优尚

YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

企业微信二维码　　　企业QQ二维码

## Features

‹ Low On-Resistance
‹ Low Gate Threshold Voltage $V_{GS(th)} < 1V$
‹ Low Input Capacitance
‹ Fast Switching Speed
‹ Low Input/Output Leakage
‹ Complementary Pair MOSFET
‹ Ultra-Small Surface Mount Package
‹ ESD Protected Gate

Mechanical Data

‹ Case: X1-DFN1612-6
‹ Case Material: Molded Plastic," Green" MoldingCompound.
  UL Flammability Classification Rating 94V-0
‹ Moisture Sensitivity: Level 1 per J-STD-020C
‹ Terminal Connections: See Diagram
‹ Terminals: Finish . NiPdAu over Copper leadframe.
  Solderable per MIL-STD-202, Method 208 (e4)
‹ Weight: 0.003 grams (approximate)

X1-DFN1612-6

ESD protected

D₁ 6   G₂ 5   S₂ 4
Q₁   Q₂
1 S₁   2 G₁   3 D₂

TOP VIEW
Internal Schematic
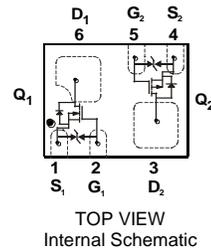
Maximum Ratings N-CHANNEL Ë Q$_1$ (@T$_A$ = +25℃, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain Source Voltage		V$_{DSS}$	20	V
Gate-Source Voltage		V$_{GSS}$	..8	V
Drain Current (Note 5)	T$_A$ = +25℃ T$_A$ = +85℃	I$_D$	750 540	mA

Maximum Ratings P-CHANNEL –Q$_2$ (@T$_A$ = +25℃, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain Source Voltage		V$_{DSS}$	-20	V
Gate-Source Voltage		V$_{GSS}$	..8	V
Drain Current (Note 5)	T$_A$ = +25℃ T$_A$ = +85℃	I$_D$	-600 -430	mA

Thermal Characteristics (@T$_A$ = +25℃, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P$_D$	500	mW
Thermal Resistance, Junction to Ambient	R$_{JA}$	250	₊C/W
Operating and Storage Temperature Range	T$_J$, T$_{STG}$	-65 to +150	₊C

Electrical Characteristics N-CHANNEL Ë Q$_1$ (@T$_A$ = +25℃, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV$_{DSS}$	20	·	·	V	V$_{GS}$ = 0V, I$_D$ = 10µA
Zero Gate Voltage Drain Current	I$_{DSS}$	·	·	1	µA	V$_{DS}$ = 16V, V$_{GS}$ = 0V
Gate-Source Leakage	I$_{GSS}$	·	·	…1	µA	V$_{GS}$ = ±4.5V, V$_{DS}$ = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	V$_{GS(th)}$	0.5	·	1.0	V	V$_{DS}$ = V$_{GS}$, I$_D$ = 250µA
Static Drain-Source On-Resistance	R$_{DS (ON)}$	· · ·	0.4 0.5 0.7	0.55 0.70 0.90		V$_{GS}$ = 4.5V, I$_D$ = 540mA V$_{GS}$ = 2.5V, I$_D$ = 500mA V$_{GS}$ = 1.8V, I$_D$ = 350mA
Forward Transfer Admittance	|Y$_{fs}$|	200	·	·	mS	V$_{DS}$ =10V, I$_D$ = 0.2A
Diode Forward Voltage (Note 6)	V$_{SD}$	0.5	·	1.2	V	V$_{GS}$ = 0V, I$_S$ = 115mA
DYNAMIC CHARACTERISTICS						
Input Capacitance	C$_{iss}$	·	·	150	pF	V$_{DS}$ = 16V, V$_{GS}$ = 0V f = 1.0MHz
Output Capacitance	C$_{oss}$	·	·	25	pF	
Reverse Transfer Capacitance	C$_{rss}$	·	·	20	pF	

