Product Summary

Device	BV_{DSS}	$R_{DS(ON)}$	I_D T_A = +25°C
Q1 N-Channel	12V	25mΩ @ V_{GS} = 4.5V	6.1A
		32mΩ @ V_{GS} = 2.5V	5.4A
		40mΩ @ V_{GS} = 1.8V	4.9A
Q2 P-Channel	-20V	80mΩ @ V_{GS} = -4.5V	-3.5A
		100mΩ @ V_{GS} = -2.5V	-3.1A
		140mΩ @ V_{GS} = -1.8V	-2.6A
		210mΩ @ V_{GS} = -1.5V	-2.1A

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 or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Description

This new generation MOSFET is 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.

Applications

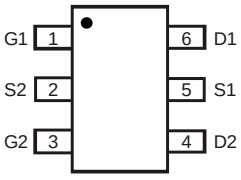
- Backlighting
- DC-DC Converters
- Power Management Functions

Mechanical Data

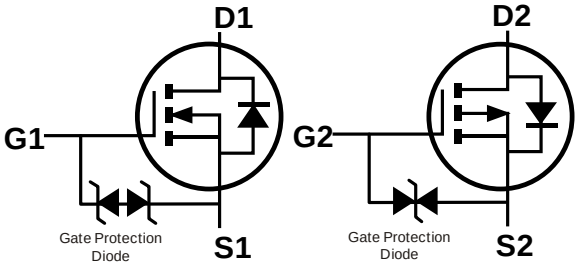
- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208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

TSOT26

Top View



Top View



Q1 N-Channel

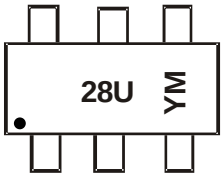
Q2 P-Channel

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 $\overline{Y}$= 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_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Q1 N-Channel	Q2 P-Channel	Unit
Drain-Source Voltage			V_{DSS}	12	-20	V
Gate-Source Voltage			V_{GSS}	±8	±8	V
Continuous Drain Current (Note 6) N-Channel: V_{GS} = 4.5V P-Channel: V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	6.1 4.7	-3.5 -2.7	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	1.4	-1.4	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	35	-20	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	0.8	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	157	°C/W
	t<5s		102	
Total Power Dissipation (Note 6)		P_D	1.2	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	108	°C/W
	t<5s		64	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	18	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics – Q1 N-CHANNEL (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	12	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1.0	µA	V_{DS} = 12V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.4	—	1	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	17	25	mΩ	V_{GS} = 4.5V, I_D = 5.2A
		—	21	32		V_{GS} = 2.5V, I_D = 4.8A
		—	30	40		V_{GS} = 1.8V, I_D = 2.5A
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{ISS}	—	787	—	pF	V_{DS} = 6V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{OSS}	—	203	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	177	—	pF	
Gate Resistance	R_G	—	4.8	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_G	—	10.5	—	nC	V_{DS} = 6V, I_D = 6.8A
Total Gate Charge (V_{GS} = 8V)		—	18.5	—	nC	
Gate-Source Charge	Q_{GS}	—	1.2	—	nC	
Gate-Drain Charge	Q_{GD}	—	2.9	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	4.6	—	ns	V_{DD} = 6V, V_{GS} = 4.5V, R_L = 1.1Ω, R_G = 1Ω
Turn-On Rise Time	t_R	—	9.4	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	15.7	—	ns	
Turn-Off Fall Time	t_F	—	3.7	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	12.0	—	ns	I_S = 5.4A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	1.8	—	nC	I_S = 5.4A, di/dt = 100A/µs

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

Electrical Characteristics – Q2 P-CHANNEL (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	-1.0	µA	V_{DS} = -20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.4	—	-1	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	55	80	mΩ	V_{GS} = -4.5V, I_D = -3.8A
		—	70	100		V_{GS} = -2.5V, I_D = -3.3A
		—	88	140		V_{GS} = -1.8V, I_D = -1.0A
		—	110	210		V_{GS} = -1.5V, I_D = -0.5A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{ISS}	—	576	—	pF	V_{DS} = -10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{OSS}	—	87	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	71	—	pF	
Gate Resistance	R_G	—	15	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_G	—	6.7	—	nC	V_{DS} = -10V, I_D = -4.9A
Total Gate Charge (V_{GS} = -8V)		—	11.5	—	nC	
Gate-Source Charge	Q_{GS}	—	1.0	—	nC	
Gate-Drain Charge	Q_{GD}	—	2.0	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	3.5	—	ns	V_{DD} = -10V, V_{GS} = -4.5V, R_L = 2.6Ω, R_G = 1Ω
Turn-On Rise Time	t_R	—	3.6	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	20.8	—	ns	
Turn-Off Fall Time	t_F	—	12.7	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	13.1	—	ns	I_S = -3.9A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	3.9	—	nC	I_S = -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

