

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

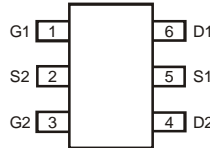
Description and Applications

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



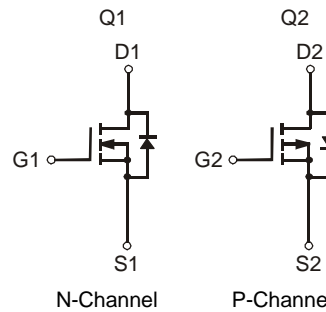
Top View

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)**

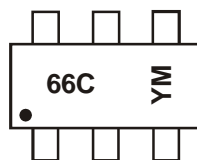
Mechanical Data

- 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 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/.
 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 _{DSS}	30	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 7) V _{GS} = 10V	Steady State	T _A = +25°C	I _D	3.4	A
		T _A = +70°C		2.7	
Continuous Drain Current (Note 7) V _{GS} = 4.5V	Steady State	T _A = +25°C	I _D	2.7	A
		T _A = +70°C		2.2	
Maximum Continuous Body Diode Forward Current (Note 5)			I _S	1.5	A
Pulsed Drain Current (Note 5)			I _{DM}	25	A

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-30	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 7) V _{GS} = -10V	Steady State	T _A = +25°C	I _D	-2.8	A
		T _A = +70°C		-2.4	
Continuous Drain Current (Note 7) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _D	-2.3	A
		T _A = +70°C		-2.1	
Maximum Continuous Body Diode Forward Current (Note 7)			I _S	-1.5	A
Pulsed Drain Current (Note 7)			I _D	-20	A

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	0.84	W
	T _A = +70°C		0.52	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	155	°C/W
	t < 10s		109	
Total Power Dissipation (Note 7)	T _A = +25°C	P _D	1.27	W
	T _A = +70°C		0.8	
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	R _{θJA}	102	°C/W
	t < 10s		71	
Thermal Resistance, Junction to Case (Note 7)		R _{θJC}	34	
Operating and Storage Temperature Range		T _J , T _{STG}	-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 (@ $T_A = +25^\circ\text{C}$ unless otherwise stated.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1.0	μA	$V_{DS} = 24V, V_{GS} = 0V$
Gate-Source Leakage	I_{GSS}	-	-	± 100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	-	2.3	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	38	60	m Ω	$V_{GS} = 10V, I_D = 3.1A$
			55	100		$V_{GS} = 4.5V, I_D = 2A$
Forward Transfer Admittance	$ Y_{fs} $	-	4	-	S	$V_{DS} = 5V, I_D = 3.1A$
Diode Forward Voltage	V_{SD}	-	0.8	1	V	$V_{GS} = 0V, I_S = 1A$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	-	290	400	pF	$V_{DS} = 15V, V_{GS} = 0V, f = 1.2MHz$
Output Capacitance	C_{oss}	-	40	80		
Reverse Transfer Capacitance	C_{rss}	-	40	80		
Gate Resistance	R_g	-	1.4	-	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$
Total Gate Charge ($V_{GS} = 4.5V$)	Q_g	-	4	6	nC	$V_{DS} = 15V, V_{GS} = 4.5V, I_D = 3.1A$
Total Gate Charge ($V_{GS} = 10V$)	Q_g	-	9	13		
Gate-Source Charge	Q_{gs}	-	1.2	-		
Gate-Drain Charge	Q_{gd}	-	1.5	-		
Turn-On Delay Time	$t_{D(on)}$	-	3	-	ns	$V_{GS} = 10V, V_{DS} = 15V, R_G = 3\Omega, R_L = 4.7\Omega$
Turn-On Rise Time	t_r	-	5	-		
Turn-Off Delay Time	$t_{D(off)}$	-	13	-		
Turn-Off Fall Time	t_f	-	3	-		