Electrical Characteristics P-CHANNEL Ë Q$_2$ (@T$_A$ = +25℃, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV$_{DSS}$	-20	·	·	V	V$_{GS}$ = 0V, I$_D$ = -250µA
Zero Gate Voltage Drain Current	I$_{DSS}$	·	·	-1.0	µA	V$_{DS}$ = -20V, V$_{GS}$ = 0V
Gate-Source Leakage	I$_{GSS}$	·	·	…1.0	µA	V$_{GS}$ = ±4.5V, V$_{DS}$ = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	V$_{GS(th)}$	-0.5	·	-1.0	V	V$_{DS}$ = V$_{GS}$, I$_D$ = -250µA
Static Drain-Source On-Resistance	R$_{DS (ON)}$	·	0.7 1.1 1.7	0.9 1.4 2.0		V$_{GS}$ = -4.5V, I$_D$ = -430mA V$_{GS}$ = -2.5V, I$_D$ = -300mA V$_{GS}$ = -1.8V, I$_D$ = -150mA
Forward Transfer Admittance	|Y$_{fs}$|	200	·	·	mS	V$_{DS}$ =10V, I$_D$ = 0.2A
Diode Forward Voltage (Note 5)	V$_{SD}$	-0.5	·	-1.2	V	V$_{GS}$ = 0V, I$_S$ = -115mA
DYNAMIC CHARACTERISTICS						
Input Capacitance	C$_{iss}$	·	·	175	pF	V$_{DS}$ = -16V, V$_{GS}$ = 0V f = 1.0MHz
Output Capacitance	C$_{oss}$	·	·	30	pF	
Reverse Transfer Capacitance	C$_{rss}$	·	·	20	pF	

Notes: 5. Device mounted on FR-4 PCB.
6. Short duration pulse test used to minimize self-heating effect.

