COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

Product Summary

Device	$V_{(BR)DSS}$	$R_{DS(on)}$	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
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: TSOT23-6
- 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: 0.008 grams (approximate)

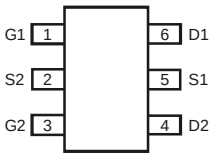
Description and Applications

This new generation MOSFET has been 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.

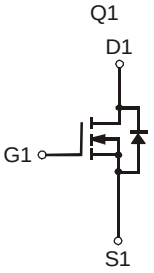
- Backlighting
- DC-DC Converters
- Power management functions

TSOT23-6

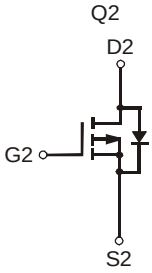
Top View



Top View



N-Channel



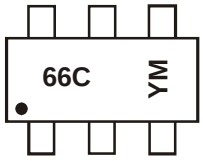
P-Channel

Ordering Information (Note 3)

Part Number	Case	Packaging
DMG6602SVT-7	TSOT23-6	3000 / Tape & Reel

Notes: 1. No purposefully added lead.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com.
3. For packaging details, go to our website at http://www.diodes.com.

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
Code	X	Y	Z	A	B	C	D

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 4) V_{GS} = 10V	Steady State	T_A = 25°C T_A = 70°C	I_D	3.4 2.7	A
Continuous Drain Current (Note 4) V_{GS} = 4.5V	Steady State	T_A = 25°C T_A = 70°C	I_D	2.7 2.2	A
Pulsed Drain Current (Note 5)			I_{DM}	13.0	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 4) V_{GS} = -10V	Steady State	T_A = 25°C T_A = 70°C	I_D	-2.8 -2.4	A
Continuous Drain Current (Note 4) V_{GS} = -4.5V	Steady State	T_A = 25°C T_A = 70°C	I_D	-2.3 -2.1	A
Pulsed Drain Current (Note 5)			I_D	-11.2	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P_D	1.12	W
Thermal Resistance, Junction to Ambient @T_A = 25°C (Note 4)	$R_{\theta JA}$	111	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics – Q1 @ T_A = 25°C unless otherwise stated

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
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 6)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	-	3.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	38 55	60 100	mΩ	V_{GS} = 10V, I_D = 3.1A 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 7)						
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		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	-	ns	V_{GS} = 10V, V_{DS} = 15V, R_G = 3Ω, R_L = 4.7Ω
Turn-On Rise Time	t_r	-	5	-		
Turn-Off Delay Time	$t_{D(off)}$	-	13	-		
Turn-Off Fall Time	t_f	-	3	-		

Notes: 4. Device mounted on FR-4 with minimum recommended pad layout, single sided.
5. Repetitive rating, pulse width limited by junction temperature.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.

Electrical Characteristics – Q2 @ T_A = 25°C unless otherwise stated

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
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 6)						
Gate Threshold Voltage	$V_{GS(th)}$	-1.0	-	-3.0	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 7)						
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		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	-	ns	V_{GS} = -10V, V_{DS} = -15V, R_G = 6Ω, R_L = 15Ω
Turn-On Rise Time	t_r	-	7.3	-		
Turn-Off Delay Time	$t_{D(off)}$	-	20	-		
Turn-Off Fall Time	t_f	-	13	-		

Notes: 6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.

