Pyramis Corporation

"The Silicon System Solutions Company"

PFB2N60/PFF2N60

PRELIMINARY

N-Channel MOSFET

Applications:

- •Adaptor
- •Charger
- •SMPS Standby Power
- •LCD Panel Power

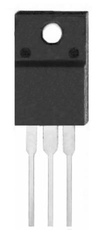
Features:

- Low ON Resistance
- Low Gate Charge
- Peak Current vs Pulse Width Curve
- Inductive Switching Curves

V_{DSS}	$R_{DS(ON)}$ typical	I_D
600V	3.7 Ω	2.1 A

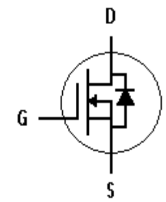
G D S

TO-220
Not to Scale



G D S

TO-220F
Not to Scale



Ordering Information

PART NUMBER	PACKAGE	BRAND
PFB2N60	TO-220	PFB2N60
PFF2N60	TO-220F	PFF2N60

Absolute Maximum Ratings T_C=25 °C unless otherwise specified

Symbol	Parameter	PFB2N60	PFF2N60	Units
V_{DSS}	Drain-to-Source Voltage (NOTE *1)	600		V
I_D	Continuous Drain Current	2.1	2.1*	A
I_D@ 100 °C	Continuous Drain Current	Fig.ure 3		
I_{DM}	Pulsed Drain Current, V_{GS}@10V (NOTE *2)	Figure 6		
P_D	Power Dissipation	54	23	W
	Derating Factor above 25 °C	0.43	0.18	W/°C
V_{GS}	Gate-to-Source Voltage	±30		V
E_{AS}	Single Pulse Avalanche Engergy L=38mH, I_D=2.1 Amps	84		mJ
I_{AS}	Pulsed Avalanche Rating	Figure 8		
dv/dt	Peak Diode Recovery dv/dt (NOTE *3)	3.0		V/ns
T_L	Maximum Soldering Lead Temperature	300		°C
T_{PKG}	Max Package Body for 10 seconds	260		
T_J and T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150		

* *Drain current limited by Maximum Junction Temperature.*

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

Thermal Resistance

Symbol	Parameter	PFB2N60	PFF2N60	Units	Test Conditions
$R_{θJC}$	Junction-to-Case.	2.3	5.5	°C/W	Water cooled heatsink, P_D adjusted for a peak junction temperature of +150 °C
$R_{θJA}$	Junction-to-Ambient	62.5	62.5		1 cubic foot chamber, free air.

OFF Characteristics T_c=25 ^oC unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	600	--	--	V	V_{GS}=0V, I_D=250µA
$\Delta BV_{DSS}/\Delta T_J$	BreakdownVoltage Temperature Coefficient, Figure 11.	--	0.7	--	V/ ^oC	Reference to 25 ^oC, I_D=250µA
I_{DSS}	Drain-to-Source Leakage Current	--	--	25	µ A	V_{DS}=600V, V_{GS}=0V T_J=25 ^oC
		--	--	250		V_{DS}=480V, V_{GS}=0V T_J=125 ^oC
I_{GSS}	Gate-to-Source Forward Leakage	--	--	100	nA	V_{GS}=+30V
	Gate-to-Source Reverse Leakage	--	--	-100		V_{GS}= -30V

ON Characteristics T_c=25 ^oC unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance Figure 9 and 10.	--	3.7	4.6	Ω	V_{GS}=10V, I_D=2.1A (NOTE *4)
$V_{GS(TH)}$	Gate Threshold Voltage, Figure 12.	2.0	--	4.0	V	V_{DS}=V_{GS}, I_D=250µA
gfs	Forward Transconductance	--	2.5	--	S	V_{DS}=15V, I_D=2.1A (NOTE *4)

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C_{iss}	Input Capacitance	--	330	--	pF	V_{GS}=0V, V_{DS}=25V
C_{oss}	Output Capacitance	--	46	--		f=1.0MHz
C_{rss}	Reverse Transfer Capacitance	--	9.0	--		Figure 14
Q_g	Total Gate Charge	--	12.5	--	nC	V_{DD}=300V
Q_{gs}	Gate-to-Source Charge	--	2.2	--		I_D=2.1A
Q_{gd}	Gate-to-Drain ("Miller") Charge	--	6.0	--		Figure 15

