20V COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

Product Summary

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

Features and Benefits

- 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 to 2.5kV HBM**
- **Lead Free/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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)

Description and Applications

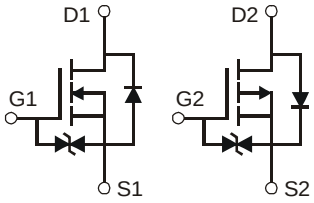
This MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Portable electronics

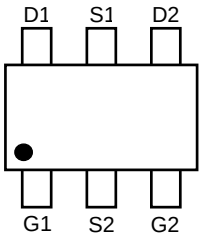
ESD PROTECTED
TO 2.5kV HBM

SOT26

Top View



Device symbol



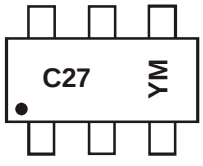
Top view
Pin-Out

Ordering Information (Note 3)

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

Notes: 1. No purposefully added lead.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com
3. 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

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_1 @T_A = 25°C unless other wise specified

Characteristic		Symbol	Value	Unit
Drain Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±6	V
Drain Current (Note 4)	T_A = 25°C T_A = 85°C	I_D	1.34 0.97	A

Maximum Ratings P-CHANNEL – Q_2 @T_A = 25°C unless oth erwise specified

Characteristic		Symbol	Value	Unit
Drain Source Voltage		V_{DSS}	-20	V
Gate-Source Voltage		V_{GSS}	±6	V
Drain Current (Note 4)	T_A = 25°C T_A = 85°C	I_D	-1.14 -1.07	A

Thermal Characteristics @T_A = 25°C unless other wise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P_D	1.12	W
Thermal Resistance, Junction to Ambient (Note 4)	$R_{\theta JA}$	111	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-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_1 @T_A = 25°C unless other wise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 5)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	100	nA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	± 1.0	μA	V_{GS} = ±4.5V, V_{DS} = 0V
ON CHARACTERISTICS (Note 5)						
Gate Threshold Voltage	$V_{GS(th)}$	0.5	—	1.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	— — —	0.3 0.4 0.5	0.4 0.5 0.7	Ω	V_{GS} = 4.5V, I_D = 600mA V_{GS} = 2.5V, I_D = 500mA V_{GS} = 1.8V, I_D = 350mA
Forward Transfer Admittance	$\|Y_{fs}\|$	—	1.4	—	S	V_{DS} =10V, I_D = 400mA
Diode Forward Voltage (Note 5)	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 150mA
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	—	60.67	—	pF	V_{DS} = 16V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	9.68	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	5.37	—	pF	
Total Gate Charge	Q_g	—	736.6	—	pC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 250mA
Gate-Source Charge	Q_{gs}	—	93.6	—		
Gate-Drain Charge	Q_{gd}	—	116.6	—		
Turn-On Delay Time	$t_{d(on)}$	—	5.1	—	ns	V_{DD} = 10V, V_{GS} = 4.5V, R_L = 47Ω, R_G = 10Ω, I_D = 200mA
Turn-On Rise Time	t_r	—	7.4	—		
Turn-Off Delay Time	$t_{d(off)}$	—	26.7	—		
Turn-Off Fall Time	t_f	—	12.3	—		

