DIODES
INCORPORATED®

Lead-free Green

DMG6602SVTQ

COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

Product Summary

Device	BV$_{DSS}$	R$_{DS(ON)}$	I$_D$ T$_A$ = +25°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

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)**
- **The DMG6602SVTQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

  https://www.diodes.com/quality/product-definitions/

Description and Applications

This new generation MOSFET is designed to minimize the on-state resistance (R$_{DS(on)}$) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- Backlighting
- DC-DC converters
- Power-management functions

Mechanical Data

- Package: TSOT26
- Package 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 (e3)
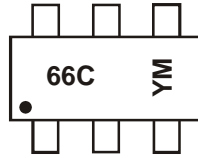- Weight: 0.013 grams (Approximate)

TSOT26

G1	1	6 D1
S2	2	5 S1
G2	3	4 D2

Top View   Top View

N-Channel   P-Channel
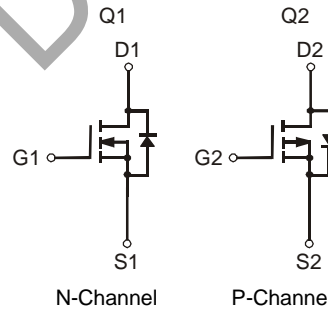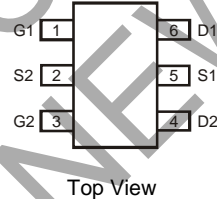
Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMG6602SVTQ-7	TSOT26	3000	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) & 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/

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Marking Information

66C = Product Type Marking Code
YM or $\overline{YM}$ = Date Code Marking
Y or $\overline{Y}$ = Year (ex: L = 2024)
M = Month (ex: 9 = September)

Date Code Key

Year	2014	…	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	B	…	L	M	N	P	R	S	T	U	V	W

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 (@T_A = +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 6) V_{GS} = 10V	Steady State	T_A = +25°C	I_D	3.4	A
		T_A = +70°C		2.7	
Continuous Drain Current (Note 6) 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 6)			I_S	1.5	A
Pulsed Drain Current (Note 6)			I_{DM}	25	A

Maximum Ratings – Q2 (@T_A = +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 6) V_{GS} = -10V	Steady State	T_A = +25°C	I_D	-2.8	A
		T_A = +70°C		-2.4	
Continuous Drain Current (Note 6) 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 6)			I_S	-1.5	A
Pulsed Drain Current (Note 6)			I_D	-20	A

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	0.84	W
	T_A = +70°C		0.52	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	155	°C/W
	t < 10s		109	
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	1.27	W
	T_A = +70°C		0.8	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	102	°C/W
	t < 10s		71	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	34	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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.

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Electrical Characteristics – Q1 NMOS (@T_A = +25°C, unless otherwise stated.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1.0	µA	V_{DS} = 24V, V_{GS} = 0
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	—	2.3	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	38	60	mΩ	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} = 0, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	290	400		V_{DS} = 15V, V_{GS} = 0, f = 1.2MHz
Output Capacitance	C_{oss}	—	40	80	pF	
Reverse Transfer Capacitance	C_{rss}	—	40	80		
Gate Resistance	R_g	—	1.4	—	Ω	V_{DS} = 0, V_{GS} = 0, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	4	6		V_{DS} = 15V, V_{GS} = 4.5V, I_D = 3.1A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	9	13	nC	V_{DS} = 15V, V_{GS} = 10V, I_D = 3A
Gate-Source Charge	Q_{gs}	—	1.2	—		
Gate-Drain Charge	Q_{gd}	—	1.5	—		
Turn-On Delay Time	$t_{D(on)}$	—	3	—		V_{GS} = 10V, V_{DS} = 15V, R_G = 3Ω, R_L = 4.7Ω
Turn-On Rise Time	t_r	—	5	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	13	—		
Turn-Off Fall Time	t_f	—	3	—		