Q1 N-CHANNEL

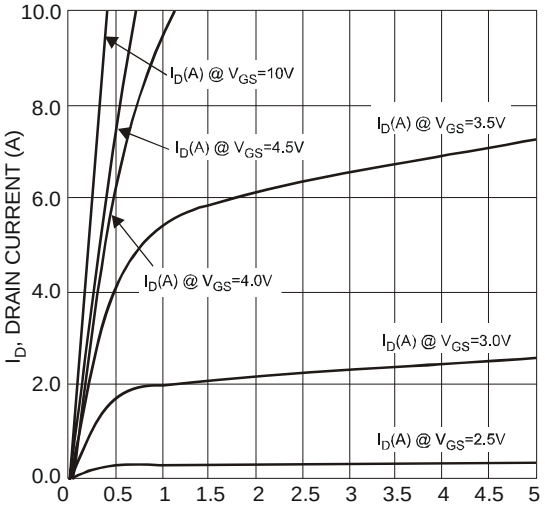


Fig. 1 Typical Output Characteristics

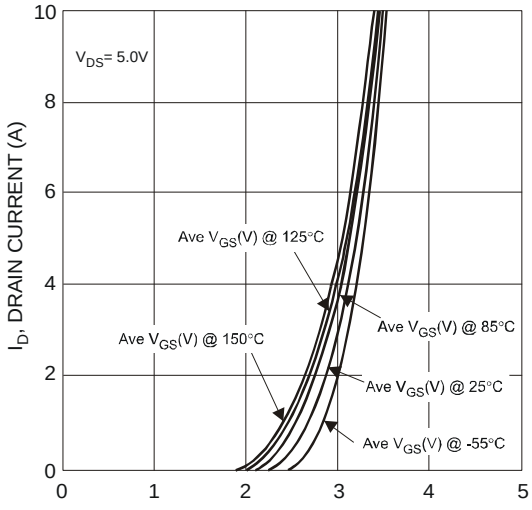


Fig. 2 Typical Transfer Characteristics

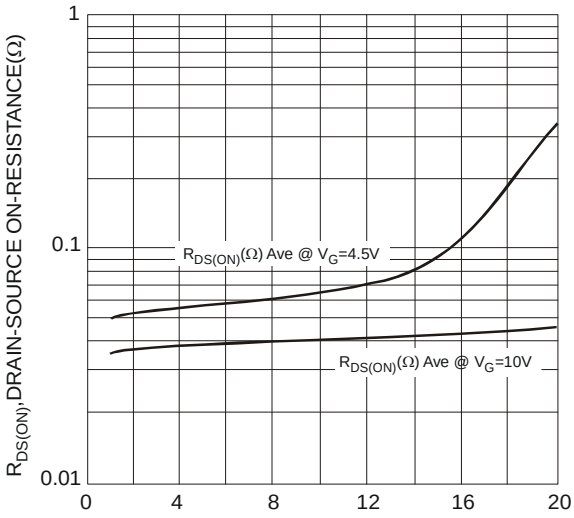


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

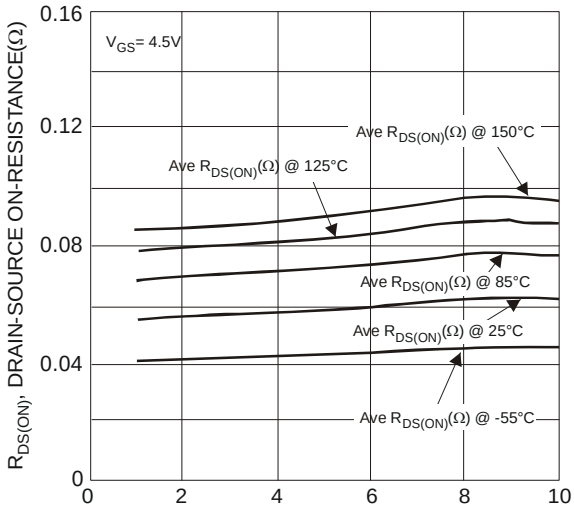


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