Electrical Characteristics P-CHANNEL – Q_2 @T_A = 25°C unless other wise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 5)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	V_{GS} = 0V, I_D = -250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-100	nA	V_{DS} = -20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	± 1.0	μA	V_{GS} = ±4.5V, V_{DS} = 0V
ON CHARACTERISTICS (Note 5)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	—	-1.0	V	V_{DS} = V_{GS}, I_D = -250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	0.5 0.7 1.0	0.7 0.9 1.3	Ω	V_{GS} = -4.5V, I_D = -430mA V_{GS} = -2.5V, I_D = -300mA V_{GS} = -1.8V, I_D = -150mA
Forward Transfer Admittance	$\|Y_{fs}\|$	—	-0.9	—	S	V_{DS} =10V, I_D = -250mA
Diode Forward Voltage (Note 5)	V_{SD}	—	-0.8	-1.2	V	V_{GS} = 0V, I_S = -150mA
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	—	59.76	—	pF	V_{DS} = -16V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	12.07	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	6.36	—	pF	
Total Gate Charge	Q_g	—	622.4	—	pC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -250mA
Gate-Source Charge	Q_{gs}	—	100.3	—		
Gate-Drain Charge	Q_{gd}	—	132.2	—		
Turn-On Delay Time	$t_{d(on)}$	—	5.1	—	ns	V_{DD} = -10V, V_{GS} = -4.5V, R_L = 47Ω, R_G = 10Ω, I_D = -200mA
Turn-On Rise Time	t_r	—	8.1	—		
Turn-Off Delay Time	$t_{d(off)}$	—	28.4	—		
Turn-Off Fall Time	t_f	—	20.7	—		

