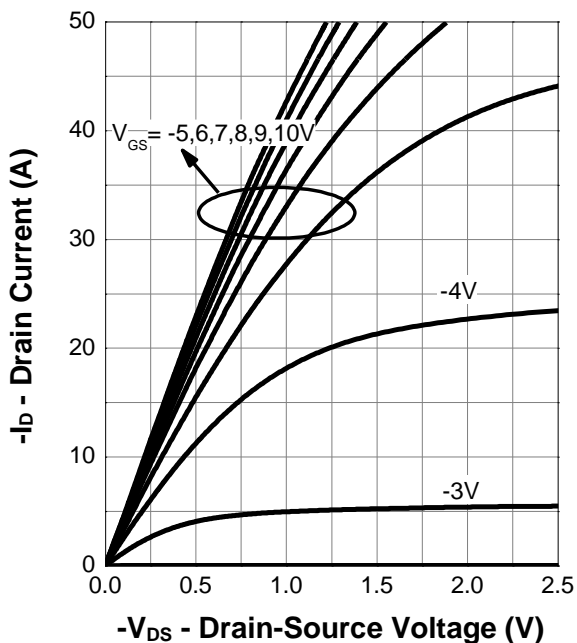




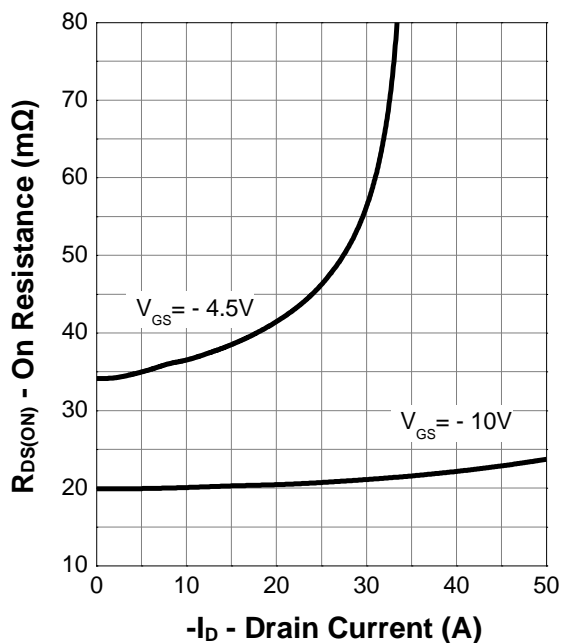
## 8. Typical Characteristics (Cont.)

P-channel:

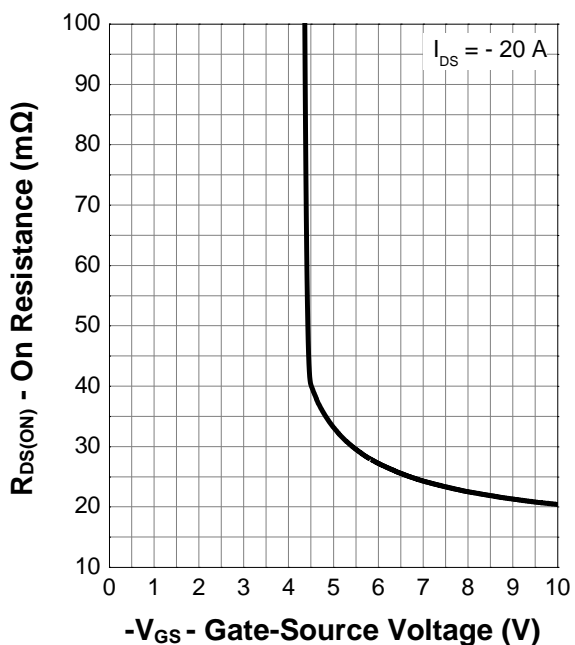
Output Characteristics



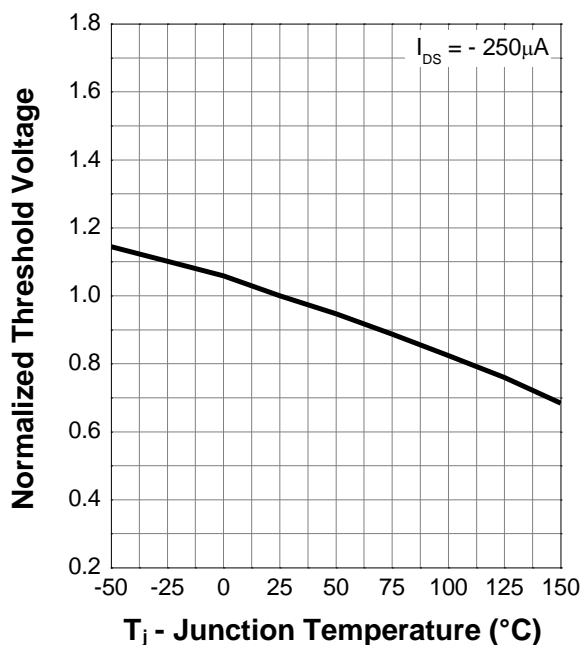
Drain-Source On Resistance



Transfer Characteristics



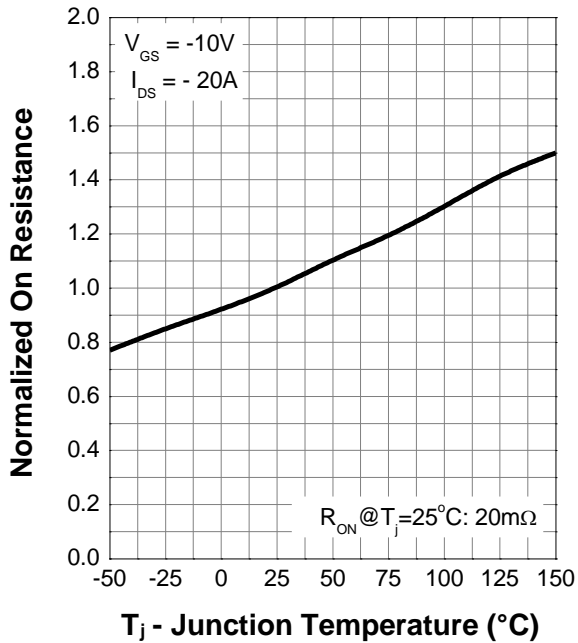
Normalized Threshold Voltage



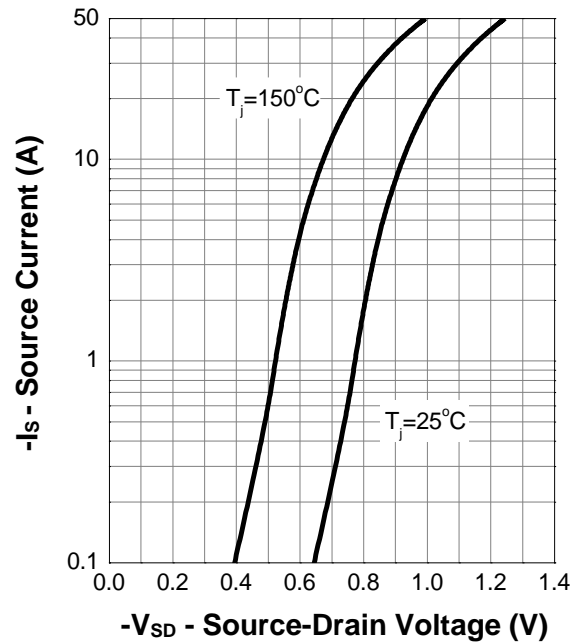
## 8. Typical Characteristics (Cont.)