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

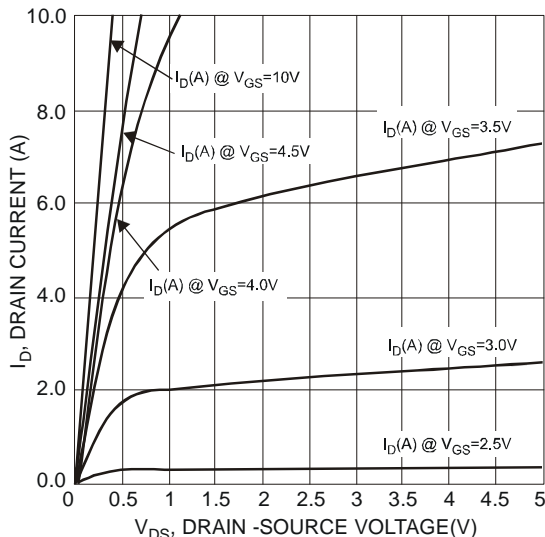


Fig. 1 Typical Output Characteristics

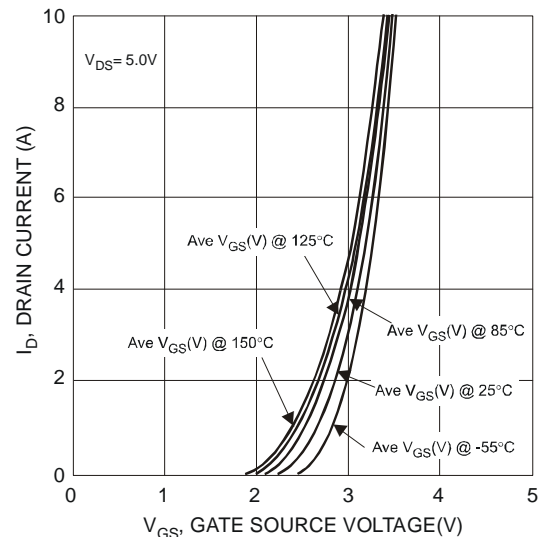


Fig. 2 Typical Transfer Characteristics

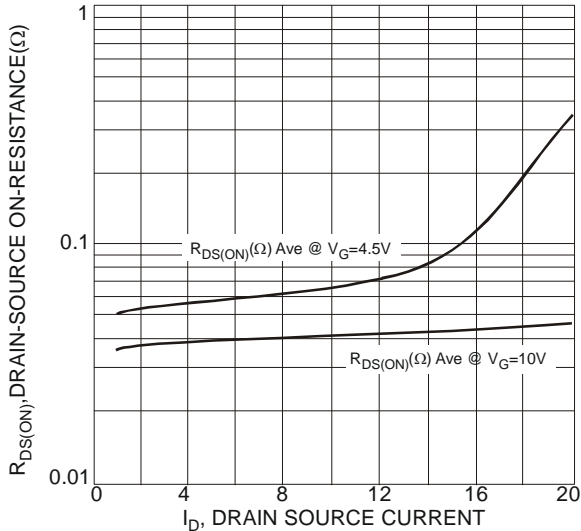


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