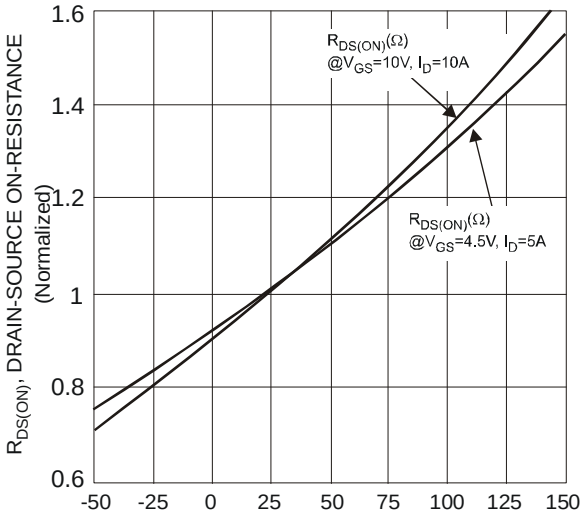


Fig. 5 On-Resistance Variation with Temperature

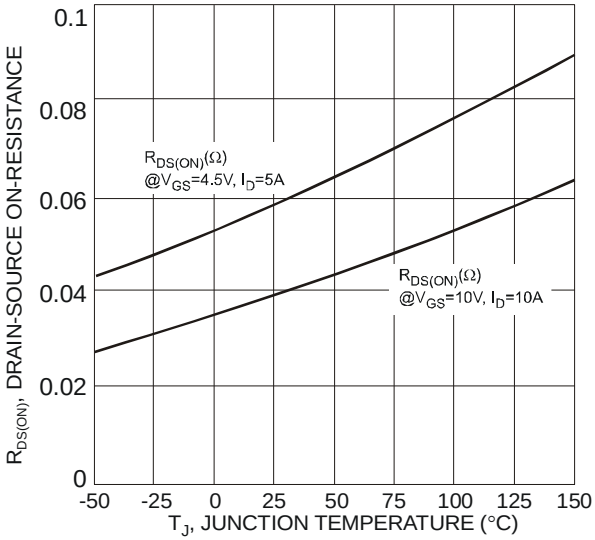


Fig. 6 On-Resistance Variation with Temperature

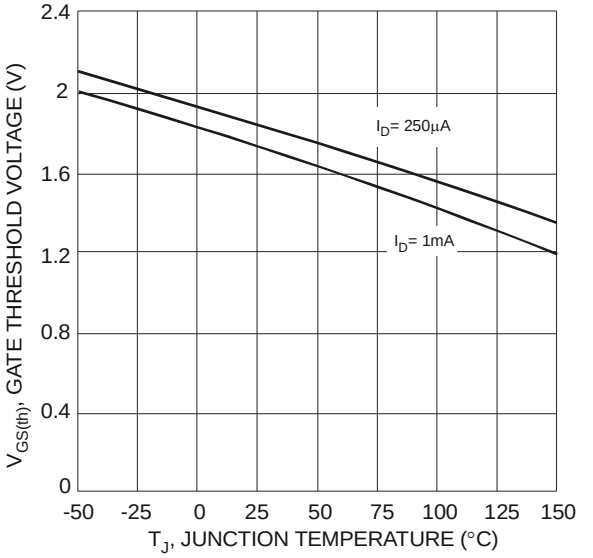


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

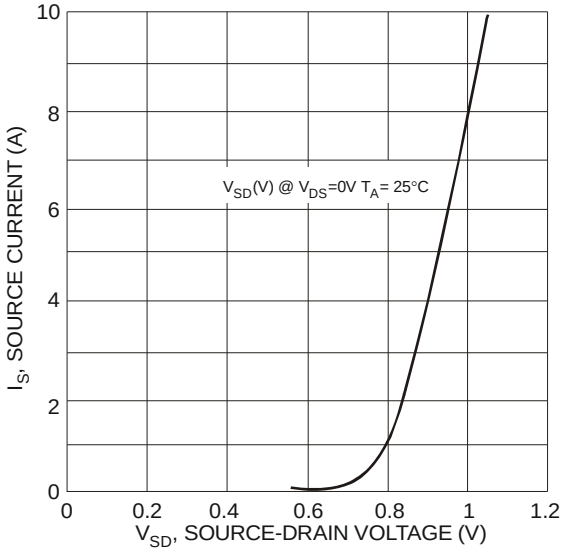


Fig. 8 Diode Forward Voltage vs. Current

