

**20V COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET**
**Product Summary**

Device	$V_{(BR)DSS}$	$R_{DS(on)}$ max	$I_D$ max $T_A = 25^\circ\text{C}$ (Notes 4)
Q1	20V	$0.4\Omega$ @ $V_{GS} = 4.5\text{V}$	1.34 A
		$0.5\Omega$ @ $V_{GS} = 2.5\text{V}$	1.65 A
Q2	-20V	$0.7\Omega$ @ $V_{GS} = -4.5\text{V}$	-1.14 A
		$0.9\Omega$ @ $V_{GS} = -2.5\text{V}$	-0.94 A

**Mechanical Data**

- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe.  
Solderable per MIL-STD-202, Method 208
- Weight: 0.015 grams (approximate)

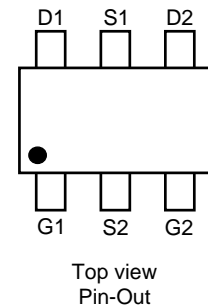
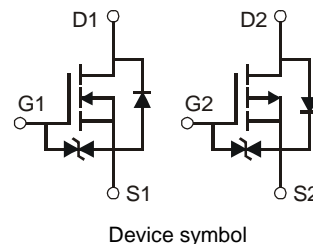
**Features and Benefits**

- Low On-Resistance
- Low Gate Threshold Voltage  $V_{GS(th)} < 1\text{V}$
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Complementary Pair MOSFET
- Ultra-Small Surface Mount Package
- ESD Protected Gate to 2.5kV HBM**
- Lead Free/RoHS Compliant (Note 1)**
- "Green" Device (Note 2)**
- Qualified to AEC-Q101 Standards for High Reliability**

**Description and Applications**

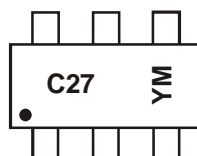
This MOSFET has been designed to minimize the on-state resistance ( $R_{DS(on)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Portable electronics


**Ordering Information (Note 3)**

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMC2700UDM-7	C27	7	8	3,000

- Notes:
- No purposefully added lead.
  - Diodes Inc.'s "Green" policy can be found on our website at <http://www.diodes.com>
  - For packaging details, go to our website at <http://www.diodes.com>

**Marking Information**


C27 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: W = 2009)  
 M = Month (ex: 9 = September)

**Date Code Key**

Date Code Key

Year	2009	2010	2011	2012	2013	2014	2015
Code	W	X	Y	Z	A	B	C

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

**Maximum Ratings N-CHANNEL – Q<sub>1</sub>** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Drain Source Voltage	V <sub>DSS</sub>	20	V
Gate-Source Voltage	V <sub>GSS</sub>	±6	V
Drain Current (Note 4)	I <sub>D</sub>	T <sub>A</sub> = 25°C 1.34 T <sub>A</sub> = 85°C 0.97	A

**Maximum Ratings P-CHANNEL – Q<sub>2</sub>** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Drain Source Voltage	V <sub>DSS</sub>	-20	V
Gate-Source Voltage	V <sub>GSS</sub>	±6	V
Drain Current (Note 4)	I <sub>D</sub>	T <sub>A</sub> = 25°C -1.14 T <sub>A</sub> = 85°C -1.07	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P <sub>D</sub>	1.12	W
Thermal Resistance, Junction to Ambient (Note 4)	R <sub>θJA</sub>	111	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Notes: 4. For a device mounted on 25mm X 25mm FR-4 PCB board with a high coverage of single sided 1oz copper, in still air conditions with two active die

**Electrical Characteristics N-CHANNEL – Q<sub>1</sub>** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 5)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	100	nA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	± 1.0	μA	V <sub>GS</sub> = ±4.5V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 5)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.5	—	1.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	0.3	0.4	Ω	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 600mA
		—	0.4	0.5		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 500mA
		—	0.5	0.7		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 350mA
Forward Transfer Admittance	Y <sub>fs</sub>	—	1.4	—	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 400mA
Diode Forward Voltage (Note 5)	V <sub>SD</sub>	—	0.7	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 150mA
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>iss</sub>	—	60.67	—	pF	V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	9.68	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	5.37	—	pF	
Total Gate Charge	Q <sub>g</sub>	—	736.6	—	pC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 250mA
Gate-Source Charge	Q <sub>gs</sub>	—	93.6	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	116.6	—		
Turn-On Delay Time	t <sub>d(on)</sub>	—	5.1	—	ns	V <sub>DD</sub> = 10V, V <sub>GS</sub> = 4.5V, R <sub>L</sub> = 47Ω, R <sub>G</sub> = 10Ω, I <sub>D</sub> = 200mA
Turn-On Rise Time	t <sub>r</sub>	—	7.4	—		
Turn-Off Delay Time	t <sub>d(off)</sub>	—	26.7	—		
Turn-Off Fall Time	t <sub>f</sub>	—	12.3	—		

