

## Product Summary

Device	BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>A</sub> = +25°C
Q1 N-Channel	12V	25mΩ @ V <sub>GS</sub> = 4.5V	6.1A
		32mΩ @ V <sub>GS</sub> = 2.5V	5.4A
		40mΩ @ V <sub>GS</sub> = 1.8V	4.9A
Q2 P-Channel	-20V	80mΩ @ V <sub>GS</sub> = -4.5V	-3.5A
		100mΩ @ V <sub>GS</sub> = -2.5V	-3.1A
		140mΩ @ V <sub>GS</sub> = -1.8V	-2.6A
		210mΩ @ V <sub>GS</sub> = -1.5V	-2.1A

## Description

This new generation MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

- Backlighting
- DC-DC Converters
- Power Management Functions

## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

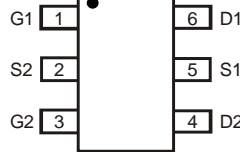
- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.013 grams (Approximate)



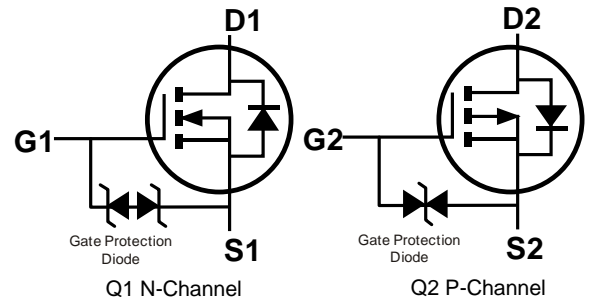
TSOT26



Top View



Top View

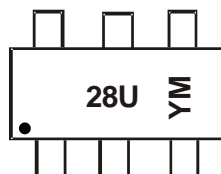


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMC1028UVT-7	TSOT26	3,000/Tape & Reel
DMC1028UVT-13	TSOT26	10,000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



28U = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: G = 2019)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	E	F	G	H	I	J	K	L	M

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** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Q1 N-Channel	Q2 P-Channel	Unit
Drain-Source Voltage	V <sub>DSS</sub>	12	-20	V
Gate-Source Voltage	V <sub>GSS</sub>	±8	±8	V
Continuous Drain Current (Note 6) N-Channel: V <sub>GS</sub> = 4.5V P-Channel: V <sub>GS</sub> = -4.5V	I <sub>D</sub>	6.1 4.7	-3.5 -2.7	A
Maximum Continuous Body Diode Forward Current (Note 6)	I <sub>S</sub>	1.4	-1.4	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	35	-20	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P <sub>D</sub>	0.8	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	157	°C/W
	t < 5s	102	
Total Power Dissipation (Note 6)	P <sub>D</sub>	1.2	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	108	°C/W
	t < 5s	64	
Thermal Resistance, Junction to Case (Note 6)	R <sub>θJC</sub>	18	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics – Q1 N-CHANNEL** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (Note 7)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	12	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	1.0	µA	V <sub>DS</sub> = 12V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10	µA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b> (Note 7)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.4	—	1	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	17	25	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5.2A
		—	21	32		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 4.8A
		—	30	40		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 2.5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS</b> (Note 8)						
Input Capacitance	C <sub>ISS</sub>	—	787	—	pF	V <sub>DS</sub> = 6V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	203	—	pF	
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	177	—	pF	
Gate Resistance	R <sub>G</sub>	—	4.8	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>G</sub>	—	10.5	—	nC	V <sub>DS</sub> = 6V, I <sub>D</sub> = 6.8A
Total Gate Charge (V <sub>GS</sub> = 8V)		—	18.5	—	nC	
Gate-Source Charge	Q <sub>GS</sub>	—	1.2	—	nC	
Gate-Drain Charge	Q <sub>GD</sub>	—	2.9	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	4.6	—	ns	V <sub>DD</sub> = 6V, V <sub>GS</sub> = 4.5V, R <sub>L</sub> = 1.1Ω, R <sub>G</sub> = 1Ω
Turn-On Rise Time	t <sub>R</sub>	—	9.4	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	15.7	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	3.7	—	ns	
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	12.0	—	ns	I <sub>S</sub> = 5.4A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	1.8	—	nC	I <sub>S</sub> = 5.4A, di/dt = 100A/µs