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

N-CHANNEL – Q_1

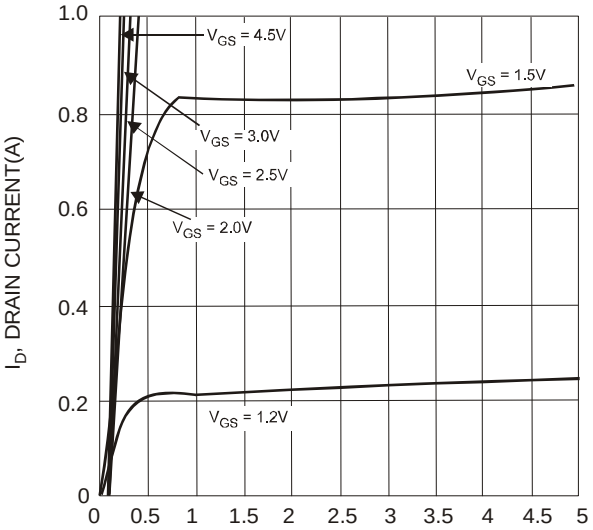


Fig.1 Typical Output Characteristics

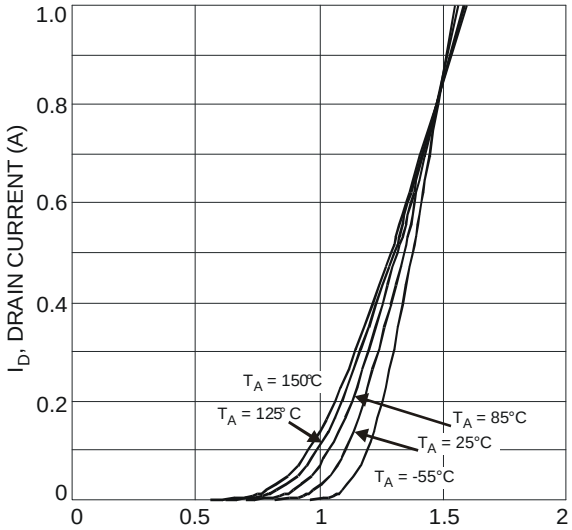


Fig. 2 Typical Transfer Characteristic

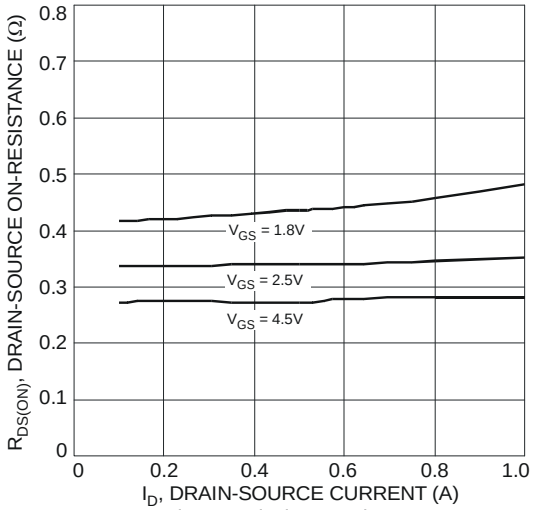


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

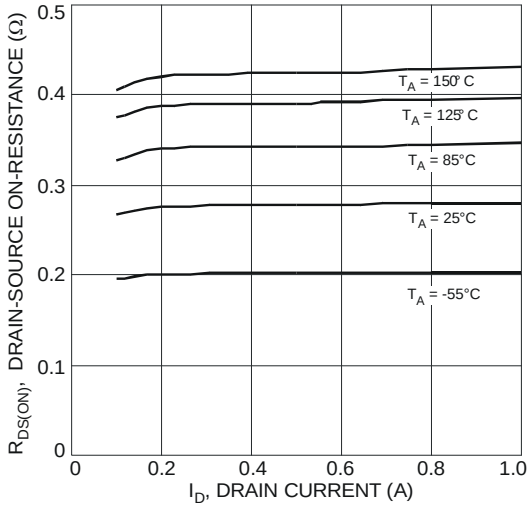


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

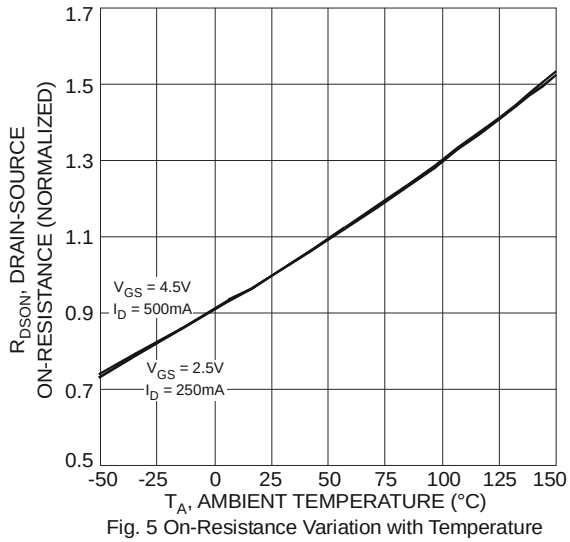


Fig. 5 On-Resistance Variation with Temperature

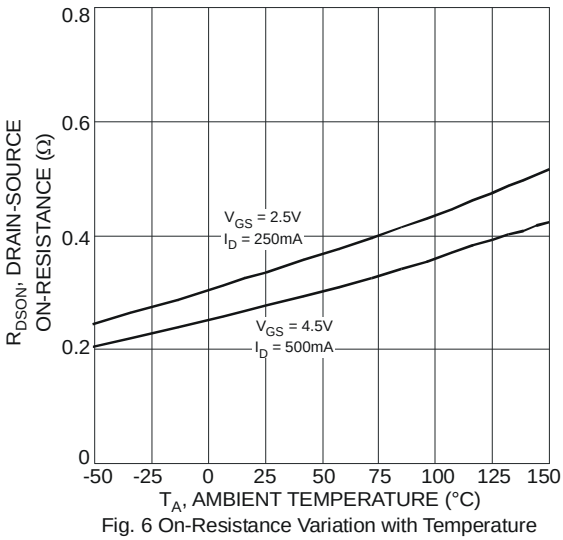


Fig. 6 On-Resistance Variation with Temperature

N-CHANNEL – Q_1 (continued)

