



## 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

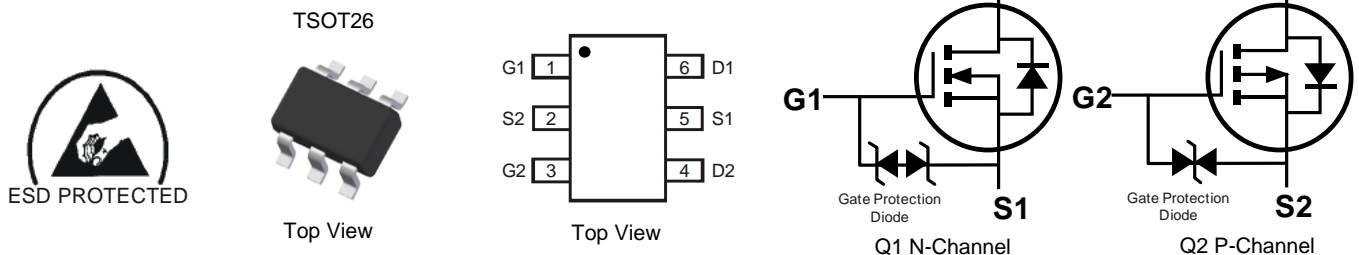
- Backlighting
- DC-DC Converters
- Power Management Functions

## 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)

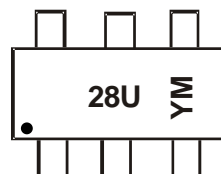


## Ordering Information (Note 4)

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)	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	6.1	-3.5	A
N-Channel: V <sub>GS</sub> = 4.5V P-Channel: V <sub>GS</sub> = -4.5V		T <sub>A</sub> = +70°C		4.7	-2.7	
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	R <sub>θJA</sub>	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	R <sub>θJA</sub>	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**