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

**Electrical Characteristics – Q2 P-CHANNEL** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</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 T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	-1.0	μA	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10	μA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.4	—	-1	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	55	80	mΩ	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.8A
		—	70	100		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -3.3A
		—	88	140		V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -1.0A
		—	110	210		V <sub>GS</sub> = -1.5V, I <sub>D</sub> = -0.5A
Diode Forward Voltage	V <sub>SD</sub>	—	-0.7	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>ISS</sub>	—	576	—	pF	V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	87	—	pF	
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	71	—	pF	
Gate Resistance	R <sub>G</sub>	—	15	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = -4.5V)	Q <sub>G</sub>	—	6.7	—	nC	V <sub>DS</sub> = -10V, I <sub>D</sub> = -4.9A
Total Gate Charge (V <sub>GS</sub> = -8V)		—	11.5	—	nC	
Gate-Source Charge	Q <sub>GS</sub>	—	1.0	—	nC	
Gate-Drain Charge	Q <sub>GD</sub>	—	2.0	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	3.5	—	ns	V <sub>DD</sub> = -10V, V <sub>GS</sub> = -4.5V, R <sub>L</sub> = 2.6Ω, R <sub>G</sub> = 1Ω
Turn-On Rise Time	t <sub>R</sub>	—	3.6	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	20.8	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	12.7	—	ns	
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	13.1	—	ns	I <sub>S</sub> = -3.9A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	3.9	—	nC	I <sub>S</sub> = -3.9A, di/dt = 100A/μs

Notes: 7. Short duration pulse test used to minimize self-heating effect.  
8. Guaranteed by design. Not subject to product testing.

