

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

Device	$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = +25^\circ C$
Q1	30V	60mΩ @ $V_{GS} = 10V$	3.4A
		100mΩ @ $V_{GS} = 4.5V$	2.7A
Q2	-30V	95mΩ @ $V_{GS} = -10V$	-2.8A
		140mΩ @ $V_{GS} = -4.5V$	-2.3A

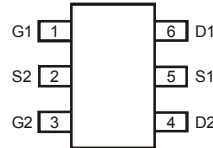
**Description and Applications**

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.

- Backlighting
- DC-DC Converters
- Power Management Functions



Top View



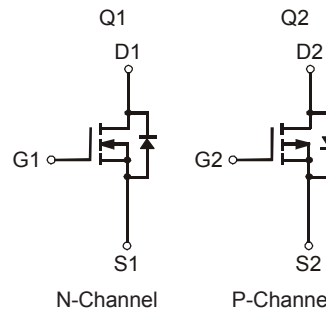
Top View

**Features and Benefits**

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

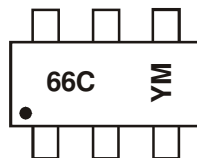
**Mechanical Data**

- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.013 grams (Approximate)


**Ordering Information** (Note 5)

Part Number	Case	Packaging
DMG6602SVTQ-7	TSOT26	3,000 / Tape & Reel
DMG6602SVTQ-13	TSOT26	10,000 / Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


66C = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: X = 2010)  
 M = Month (ex: 9 = September)

## Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Code	X	Y	Z	A	B	C	D	E	F	G	H

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 – Q1** (@TA = +25°C unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	30	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 7) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	3.4	A
		T <sub>A</sub> = +70°C		2.7	
Continuous Drain Current (Note 7) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	2.7	A
		T <sub>A</sub> = +70°C		2.2	
Maximum Continuous Body Diode Forward Current (Note 5)			I <sub>S</sub>	1.5	A
Pulsed Drain Current (Note 5)			I <sub>DM</sub>	25	A

**Maximum Ratings – Q2** (@TA = +25°C unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	-30	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 7) V <sub>GS</sub> = -10V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	-2.8	A
		T <sub>A</sub> = +70°C		-2.4	
Continuous Drain Current (Note 7) V <sub>GS</sub> = -4.5V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	-2.3	A
		T <sub>A</sub> = +70°C		-2.1	
Maximum Continuous Body Diode Forward Current (Note 7)			I <sub>S</sub>	-1.5	A
Pulsed Drain Current (Note 7)			I <sub>D</sub>	-20	A

**Thermal Characteristics**

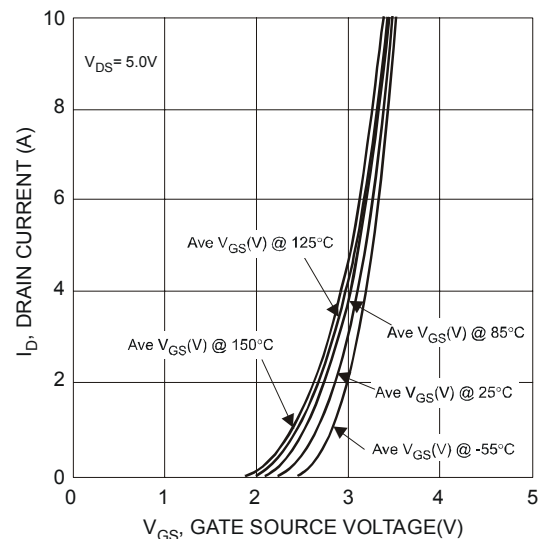
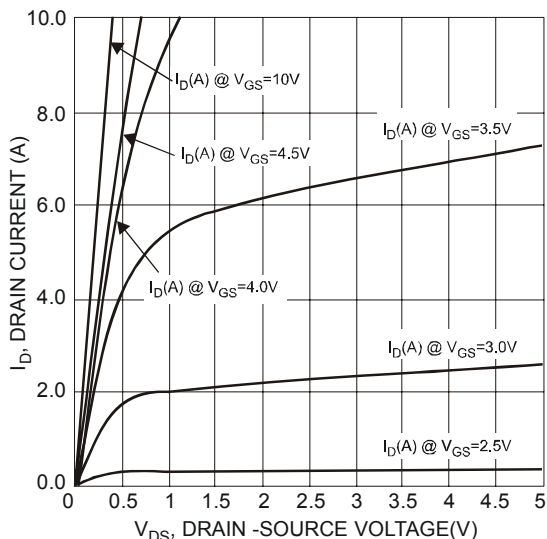
Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	0.84	W
	T <sub>A</sub> = +70°C		0.52	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	155	°C/W
	t < 10s		109	
Total Power Dissipation (Note 7)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.27	W
	T <sub>A</sub> = +70°C		0.8	
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	R <sub>θJA</sub>	102	°C/W
	t < 10s		71	
Thermal Resistance, Junction to Case (Note 7)		R <sub>θJC</sub>	34	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes: 6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.  
7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