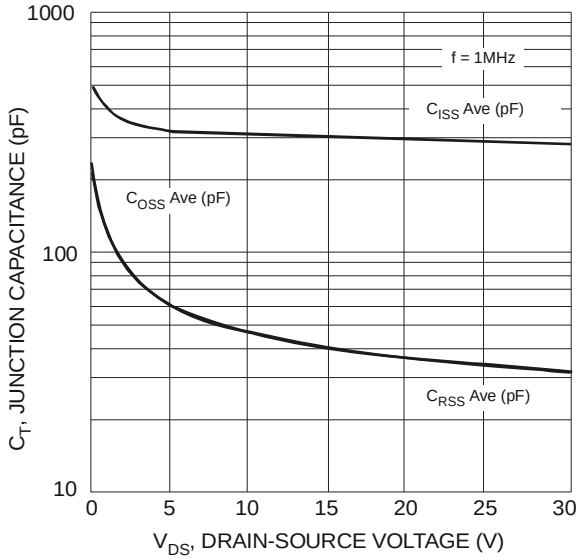


Fig. 9 Typical Junction Capacitance

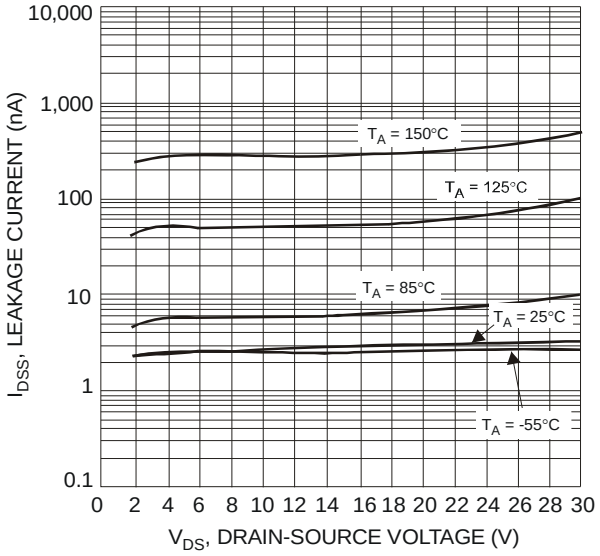


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

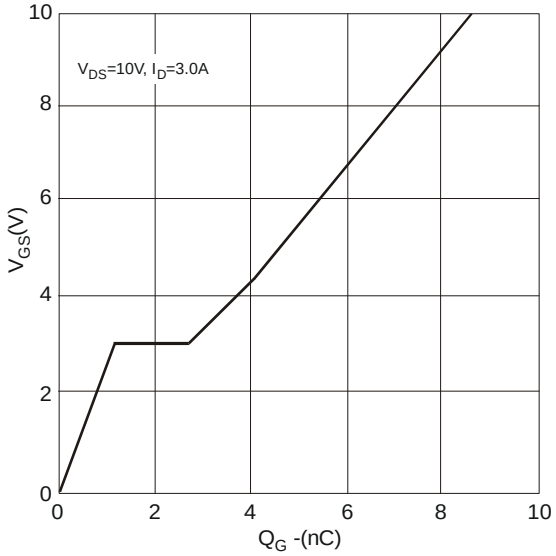


Fig. 11 Gate Charge Characteristics

Q2 P-CHANNEL

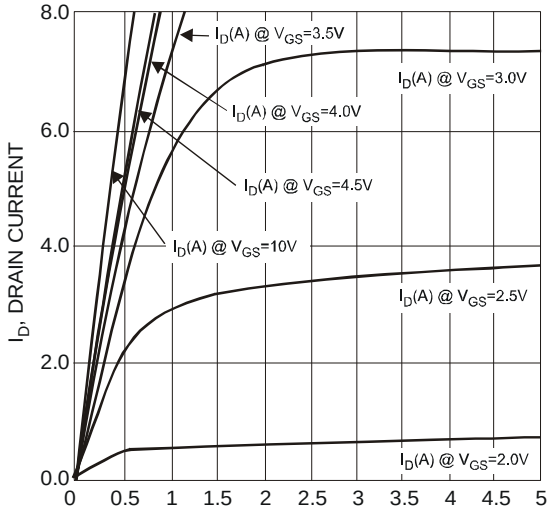


Fig. 12 Typical Output Characteristics