**Typical Characteristics – Q1 N-CHANNEL**

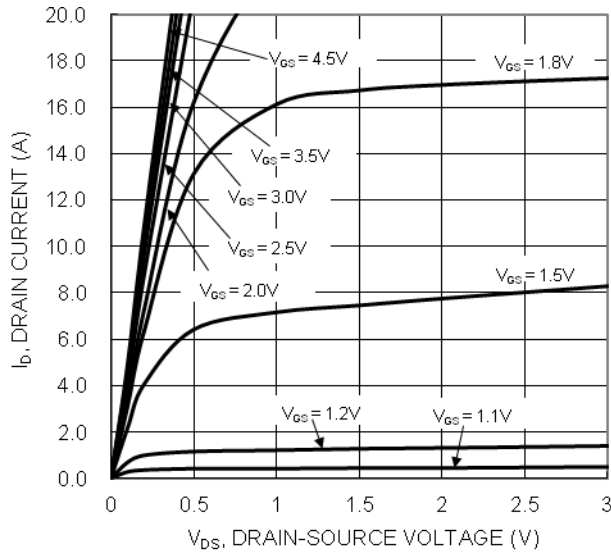


Figure 1 Typical Output Characteristic

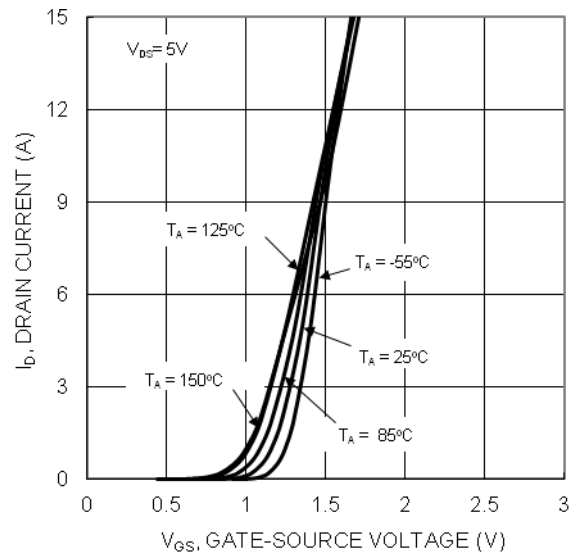


Figure 2 Typical Transfer Characteristic

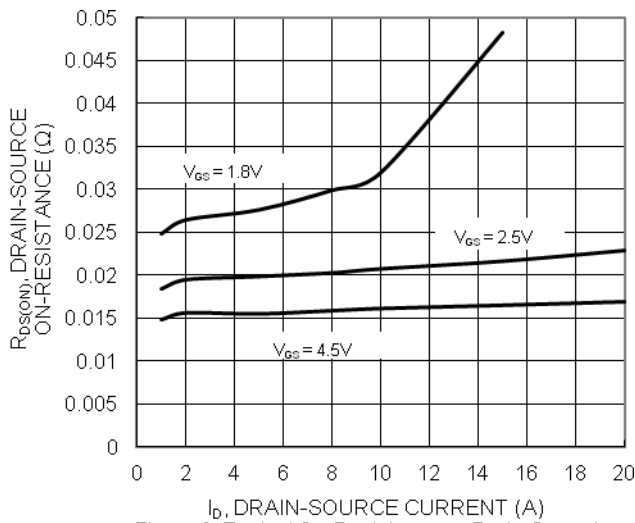


Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

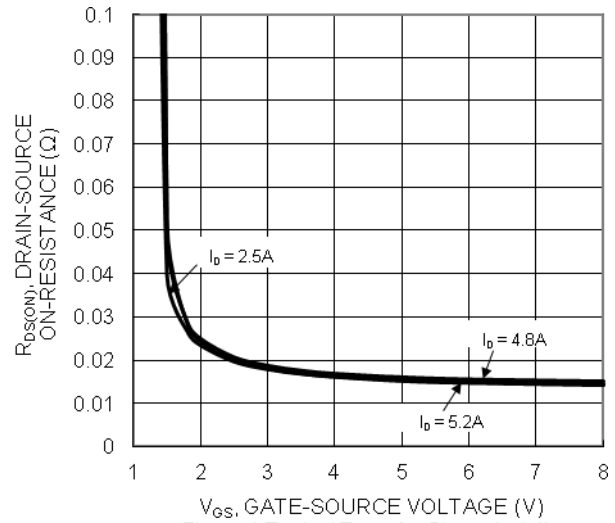


Figure 4 Typical Transfer Characteristic