**Electrical Characteristics – Q1 NMOS** (@ T<sub>A</sub> = +25°C unless otherwise stated.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	1.0	μA	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	-	2.3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	-	38 55	60 100	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.1A V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2A
Forward Transfer Admittance	Y <sub>fs</sub>	-	4	-	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 3.1A
Diode Forward Voltage	V <sub>SD</sub>	-	0.8	1	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iSS</sub>	-	290	400	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.2MHz
Output Capacitance	C <sub>oSS</sub>	-	40	80		
Reverse Transfer Capacitance	C <sub>rSS</sub>	-	40	80		
Gate Resistance	R <sub>g</sub>	-	1.4	-	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>	-	4	6	nC	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3.1A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	-	9	13		
Gate-Source Charge	Q <sub>gs</sub>	-	1.2	-		
Gate-Drain Charge	Q <sub>gd</sub>	-	1.5	-		
Turn-On Delay Time	t <sub>D(on)</sub>	-	3	-	ns	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 15V, R <sub>G</sub> = 3Ω, R <sub>L</sub> = 4.7Ω
Turn-On Rise Time	t <sub>r</sub>	-	5	-		
Turn-Off Delay Time	t <sub>D(off)</sub>	-	13	-		
Turn-Off Fall Time	t <sub>f</sub>	-	3	-		