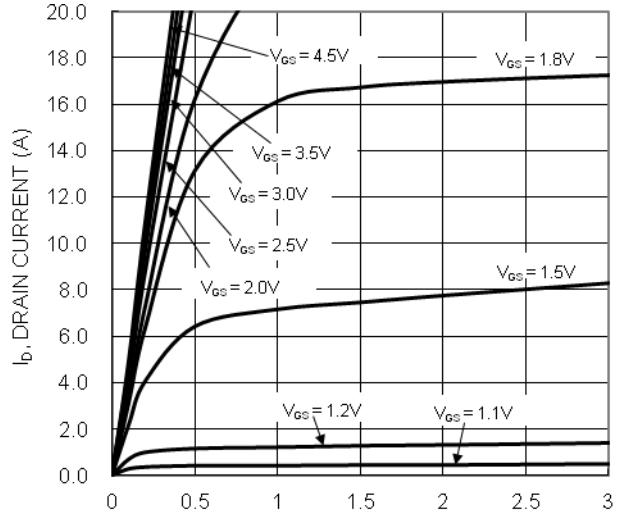


Figure 1 Typical Output Characteristic

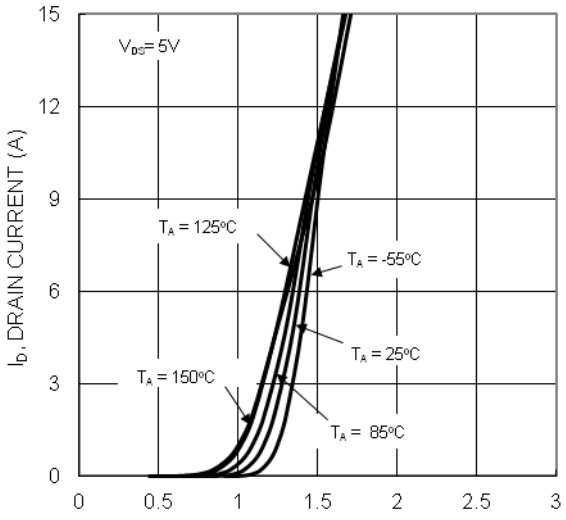


Figure 2 Typical Transfer Characteristic

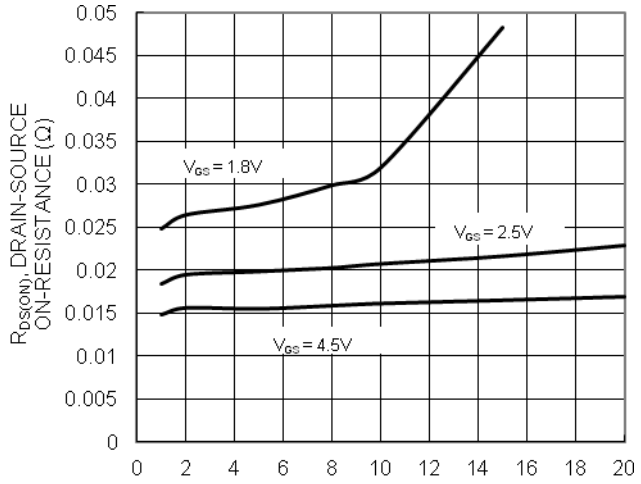


Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

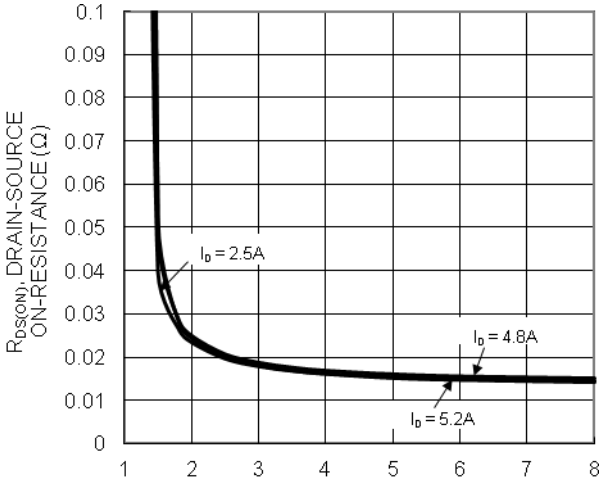


Figure 4 Typical Transfer Characteristic

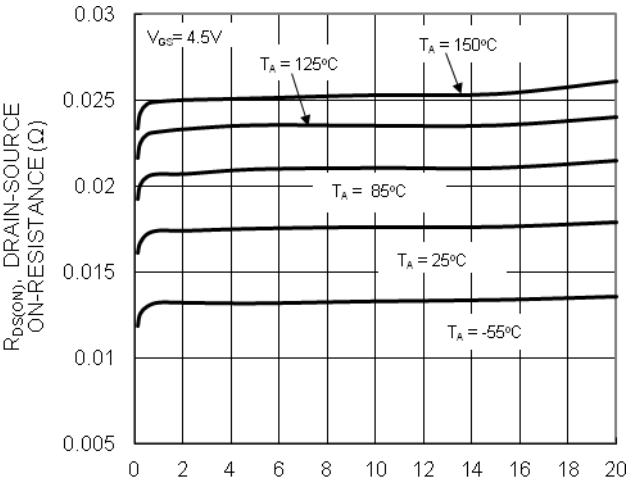


Figure 5 Typical On-Resistance vs Drain Current and Temperature

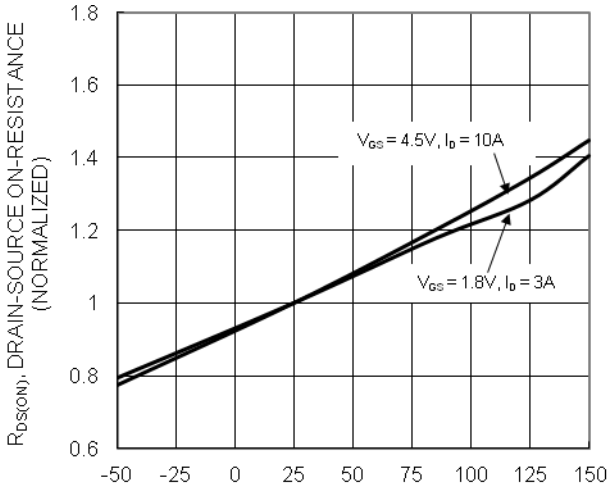


Figure 6 On-Resistance Variation with Temperature

Typical Characteristics – Q1 N-CHANNEL (continued)