**Electrical Characteristics P-CHANNEL – Q<sub>2</sub>** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 5)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-100	nA	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	± 1.0	μA	V <sub>GS</sub> = ±4.5V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 5)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-0.5	—	-1.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	0.5	0.7	Ω	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -430mA
		—	0.7	0.9		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -300mA
		—	1.0	1.3		V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -150mA
Forward Transfer Admittance	Y <sub>fs</sub>	—	-0.9	—	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = -250mA
Diode Forward Voltage (Note 5)	V <sub>SD</sub>	—	-0.8	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -150mA
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>iss</sub>	—	59.76	—	pF	V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	12.07	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	6.36	—	pF	
Total Gate Charge	Q <sub>g</sub>	—	622.4	—	pC	V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -10V, I <sub>D</sub> = -250mA
Gate-Source Charge	Q <sub>gs</sub>	—	100.3	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	132.2	—		
Turn-On Delay Time	t <sub>d(on)</sub>	—	5.1	—	ns	V <sub>DD</sub> = -10V, V <sub>GS</sub> = -4.5V, R <sub>L</sub> = 47Ω, R <sub>G</sub> = 10Ω, I <sub>D</sub> = -200mA
Turn-On Rise Time	t <sub>r</sub>	—	8.1	—		
Turn-Off Delay Time	t <sub>d(off)</sub>	—	28.4	—		
Turn-Off Fall Time	t <sub>f</sub>	—	20.7	—		

Notes: 5. Short duration pulse test used to minimize self-heating effect.