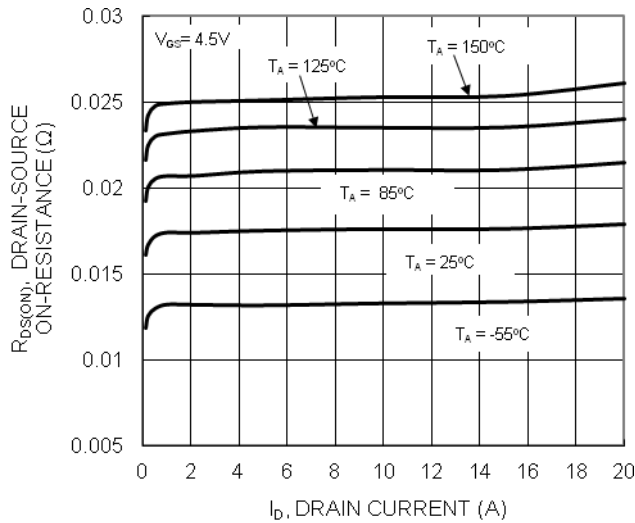


Figure 5 Typical On-Resistance vs Drain Current and Temperature

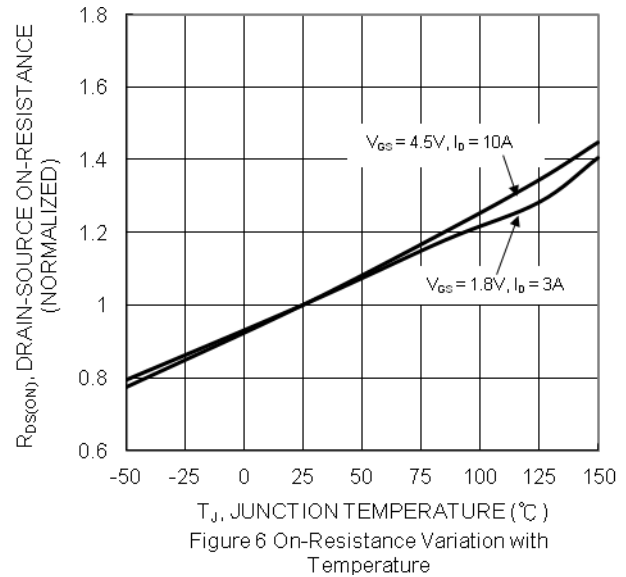


Figure 6 On-Resistance Variation with Temperature

**Typical Characteristics – Q1 N-CHANNEL** (continued)

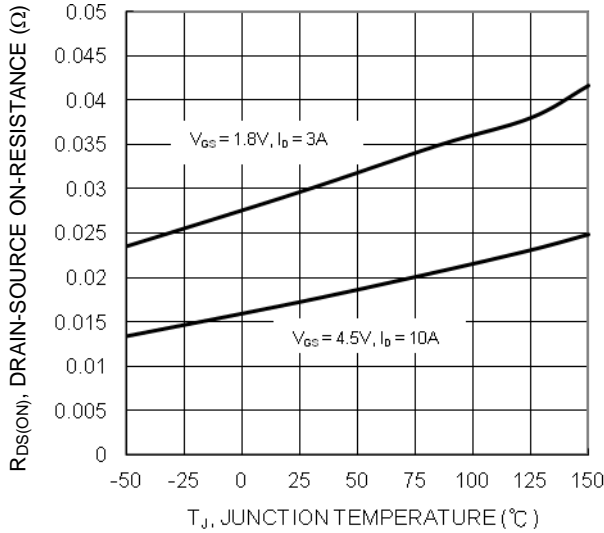


Figure 7 On-Resistance Variation with Temperature

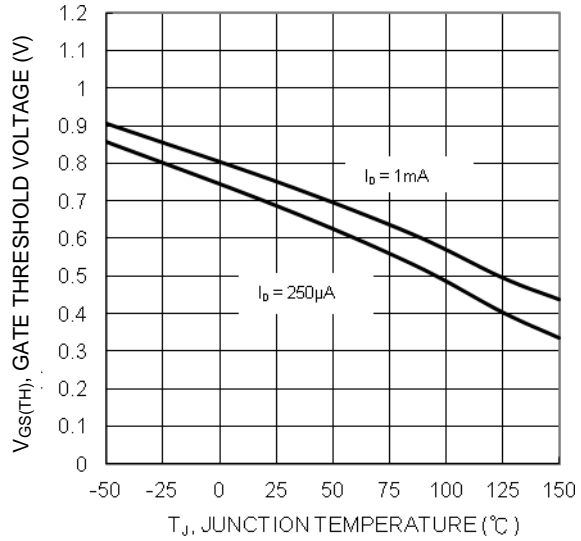


