

## 350V N+P Dual Channel MOSFETs

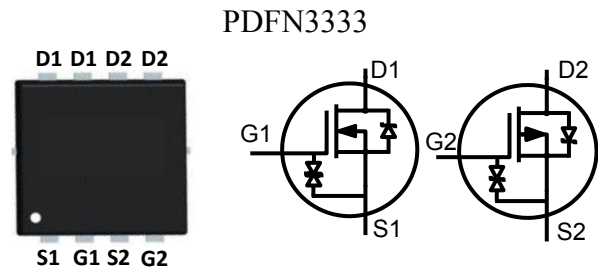
### General Features

- Proprietary Advanced Planar Technology
- Rugged Polysilicon Gate Cell Structure
- Fast Switching Speed
- RoHS Compliant
- Halogen-free available

<b>BV<sub>DSX</sub></b>	<b>R<sub>DS(ON)</sub> (Max.)</b>	<b>I<sub>D</sub></b>
<b>350V</b>	<b>15 Ω</b>	<b>300mA</b>
<b>-350V</b>	<b>30 Ω</b>	<b>-200mA</b>

### Applications

- Power Management
- Load Switch
- Motor Driver



### Ordering Information

Part Number	Package	Marking	Remark
FTF15C35G	PDFN3333	15C35	Halogen Free

### Absolute Maximum Ratings

*T<sub>A</sub>*=25°C unless otherwise specified

Symbol	Parameter	N channel	P channel	Unit
V <sub>DSS</sub>	Drain-to-Source Voltage <sup>[1]</sup>	350	-350	V
V <sub>GS</sub>	Gate-to-Source Voltage	±20	±20	V
I <sub>D</sub>	Continuous Drain Current	0.3	-0.2	A
I <sub>DP</sub>	300us Pulsed Drain Current Tested <sup>[2]</sup>	1.2	-0.8	A
P <sub>D</sub>	Power Dissipation	2.5		W
T <sub>J</sub> and T <sub>STG</sub>	Operating and Storage Temperature Range	-55 to 150		°C

*\*Drain Current limited by Maximum Junction Temperature.*

*Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.*

### Thermal Characteristics

Symbol	Parameter	FTF15C35G	Unit
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient	45	°C/W

## Electrical Characteristics

### N-Channel OFF Characteristics

 $T_A=25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$BV_{DSX}$	Drain-to-Source Breakdown Voltage	350	--	--	V	$V_{GS}=0V, I_D=250\mu A$
$I_{DSS}$	Drain-to-Source Leakage Current	--	--	1	$\mu A$	$V_{DS}=350V, V_{GS}=0V$
		--	--	100	$\mu A$	$V_{DS}=350V, V_{GS}=0V$ $T_J=125^{\circ}\text{C}$
$I_{GSS}$	Gate-to-Source Leakage Current	--	--	20	$\mu A$	$V_{GS}=+20V, V_{DS}=0V$
		--	--	-20	$\mu A$	$V_{GS}=-20V, V_{DS}=0V$

### ON Characteristics

 $T_A=25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	8	15	$\Omega$	$V_{GS}=10V, I_D=300mA^{[3]}$
$V_{GS(TH)}$	Gate Threshold Voltage	1	--	3	V	$V_{GD}=0V, I_D=250\mu A$

### Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$C_{ISS}$	Input Capacitance	--	32.58	--	pF	$V_{GS}=0V$ $V_{DS}=25V$ $f=1.0\text{MHZ}$
$C_{OSS}$	Opout Capacitance	--	5.36	--		
$C_{RSS}$	Reverse Transfer Capacitance	--	0.75	--		
$t_{d(ON)}$	Turn-on Delay Time	--	14	--	ns	$V_{DD}=25V,$ $I_D=-80mA$ $R_G=25\text{Ohm}$ $V_{GS}=10V\sim 0V$
$t_{rise}$	Rise Time	--	10	--		
$t_{d(OFF)}$	Turn-off Delay Time	--	24	--		
$t_{fall}$	Fall Time	--	36	--		

### Source-Drain Diode Characteristics

 $T_A=25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Min	Typ.	Max.	Units	Test Conditions
$V_{SD}$	Diode Forward Voltage	--	--	1.2	V	$I_{SD}=300mA, V_{GS}=0V$

**P-Channel  
OFF Characteristics**
 $T_A=25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$BV_{DSX}$	Drain-to-Source Breakdown Voltage	-350	--	--	V	$V_{GS}=0V, I_D=250\mu A$
$I_{DSS}$	Drain-to-Source Leakage Current	--	--	-1	$\mu A$	$V_{DS}=-350V, V_{GS}=0V$
		--	--	-100	$\mu A$	$V_{DS}=-350V, V_{GS}=0V$ $T_J=125^{\circ}\text{C}$
$I_{GSS}$	Gate-to-Source Leakage Current	--	--	20	$\mu A$	$V_{GS}=+20V, V_{DS}=0V$
		--	--	-20	$\mu A$	$V_{GS}=-20V, V_{DS}=0V$