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	—	—	V	V_{GS} = 0, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1.0	µA	V_{DS} = -24V, V_{GS} = 0
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0
ON CHARACTERISTICS (Note 7)						
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	95	mΩ	V_{GS} = -10V, I_D = -2.7A
			99	140		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} = 0, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	350	420		V_{DS} = -15V, V_{GS} = 0, f = 1.2MHz
Output Capacitance	C_{oss}	—	50	100	pF	
Reverse Transfer Capacitance	C_{rss}	—	45	80		
Gate Resistance	R_g	—	17.1	—	Ω	V_{DS} = 0, V_{GS} = 0, f = 1MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_g	—	4	6		V_{DS} = -15V, V_{GS} = -4.5V, I_D = -3A
Total Gate Charge (V_{GS} = -10V)	Q_g	—	7	9	nC	V_{DS} = -15V, V_{GS} = -10V, I_D = -3A
Gate-Source Charge	Q_{gs}	—	0.9	—		
Gate-Drain Charge	Q_{gd}	—	1.2	—		
Turn-On Delay Time	$t_{D(on)}$	—	4.8	—		V_{GS} = -10V, V_{DS} = -15V, R_G = 6Ω, R_L = 15Ω
Turn-On Rise Time	t_r	—	7.3	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	20	—		
Turn-Off Fall Time	t_f	—	13	—		

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

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Q1 NMOS
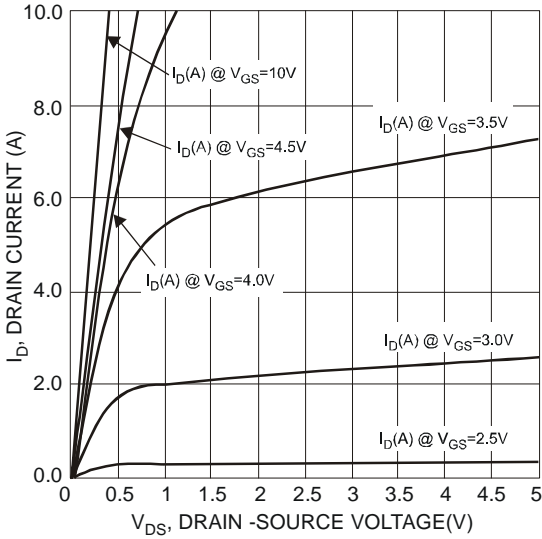
Fig. 1 Typical Output Characteristics
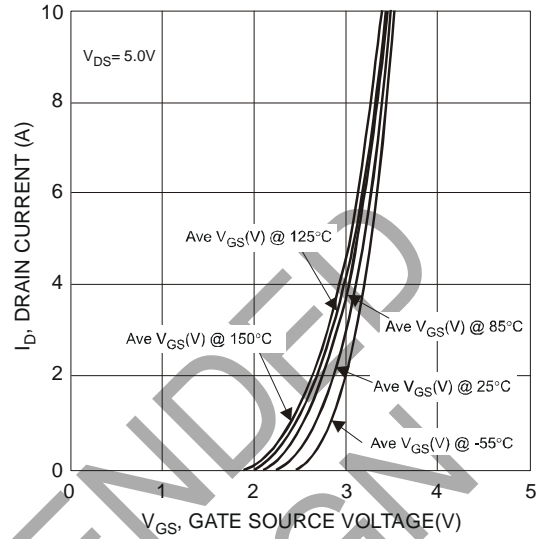
Fig. 2 Typical Transfer Characteristics
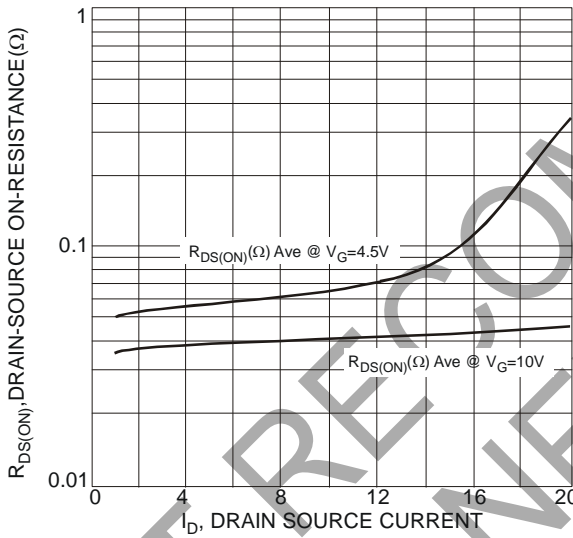
Fig. 3 Typical On-Resistance vs.
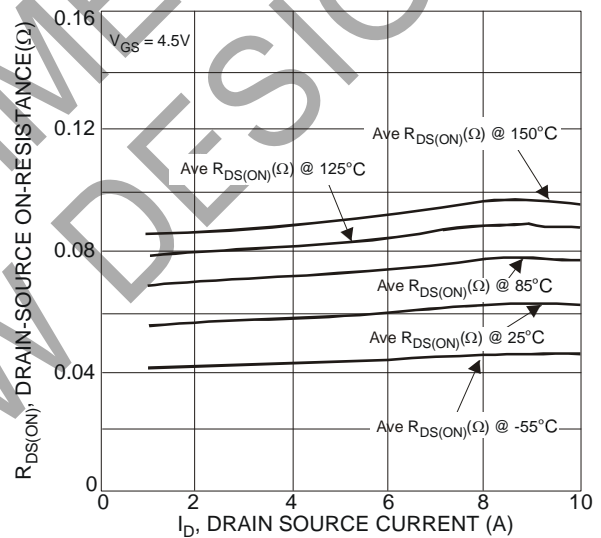Drain Current and Gate Voltage