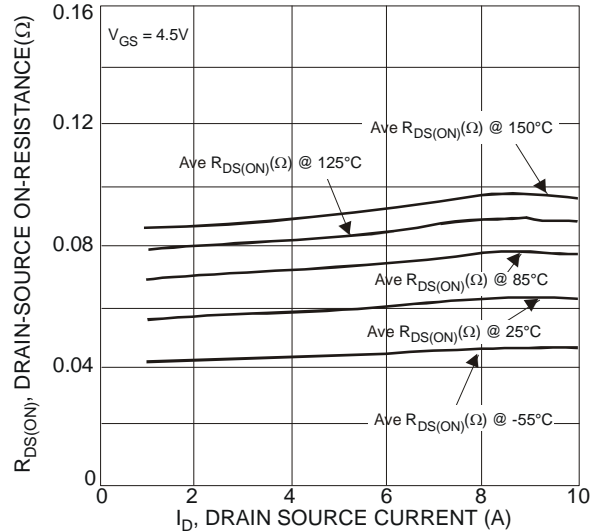


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

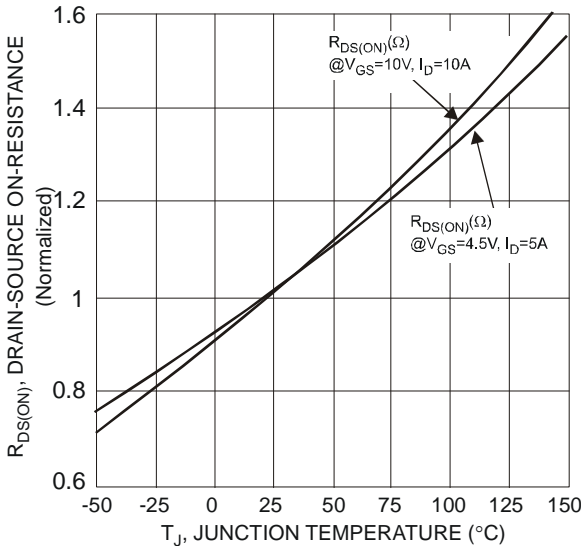


Fig. 5 On-Resistance Variation with Temperature

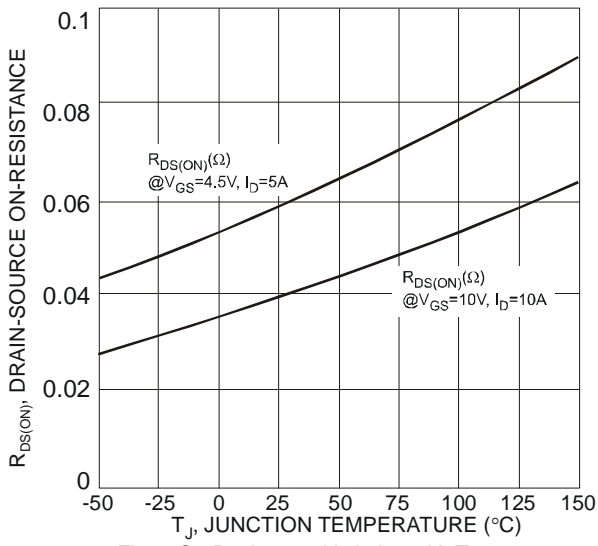


Fig. 6 On-Resistance Variation with Temperature

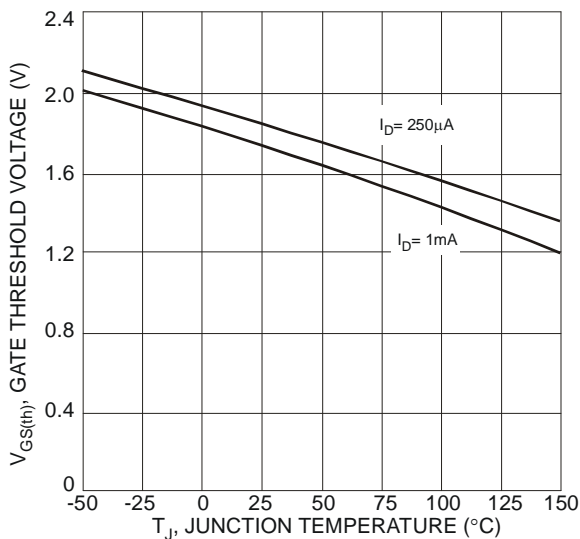