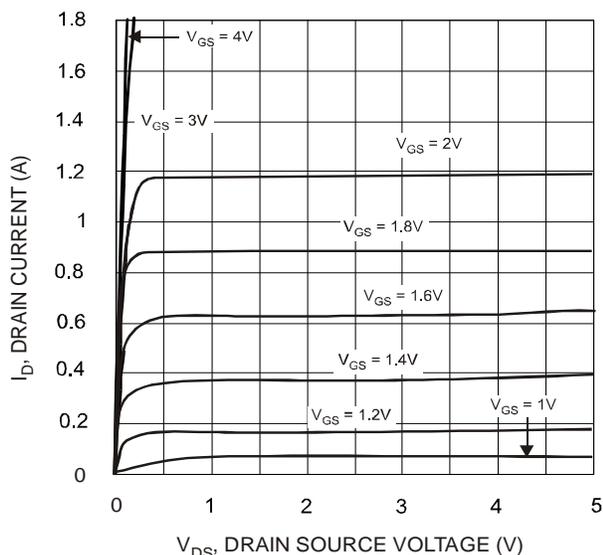**YOUSHANG** SEMICONDUCTOR

Q₁, N-CHANNEL

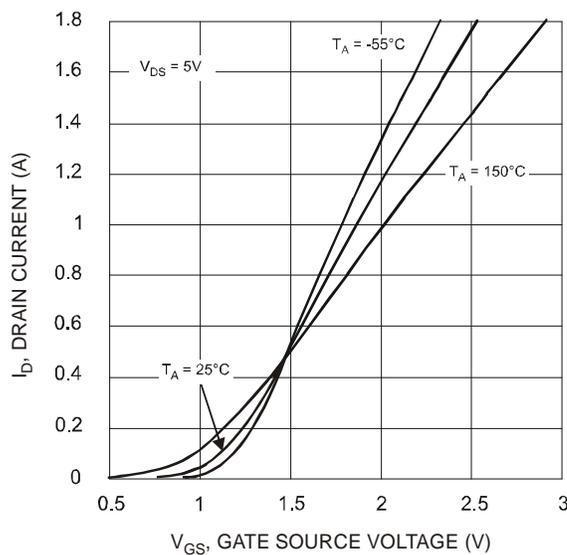Fig. 1 Typical Output Characteristics

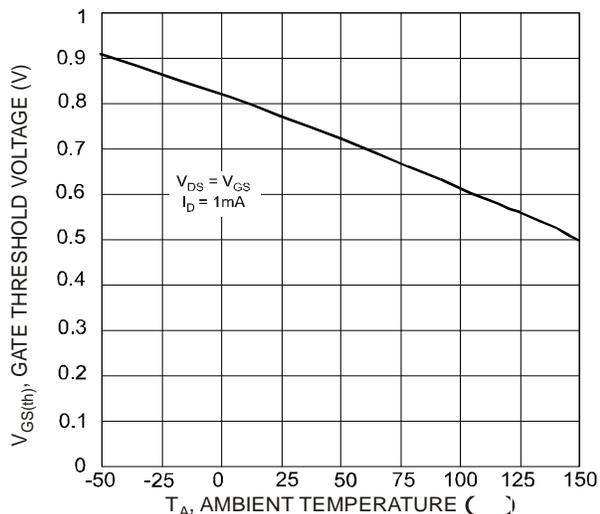Fig. 2 Typical Transfer Characteristics

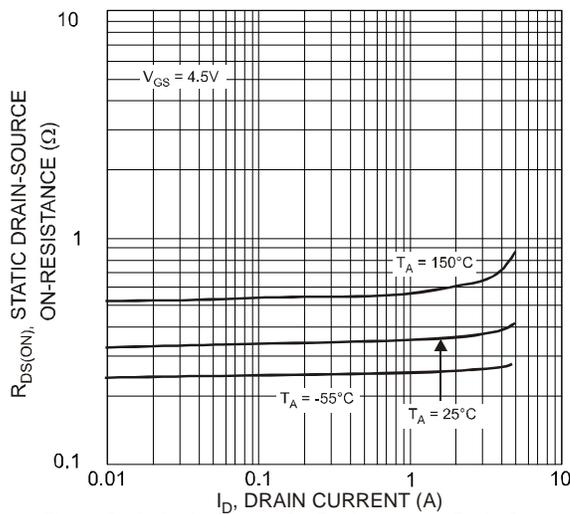Fig. 3 Gate Threshold Voltage vs. Ambient Temperature

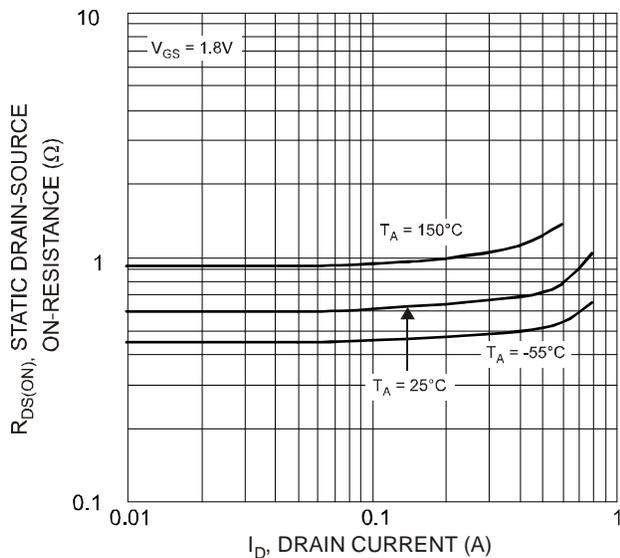Fig. 4 Static Drain-Source On-Resistance vs. Drain Current

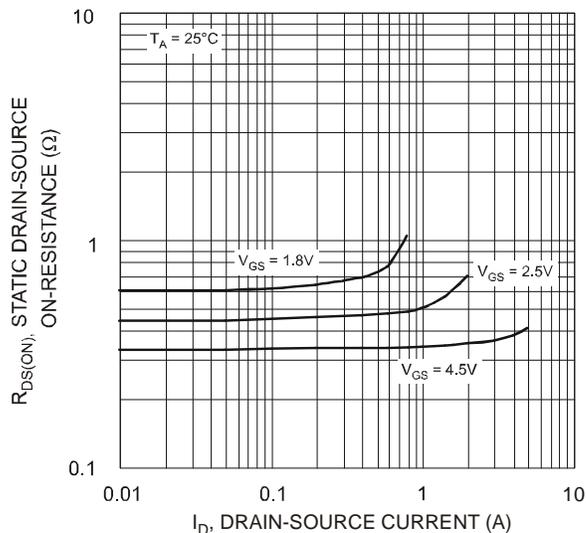Fig. 5 Static Drain-Source On-Resistance vs. Drain Current