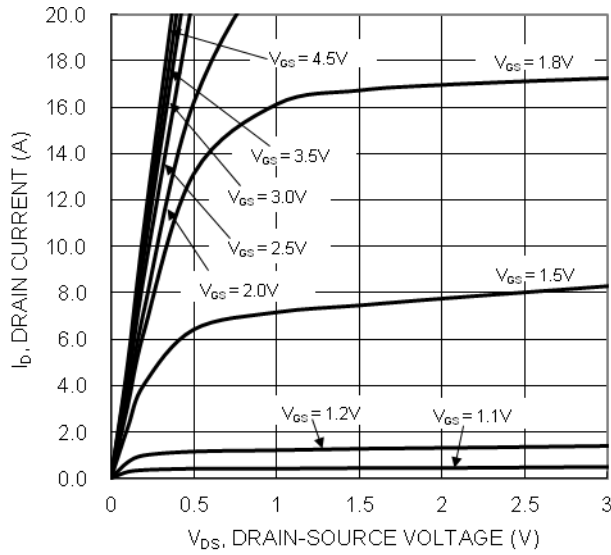


Figure 1 Typical Output Characteristic

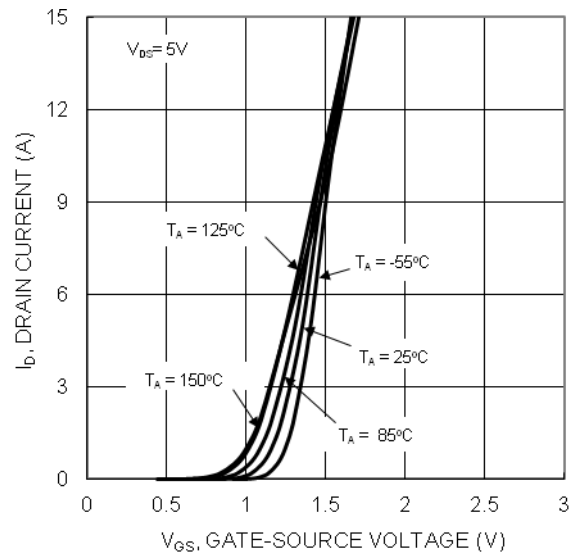


Figure 2 Typical Transfer Characteristic

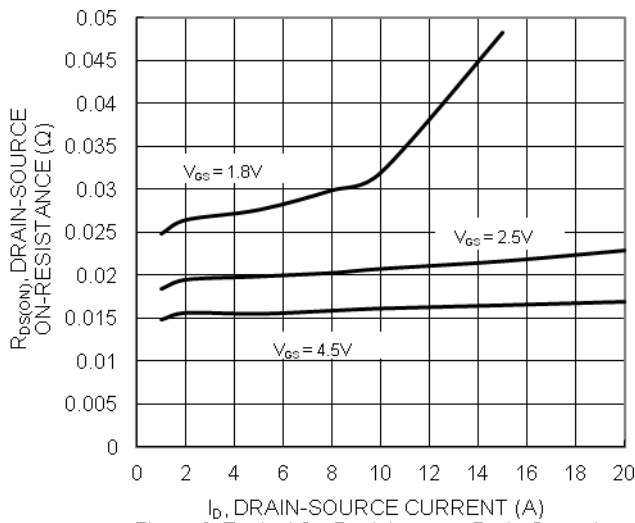


Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

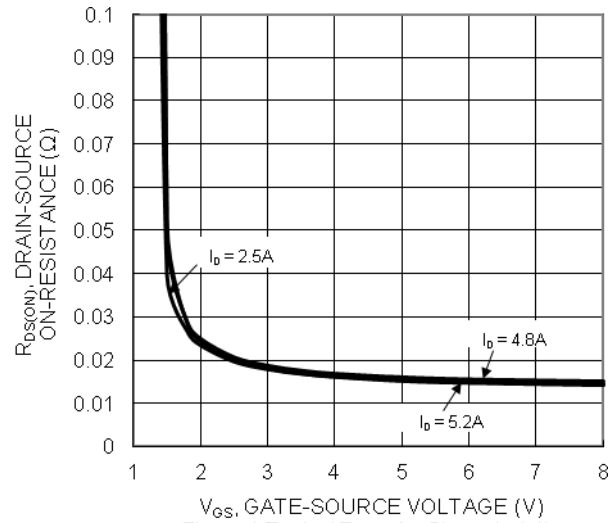