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

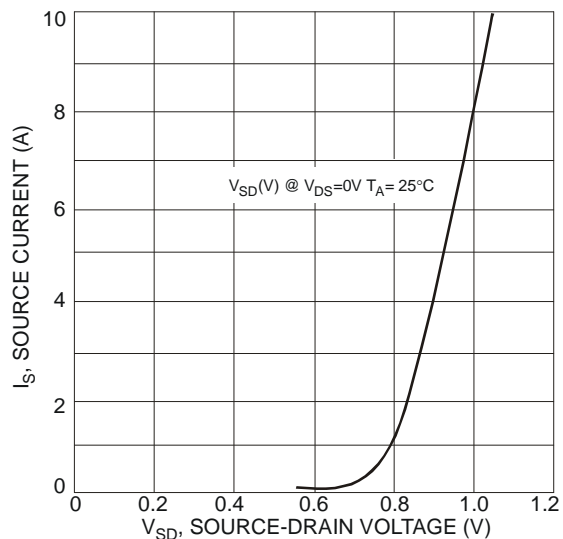
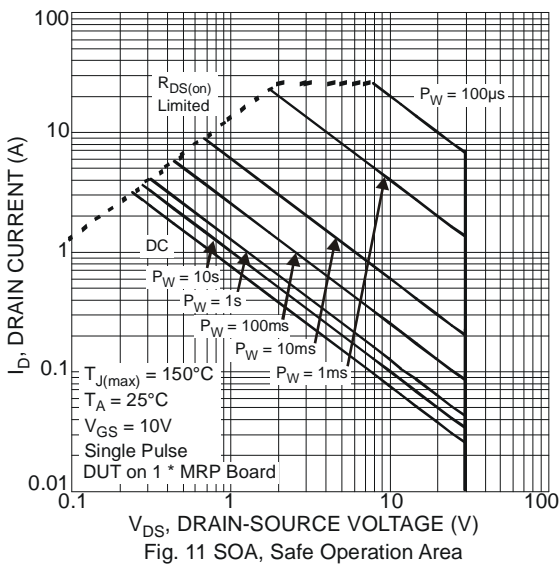
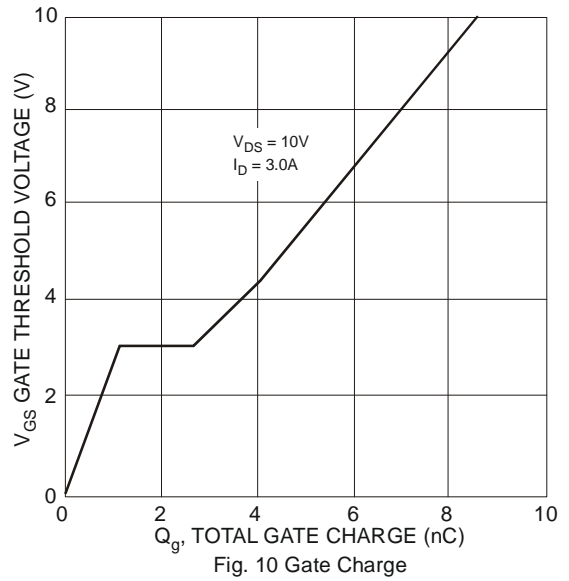
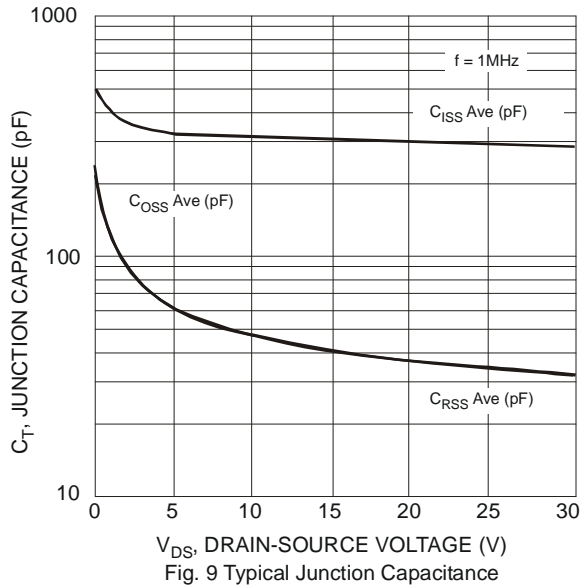


Fig. 8 Diode Forward Voltage vs. Current



Electrical Characteristics – Q2 PMOS (@ T_A = +25°C unless otherwise stated.)