Figure 8 Gate Threshold Variation vs Junction Temperature

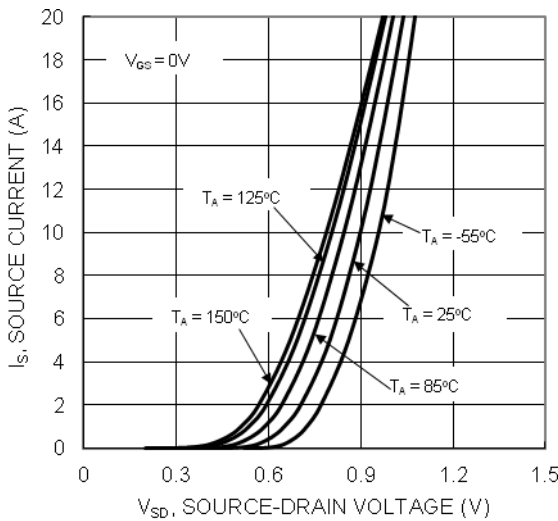


Figure 9 Diode Forward Voltage vs. Current

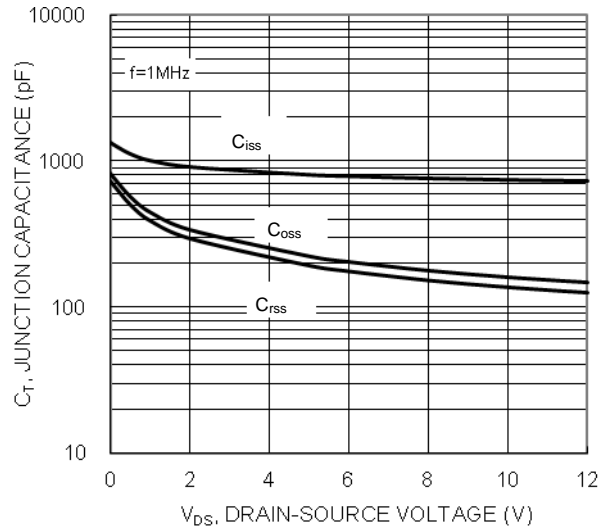


Figure 10 Typical Junction Capacitance

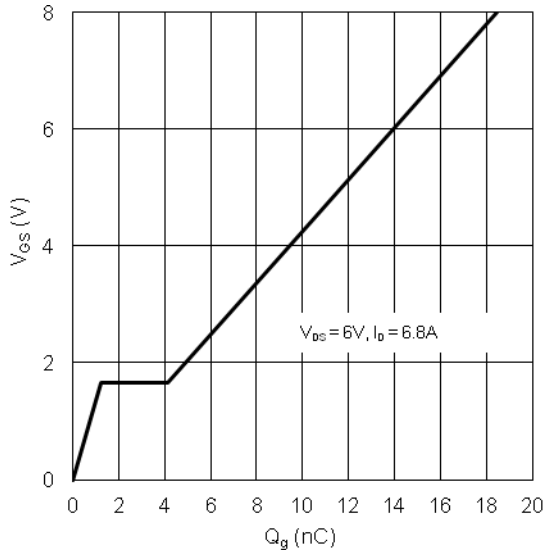


Figure 11 Gate Charge

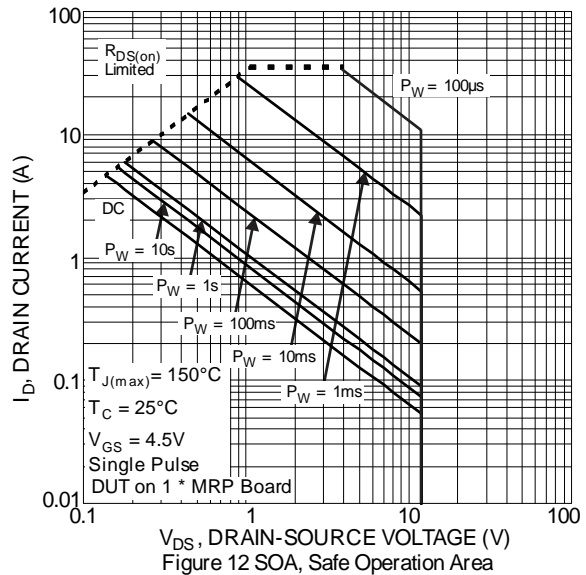


Figure 12 SOA, Safe Operation Area

**Typical Characteristics – Q2 P-CHANNEL**

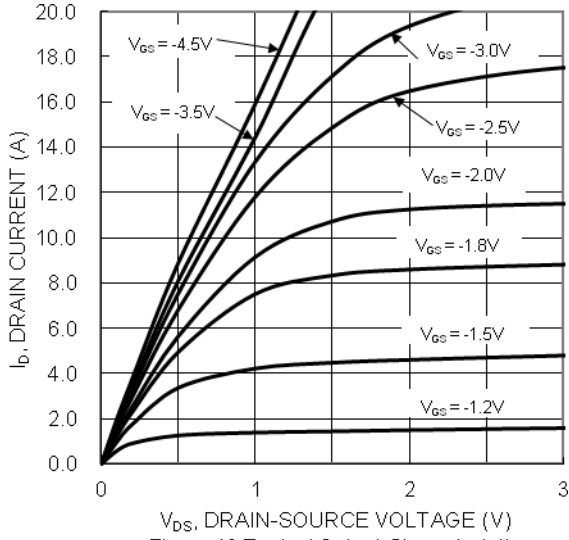