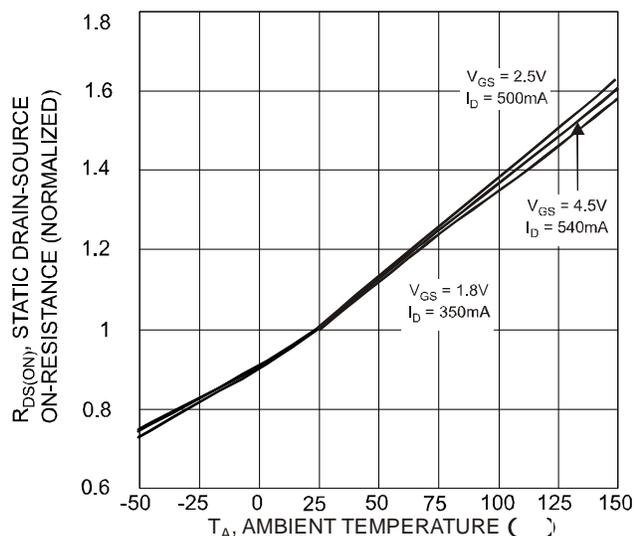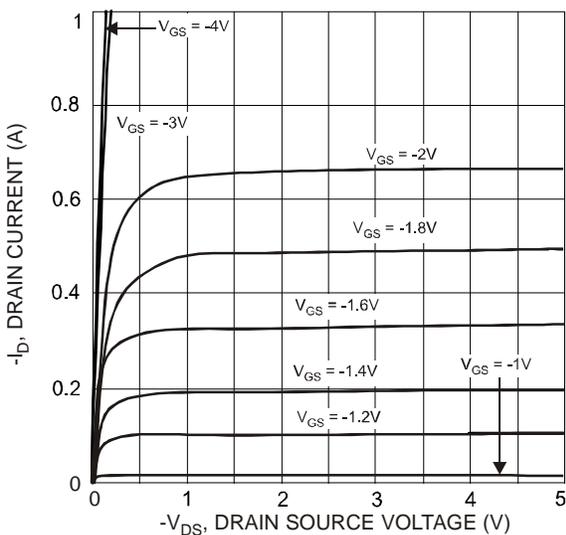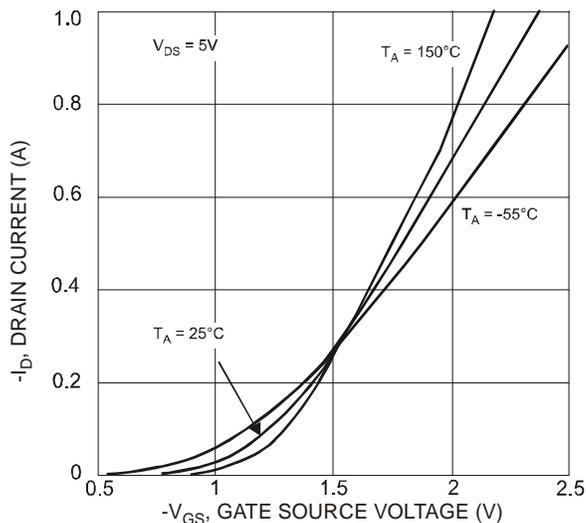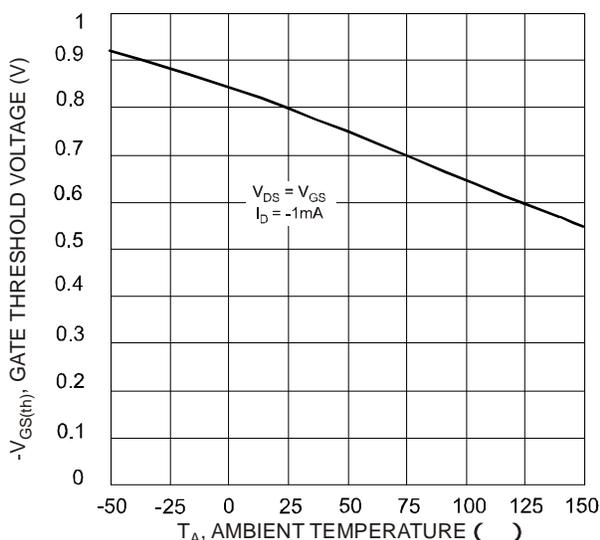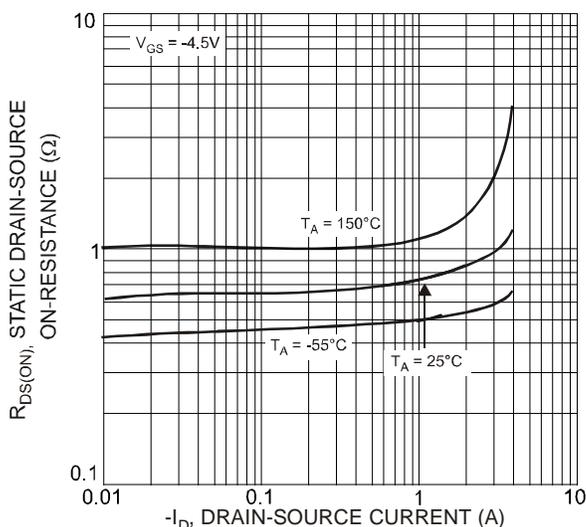Fig. 6 Static Drain-Source On-Resistance vs. Drain-Source Current vs. Gate Source Voltage