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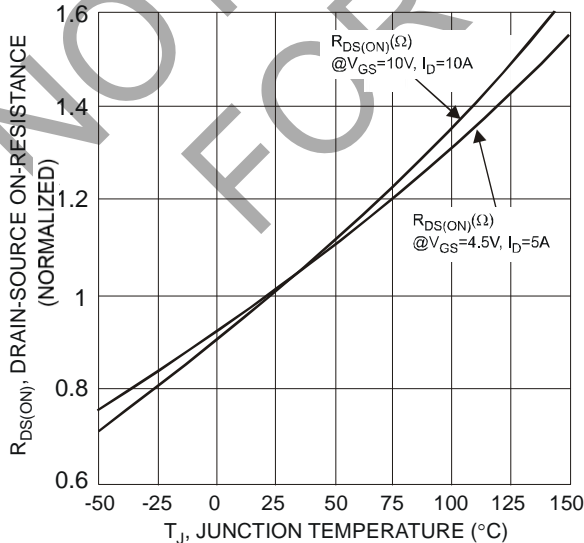Drain Current and Temperature
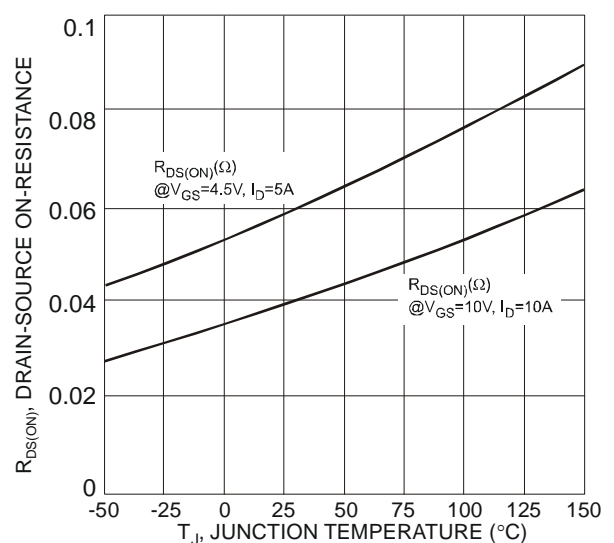