**N-CHANNEL – Q<sub>1</sub>**

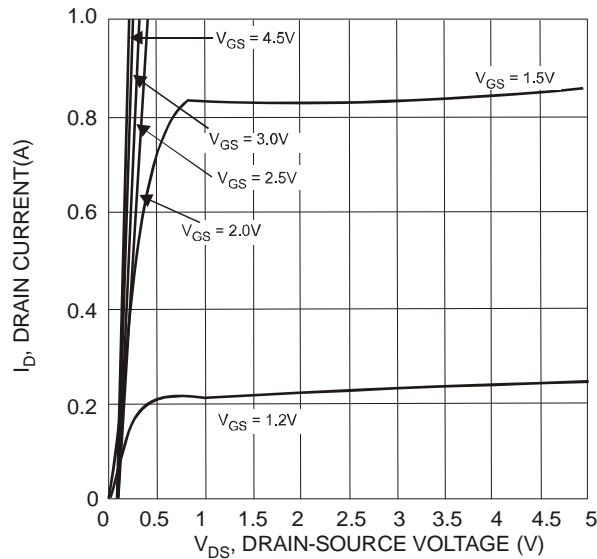


Fig. 1 Typical Output Characteristics

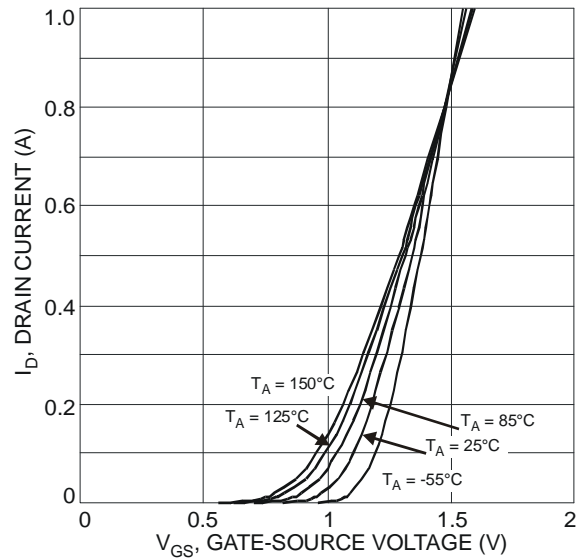


Fig. 2 Typical Transfer Characteristic

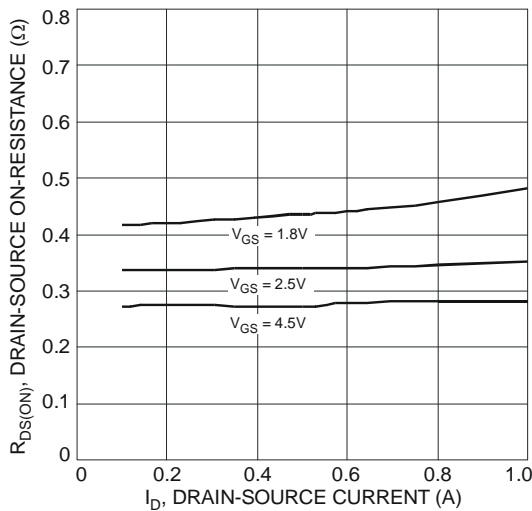


Fig. 3 Typical On-Resistance  
vs. Drain Current and Gate Voltage

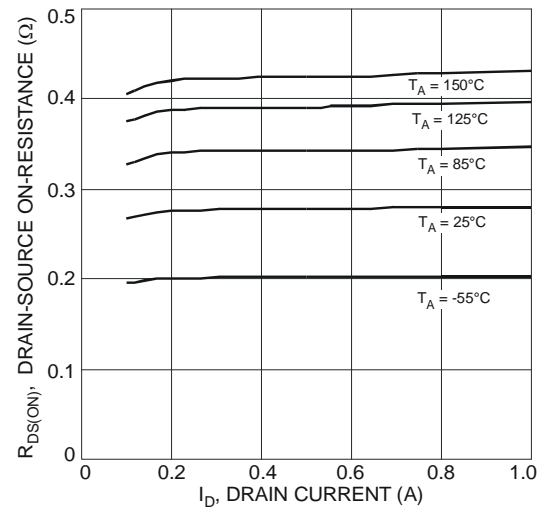


Fig. 4 Typical On-Resistance  
vs. Drain Current and Temperature

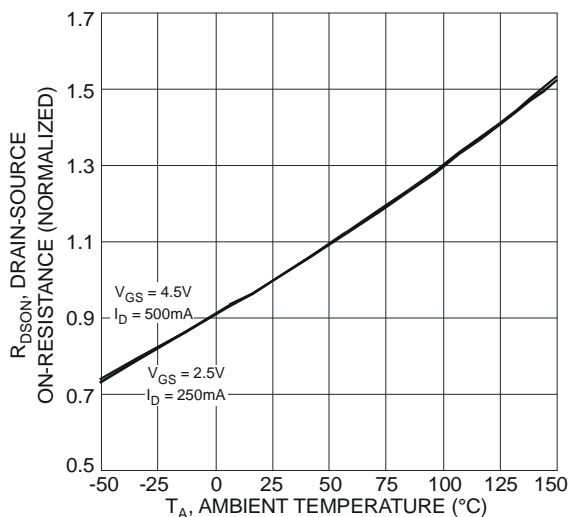