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Q$_1$, N-CHANNEL (continued)

Fig. 7 Static Drain-Source On-State Resistance
vs. Ambient Temperature
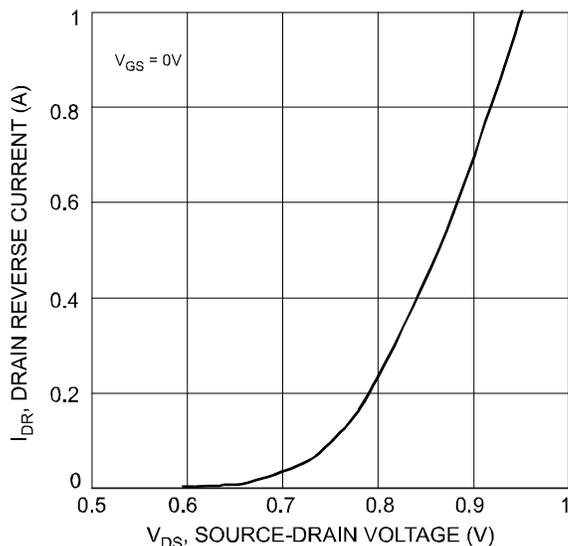
Fig. 8 Drain Reverse Current vs. Source-Drain Voltage
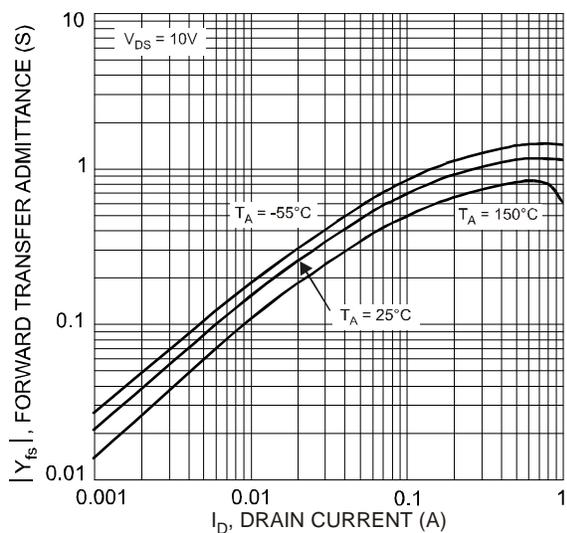
Fig. 9 Forward Transfer Admittance vs. Drain Current
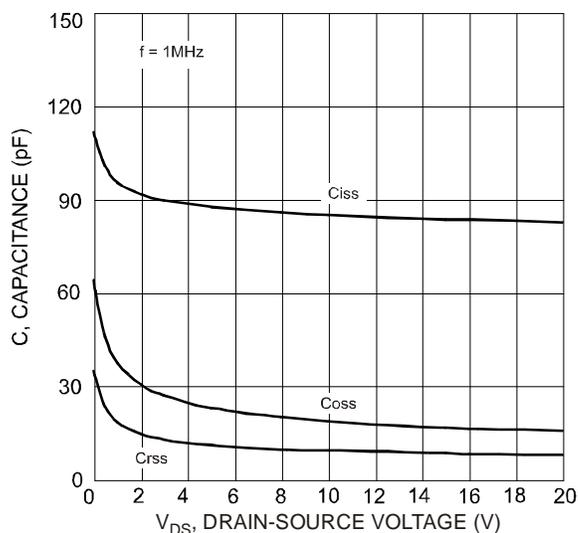
Fig. 10 Typical Capacitance