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

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

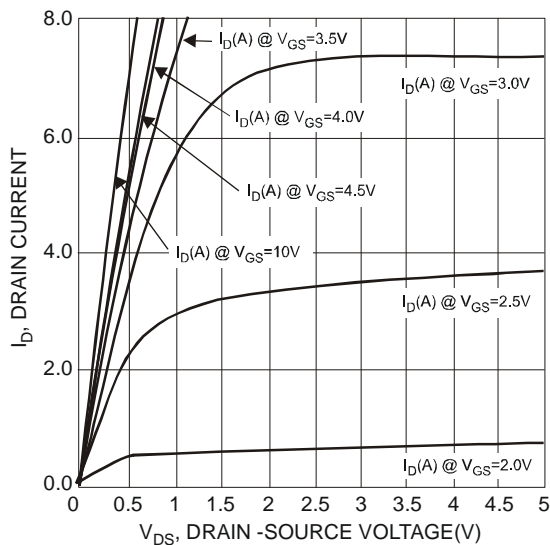


Fig. 12 Typical Output Characteristics

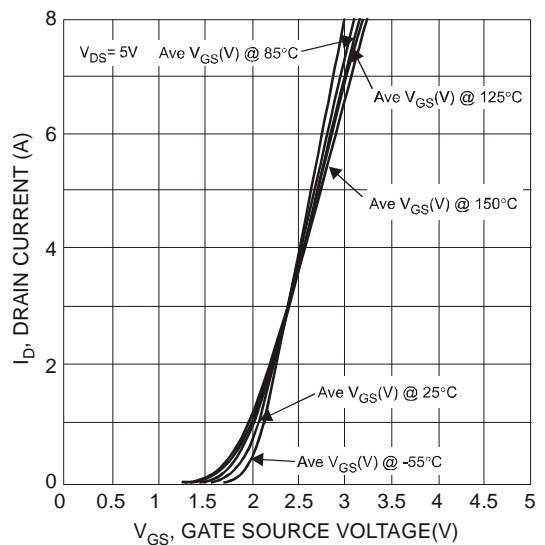


Fig. 13 Typical Transfer Characteristics

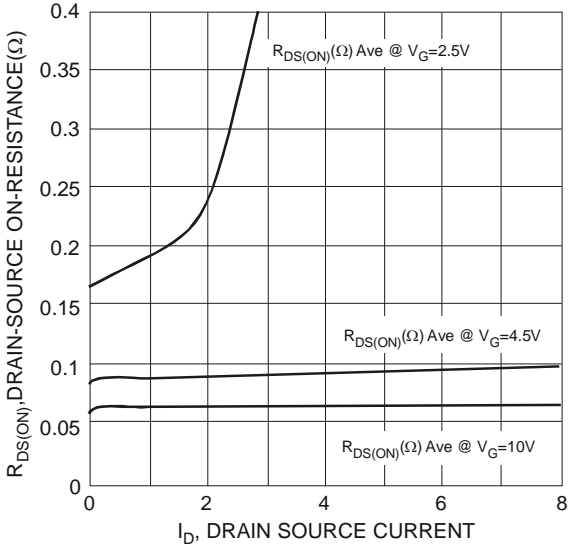


Fig. 14 Typical On-Resistance vs. Drain Current and Gate Voltage