Fig. 5 On-Resistance Variation with Temperature

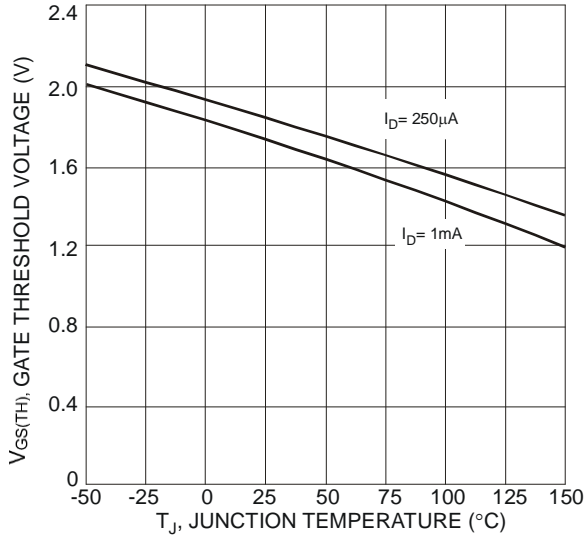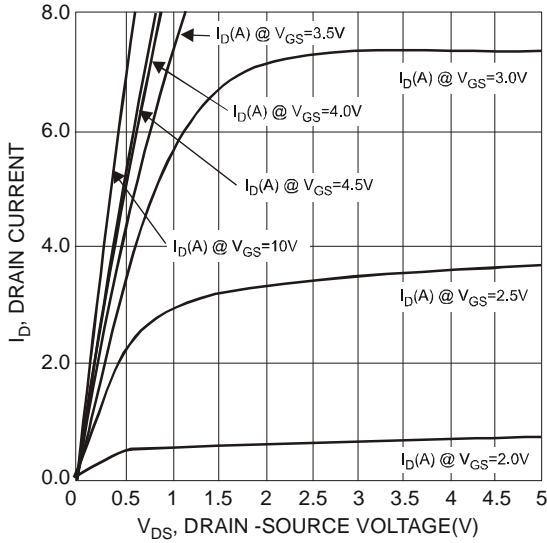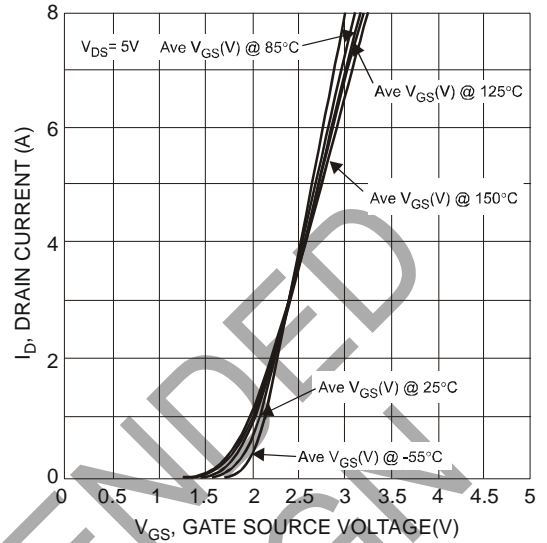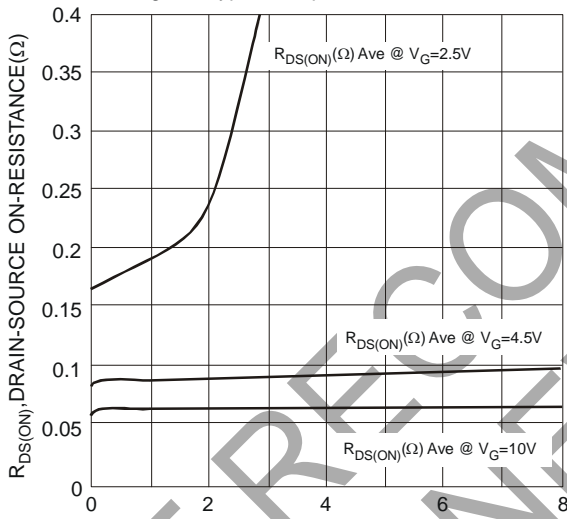