Fig. 5 On-Resistance Variation with Temperature

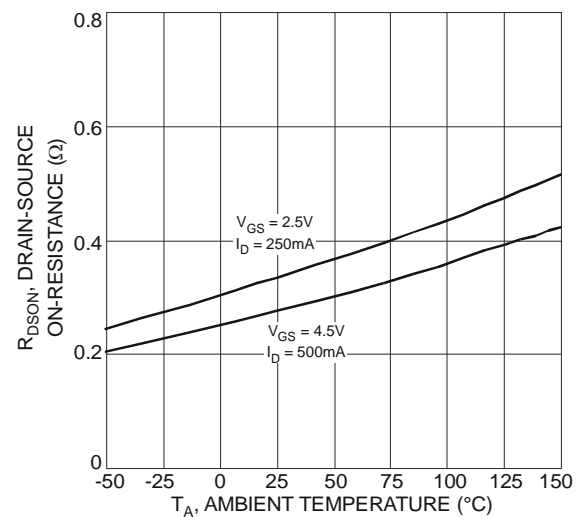


Fig. 6 On-Resistance Variation with Temperature

**N-CHANNEL – Q<sub>1</sub> (continued)**

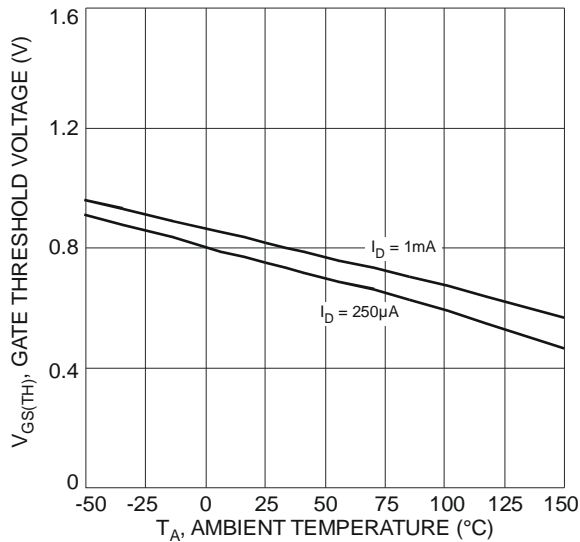


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

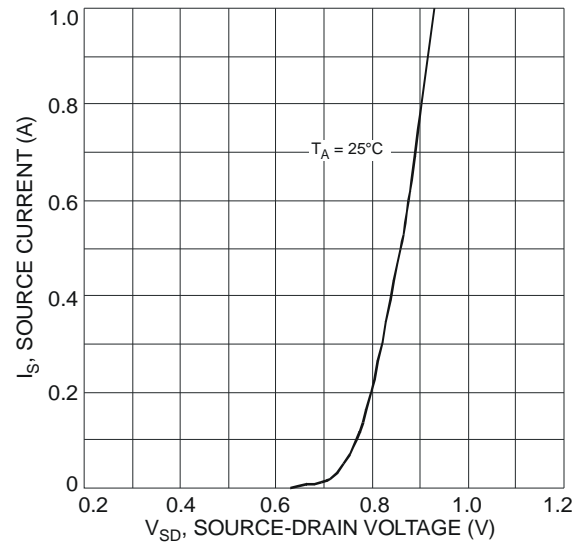


Fig. 8 Diode Forward Voltage vs. Current

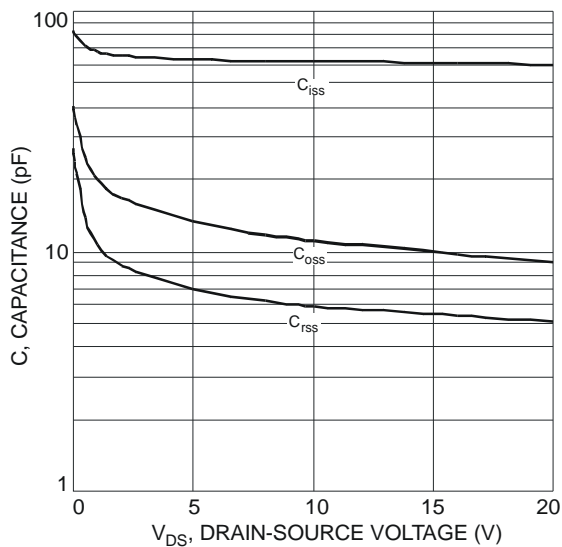


Fig. 9 Typical Total Capacitance

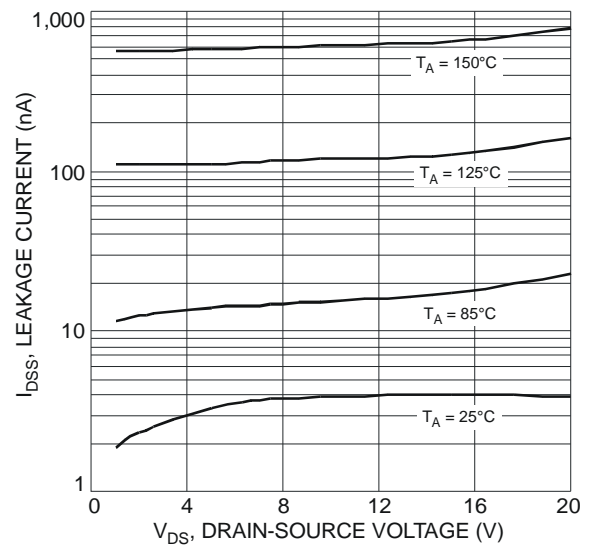