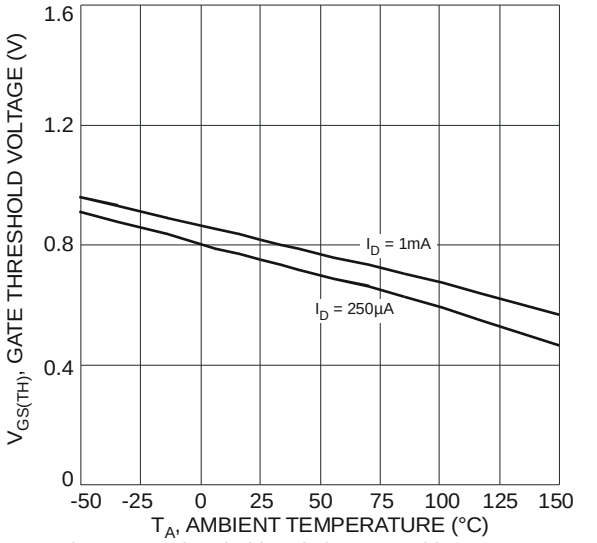


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

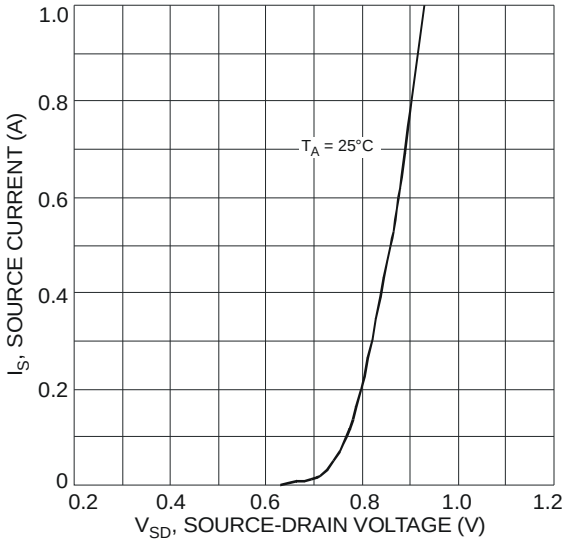


Fig. 8 Diode Forward Voltage vs. Current

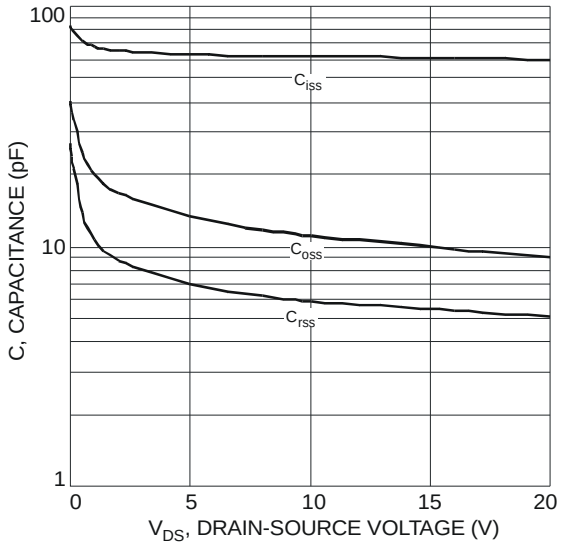


Fig. 9 Typical Total Capacitance

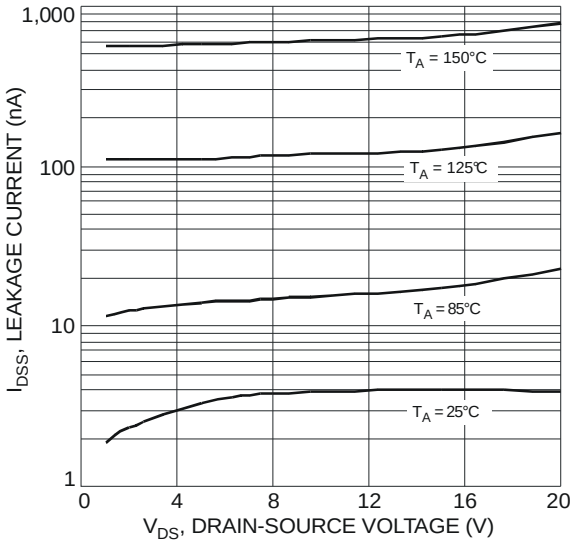


