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[DMG4511SK4-13](#)

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**DMG4511SK4**

## COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

### Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$ $T_A = 25^\circ C$
35V	35m $\Omega$ @ $V_{GS} = 10V$	13A
-35V	45m $\Omega$ @ $V_{GS} = -10V$	-12A

### 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.

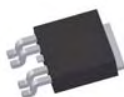
- Backlighting
- DC-DC Converters
- Power management functions

### Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Complementary Pair MOSFET
- **Lead Free/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

### Mechanical Data

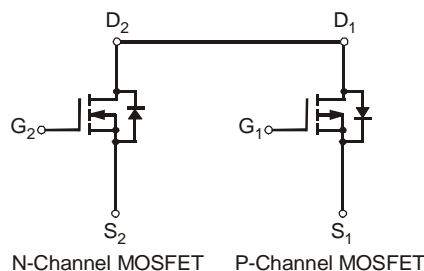
- Case: TO252-4L
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.328 grams (approximate)



Top View



Bottom View



### Ordering Information (Note 3)

Part Number	Case	Packaging
DMG4511SK4-7	TO252-4L	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



JII = Manufacturer's Marking  
 G4511S = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 09 = 2009)  
 WW = Week (01 – 53)


**DMG4511SK4**
**Maximum Ratings – N-CHANNEL, Q1 @T<sub>A</sub> = 25°C unless otherwise specified**

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	35	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 4) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub>	5.3	A
		T <sub>A</sub> = 70°C		4.2	
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub>	8.6	A
		T <sub>A</sub> = 70°C		6.8	
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	t ≤ 10s	T <sub>A</sub> = 25°C	I <sub>D</sub>	13	A
		T <sub>A</sub> = 70°C		11	
Continuous Drain Current (Note 5) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub>	6.3	A
		T <sub>A</sub> = 70°C		5.0	
Continuous Drain Current (Note 5) V <sub>GS</sub> = 4.5V	t ≤ 10s	T <sub>A</sub> = 25°C	I <sub>D</sub>	9.3	A
		T <sub>A</sub> = 70°C		7.4	
Pulsed Drain Current (Note 6)			I <sub>DM</sub>	50	A

**Maximum Ratings – P-CHANNEL, Q2 @T<sub>A</sub> = 25°C unless otherwise specified**

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	-35	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 4) V <sub>GS</sub> = -10V	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub>	-5.0	A
		T <sub>A</sub> = 70°C		-3.8	
Continuous Drain Current (Note 5) V <sub>GS</sub> = -10V	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub>	-7.8	A
		T <sub>A</sub> = 70°C		-6.2	
Continuous Drain Current (Note 5) V <sub>GS</sub> = -10V	t ≤ 10s	T <sub>A</sub> = 25°C	I <sub>D</sub>	-12	A
		T <sub>A</sub> = 70°C		-10	
Continuous Drain Current (Note 5) V <sub>GS</sub> = -4.5V	Steady State	T <sub>A</sub> = 25°C	I <sub>D</sub>	-6.5	A
		T <sub>A</sub> = 70°C		-5.2	
Continuous Drain Current (Note 5) V <sub>GS</sub> = -4.5V	t ≤ 10s	T <sub>A</sub> = 25°C	I <sub>D</sub>	-9.6	A
		T <sub>A</sub> = 70°C		-7.7	
Pulsed Drain Current (Note 6)			I <sub>DM</sub>	-50	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P <sub>D</sub>	1.54	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = 25°C (Note 4)	R <sub>θJA</sub>	81.3	°C/W
Power Dissipation (Note 5)	P <sub>D</sub>	4.1	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = 25°C (Note 5)	R <sub>θJA</sub>	30.8	°C/W
Power Dissipation (Note 5) t ≤ 10s	P <sub>D</sub>	8.9	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = 25°C (Note 5) t ≤ 10s	R <sub>θJA</sub>	14	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
4. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
  5. Device mounted on 2" x 2" FR-4 PCB with high coverage 2 oz. Copper, single sided.
  6. Repetitive rating, pulse width limited by junction temperature.