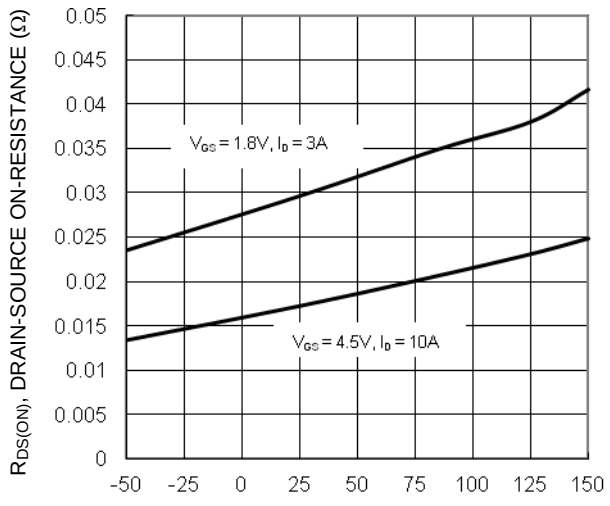


Figure 7 On-Resistance Variation with Temperature

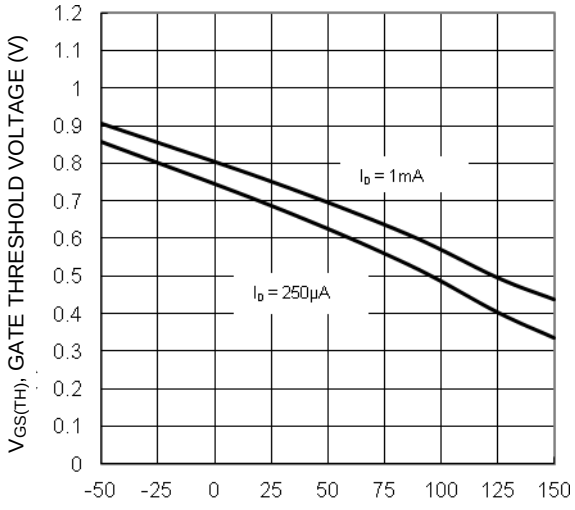


Figure 8 Gate Threshold Variation vs Junction Temperature

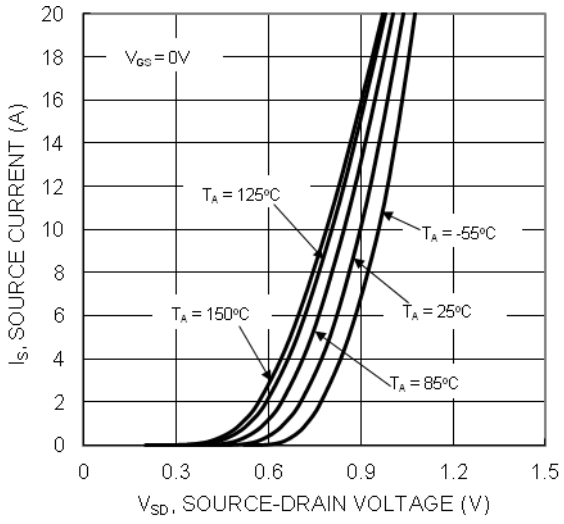


Figure 9 Diode Forward Voltage vs. Current

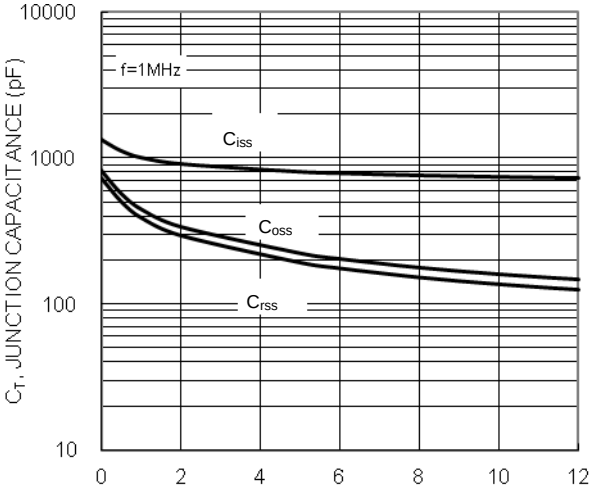
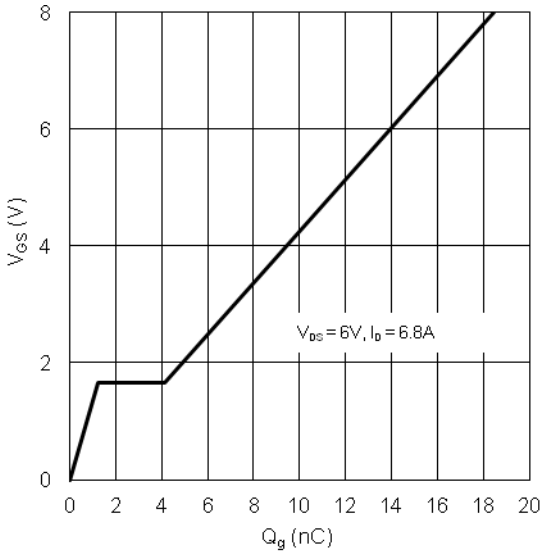