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



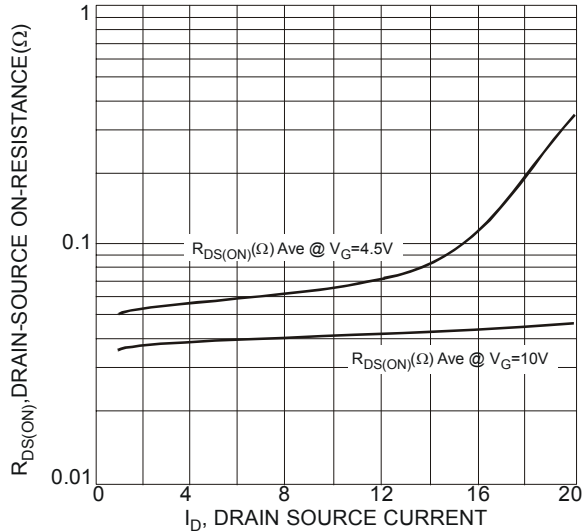


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

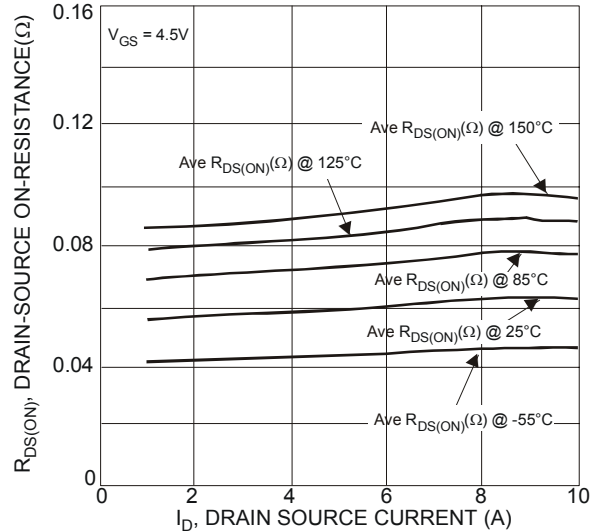


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

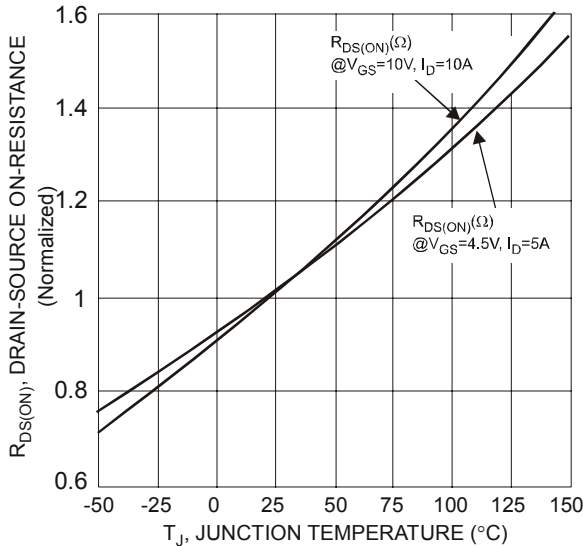


Fig. 5 On-Resistance Variation with Temperature

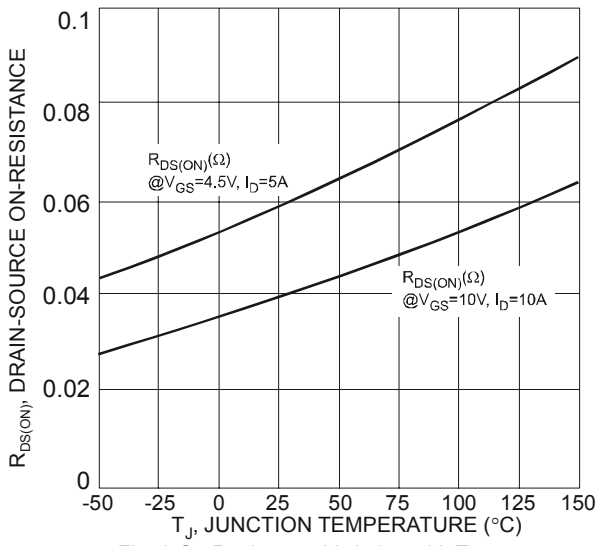


Fig. 6 On-Resistance Variation with Temperature

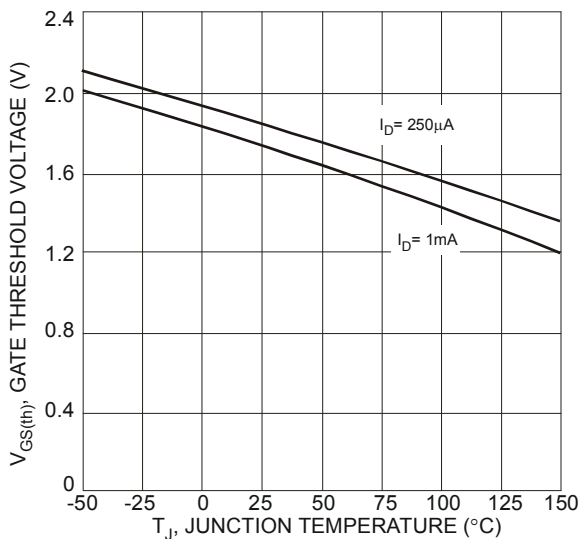


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

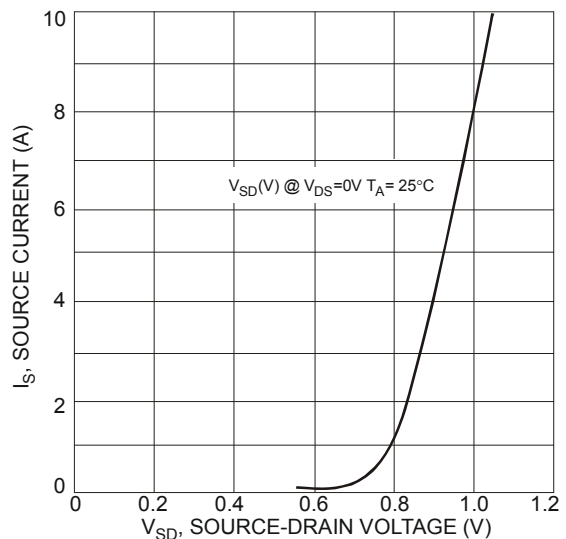
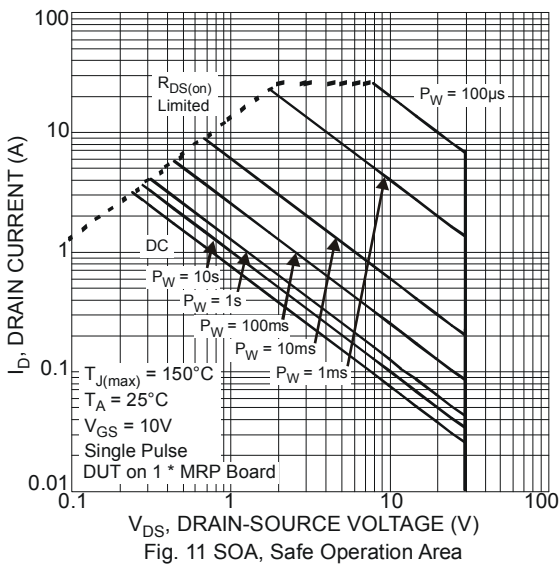
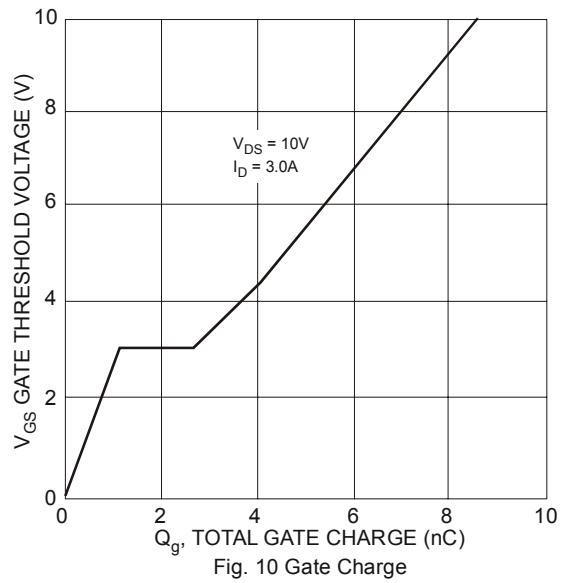
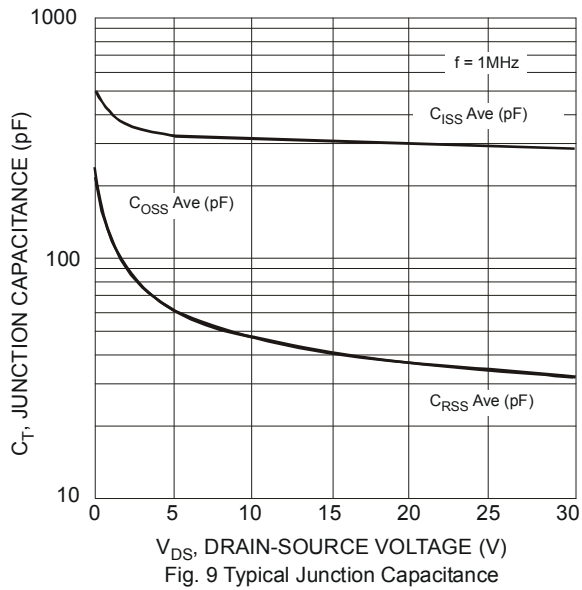


Fig. 8 Diode Forward Voltage vs. Current



**Electrical Characteristics – Q2 PMOS** (@ T<sub>A</sub> = +25°C unless otherwise stated.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-30	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	-1.0	μA	V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-1.0	-	-2.3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	73 99	95 140	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.7A V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2A
Forward Transfer Admittance	Y <sub>fs</sub>	-	6	-	S	V <sub>DS</sub> = -5V, I <sub>D</sub> = -2.7A
Diode Forward Voltage	V <sub>SD</sub>	-	-0.8	-1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	-	350	420	pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1.2MHz
Output Capacitance	C <sub>oss</sub>	-	50	100		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	45	80		
Gate Resistance	R <sub>g</sub>	-	17.1	-	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>	-	4	6	nC	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3A
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>g</sub>	-	7	9		
Gate-Source Charge	Q <sub>gs</sub>	-	0.9	-		
Gate-Drain Charge	Q <sub>gd</sub>	-	1.2	-	ns	V <sub>GS</sub> = -10V, V <sub>DS</sub> = -15V, R <sub>G</sub> = 6Ω, R <sub>L</sub> = 15Ω
Turn-On Delay Time	t <sub>D(on)</sub>	-	4.8	-		
Turn-On Rise Time	t <sub>r</sub>	-	7.3	-		
Turn-Off Delay Time	t <sub>D(off)</sub>	-	20	-		
Turn-Off Fall Time	t <sub>f</sub>	-	13	-		

