

**P-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ Max}$	$I_D$ $T_A = +25^\circ\text{C}$
-60V	105m $\Omega$ @ $V_{GS} = -10\text{V}$	-3.3A
	130m $\Omega$ @ $V_{GS} = -4.5\text{V}$	-3.0A

**Description**

This 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.


**Applications**

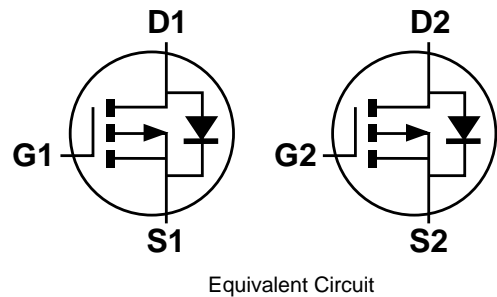
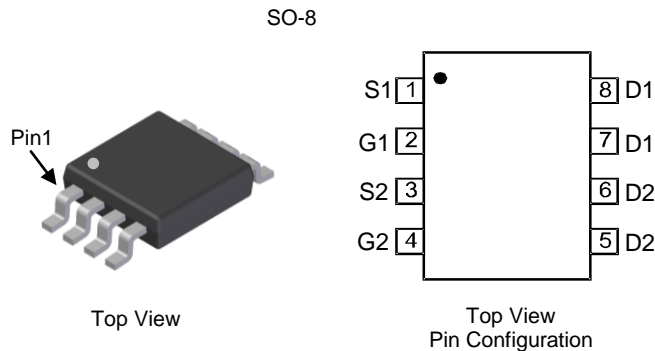
- DC-DC Converters
- Power Management Functions
- Backlighting

**Features**

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **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**

**Mechanical Data**

- Case: SO-8
- 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
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe.  
Solderable per MIL-STD-202, Method 208 
- Weight: 0.074 grams (Approximate)

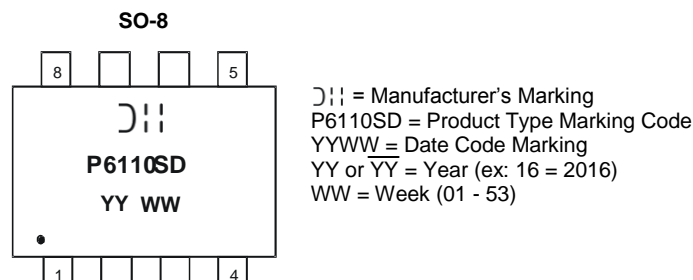


**Ordering Information** (Note 4)

Part Number	Case	Packaging
DMP6110SSD-13	SO-8	2,500/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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**



**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V <sub>DSS</sub>	-60	V
Gate-Source Voltage		V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = -10V	T <sub>C</sub> = +25°C	I <sub>D</sub>	-7.8	A
	T <sub>C</sub> = +70°C	I <sub>D</sub>	-6.3	A
	T <sub>A</sub> = +25°C	I <sub>D</sub>	-3.3	A
			-2.7	A
Pulsed Drain Current (380µs Pulse, 1% Duty Cycle)		I <sub>DM</sub>	-24	A
Maximum Continuous Body Diode Forward Current (Note 6)		I <sub>S</sub>	-1.8	A
Avalanche Current (Note 9) L = 0.1mH		I <sub>AS</sub>	-19	A
Avalanche Energy (Note 9) L = 0.1mH		E <sub>AS</sub>	18	mJ