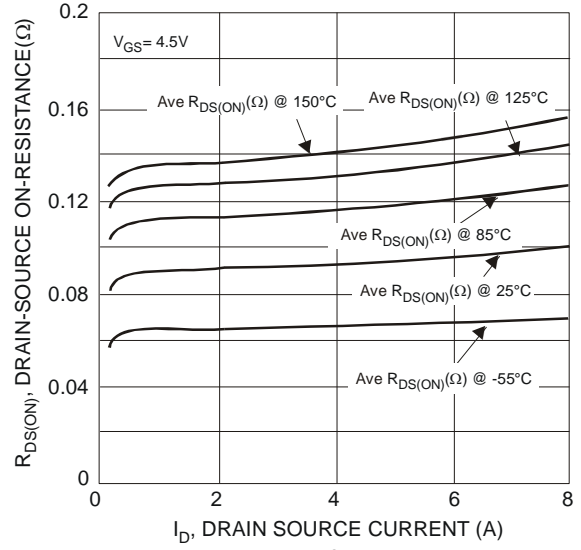


Fig. 15 Typical On-Resistance vs. Drain Current and Temperature

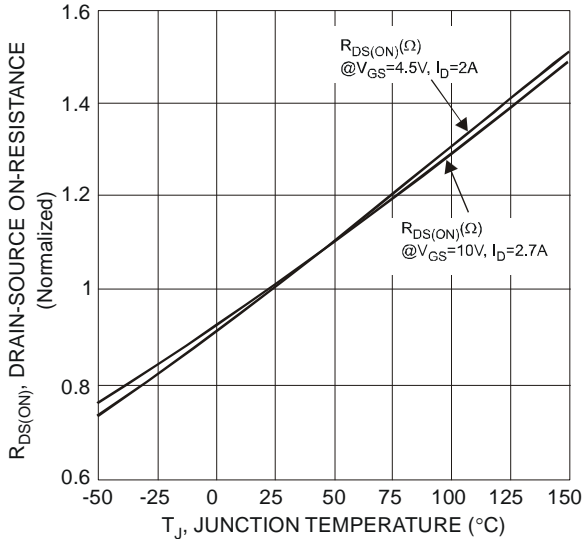


Fig. 16 On-Resistance Variation with Temperature

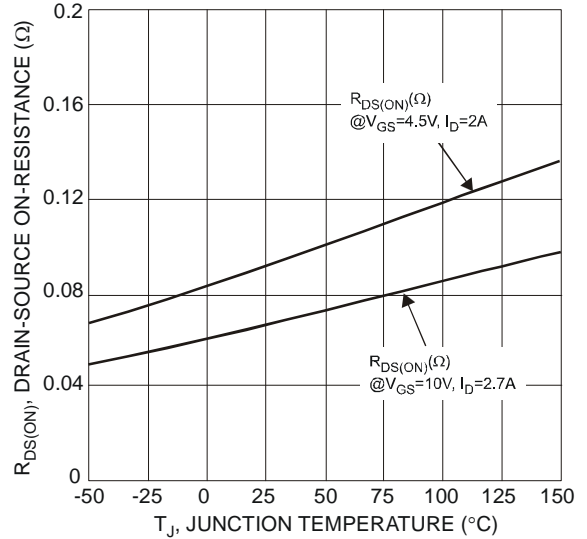


Fig. 17 On-Resistance Variation with Temperature

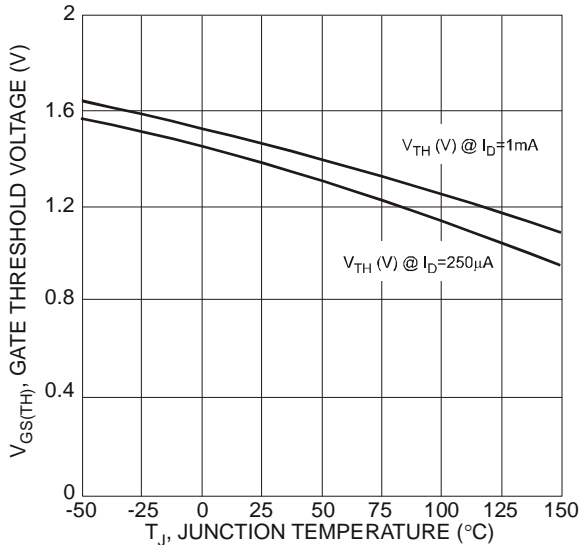


Fig. 18 Gate Threshold Variation vs. Ambient Temperature