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

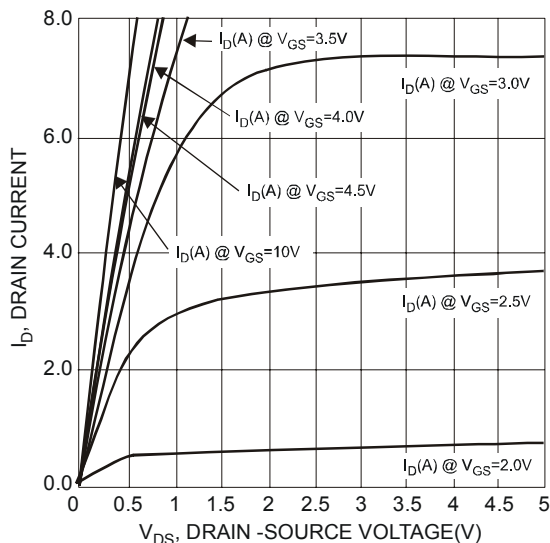


Fig. 12 Typical Output Characteristics

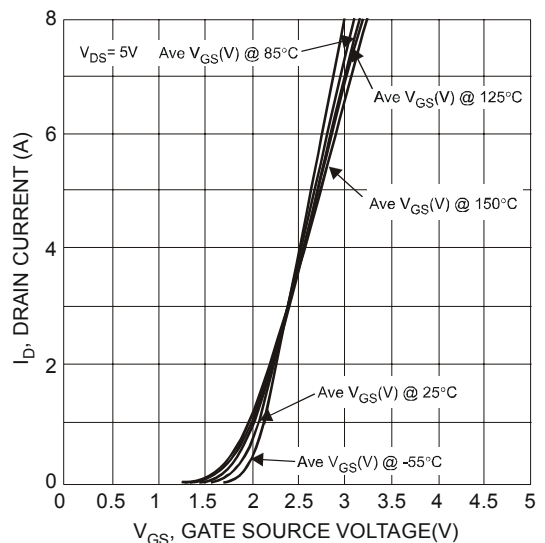


Fig. 13 Typical Transfer Characteristics

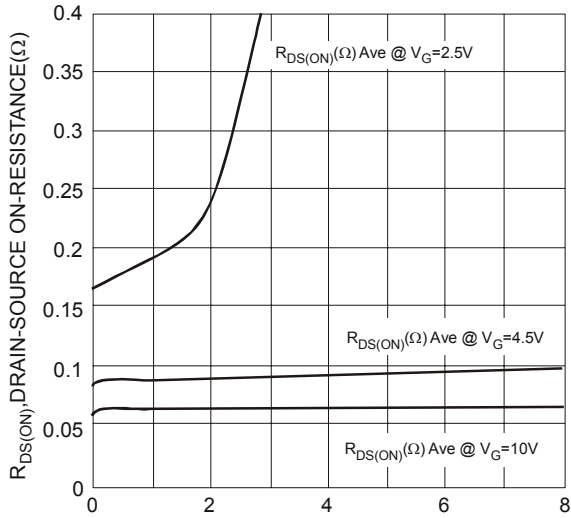


Fig. 14 Typical On-Resistance vs. Drain Current and Gate Voltage