**ON Characteristics**
 $T_A=25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	18	30	$\Omega$	$V_{GS}=-10V, I_D=-200mA^{[3]}$
$V_{GS(TH)}$	Gate Threshold Voltage	-1	--	-3	V	$V_{GD}=0V, I_D=-250\mu A$

**Dynamic Characteristics**

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$C_{ISS}$	Input Capacitance	--	43.39	--	pF	$V_{GS}=0V$ $V_{DS}=-25V$ $f=1.0\text{MHZ}$
$C_{OSS}$	Output Capacitance	--	6.94	--		
$C_{RSS}$	Reverse Transfer Capacitance	--	0.84	--		
$t_{d(ON)}$	Turn-on Delay Time	--	12	--	ns	$V_{DD}=-25V$ $I_D=-80mA$ $R_G=25\Omega$ $V_{GS}=-10V\sim 0V$
$t_{rise}$	Rise Time	--	60	--		
$t_{d(OFF)}$	Turn-off Delay Time	--	136	--		
$t_{fall}$	Fall Time	--	320	--		

**Source-Drain Diode Characteristics**
 $T_A=25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{SD}$	Diode Forward Voltage	--	--	-1.2	V	$I_{SD}=-200mA, V_{GS}=0V$

**NOTE:**

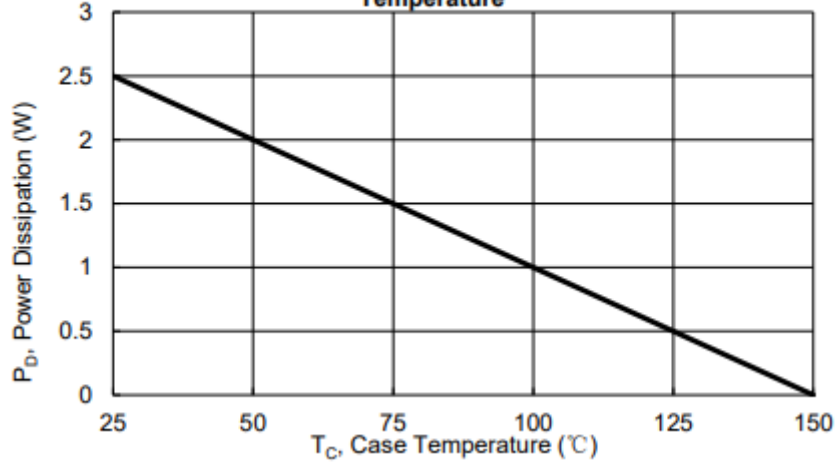
[1]  $T_J=+25^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$ 

[2] Repetitive rating, pulse width limited by maximum junction temperature.

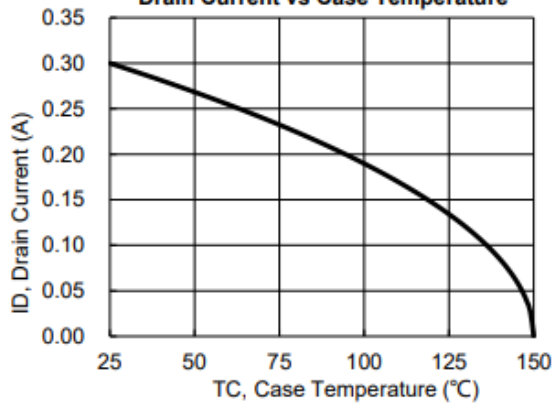
[3] Pulse width  $\leq 380\mu s$ ; duty cycle  $\leq 2\%$ .

## Typical Characteristics

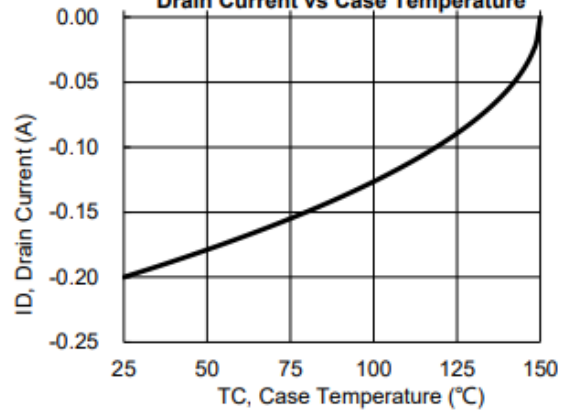
**Figure 1. Maximum Power Dissipation vs. Case Temperature**