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	13	--	ns	V_{DD}=300V
t_{rise}	Rise Time	--	13	--		I_D=2.1A
$t_{d(OFF)}$	Turn-Off Delay Time	--	34	--		V_{GS}=10V
t_{fall}	Fall Time	--	26	--		R_G=18Ω

Source-Drain Diode Characteristics T_c=25 ^oC unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	--	--	2.1	A	Integral pn-diode in MOSFET
I_{SM}	Maximum Pulsed Current (Body Diode)	--	--	8.4	A	
V_{SD}	Diode Forward Voltage	--	--	1.5	V	I_S=2.1 A, V_{GS}=0 V
t_{rr}	Reverse Recovery Time	--	172	258	ns	V_{GS}=0 V
Q_{rr}	Reverse Recovery Charge	--	0.75	1.13	μC	I_F=2.1A, di/dt=100 A/μs

Notes:

*1. T_J = +25 ^oC to +150 ^oC.

*2. Repetitive rating; pulse width limited by maximum junction temperature.

*3. I_{SD}= 2.1 A di/dt ≤ 100 A/μs, V_{DD} ≤ BV_{DSS}, T_J=+150 ^oC.

*4. Pulse width ≤ 380 μs; duty cycle ≤ 2%.

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

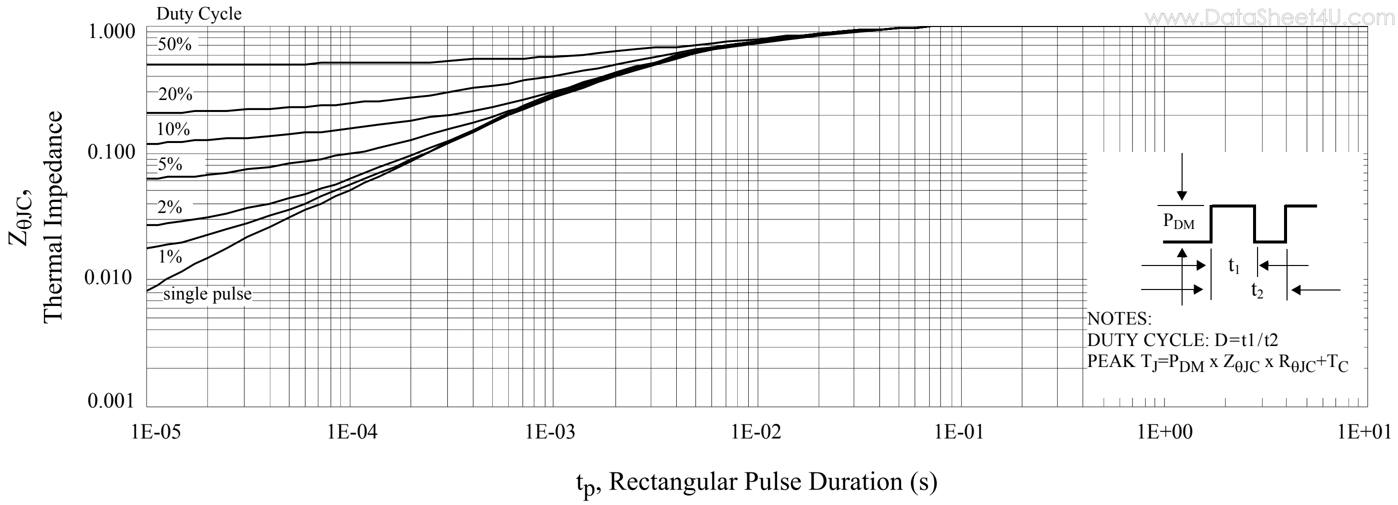


Figure 2. Maximum Power Dissipation vs Case Temperature

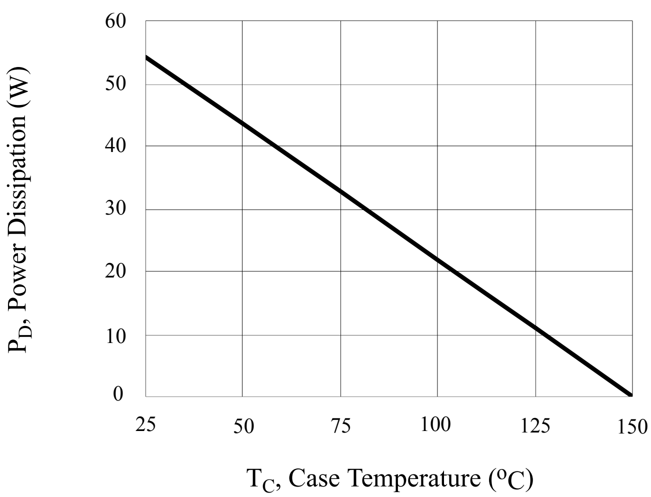