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

P-CHANNEL – Q_2

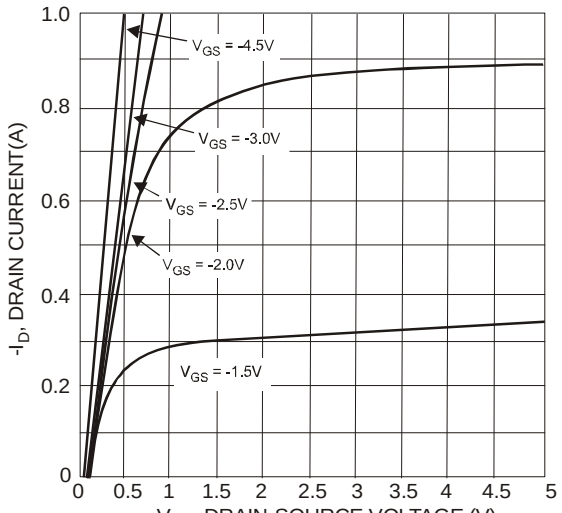


Fig.11 Typical Output Characteristics

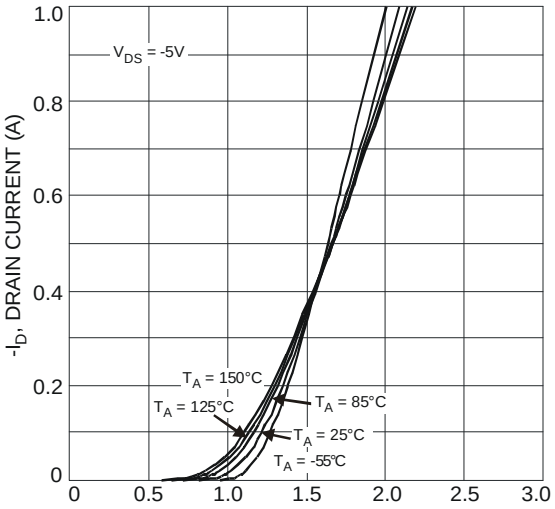


Fig. 12 Typical Transfer Characteristic

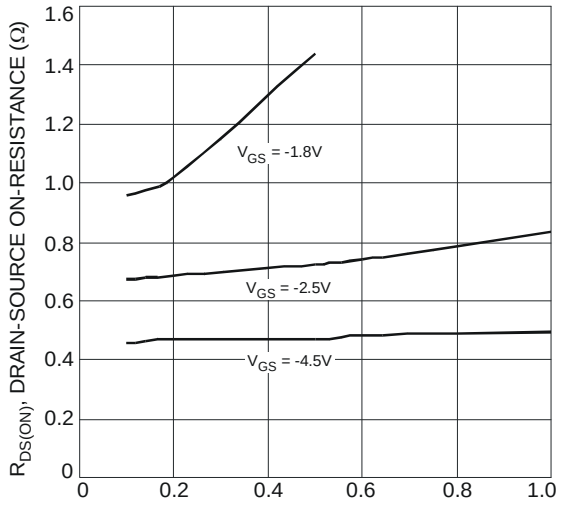


Fig. 13 Typical On-Resistance
vs. Drain Current and Gate Voltage