Figure 4 Typical Transfer Characteristic

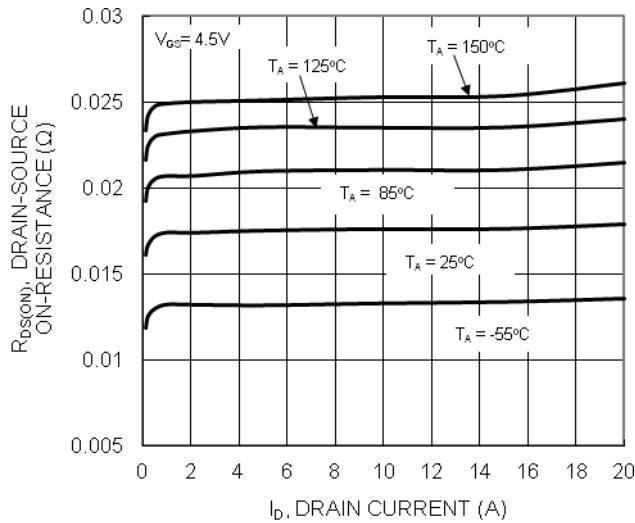


Figure 5 Typical On-Resistance vs Drain Current and Temperature

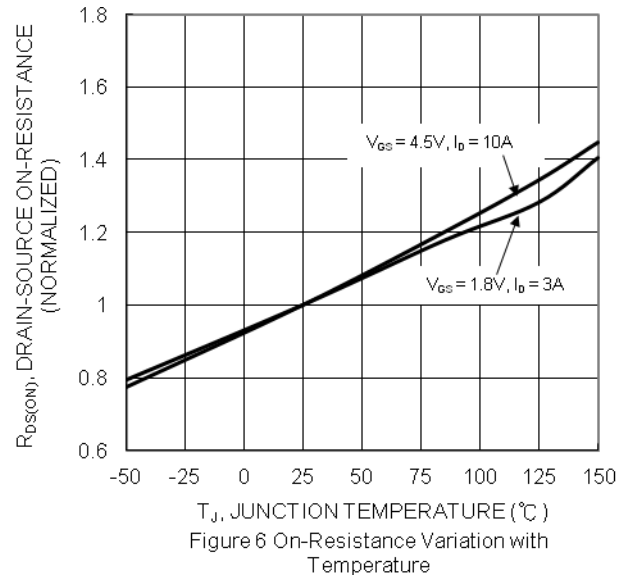


Figure 6 On-Resistance Variation with Temperature

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

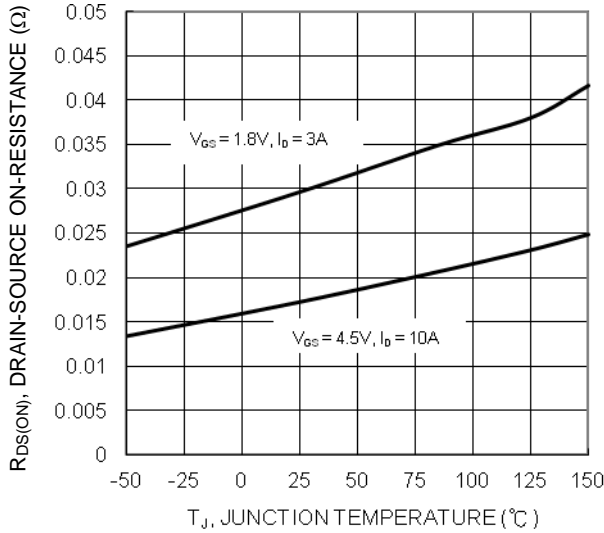