Figure 10 Typical Junction Capacitance



Fiure 11 Gate Charge

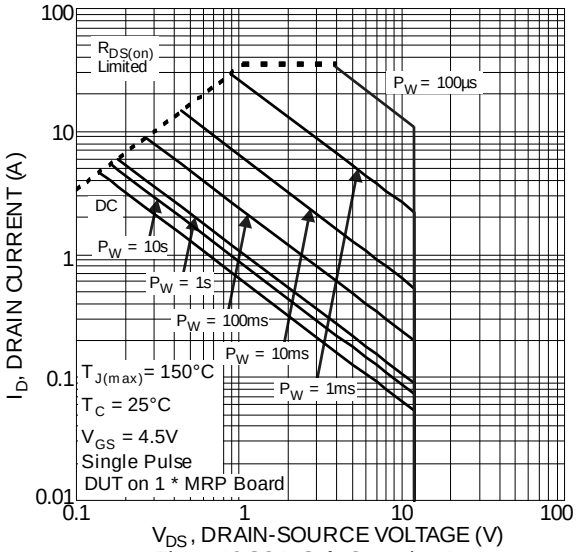


Figure 12 SOA, Safe Operation Area

Typical Characteristics – Q2 P-CHANNEL

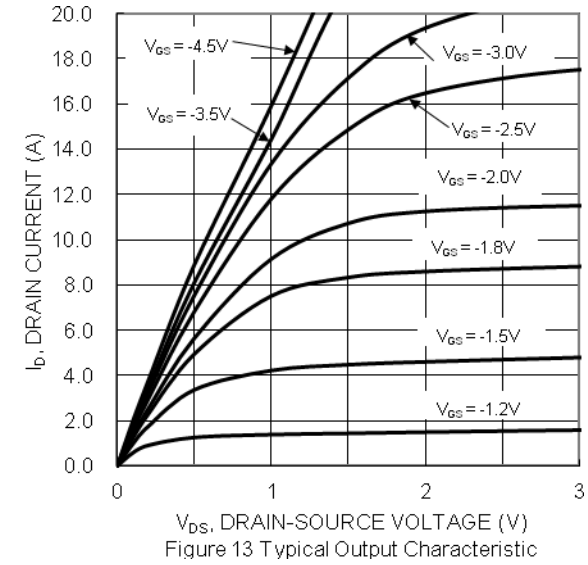


Figure 13 Typical Output Characteristic

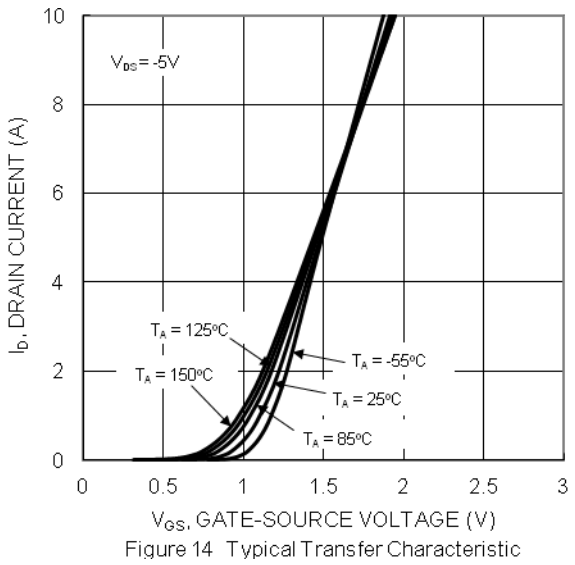


Figure 14 Typical Transfer Characteristic

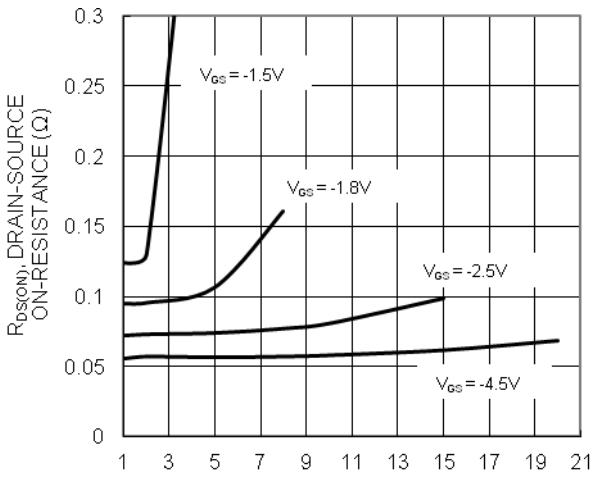