Figure 13 Typical Output Characteristic

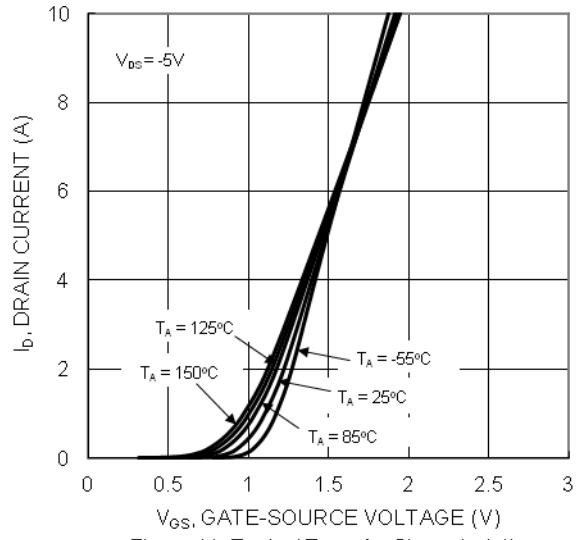


Figure 14 Typical Transfer Characteristic

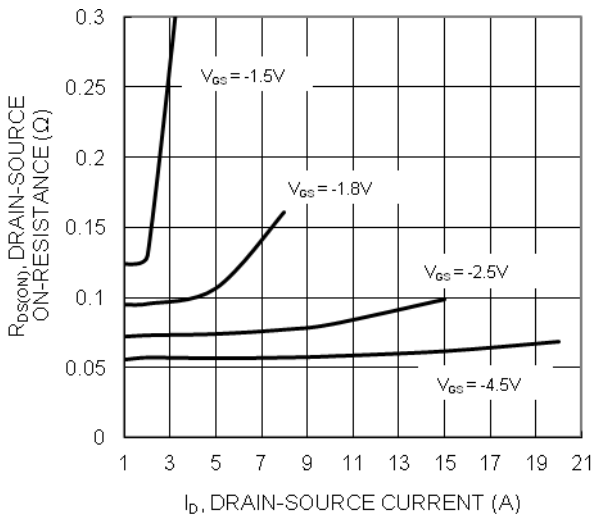


Figure 15 Typical On-Resistance vs Drain Current and Gate Voltage

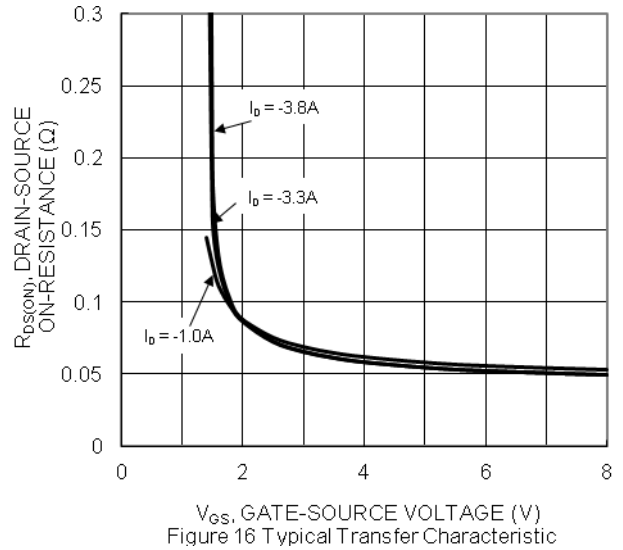


Figure 16 Typical Transfer Characteristic

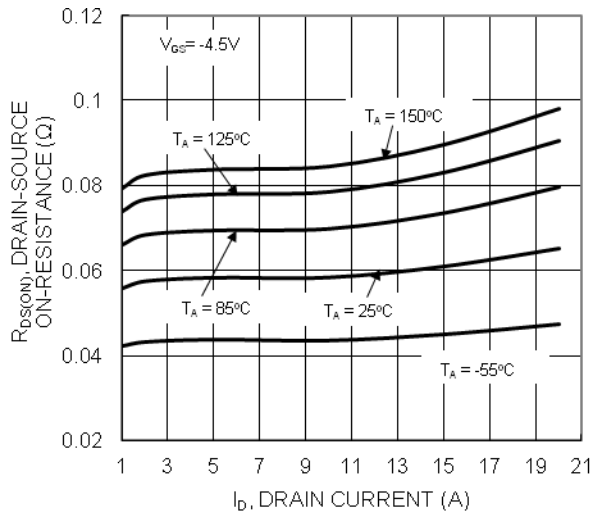