Figure 7 On-Resistance Variation with Temperature

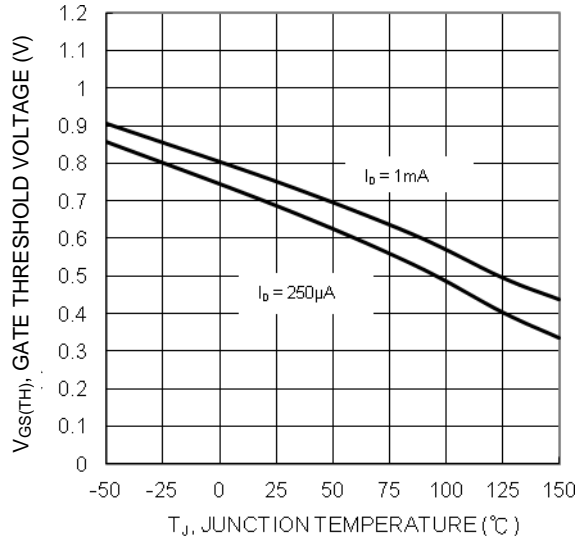


Figure 8 Gate Threshold Variation vs Junction Temperature

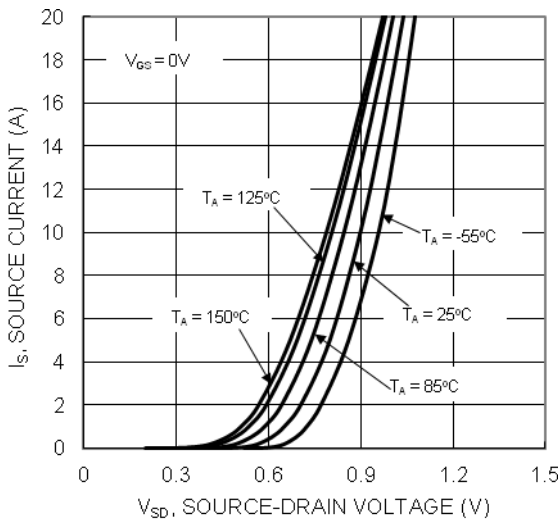


Figure 9 Diode Forward Voltage vs. Current

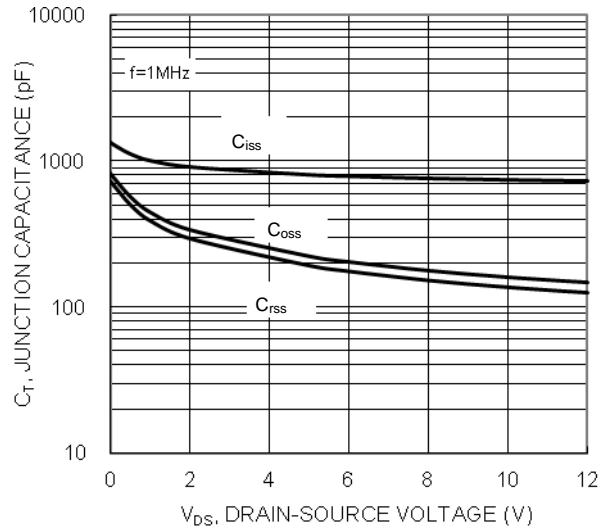


Figure 10 Typical Junction Capacitance