Q$_2$, P-CHANNEL

Fig. 11 Typical Output Characteristics

Fig. 12 Typical Transfer Characteristics

Fig. 13 Gate Threshold Voltage vs. Ambient Temperature

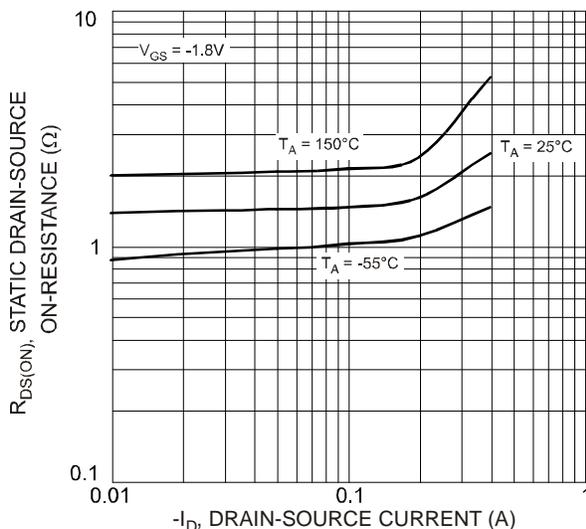Fig. 14 Static Drain-Source On-Resistance vs. Drain Current

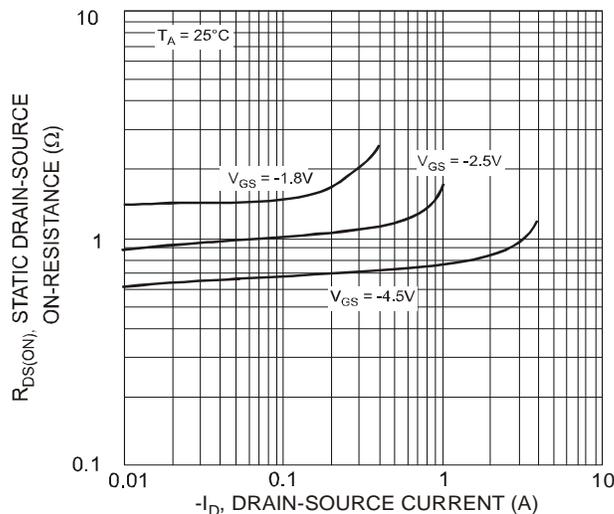Fig. 15 Static Drain-Source On-Resistance vs. Drain Current

Fig. 16 Static Drain-Source On-Resistance vs. Drain-Source Current vs. Gate Source Voltage

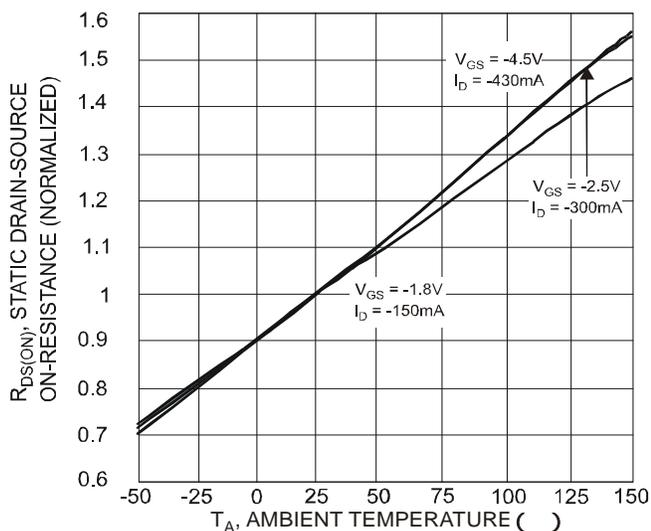## Q_2, P-CHANNEL (continued)

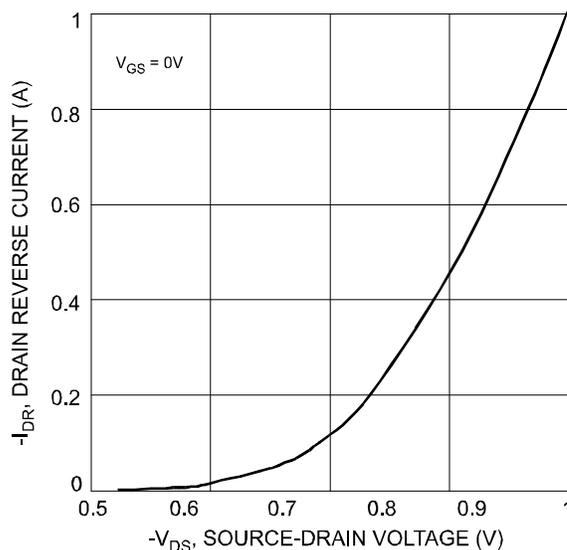Fig. 17 Static Drain-Source On-State Resistance vs. Ambient Temperature