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## Electrical Characteristics – N-CHANNEL, Q1 @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	35	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = 25°C	I <sub>DSS</sub>	-	-	1.0	μA	V <sub>DS</sub> = 35V, 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 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	-	3.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	-	25 50	35 65	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 8A V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6A
Forward Transfer Admittance	Y <sub>fs</sub>	-	4.5	-	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 8A
Diode Forward Voltage	V <sub>SD</sub>	-	-	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 8A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	-	850	-	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	-	64.7	-	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	-	51.9	-	pF	
Gate Resistance	R <sub>g</sub>	-	1.6	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	-	18.7	-	nC	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 28V, I <sub>D</sub> = 8A
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	-	8.8	-		V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 28V, I <sub>D</sub> = 8A
Gate-Source Charge	Q <sub>gs</sub>	-	2.6	-		
Gate-Drain Charge	Q <sub>gd</sub>	-	2.1	-		
Turn-On Delay Time	t <sub>D(on)</sub>	-	5.4	-	ns	V <sub>DS</sub> = 18V, V <sub>GS</sub> = 10V, R <sub>L</sub> = 18Ω, R <sub>G</sub> = 3.3Ω, I <sub>D</sub> = 1A
Turn-On Rise Time	t <sub>r</sub>	-	2.8	-	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	33.2	-	ns	
Turn-Off Fall Time	t <sub>f</sub>	-	35.6	-	ns	

## Electrical Characteristics – P-CHANNEL, Q2 @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-35	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = 25°C	I <sub>DSS</sub>	-	-	-1.0	μA	V <sub>DS</sub> = -35V, 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 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-1.0	-	-3.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	-	30 40	45 65	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -6A V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4A
Forward Transfer Admittance	Y <sub>fs</sub>	-	8	-	S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -6A
Diode Forward Voltage	V <sub>SD</sub>	-	-	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -6A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	-	985.2	-	pF	V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	-	90.6	-	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	-	75.3	-	pF	
Gate Resistance	R <sub>g</sub>	-	7.0	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>g</sub>	-	19.2	-	nC	V <sub>GS</sub> = -10V, V <sub>DS</sub> = -28V, I <sub>D</sub> = -6A
Total Gate Charge (V <sub>GS</sub> = -4.5V)	Q <sub>g</sub>	-	9.5	-		V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -28V, I <sub>D</sub> = -6A
Gate-Source Charge	Q <sub>gs</sub>	-	2.0	-		
Gate-Drain Charge	Q <sub>gd</sub>	-	3.5	-		
Turn-On Delay Time	t <sub>D(on)</sub>	-	5.2	-	ns	V <sub>DS</sub> = -18V, V <sub>GS</sub> = -10V, R <sub>L</sub> = 18Ω, R <sub>G</sub> = 3.3Ω, I <sub>D</sub> = -1A
Turn-On Rise Time	t <sub>r</sub>	-	4.8	-	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	45.8	-	ns	
Turn-Off Fall Time	t <sub>f</sub>	-	29.5	-	ns	