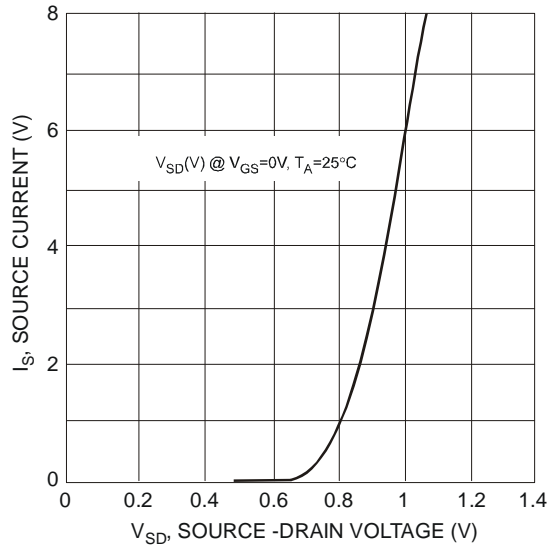


Fig. 19 Diode Forward Voltage vs. Current

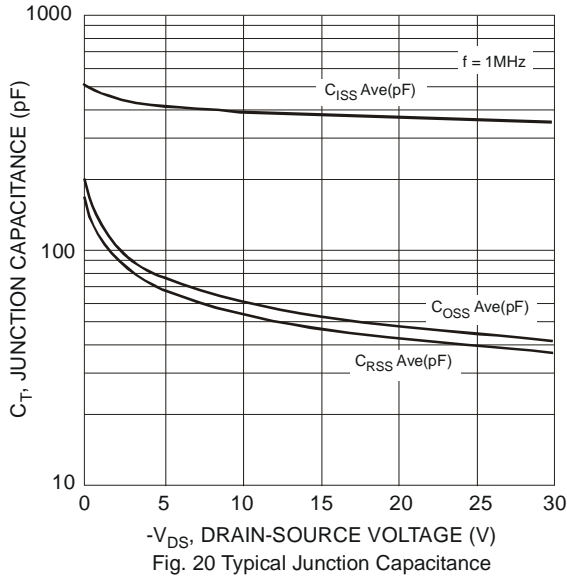


Fig. 20 Typical Junction Capacitance

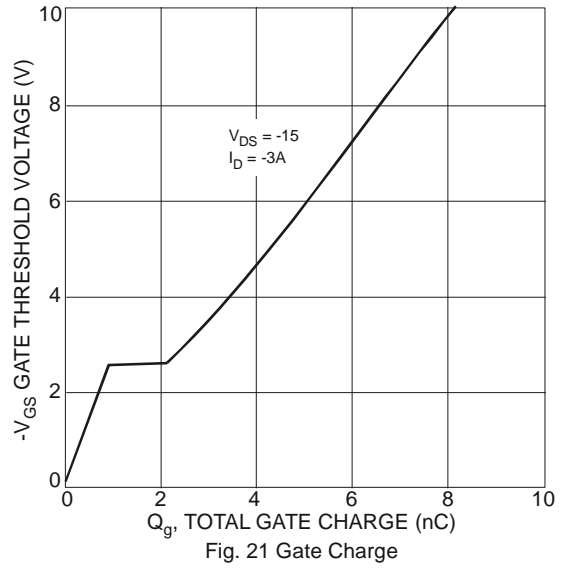


Fig. 21 Gate Charge

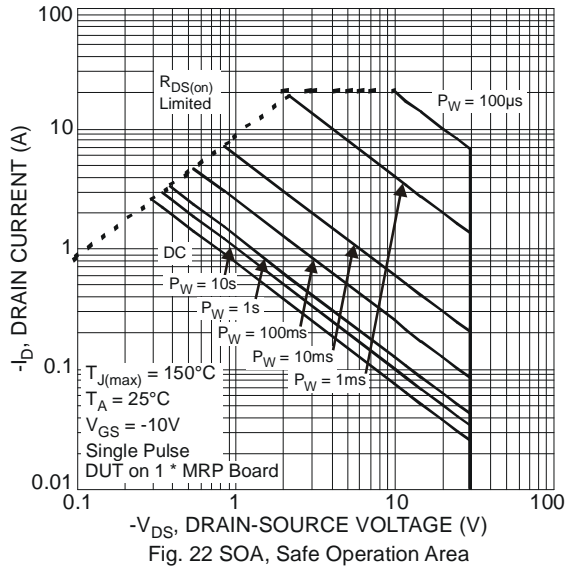


Fig. 22 SOA, Safe Operation Area

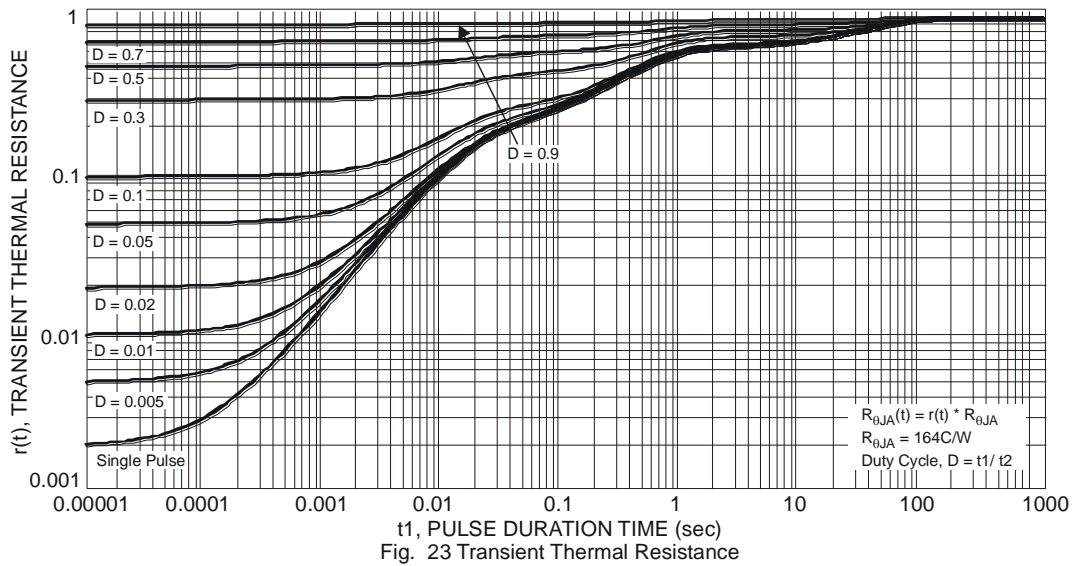