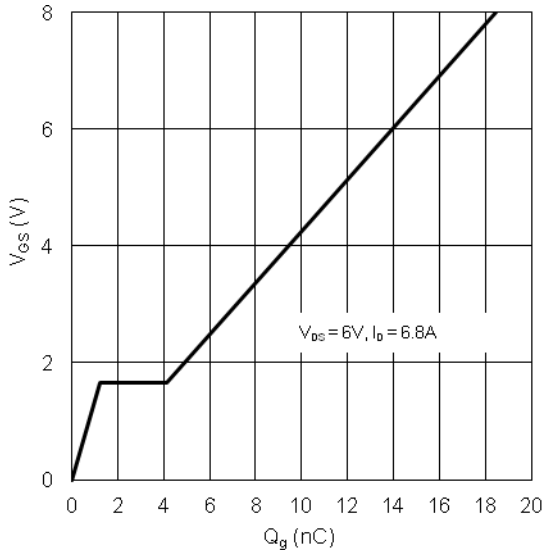


Figure 11 Gate Charge

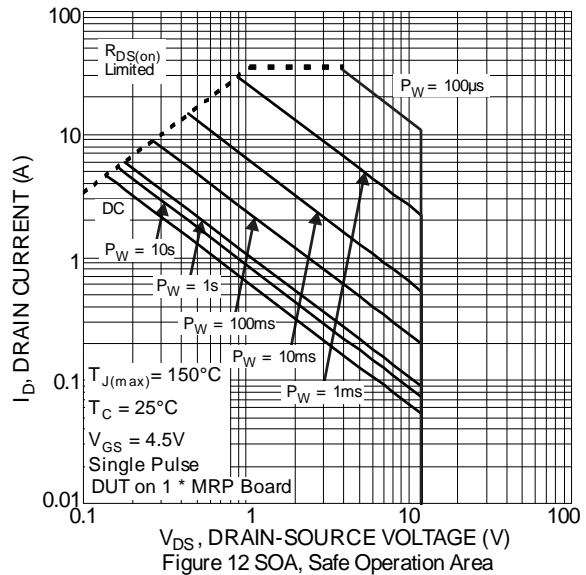


Figure 12 SOA, Safe Operation Area

**Typical Characteristics – Q2 P-CHANNEL**

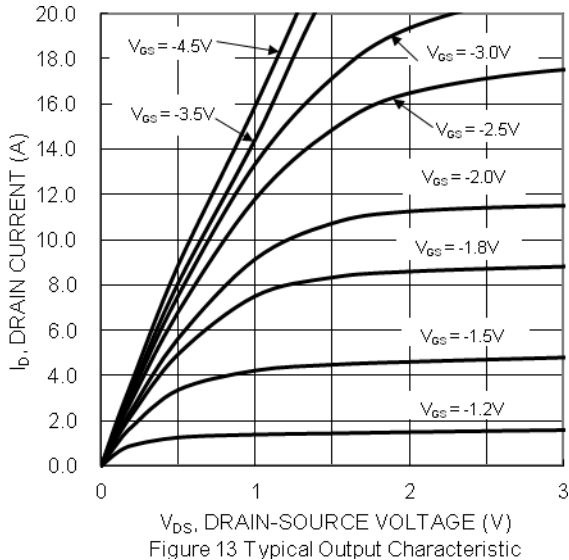


Figure 13 Typical Output Characteristic

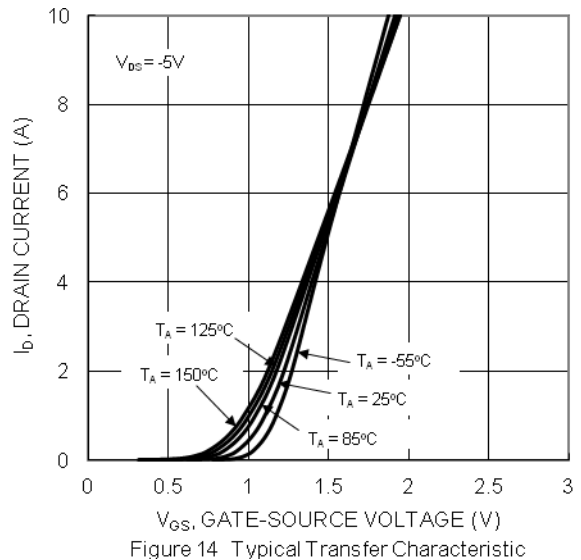


Figure 14 Typical Transfer Characteristic