Figure 3. Maximum Continuous Drain Current vs Case Temperature

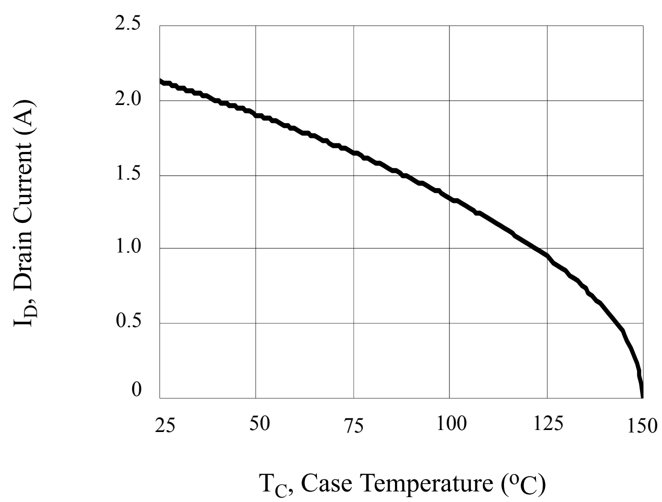


Figure 4. Typical Output Characteristics

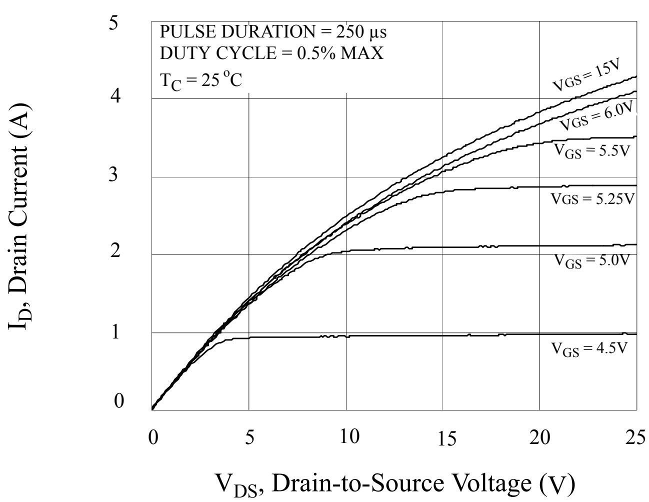


Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

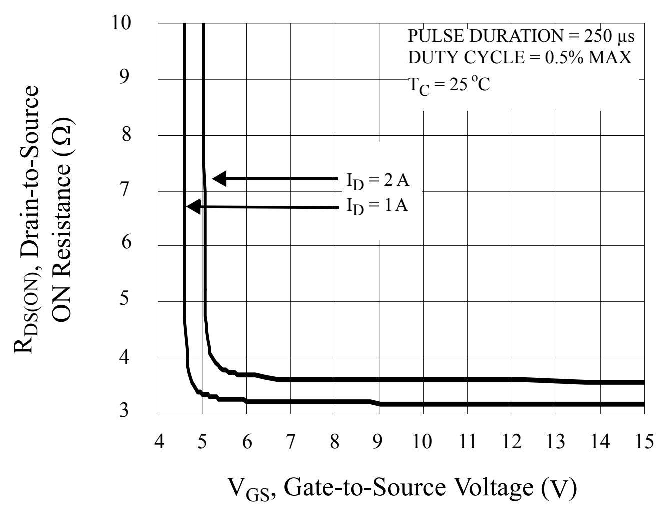


Figure 6. Maximum Peak Current Capability

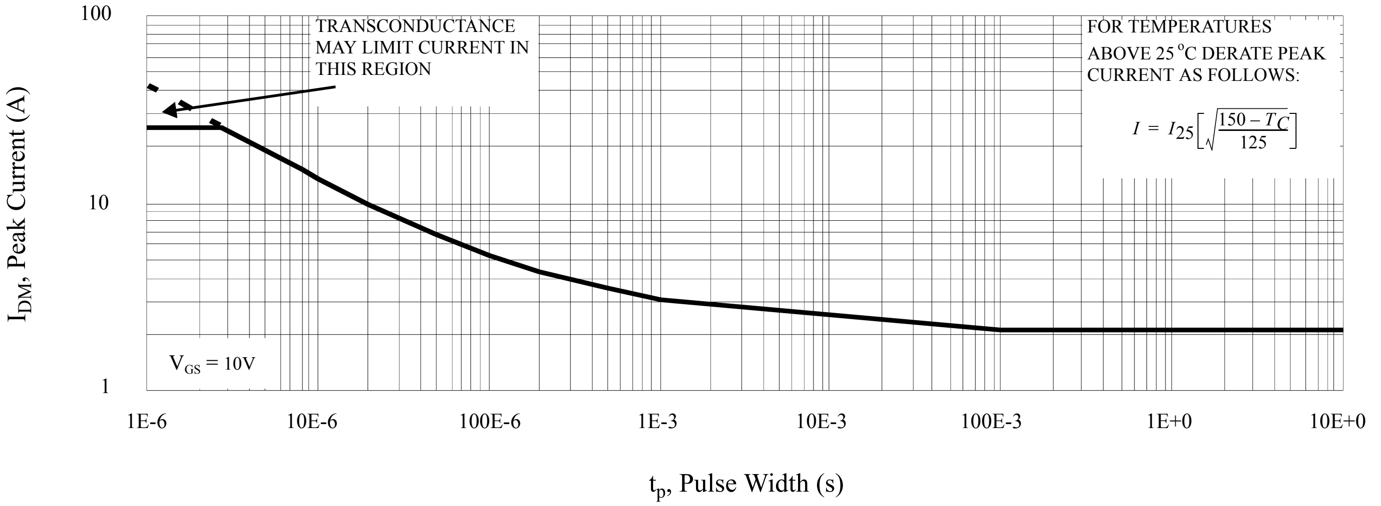


Figure 7. Typical Transfer Characteristics

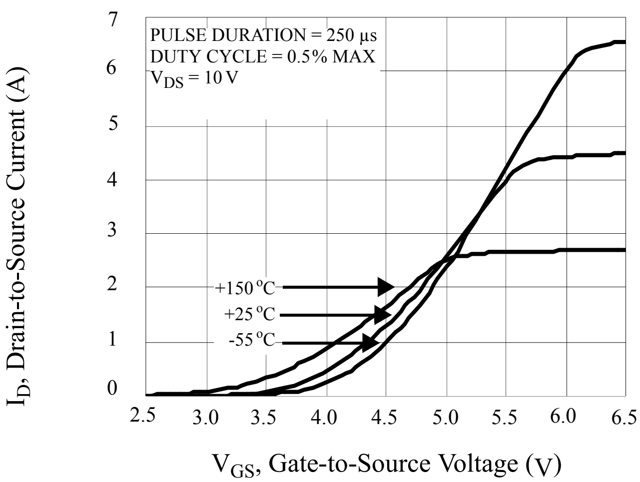


Figure 8. Unclamped Inductive Switching Capability