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5 & 7)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.2	W
	T <sub>A</sub> = +70°C		0.9	
Total Power Dissipation (Note 5 & 8)	T <sub>A</sub> = +25°C		1.2	
Thermal Resistance, Junction to Ambient (Note 5 & 7)	Steady State	R <sub>ΘJA</sub>	104	°C/W
	t < 10s		45	
Thermal Resistance, Junction to Ambient (Note 5 & 8)	Steady State		100	
Total Power Dissipation (Note 6 & 7)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.7	W
	T <sub>A</sub> = +70°C		1.1	
Total Power Dissipation (Note 6 & 8)	T <sub>A</sub> = +25°C		1.8	
Thermal Resistance, Junction to Ambient (Note 6 & 7)	Steady State	R <sub>ΘJA</sub>	74	°C/W
	t < 10s		37	
Thermal Resistance, Junction to Ambient (Note 6 & 8)	Steady State		71	
Thermal Resistance, Junction to Case (Note 6 & 7)		R <sub>ΘJC</sub>	15	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-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.
  7. For a dual device with one active die.
  8. For a device with two active die running at equal power.
  9. I<sub>AS</sub> and E<sub>AS</sub> rating are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (Note 10)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-60	—	—	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	μA	V <sub>DS</sub> = -48V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	100	nA	V <sub>GS</sub> = ±16V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b> (Note 10)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-1	—	-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>	—	—	105	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.5A
		—	—	130		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.5A
Diode Forward Voltage	V <sub>SD</sub>	—	-0.7	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A
<b>DYNAMIC CHARACTERISTICS</b> (Note 11)						
Input Capacitance	C <sub>ISS</sub>	—	969	—	pF	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	57	—	pF	
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	44	—	pF	
Gate Resistance	R <sub>G</sub>	—	13.7	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = -4.5V)	Q <sub>G</sub>	—	8.2	—	nC	V <sub>DS</sub> = -30V, I <sub>D</sub> = -12A
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>G</sub>	—	17.2	—	nC	V <sub>DS</sub> = -30V, I <sub>D</sub> = -12A
Gate-Source Charge	Q <sub>GS</sub>	—	3.0	—	nC	
Gate-Drain Charge	Q <sub>GD</sub>	—	3.1	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	4.4	—	ns	
Turn-On Rise Time	t <sub>R</sub>	—	23	—	ns	V <sub>GS</sub> = -10V, V <sub>DS</sub> = -30V, R <sub>GEN</sub> = 3Ω, I <sub>D</sub> = -12A
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	34	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	42	—	ns	I <sub>S</sub> = -12A, di/dt = 100A/μs
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	13.2	—	ns	
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	6.18	—	nC	

Notes: 10. Short duration pulse test used to minimize self-heating effect.  
11. Guaranteed by design. Not subject to product testing.