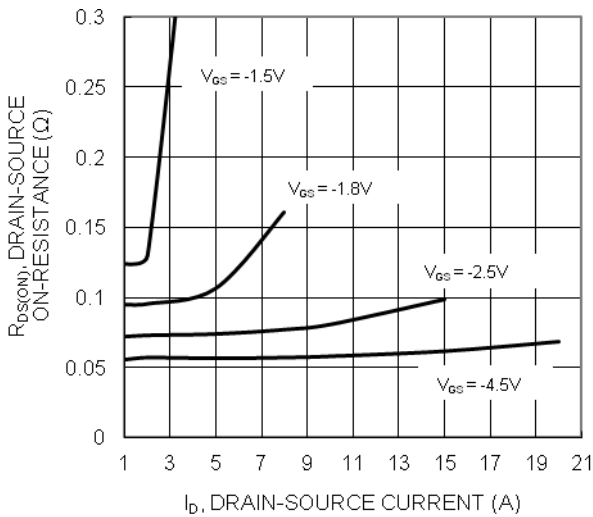


Figure 15 Typical On-Resistance vs Drain Current and Gate Voltage

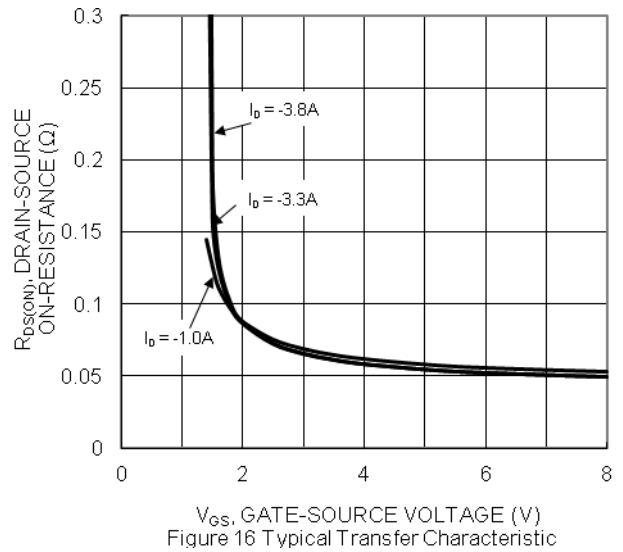


Figure 16 Typical Transfer Characteristic

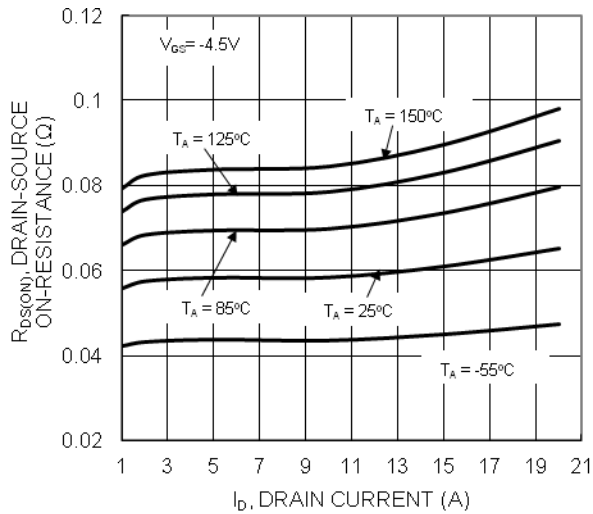


Figure 17 Typical On-Resistance vs Drain Current and Temperature