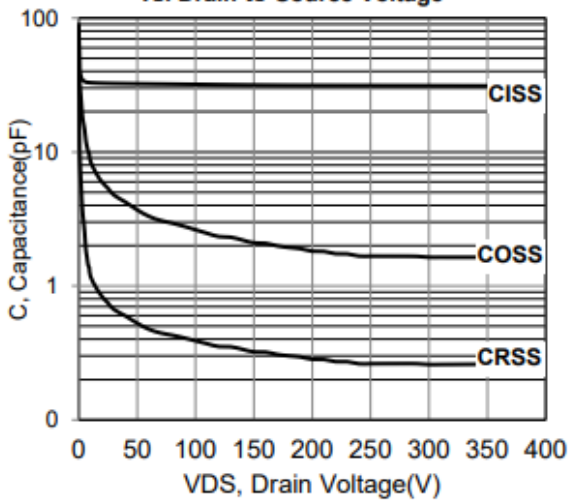
**Figure 2. N channel Maximum Continuous Drain Current vs Case Temperature**



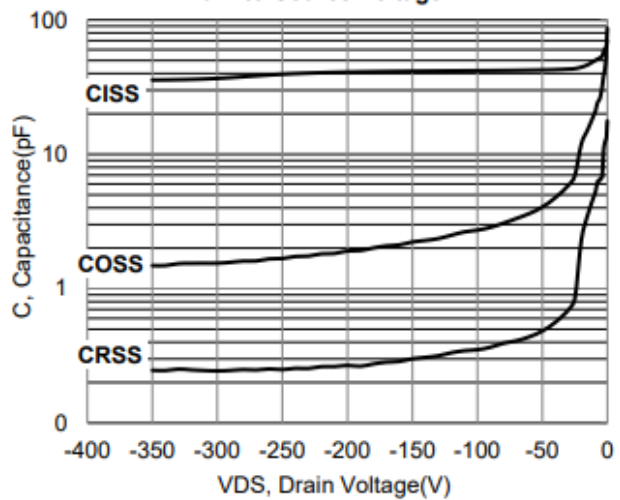
**Figure 3. P channel Maximum Continuous Drain Current vs Case Temperature**



**Figure 4. N channel Typical Capacitance vs. Drain-to-Source Voltage**

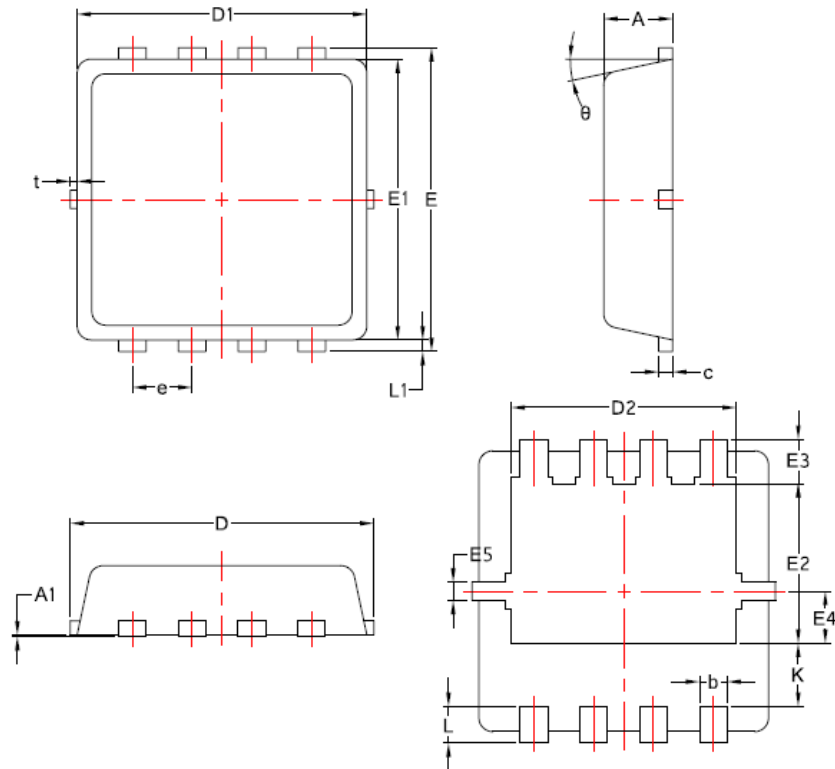


**Figure 5. P channel Typical Capacitance vs. Drain-to-Source Voltage**



**Package Dimensions**
**PDFN3333**

SYMBOL	COMMON		
	MM		
	MIN	NOM	MAX
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
$\triangle 2$ D1	3.00	3.15	3.25
$\triangle 2$ D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
$\triangle 3$ E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
$\triangle 2$ K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
$\triangle 2$ t	0	0.075	0.13
$\triangle 2$ $\theta$	10°	12°	14°





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