Figure 15 Typical On-Resistance vs Drain Current and Gate Voltage

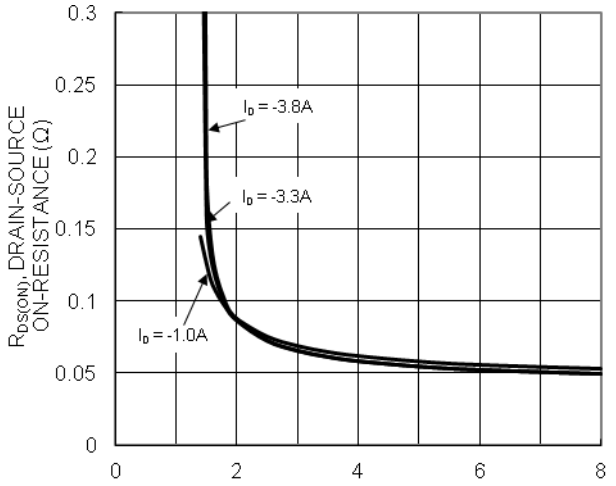


Figure 16 Typical Transfer Characteristic

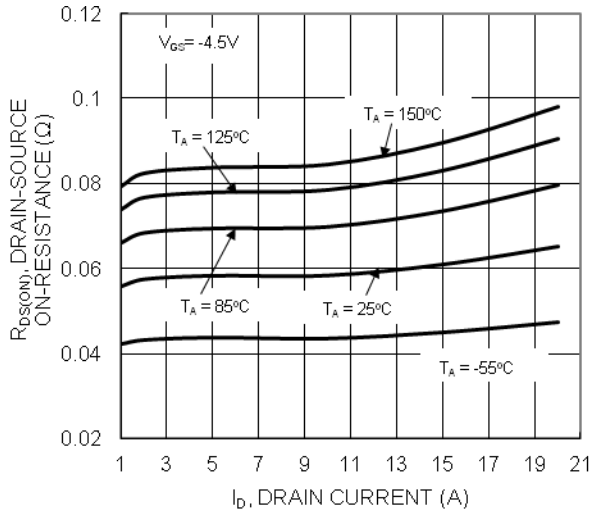


Figure 17 Typical On-Resistance vs Drain Current and Temperature

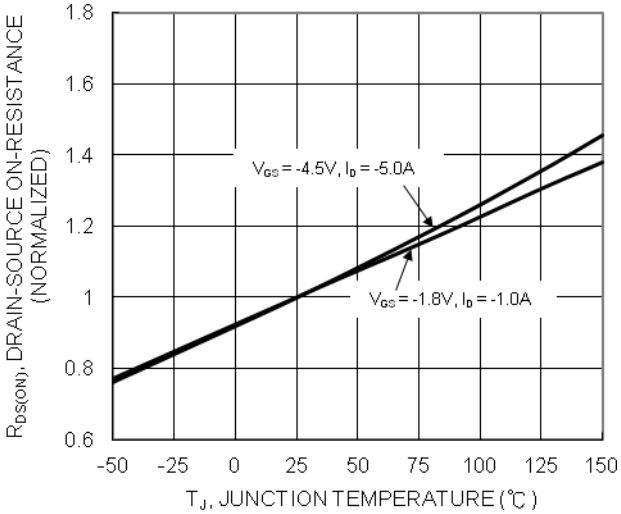


Figure 18 On-Resistance Variation with Temperature

Typical Characteristics – Q2 P-CHANNEL (continued)