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

## N-CHANNEL, Q1

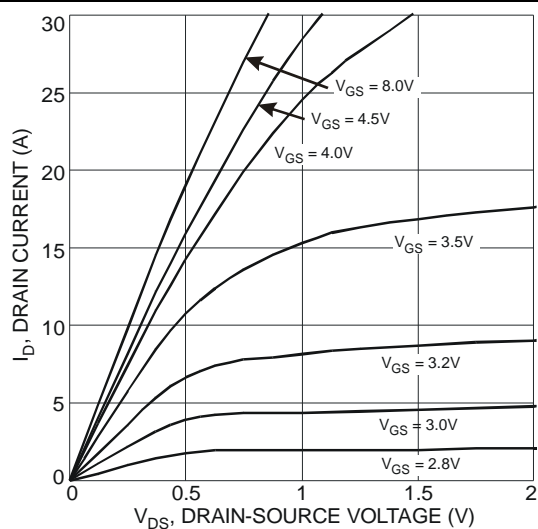


Fig. 1 Typical Output Characteristic

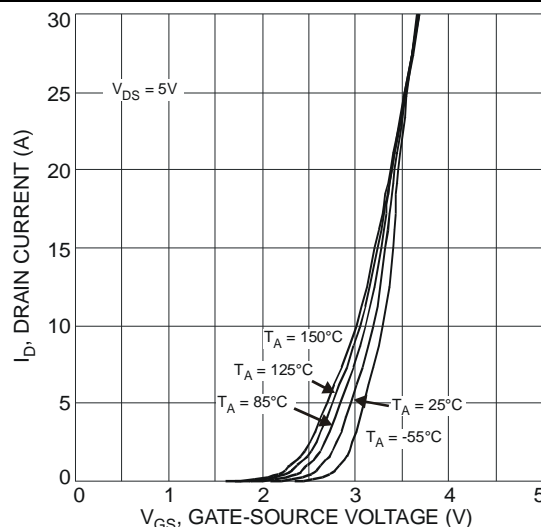


Fig. 2 Typical Transfer Characteristic

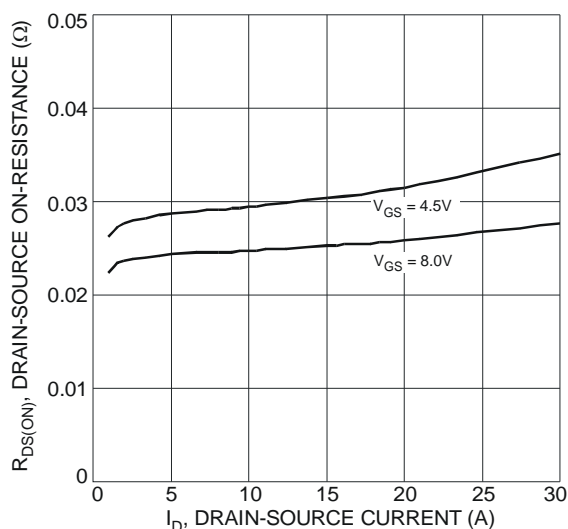


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

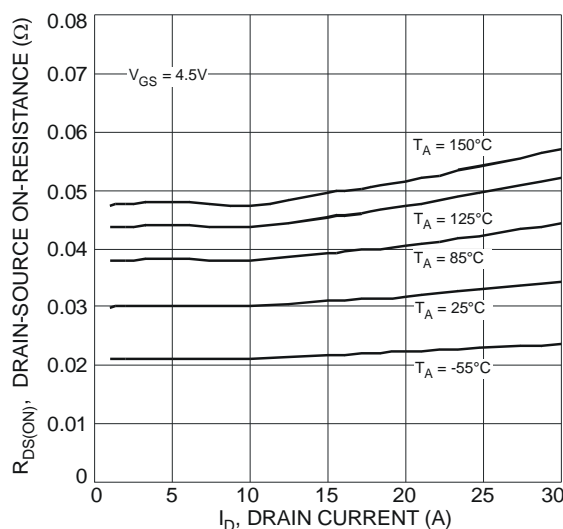