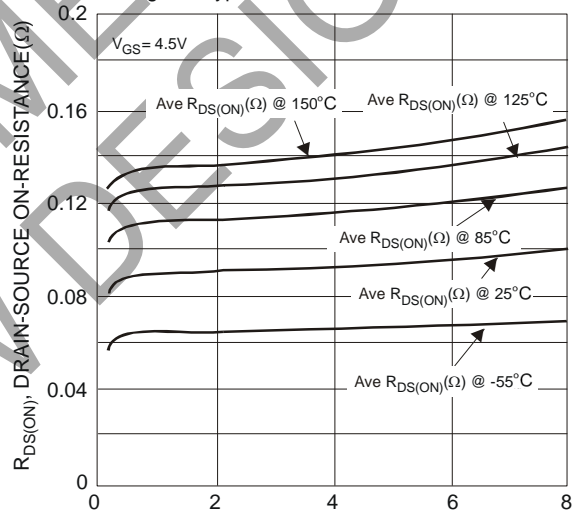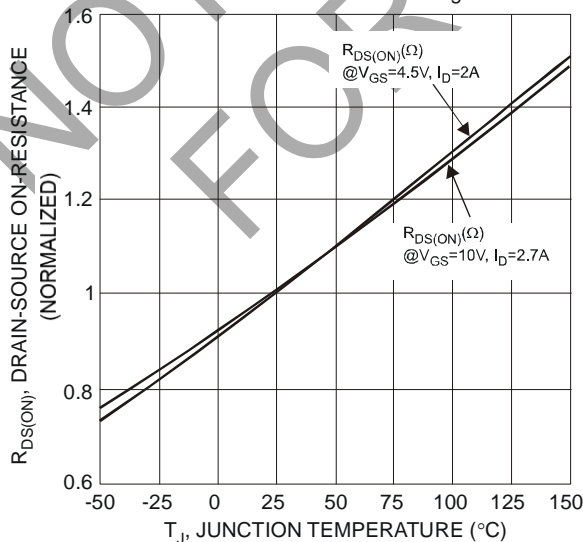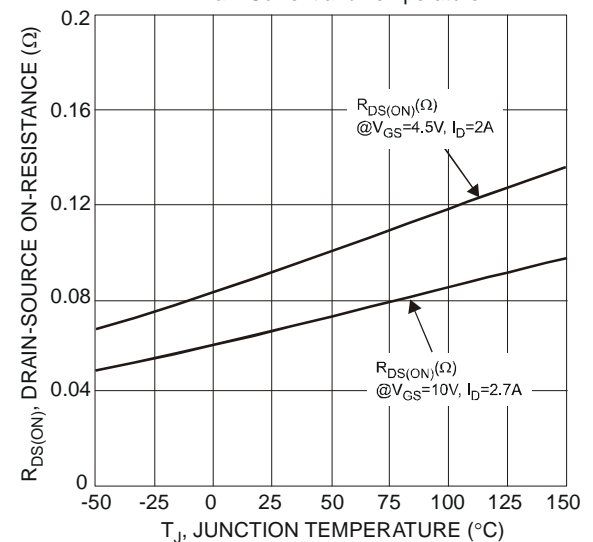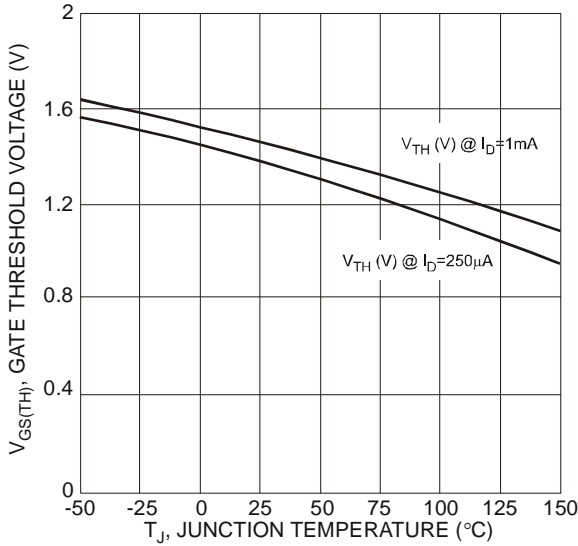Fig. 6 On-Resistance Variation with Temperature