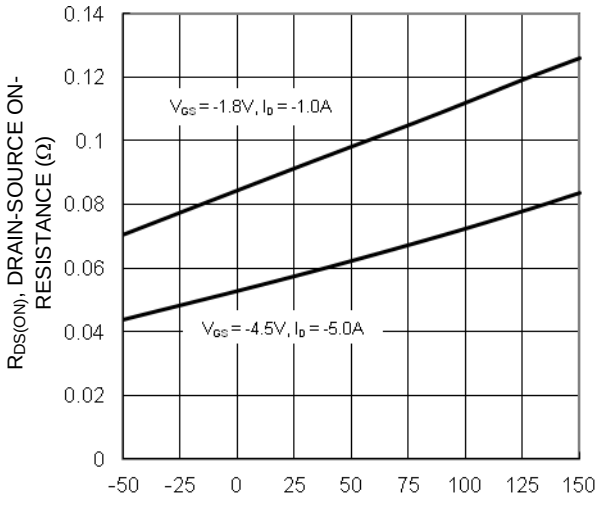


Figure 19 On-Resistance Variation with Temperature

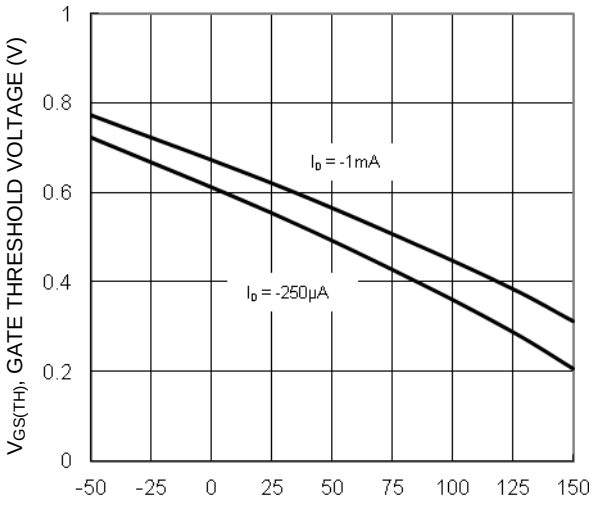


Figure 20 Gate Threshold Variation vs Junction Temperature

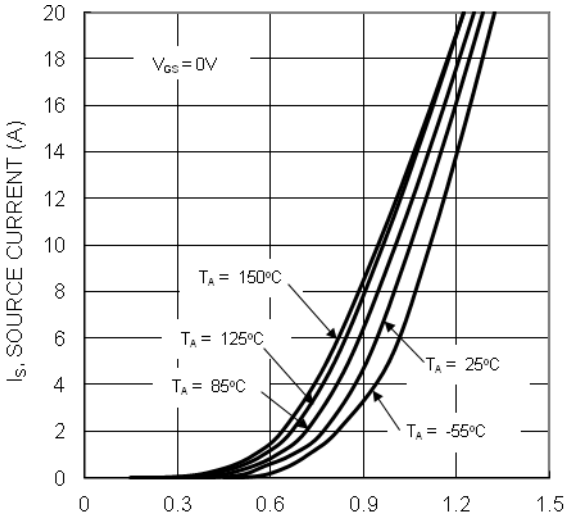


Figure 21 Diode Forward Voltage vs. Current

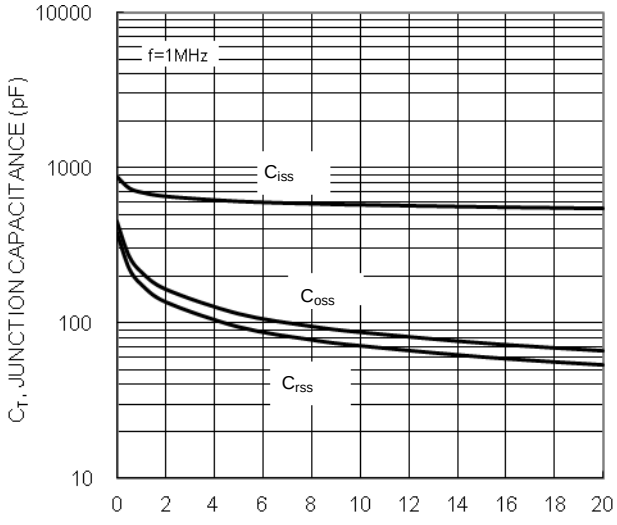


Figure 22 Typical Junction Capacitance

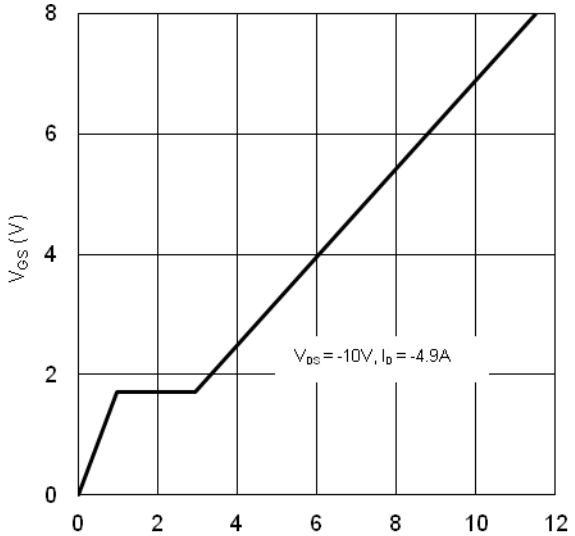


Figure 23 Gate Charge