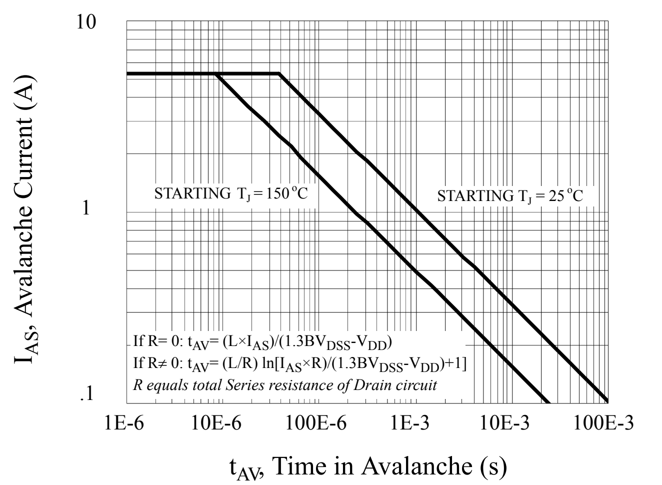


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

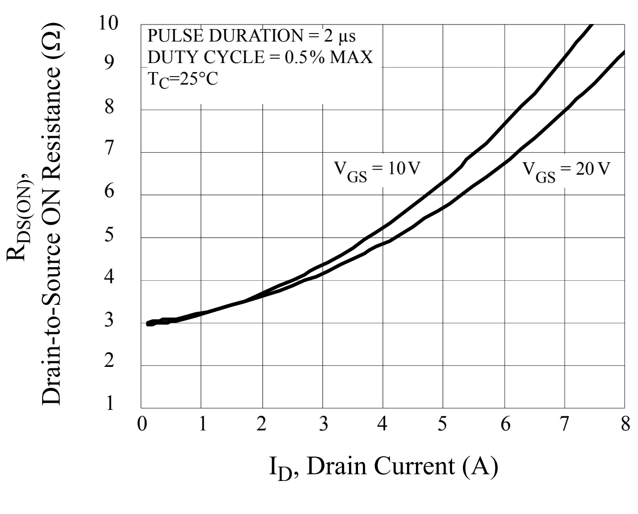


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

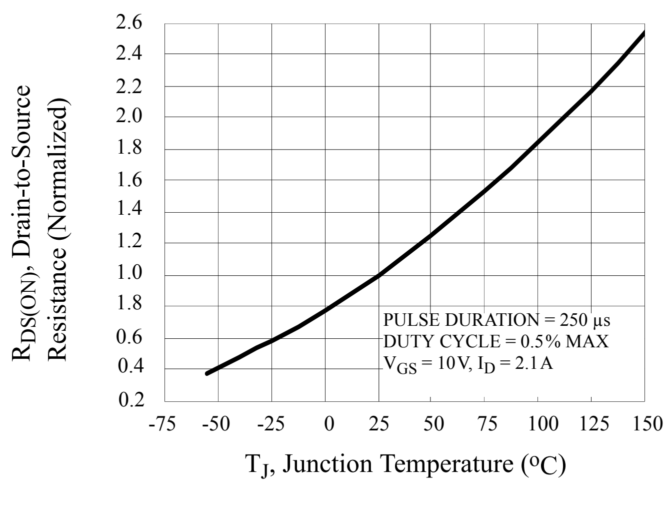


Figure 11. Typical Breakdown Voltage vs Junction Temperature

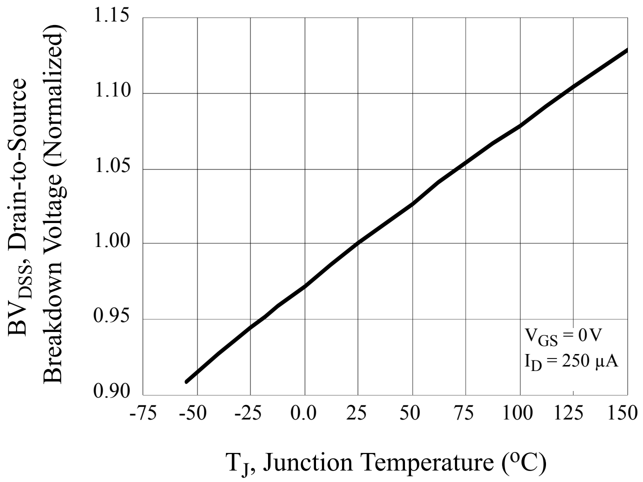


Figure 12. Typical Threshold Voltage vs Junction Temperature

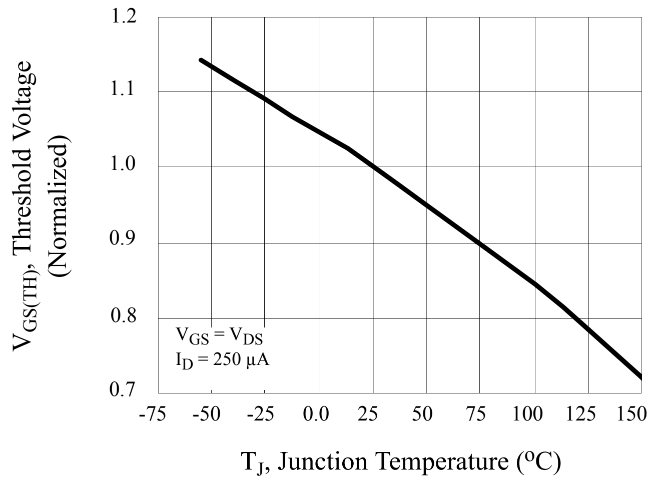


Figure 13. Maximum Forward Bias Safe Operating Area