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Fig. 7 Gate Threshold Variation vs. Junction Temperature
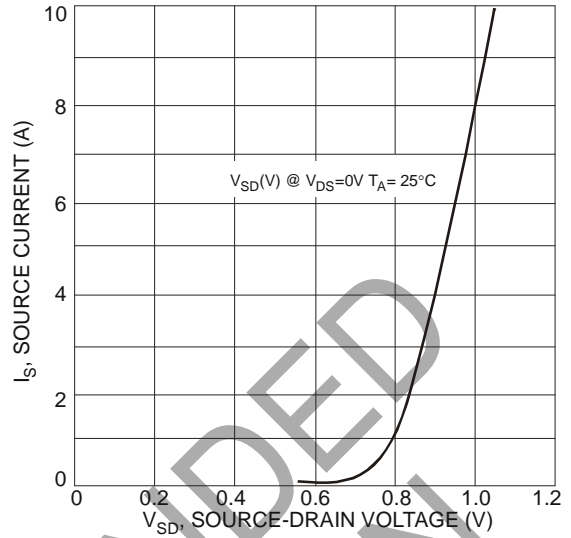
Fig. 8 Diode Forward Voltage vs. Current
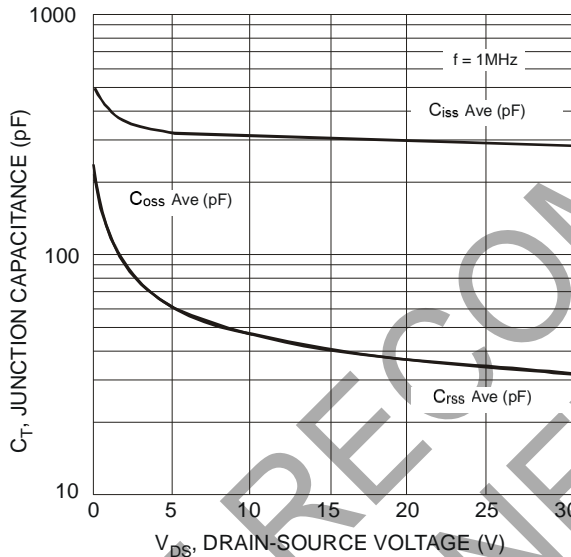
Fig. 9 Typical Junction Capacitance
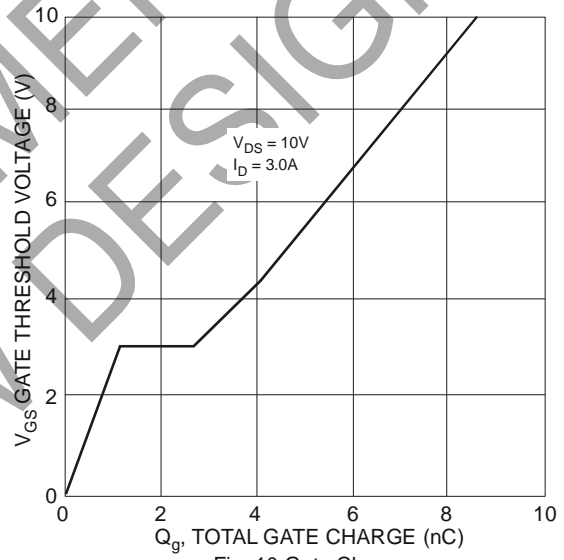
Fig. 10 Gate Charge