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

**P-CHANNEL – Q<sub>2</sub>**

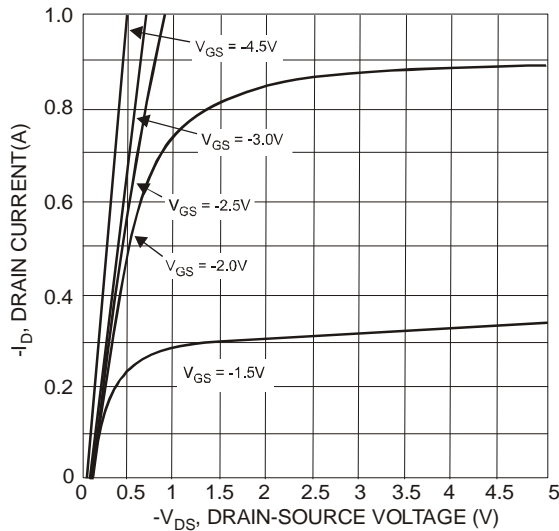


Fig. 11 Typical Output Characteristics

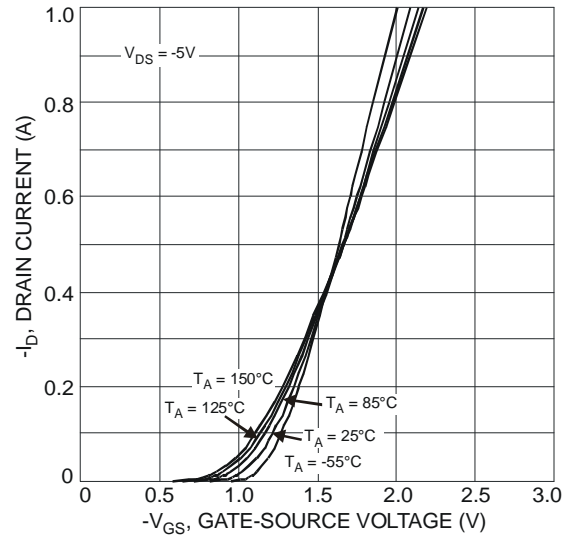


Fig. 12 Typical Transfer Characteristic

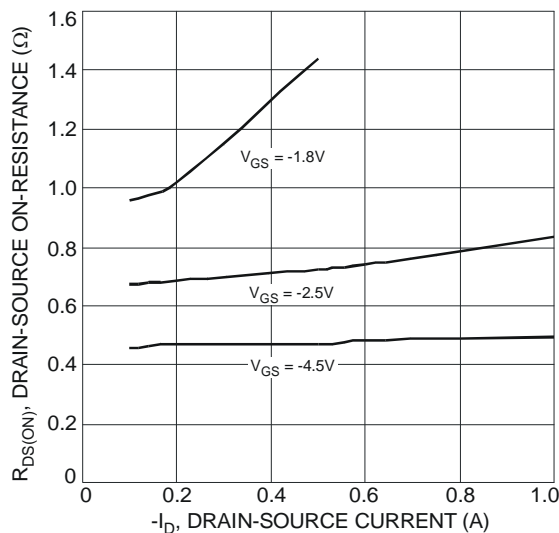


Fig. 13 Typical On-Resistance vs. Drain Current and Gate Voltage

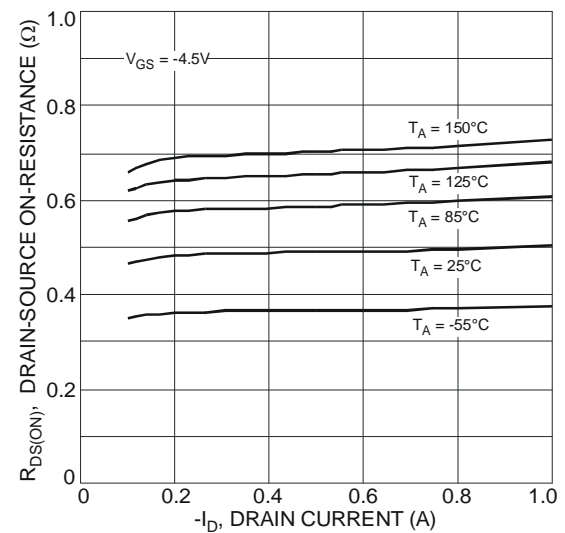


Fig. 14 Typical On-Resistance vs. Drain Current and Temperature