Figure 17 Typical On-Resistance vs Drain Current and Temperature

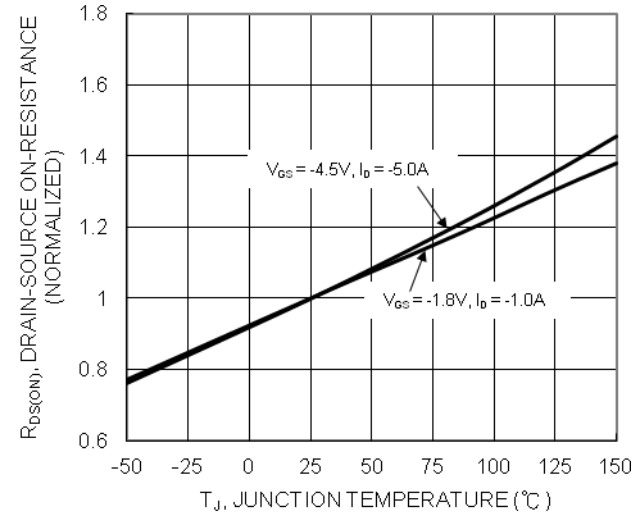
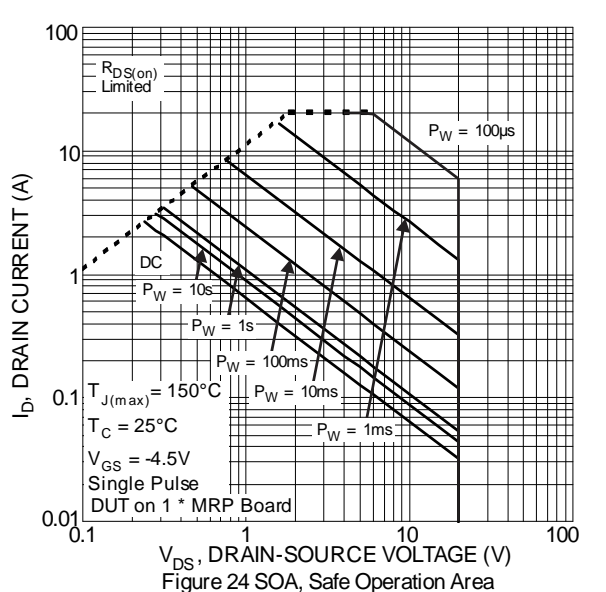
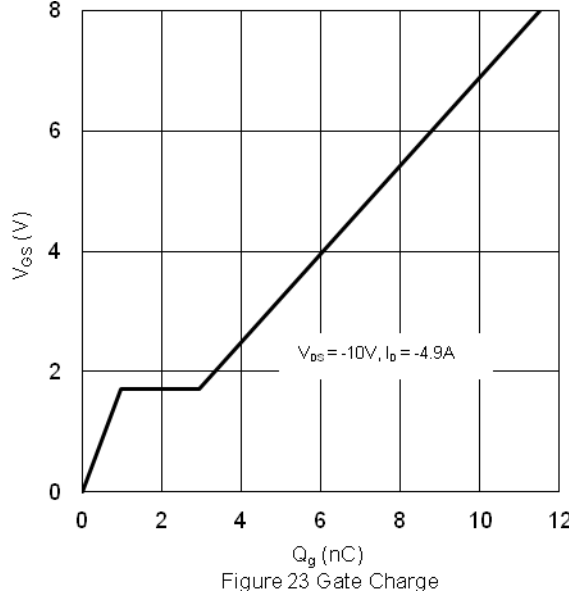
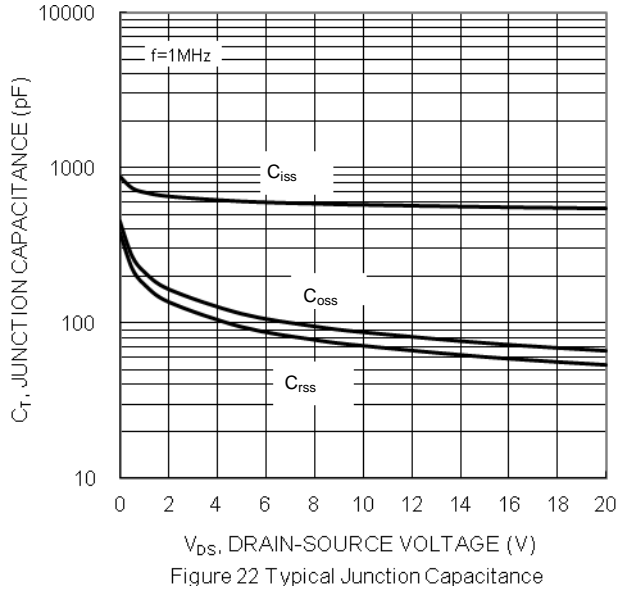
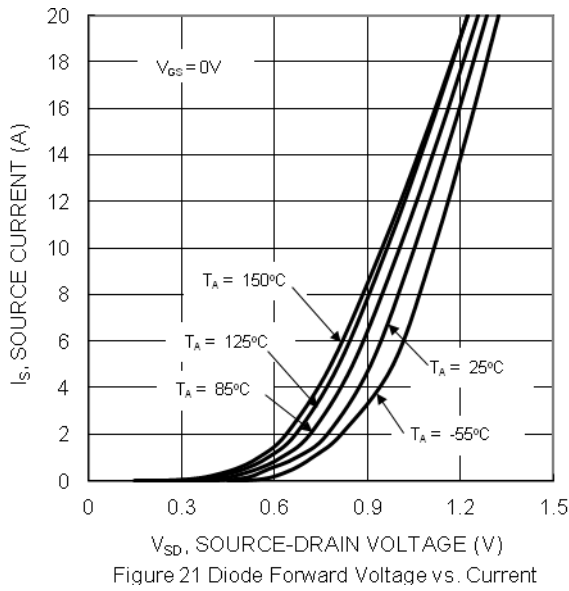
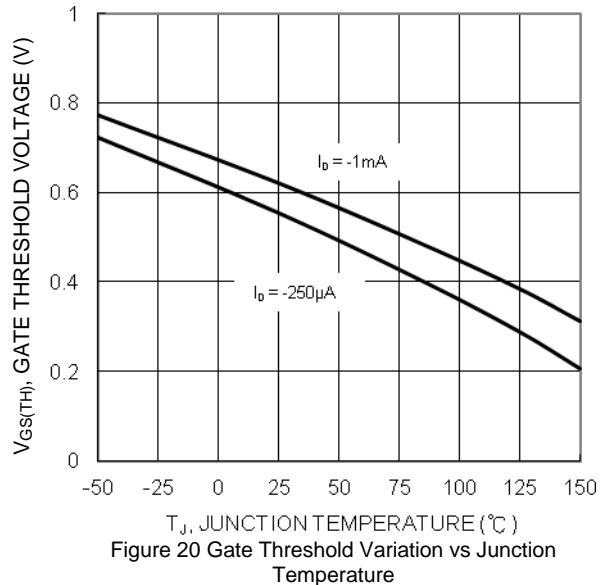
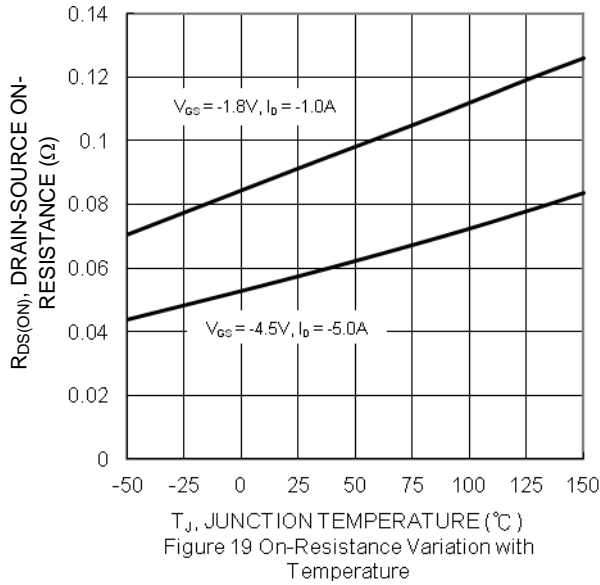
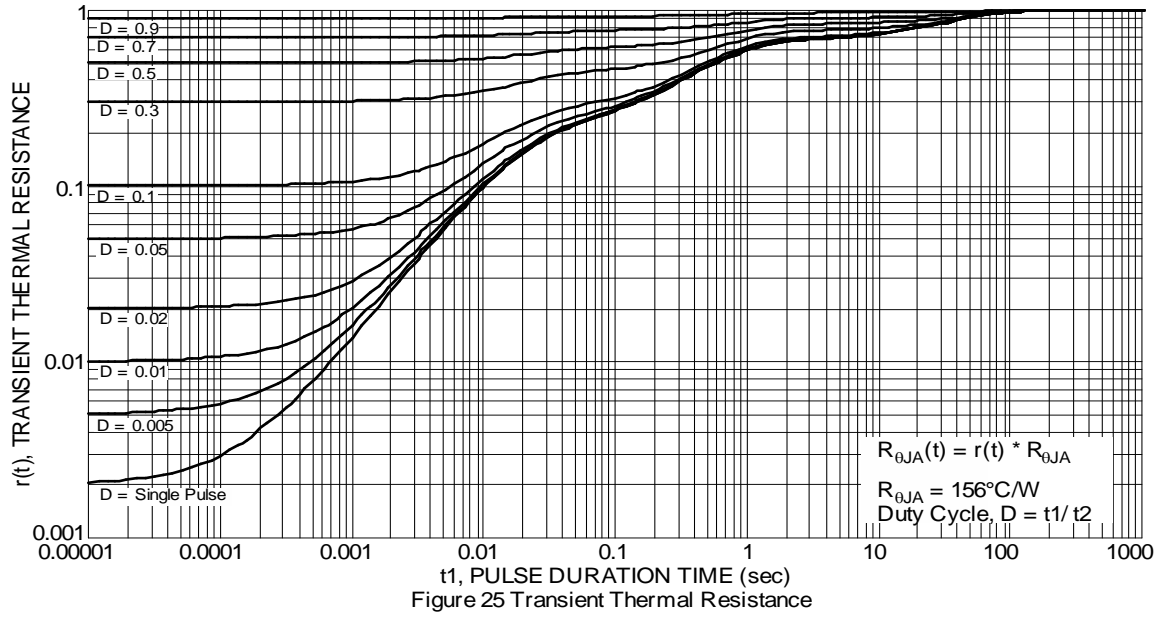