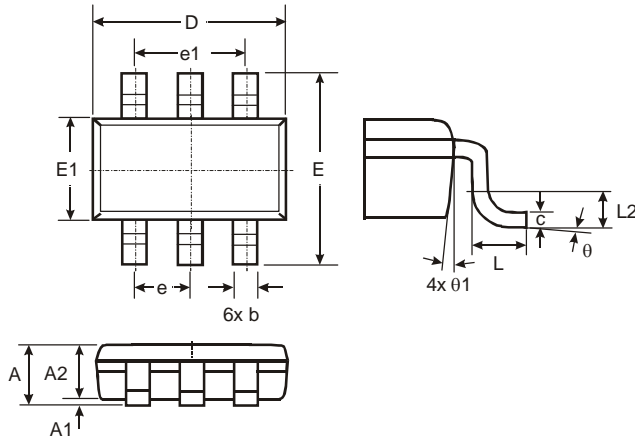


Fig. 23 Transient Thermal Resistance

Package Outline Dimensions

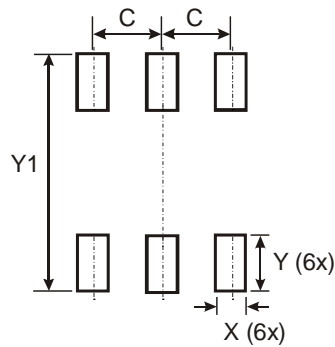
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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°	-
All Dimensions in mm			

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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