Fig. 11 SOA, Safe Operation Area

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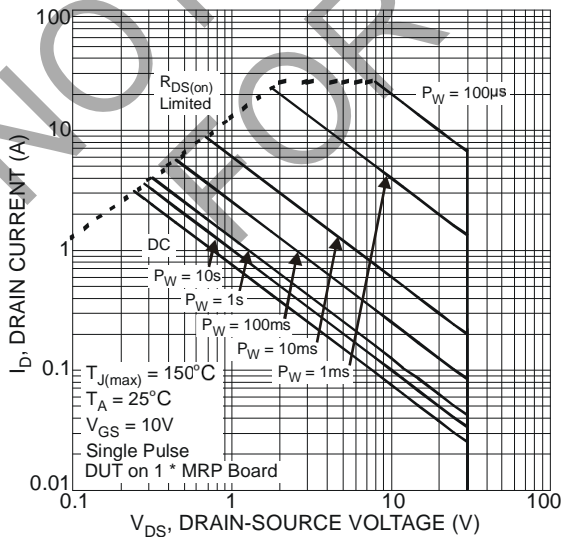
Q2 PMOS

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

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Fig. 18 Gate Threshold Variation vs. Junction Temperature
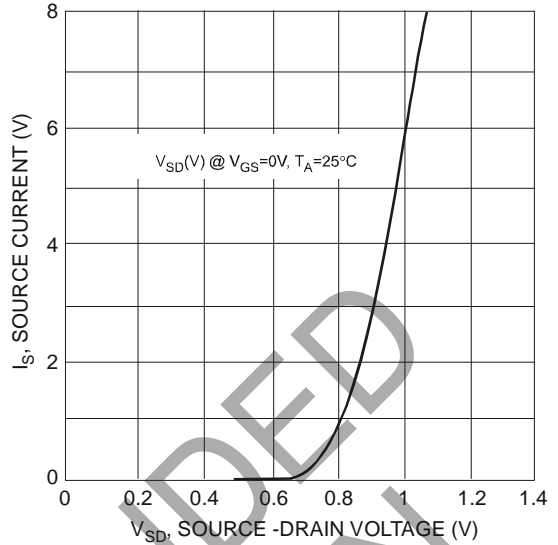
Fig. 19 Diode Forward Voltage vs. Current
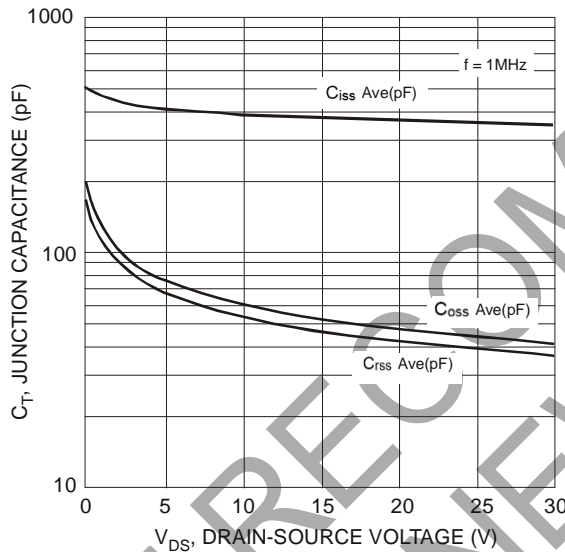
Fig. 20 Typical Junction Capacitance
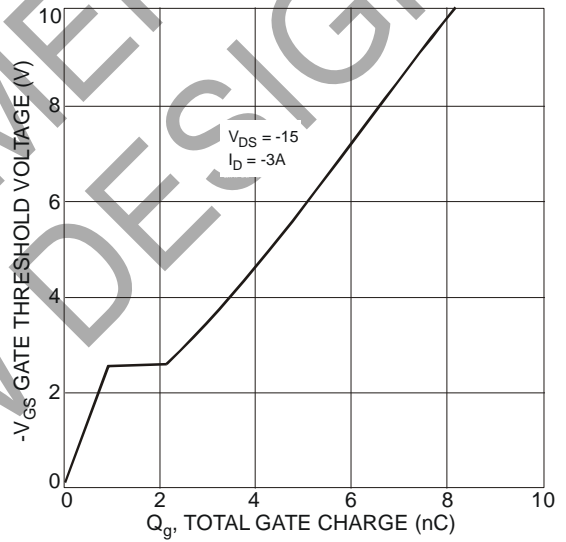
Fig. 21 Gate Charge