Figure 18 On-Resistance Variation with Temperature

**Typical Characteristics – Q2 P-CHANNEL** (continued)



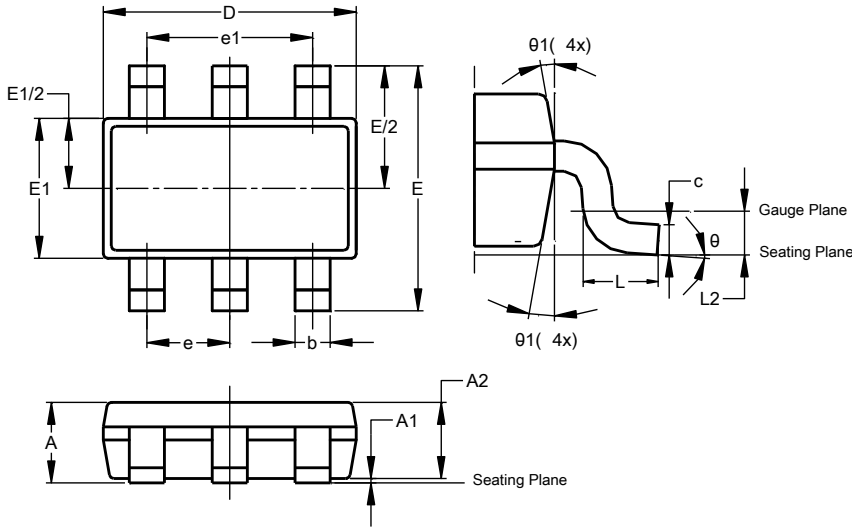




**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**TSOT26**

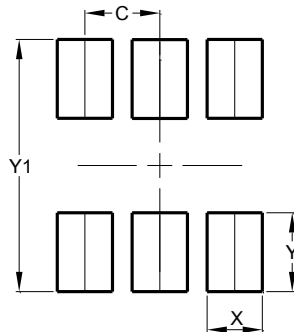


TSOT26			
Dim	Min	Max	Typ
A	-	1.00	-
A1	0.010	0.100	-
A2	0.840	0.900	-
D	2.800	3.000	2.900
E	2.800 BSC		
E1	1.500	1.700	1.600
b	0.300	0.450	-
c	0.120	0.200	-
e	0.950 BSC		
e1	1.900 BSC		
L	0.30	0.50	-
L2	0.250 BSC		
$\theta$	0°	8°	4°
$\theta_1$	4°	12°	-
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**TSOT26**



Dimensions	Value (in mm)
C	0.950
X	0.700
Y	1.000
Y1	3.199

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2. support or sustain life and 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.

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