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

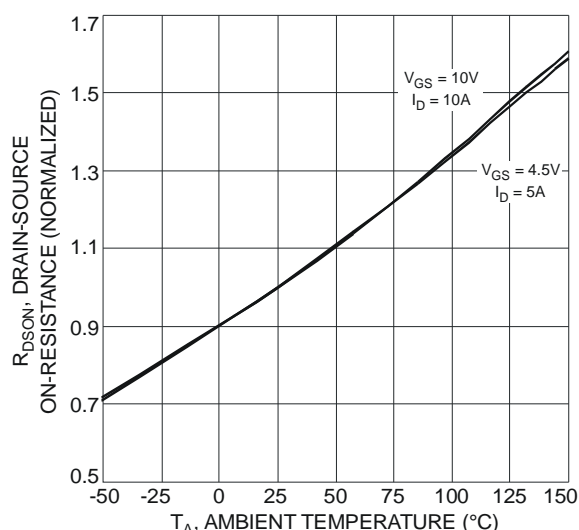


Fig. 5 On-Resistance Variation with Temperature

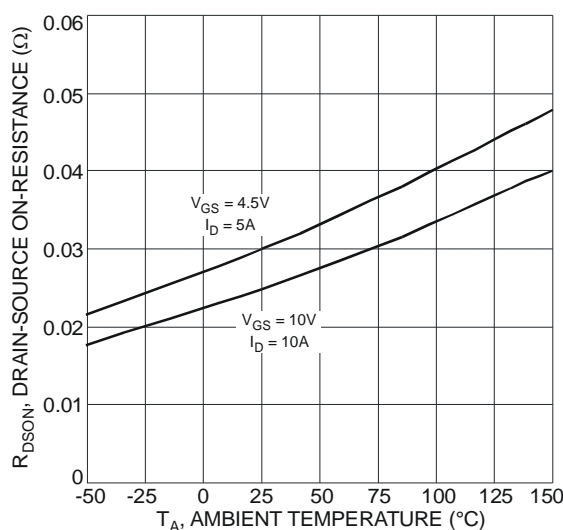


Fig. 6 On-Resistance Variation with Temperature



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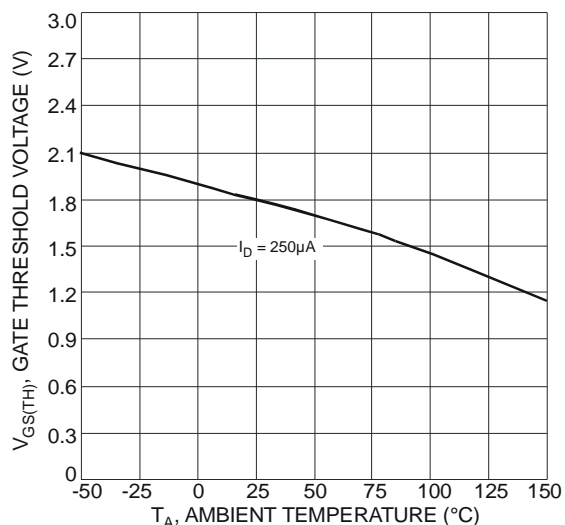