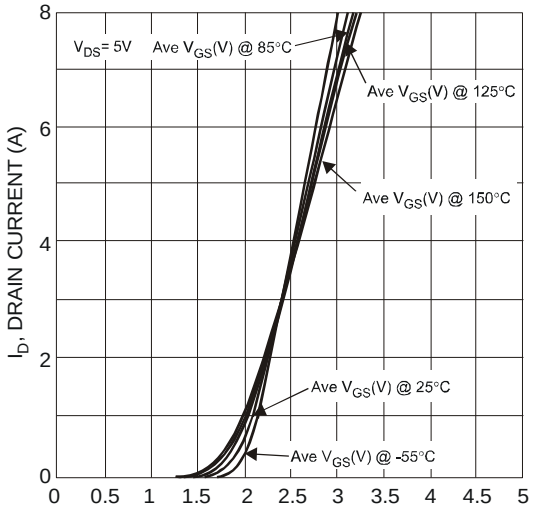


Fig. 13 Typical Transfer Characteristics

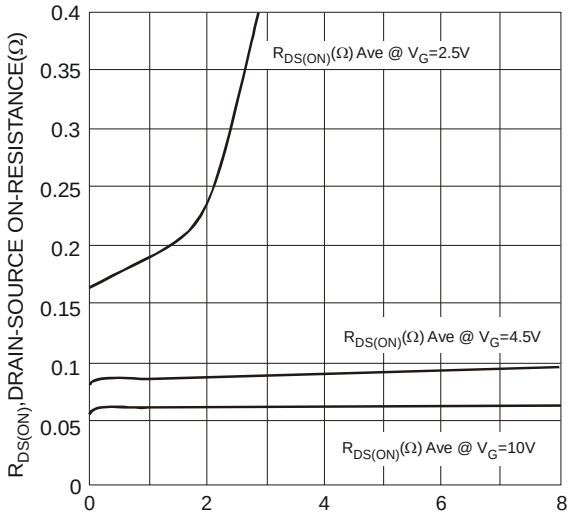


Fig. 14 Typical On-Resistance vs. Drain Current and Gate Voltage

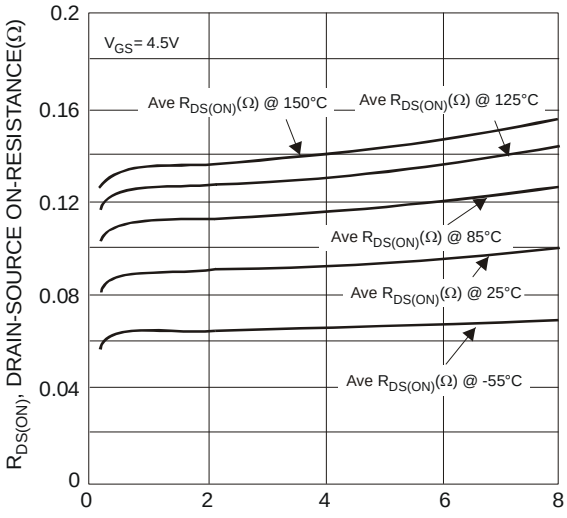


Fig. 15 Typical On-Resistance vs. Drain Current and Temperature

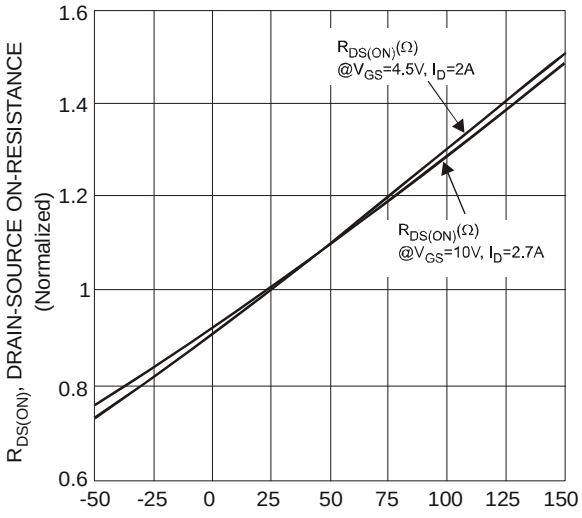


Fig. 16 On-Resistance Variation with Temperature