Fig. 22 SOA, Safe Operation Area

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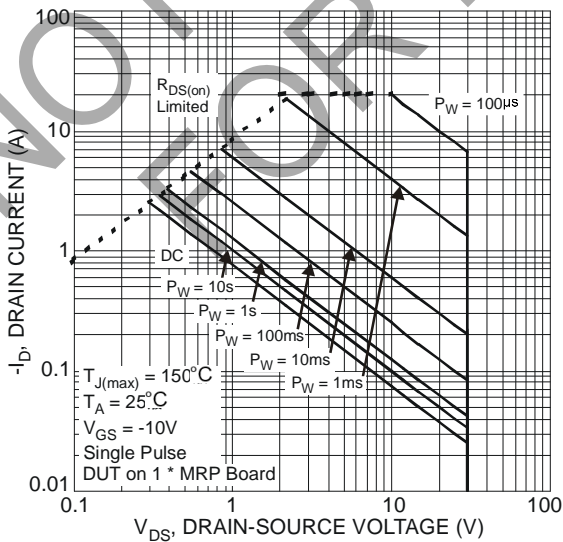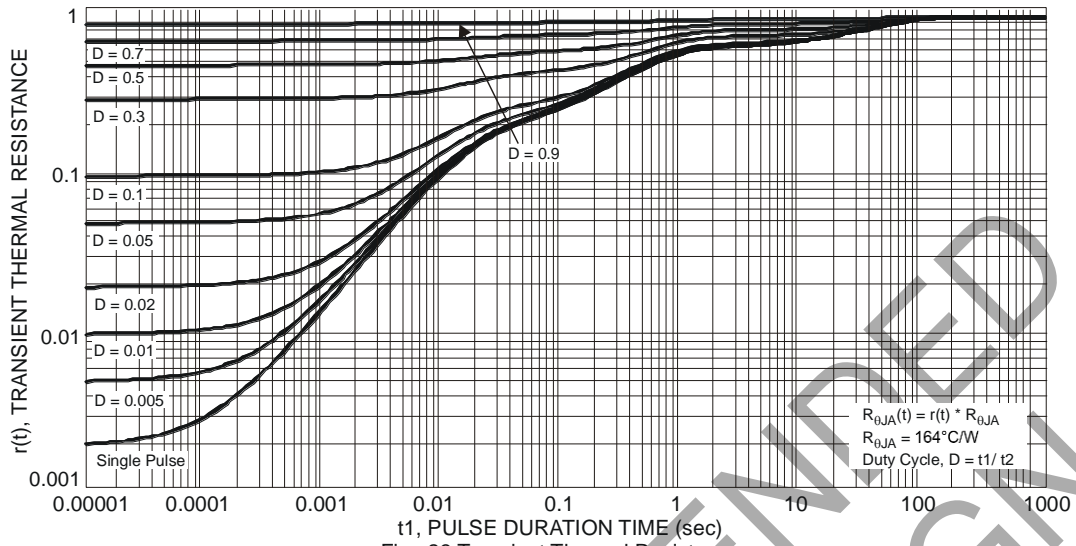
Fig. 23 Transient Thermal Resistance

$R_{\theta JA}(t) = r(t) * R_{\theta JA}$
$R_{\theta JA} = 164°C/W$
Duty Cycle, D = t1/ t2

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Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.
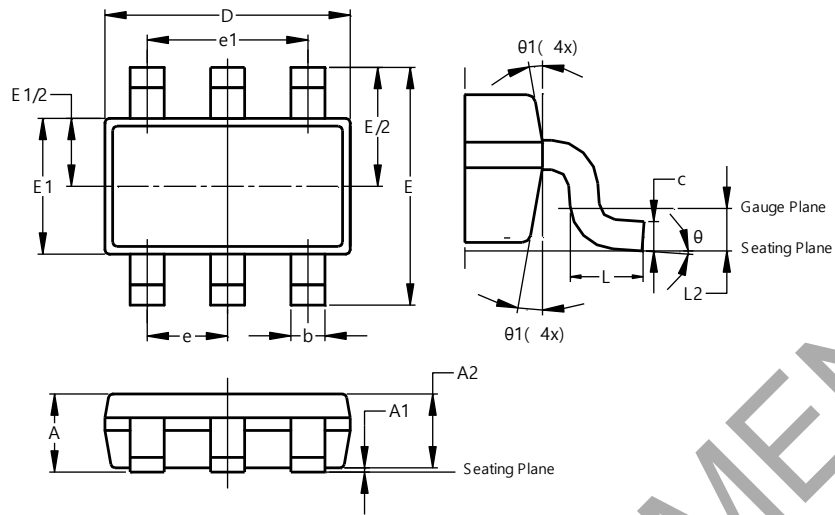
TSOT26

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
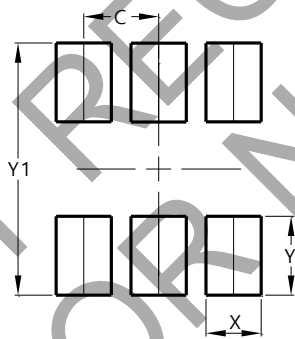
Dimensions	Value (in mm)
C	0.950
X	0.700
Y	1.000
Y1	3.200

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IMPORTANT NOTICE

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