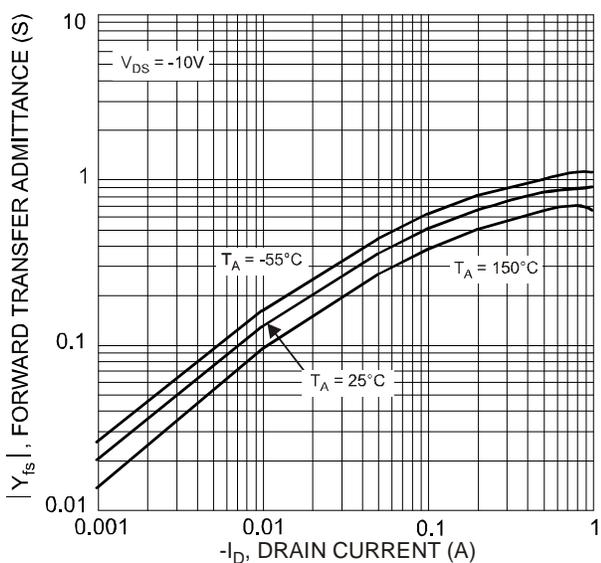Fig. 18 Drain Reverse Current vs. Source-Drain Voltage

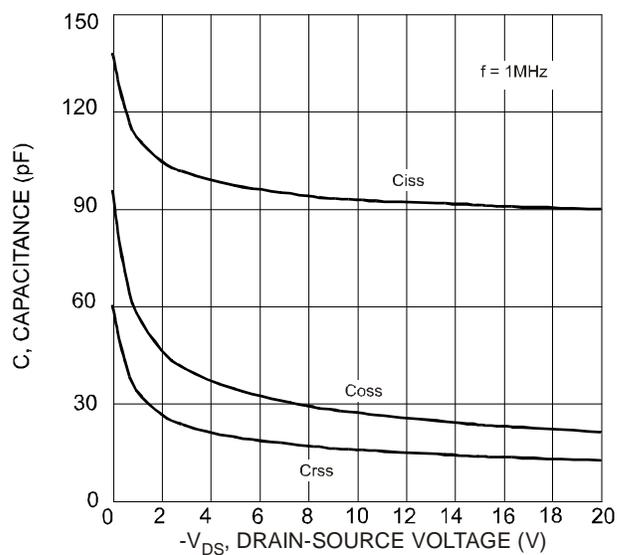Fig. 19 Forward Transfer Admittance vs. Drain Current

Fig. 20 Typical Capacitance

Package Outline Dimensions
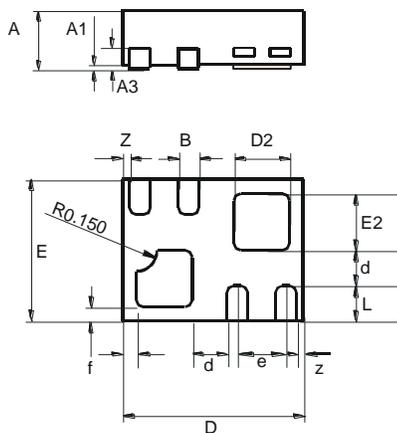
X1-DFN1612-6			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0	0.05	0.02
A3	–	–	0.13
b	0.15	0.25	0.20
D	1.55	1.675	1.60
d	–	–	0.25
D2	0.40	0.60	0.50
E	1.15	1.28	1.20
e	–	–	0.40
E2	0.45	0.65	0.55
f	–	–	0.15
L	0.20	0.30	0.25
Z	–	–	0.10
All Dimensions in mm			

Suggested Pad Layout
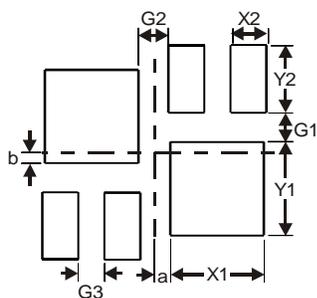
Dimensions	Value (in mm)
G1	0.15
G2	0.175
G3	0.15
X1	0.60
X2	0.25
Y1	0.65
Y2	0.45
a	0.10
b	0.15