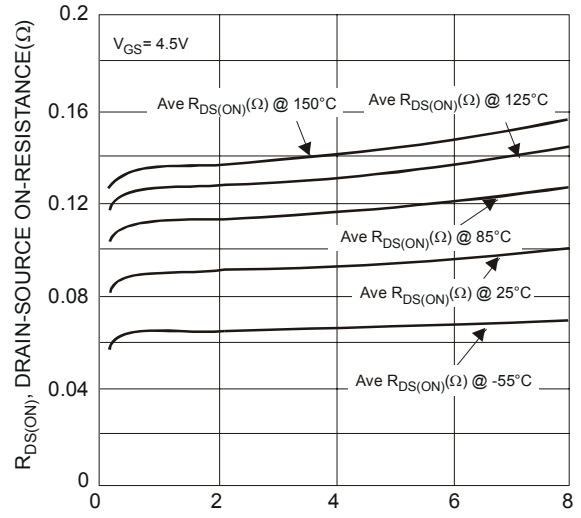


Fig. 15 Typical On-Resistance vs. Drain Current and Temperature

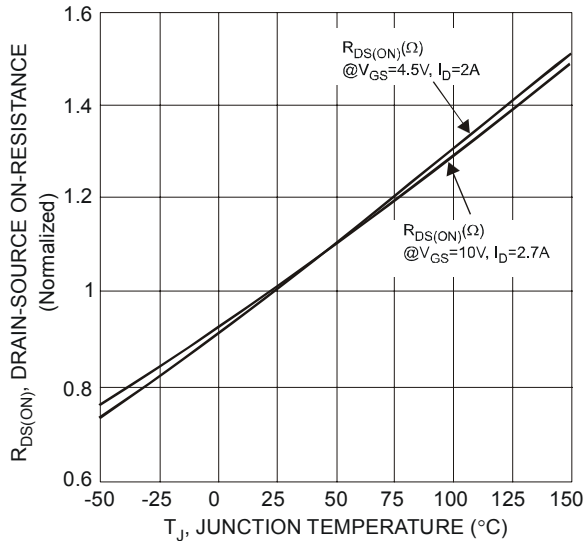


Fig. 16 On-Resistance Variation with Temperature

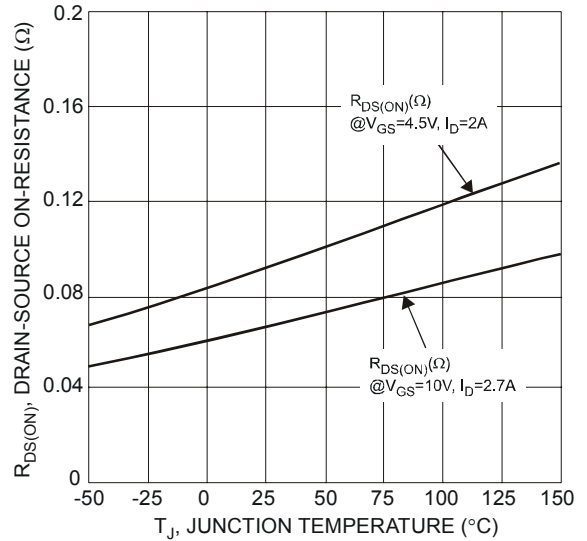


Fig. 17 On-Resistance Variation with Temperature

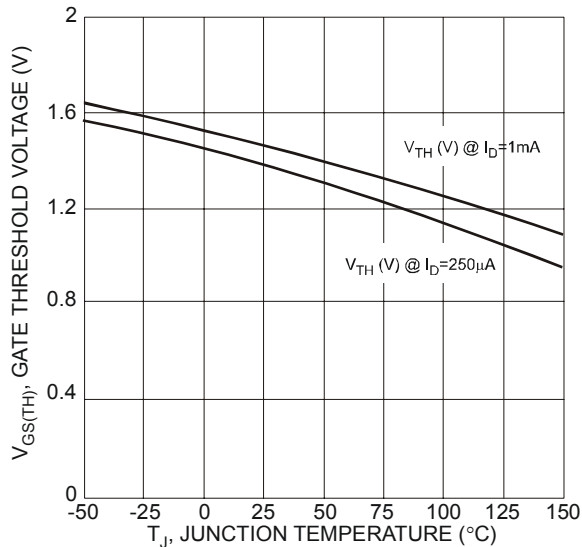