P-channel:

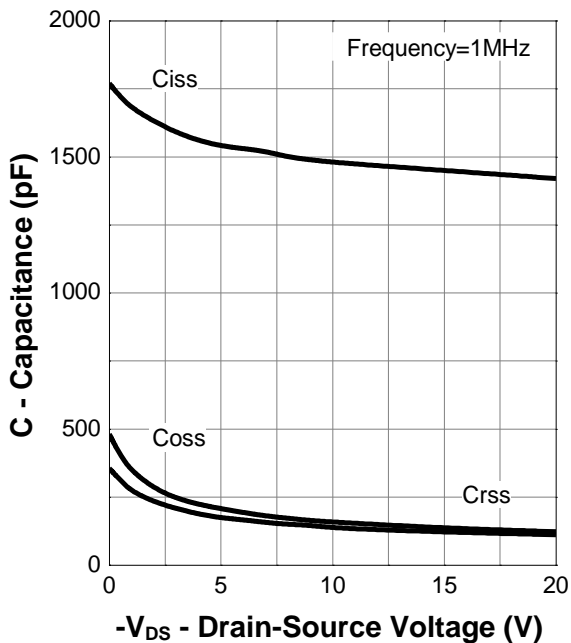
Normalized On Resistance



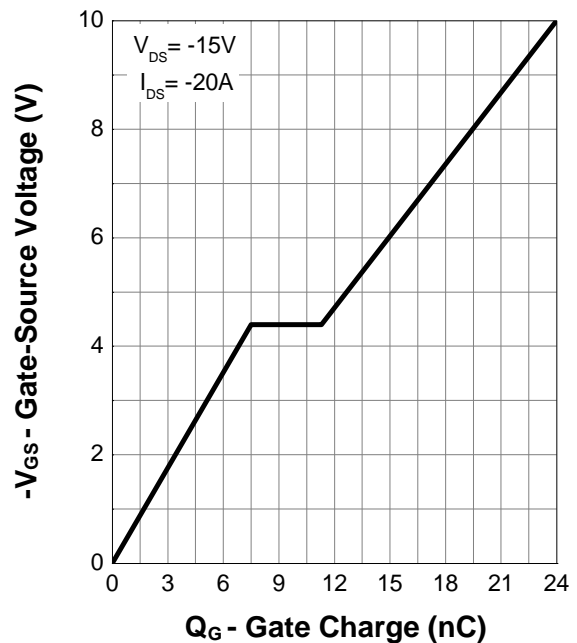
Diode Forward Current



Capacitance

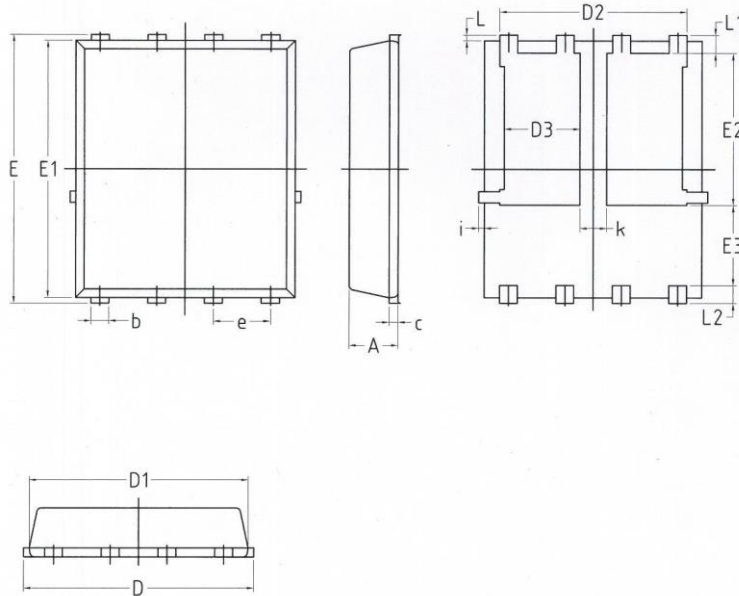


Gate Charge



## 9. Package Dimensions

### PDFN5x6-8L (Dual) Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	1.03	1.17
B	0.34	0.48
c	0.203 BSC	
D	4.80	5.40
D1	4.80	5.00
D2	4.11	4.31
D3	1.60	1.80
E	5.95	6.15
E1	5.65	5.85
E2	3.30	3.50
E3	1.70	-
e	1.27 BSC	
L	0.05	0.25
L1	0.38	0.50
L2	0.38	0.50
i	-	0.18
k	0.50	0.70