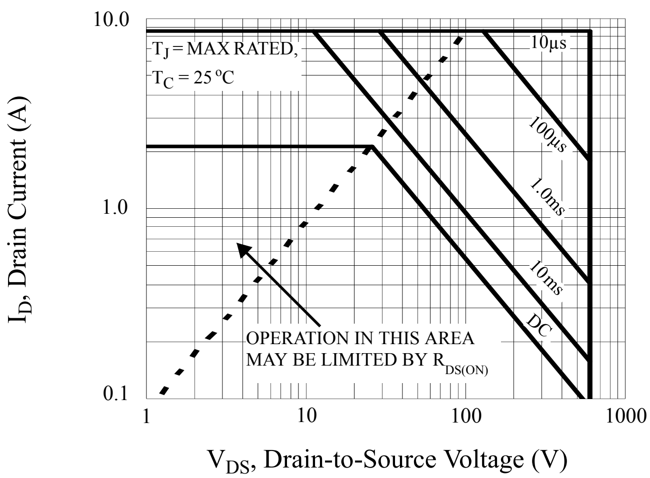


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

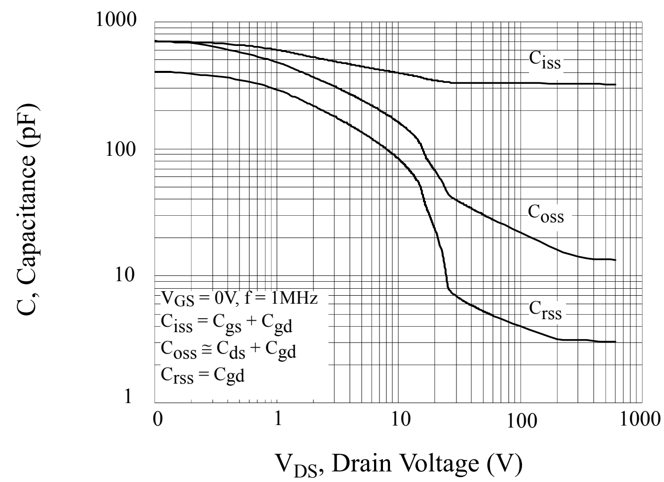


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

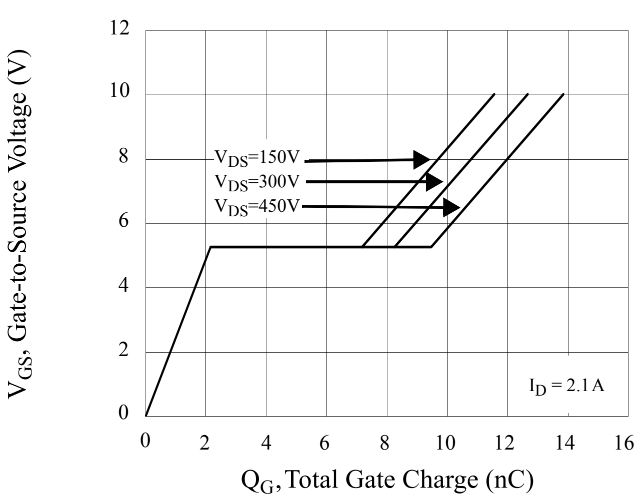
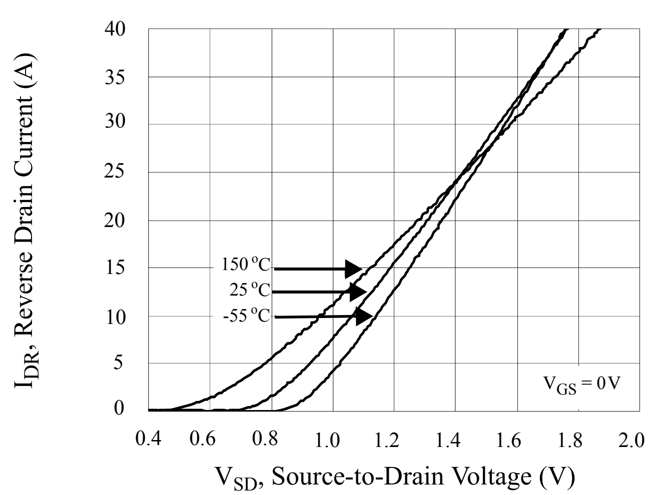


Figure 16. Typical Body Diode Transfer Characteristics



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   b. support or sustain life,
   c. whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.