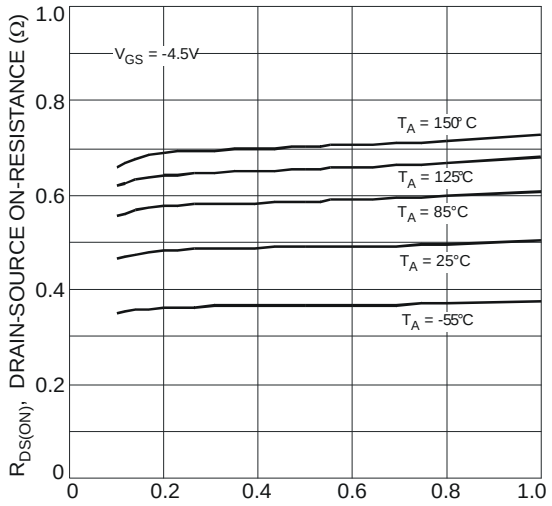


Fig. 14 Typical On-Resistance
vs. Drain Current and Temperature

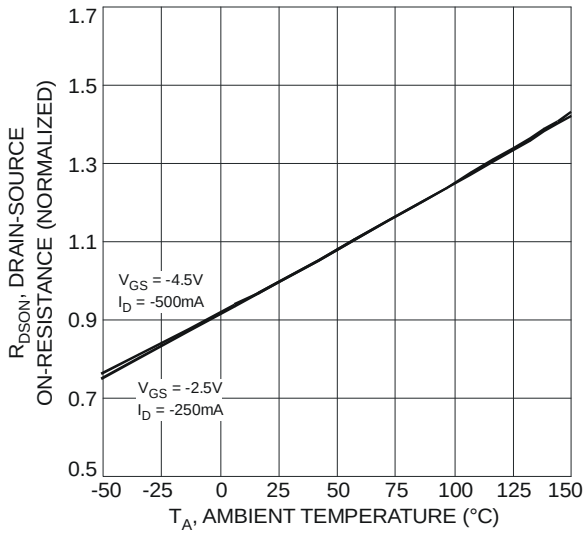


Fig. 15 On-Resistance Variation with Temperature

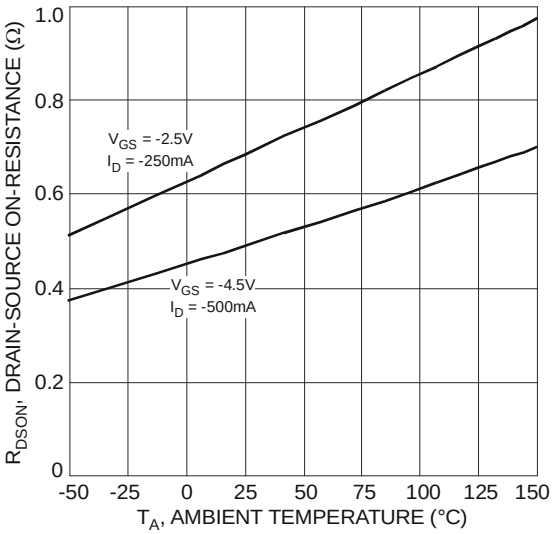


Fig. 16 On-Resistance Variation with Temperature

P-CHANNEL – Q_2 (continued)