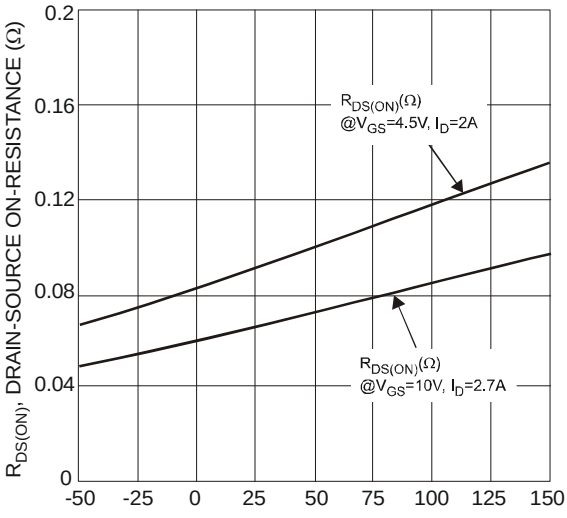


Fig. 17 On-Resistance Variation with Temperature

Q2 P-CHANNEL

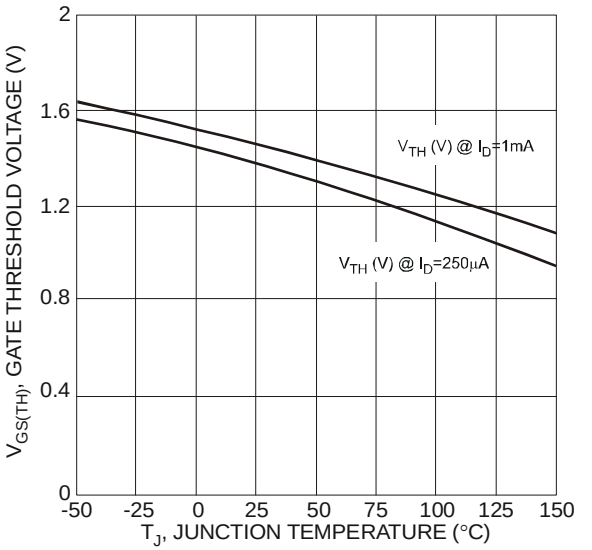


Fig. 18 Gate Threshold Variation vs. Ambient Temperature

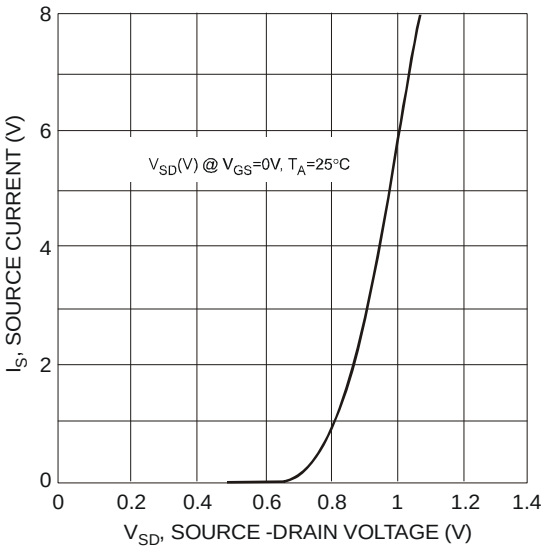


Fig. 19 Diode Forward Voltage vs. Current

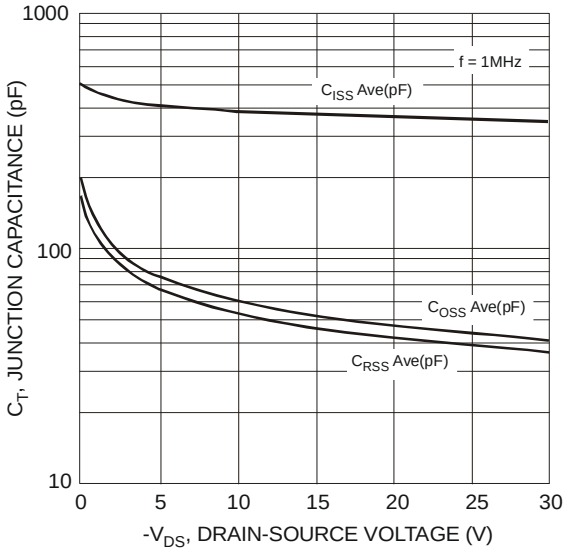


Fig. 20 Typical Junction Capacitance