Fig. 18 Gate Threshold Variation vs. Ambient Temperature

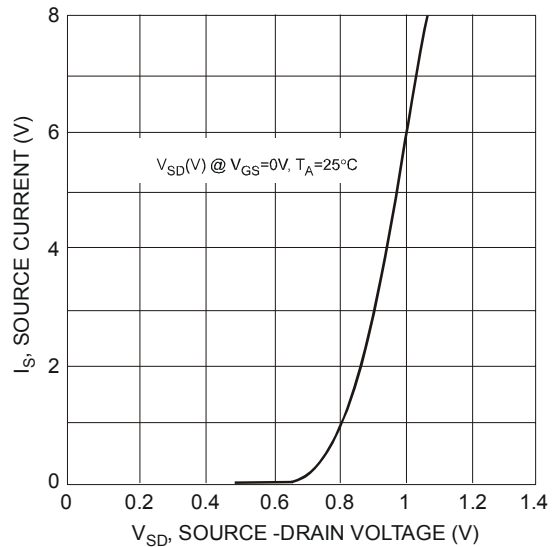
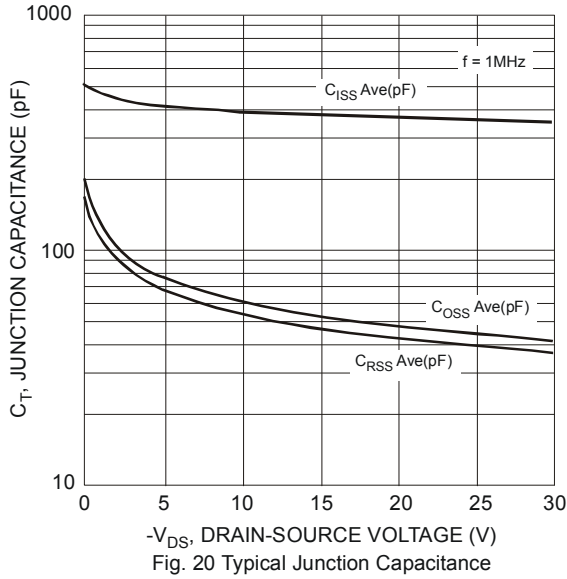


Fig. 19 Diode Forward Voltage vs. Current



-V<sub>DS</sub>, DRAIN-SOURCE VOLTAGE (V)  
Fig. 20 Typical Junction Capacitance

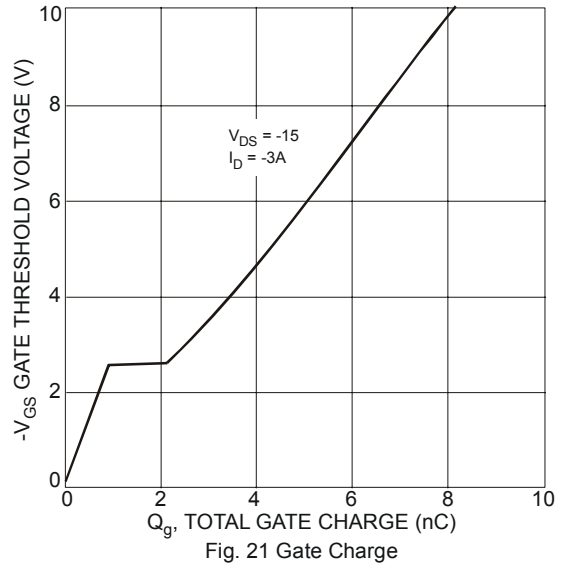
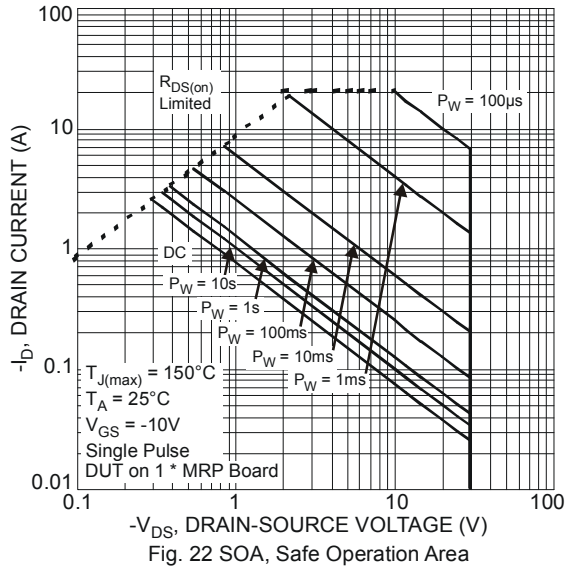