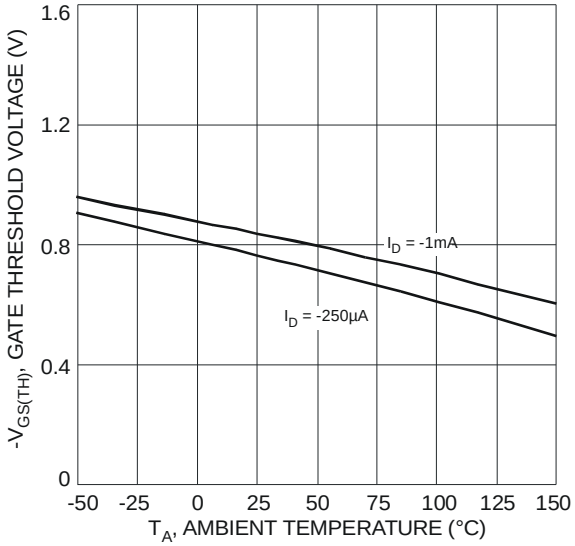


Fig. 17 Gate Threshold Variation vs. Ambient Temperature

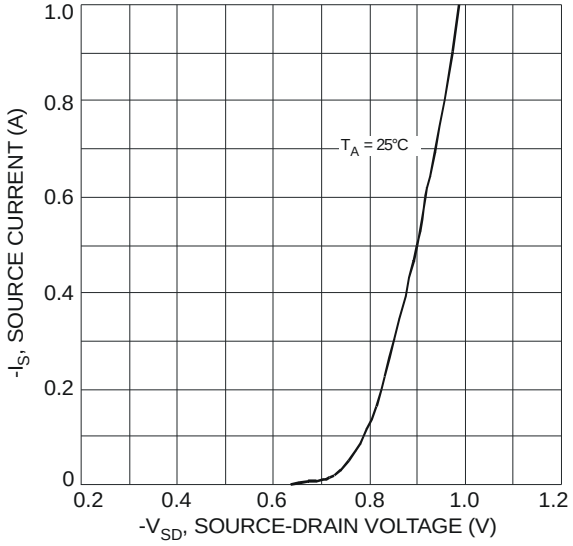


Fig. 18 Diode Forward Voltage vs. Current

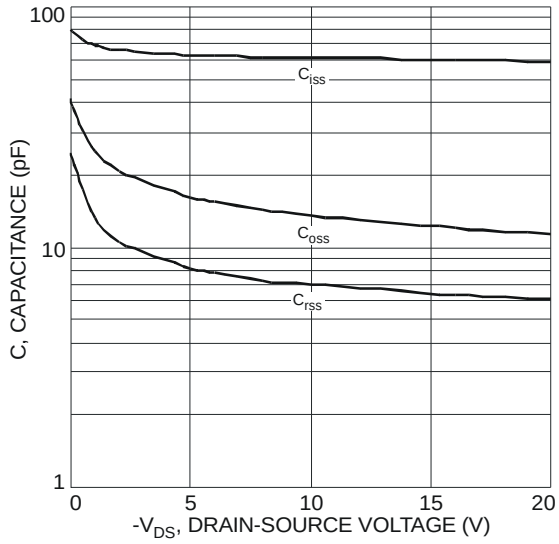


Fig. 19 Typical Total Capacitance

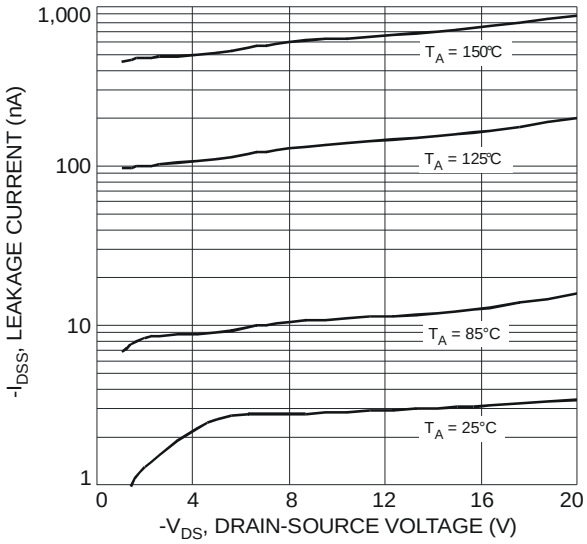
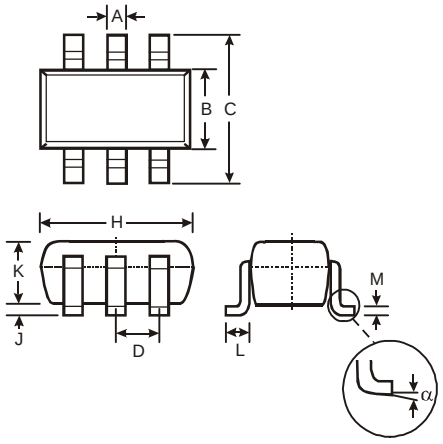


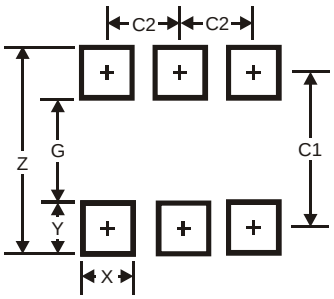
Fig. 20 Typical Leakage Current
vs. Drain-Source Voltage

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
α	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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