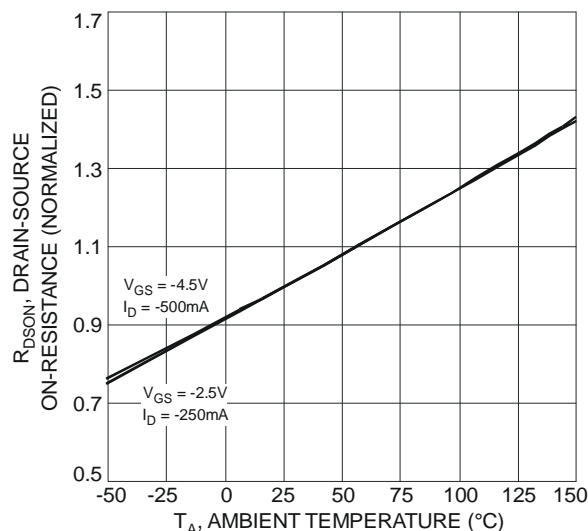


Fig. 15 On-Resistance Variation with Temperature

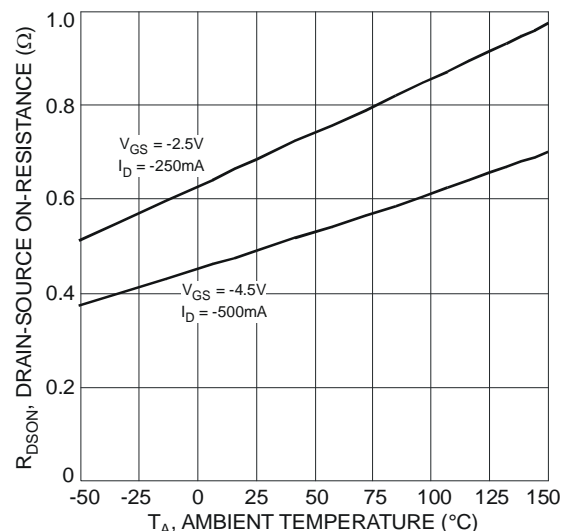


Fig. 16 On-Resistance Variation with Temperature

**P-CHANNEL – Q<sub>2</sub> (continued)**

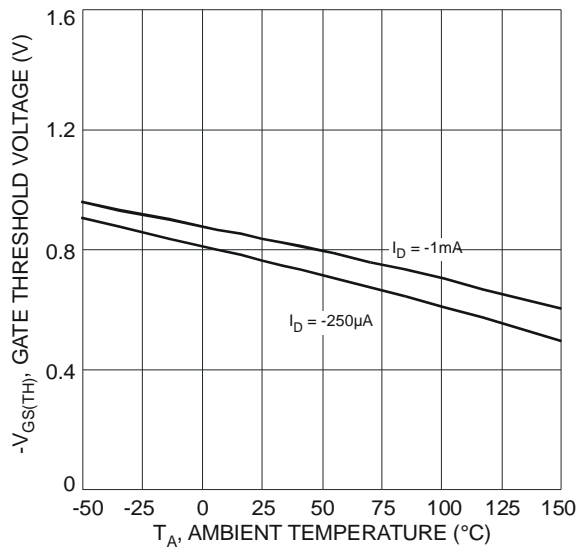


Fig. 17 Gate Threshold Variation vs. Ambient Temperature

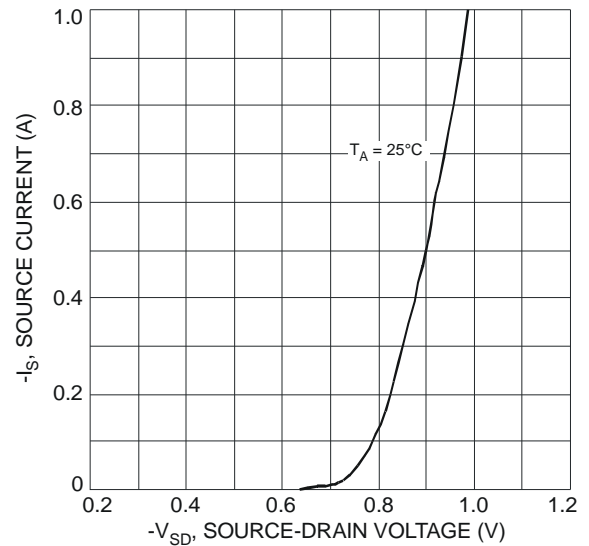


Fig. 18 Diode Forward Voltage vs. Current

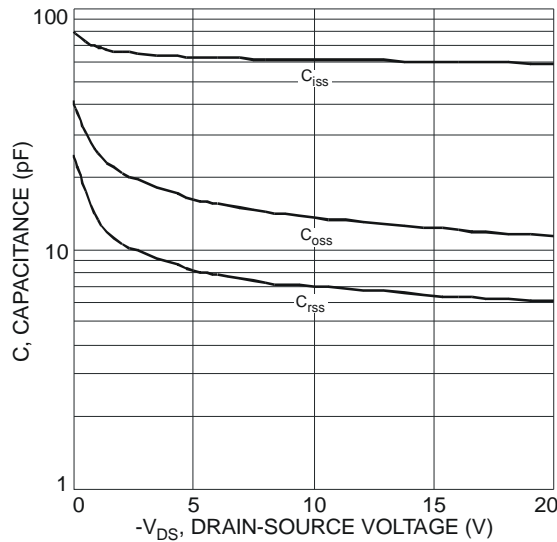


Fig. 19 Typical Total Capacitance