Fig. 21 Gate Charge



-V<sub>DS</sub>, DRAIN-SOURCE VOLTAGE (V)  
Fig. 22 SOA, Safe Operation Area

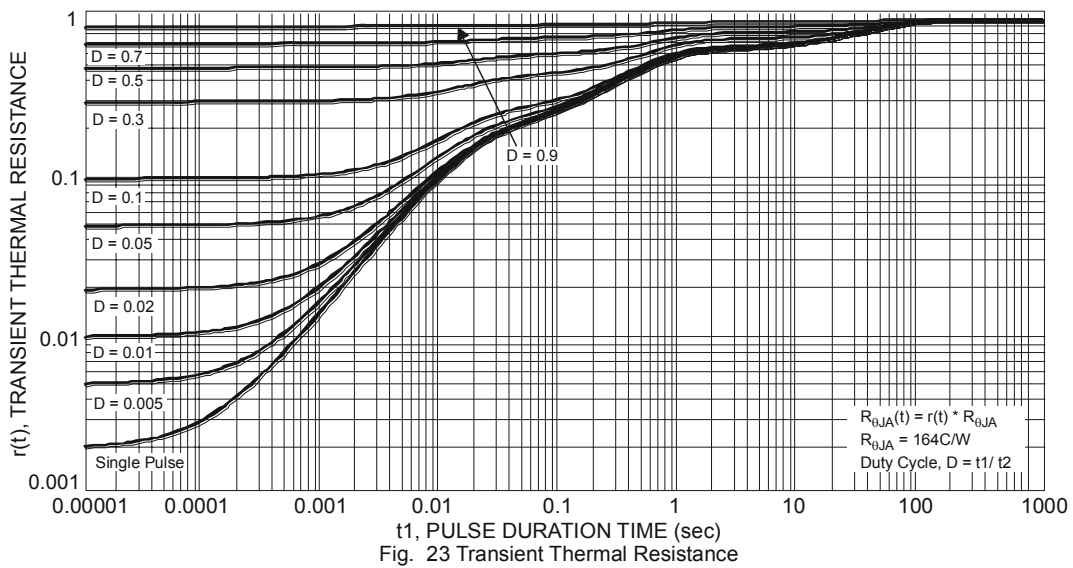
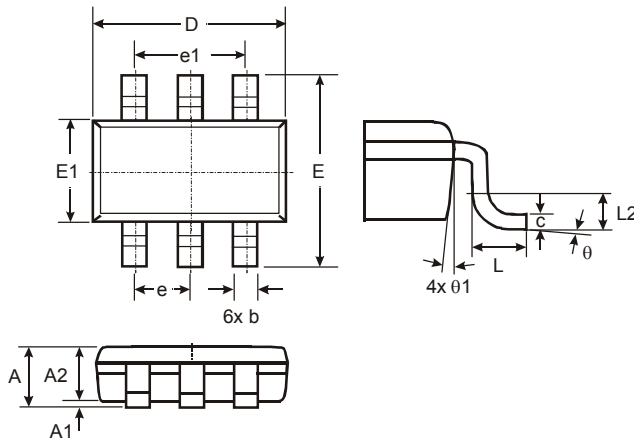


Fig. 23 Transient Thermal Resistance



**Package Outline Dimensions**

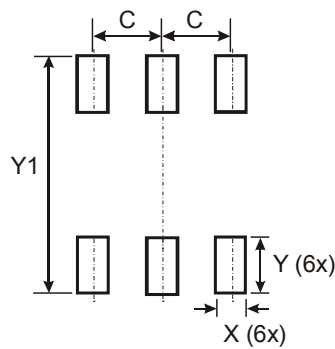
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



TSOT26			
Dim	Min	Max	Typ
A	-	1.00	-
A1	0.01	0.10	-
A2	0.84	0.90	-
D	-	-	2.90
E	-	-	2.80
E1	-	-	1.60
b	0.30	0.45	-
c	0.12	0.20	-
e	-	-	0.95
e1	-	-	1.90
L	0.30	0.50	-
L2	-	-	0.25
theta	0°	8°	4°
theta1	4°	12°	-
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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

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