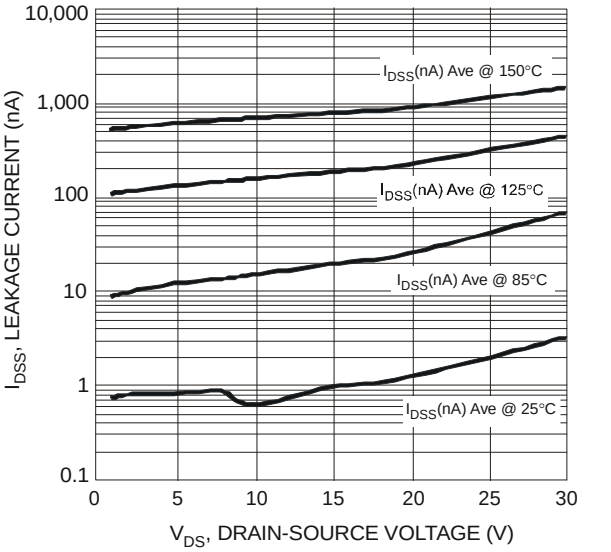


Fig. 21 Typical Drain-Source Leakage Current vs. Voltage

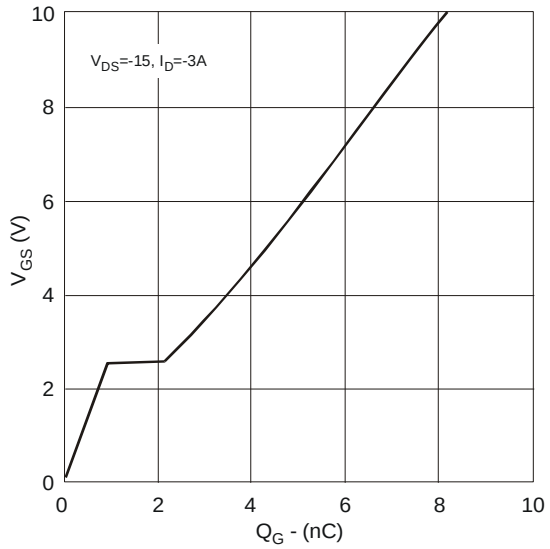


Fig. 22 Gate Charge Characteristics

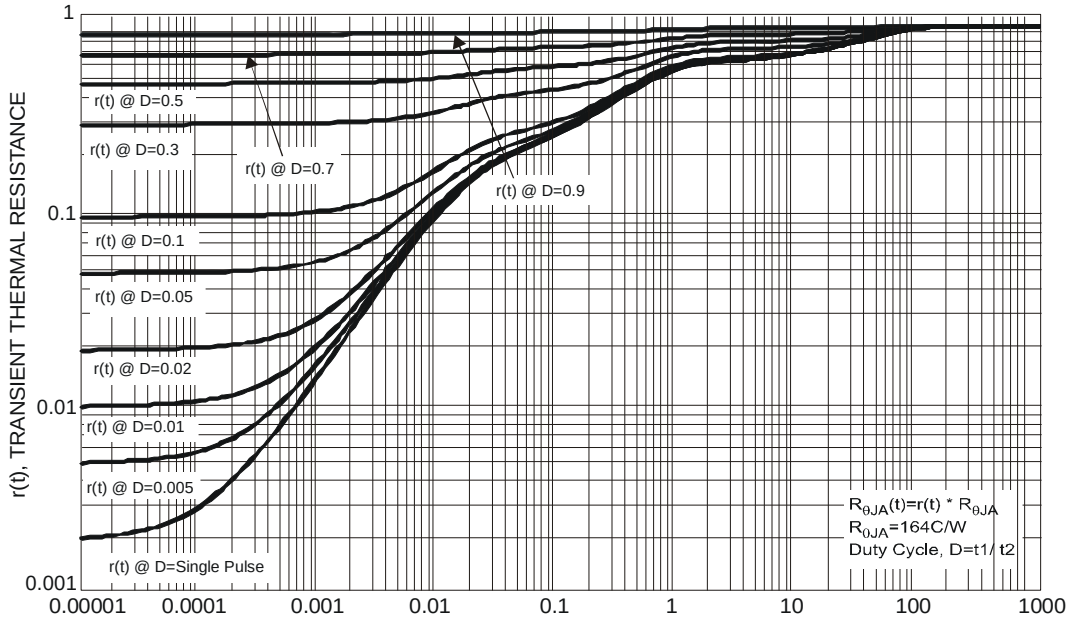
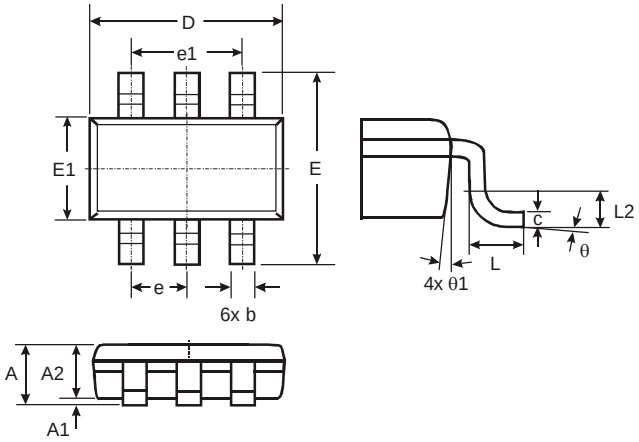


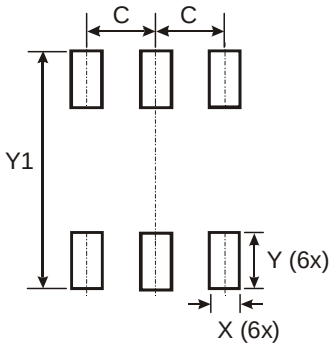
Fig. 23 Transient Thermal Resistance

Package Outline Dimensions



TSOT23-6			
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
θ	0°	8°	4°
θ1	4°	12°	–
All Dimensions in mm			

Suggested Pad Layout



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

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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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