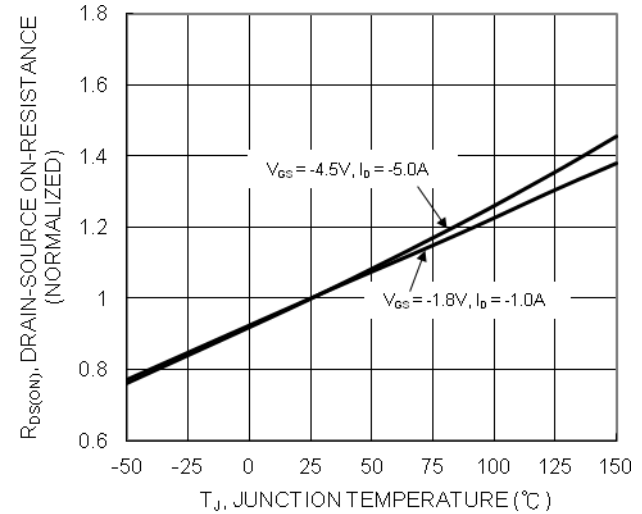
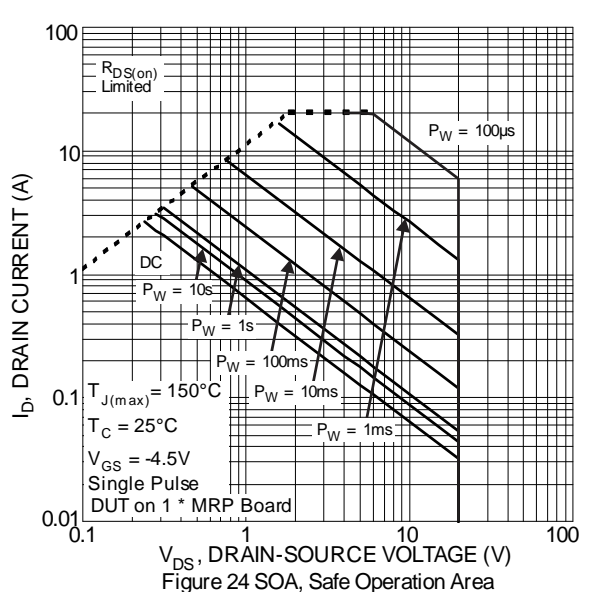
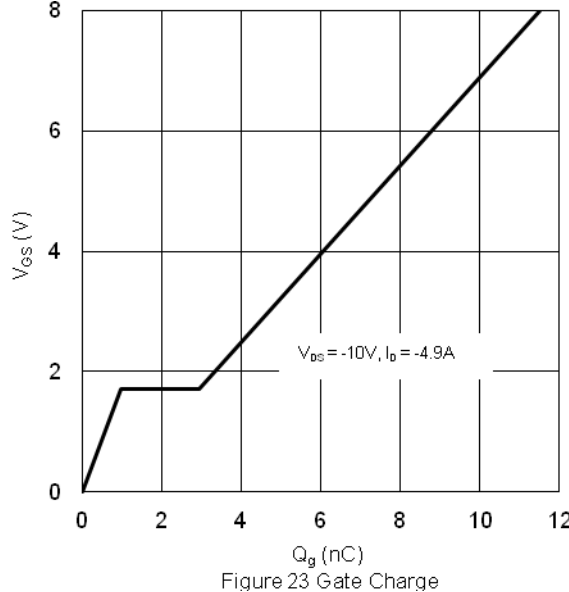
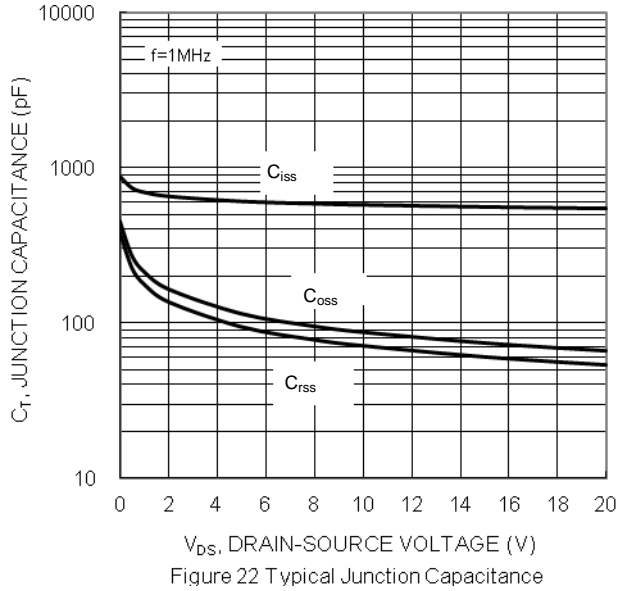
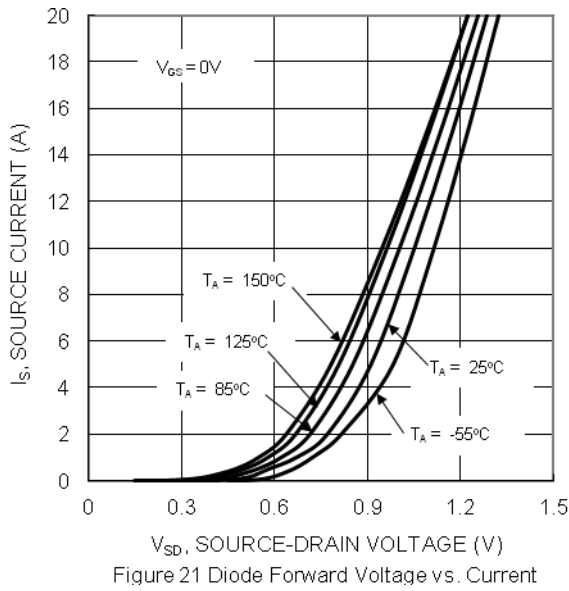
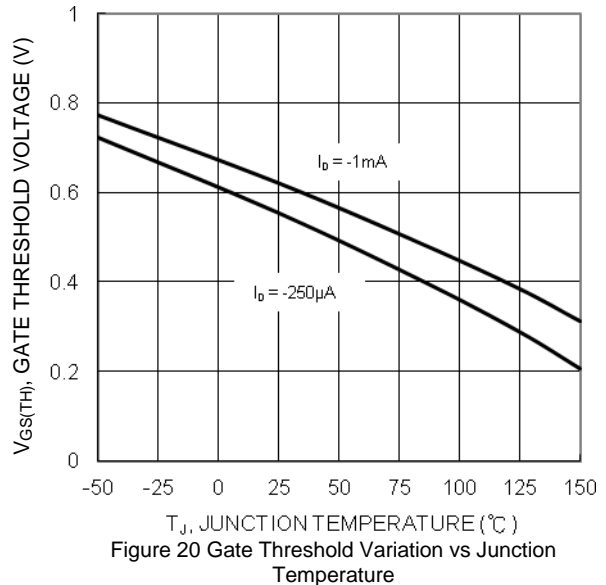
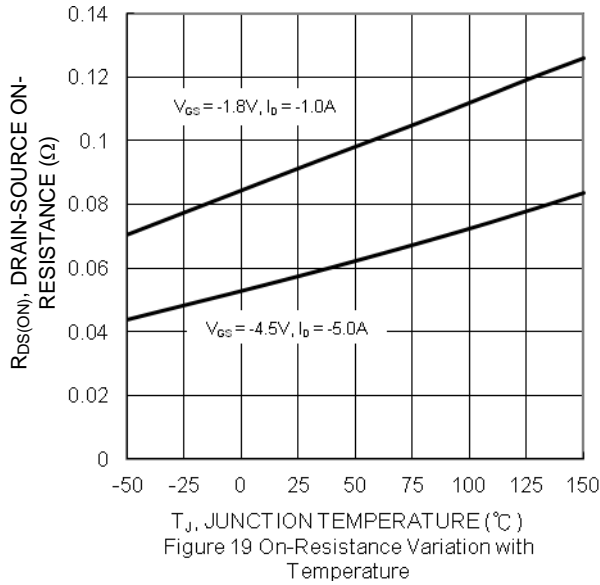
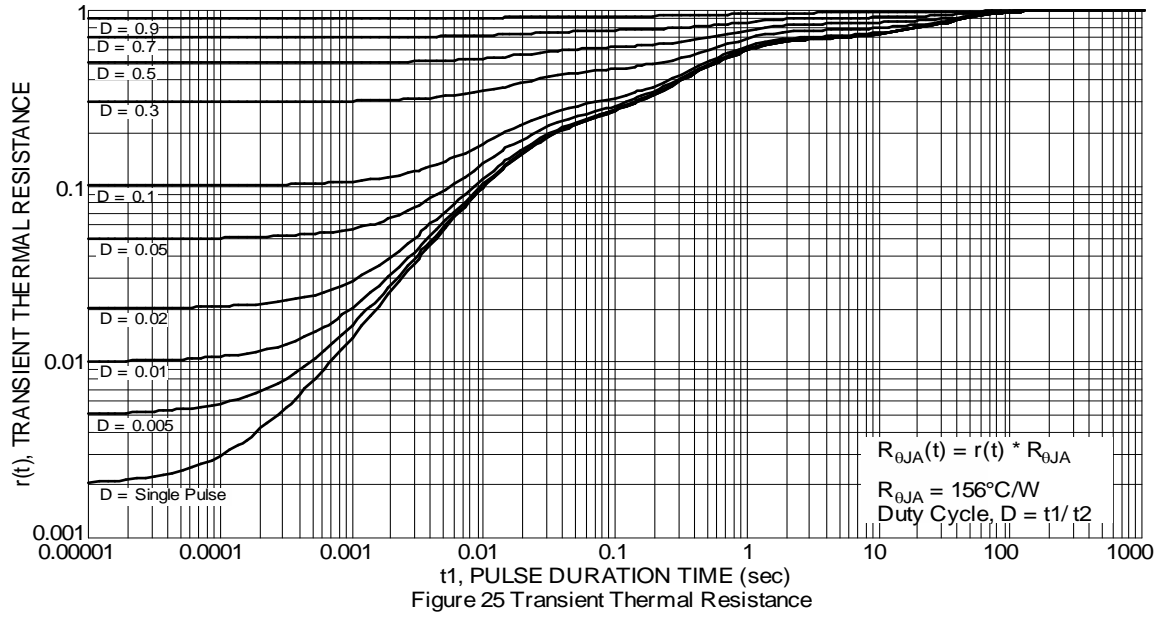