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

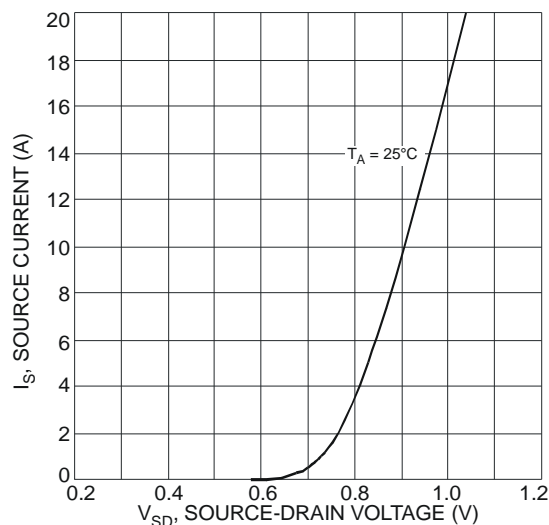


Fig. 8 Diode Forward Voltage vs. Current

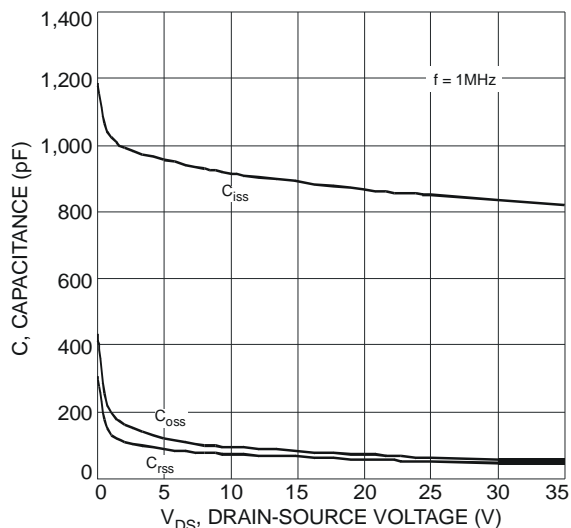


Fig. 9 Typical Total Capacitance

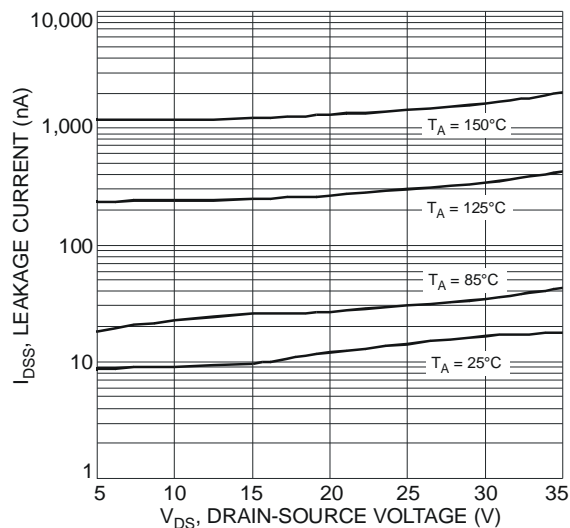


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