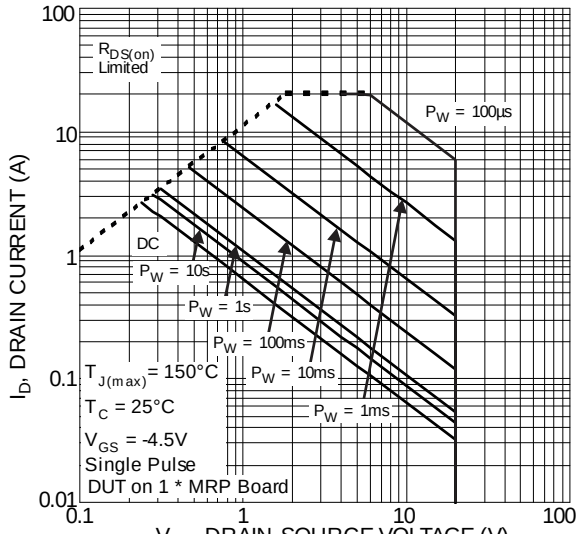


Figure 24 SOA, Safe Operation Area

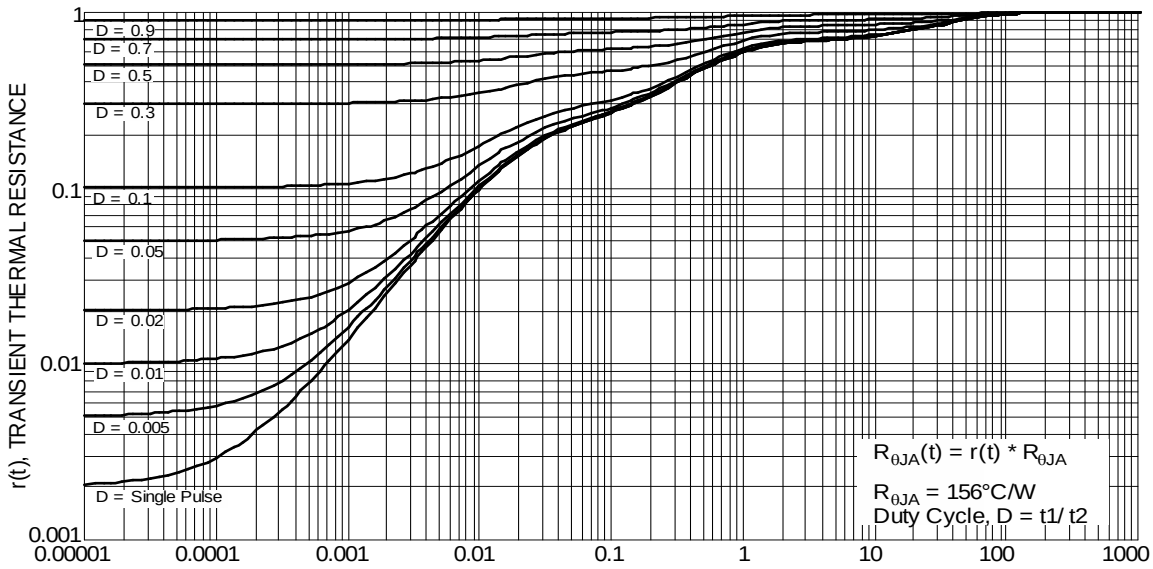
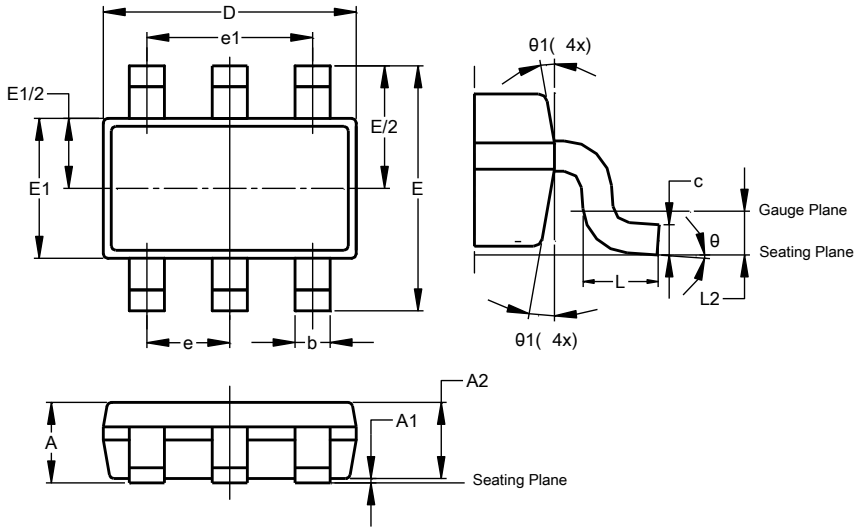


Figure 25 Transient Thermal Resistance

Package Outline Dimensions

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

TSOT26

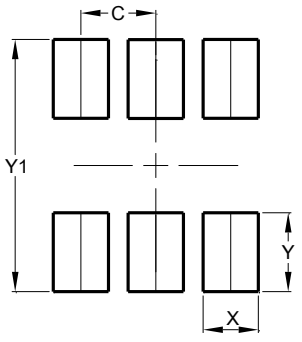


TSOT26			
Dim	**Min**	**Max**	**Typ**
A	–	1.00	–
A1	0.010	0.100	–
A2	0.840	0.900	–
D	2.800	3.000	2.900
E	2.800 BSC		
E1	1.500	1.700	1.600
b	0.300	0.450	–
c	0.120	0.200	–
e	0.950 BSC		
e1	1.900 BSC		
L	0.30	0.50	–
L2	0.250 BSC		
θ	0°	8°	4°
θ1	4°	12°	–
All Dimensions in mm			

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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1. are intended to implant into the body, or

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.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

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