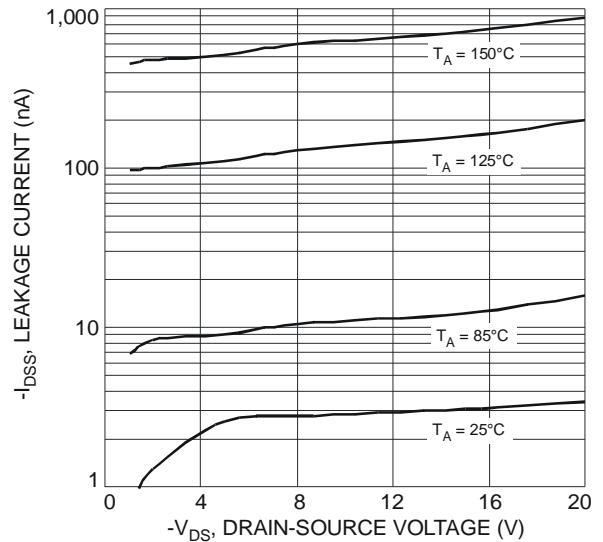
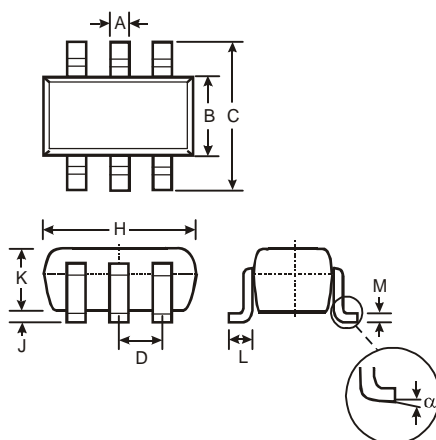


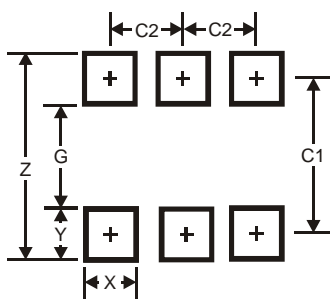
Fig. 20 Typical Leakage Current  
vs. Drain-Source Voltage

## Package Outline Dimensions



SOT26			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
$\alpha$	0°	8°	—
All Dimensions in mm			

## Suggested Pad Layout



Dimensions	Value (in mm)
Z	3.20
G	1.60
X	0.55
Y	0.80
C1	2.40
C2	0.95



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