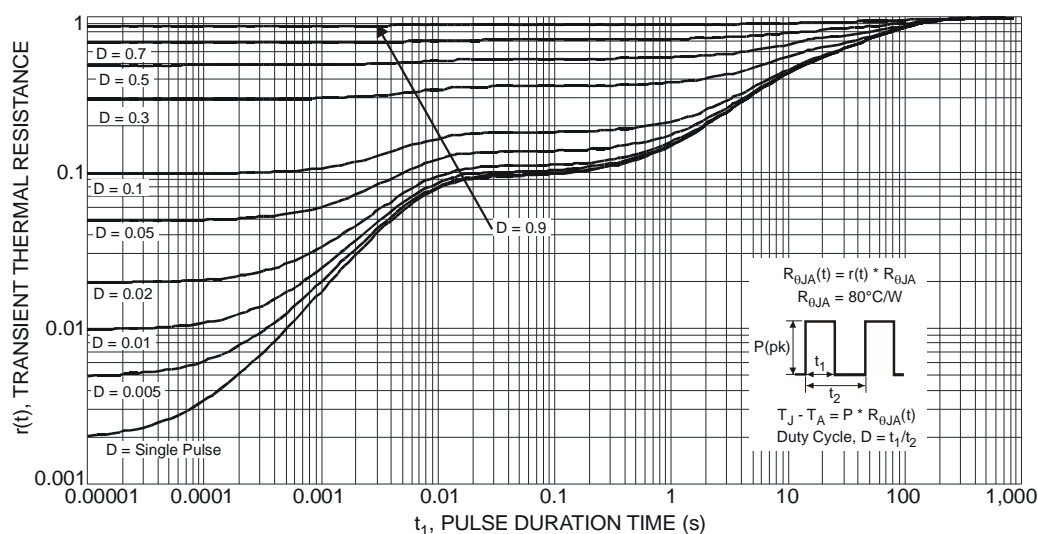
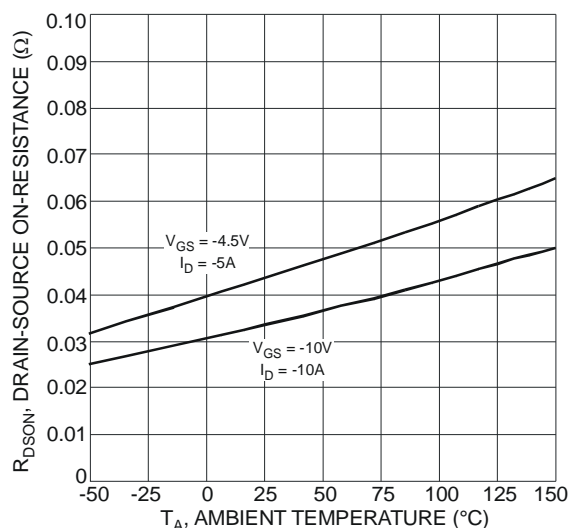
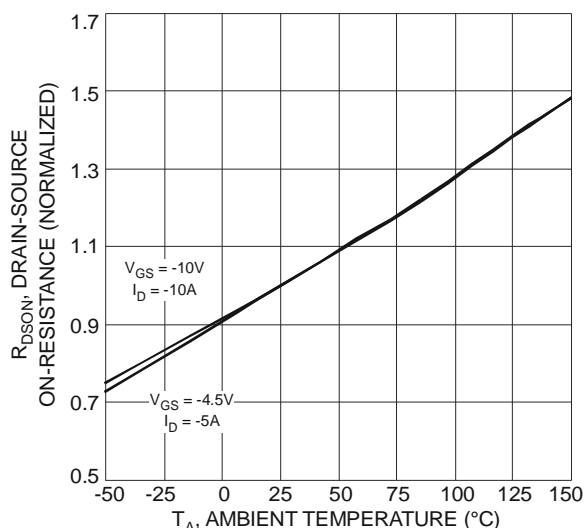
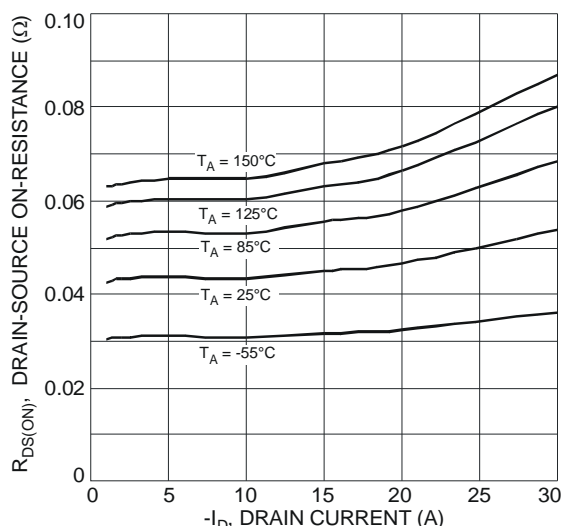
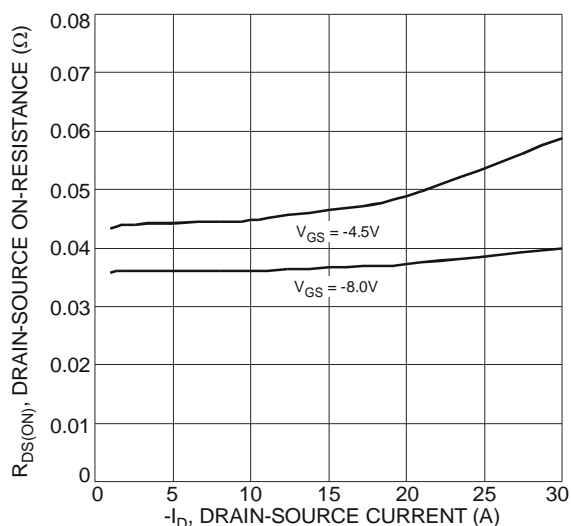
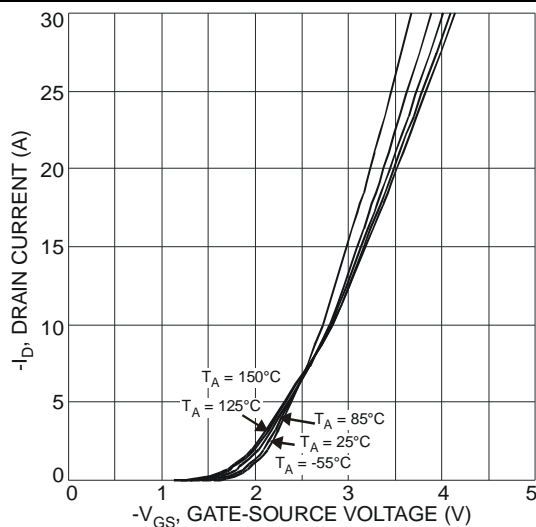
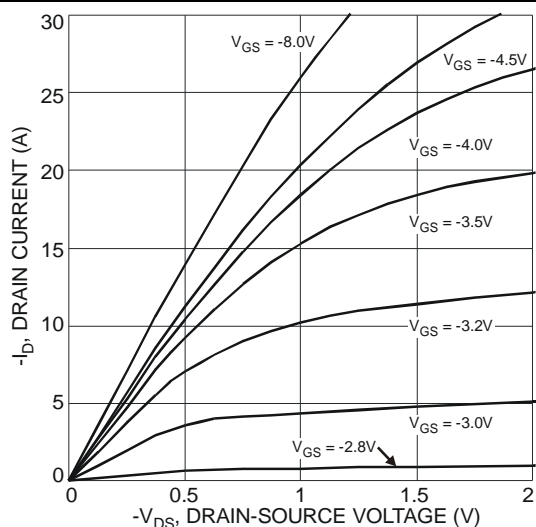