Figure 18 On-Resistance Variation with Temperature

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

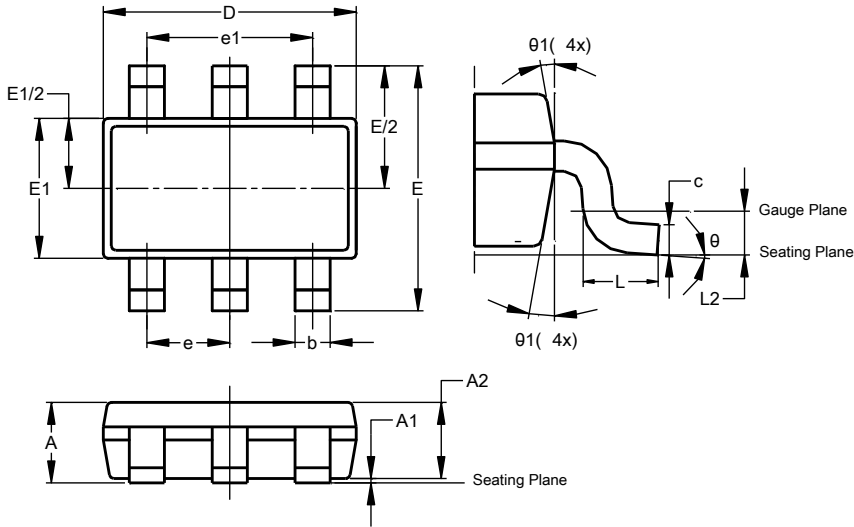




**Package Outline Dimensions**

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

**TSOT26**

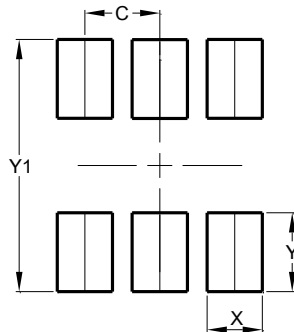


TSOT26			
Dim	Min	Max	Typ
A	–	1.00	–
A1	0.010	0.100	–
A2	0.840	0.900	–
D	2.800	3.000	2.900
E	2.800 BSC		
E1	1.500	1.700	1.600
b	0.300	0.450	–
c	0.120	0.200	–
e	0.950 BSC		
e1	1.900 BSC		
L	0.30	0.50	–
L2	0.250 BSC		
θ	0°	8°	4°
θ1	4°	12°	–
<b>All Dimensions in mm</b>			

**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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