Fig. 11 Transient Thermal Response

**P-CHANNEL, Q2**





**DMG4511SK4**

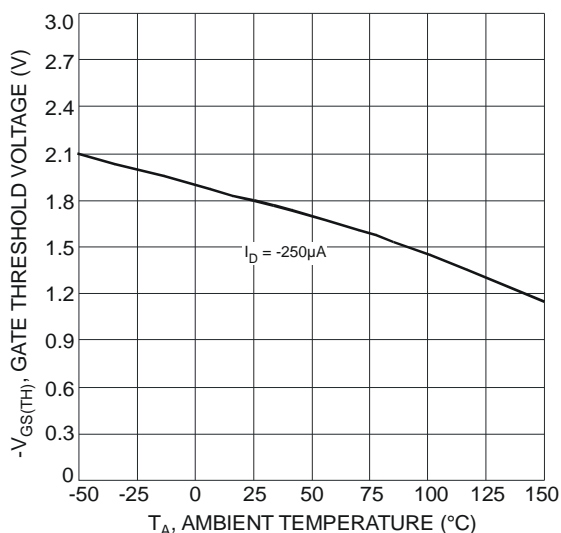


Fig. 18 Gate Threshold Variation vs. Ambient Temperature

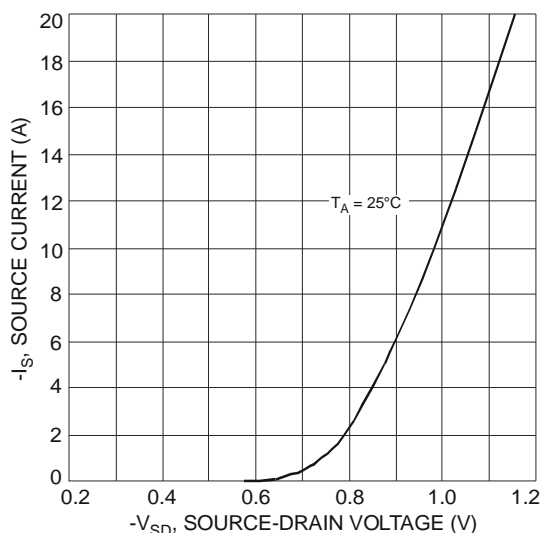


Fig. 19 Diode Forward Voltage vs. Current

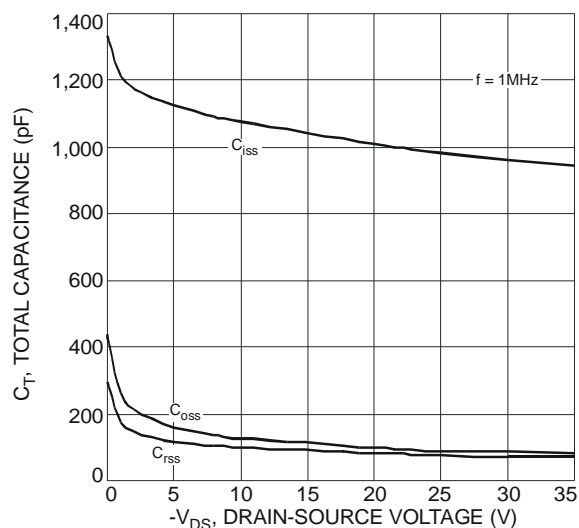


Fig. 20 Typical Total Capacitance

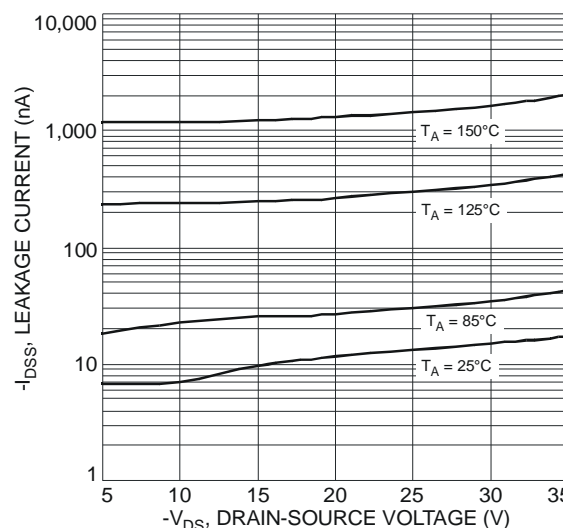


Fig. 21 Typical Leakage Current vs. Drain-Source Voltage

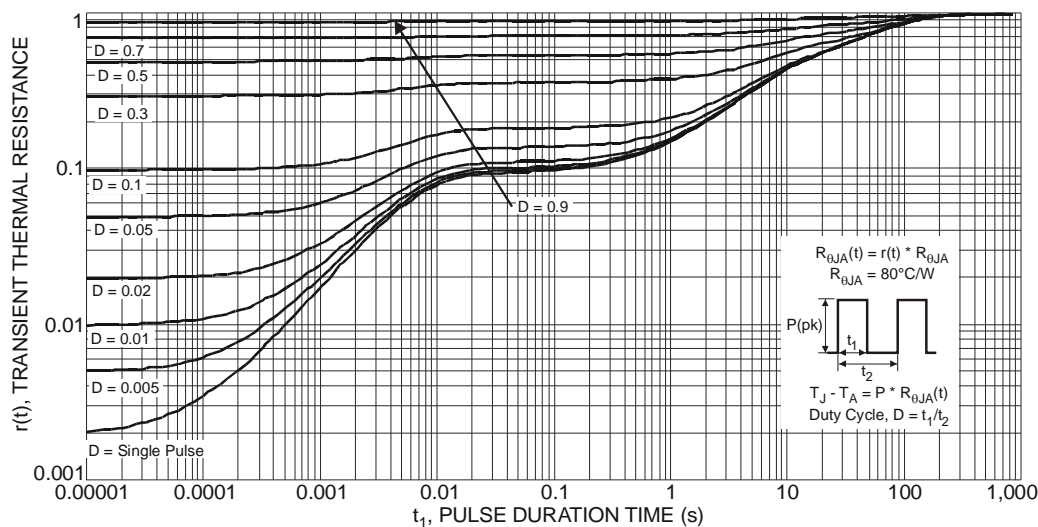
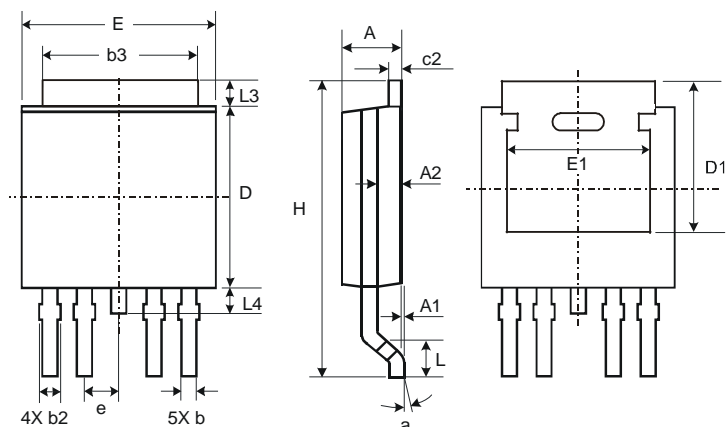


Fig. 22 Transient Thermal Response

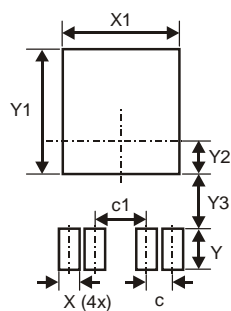


## Package Outline Dimensions



TO252-4L			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.51	0.71	0.583
b2	0.61	0.79	0.70
b3	5.21	5.46	5.33
c2	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	—	—
e	—	—	1.27
E	6.45	6.70	6.58
E1	4.32	—	—
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	—
All Dimensions in mm			

## Suggested Pad Layout



Dimensions	Value (in mm)
c	1.27
c1	2.54
X	1.00
X1	5.73
Y	2.00
Y1	6.17
Y2	1.64
Y3	2.66

**DMG4511SK4**

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