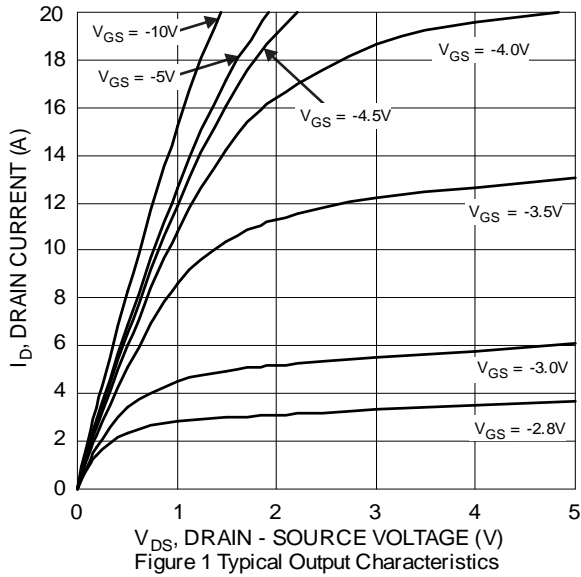


Figure 1 Typical Output Characteristics

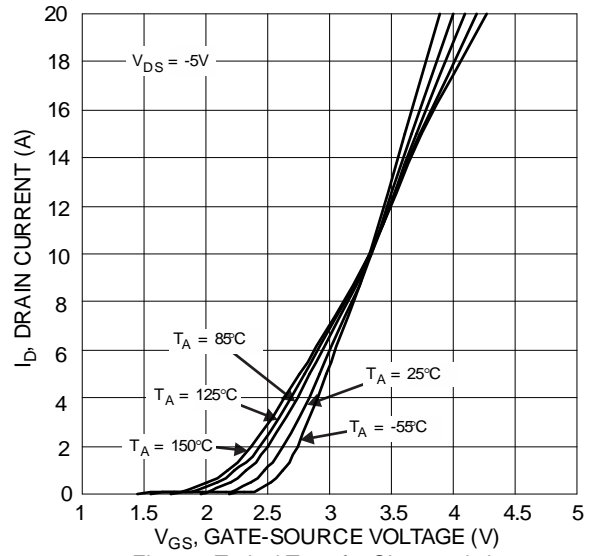


Figure 2 Typical Transfer Characteristics

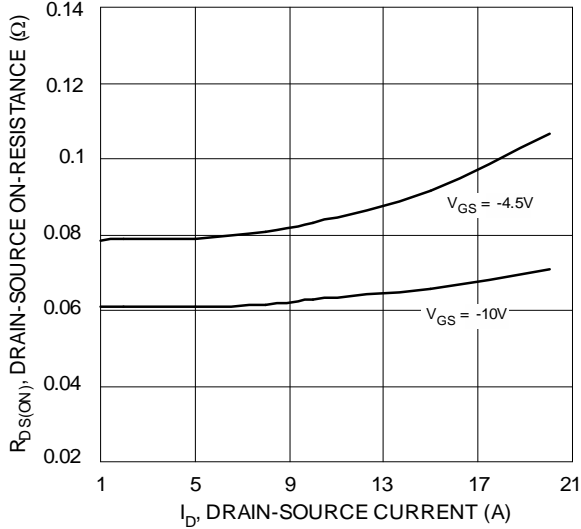


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

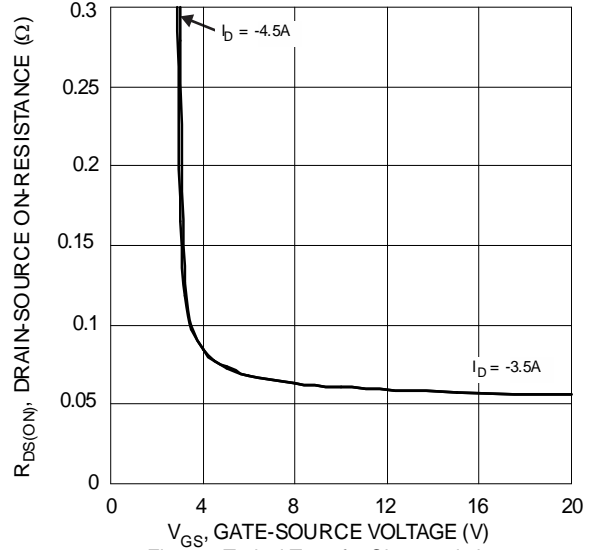


Figure 4 Typical Transfer Characteristics

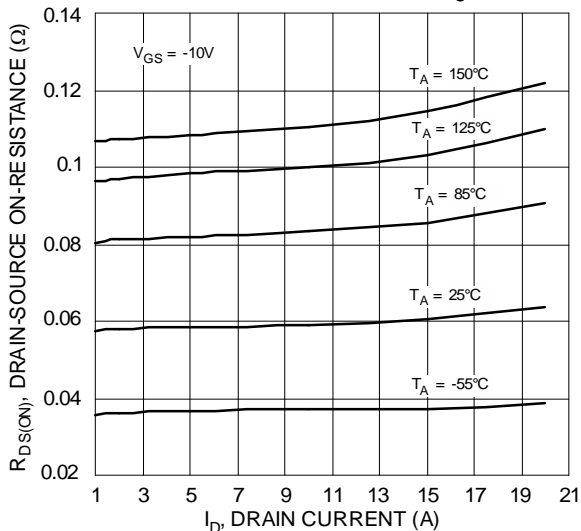


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

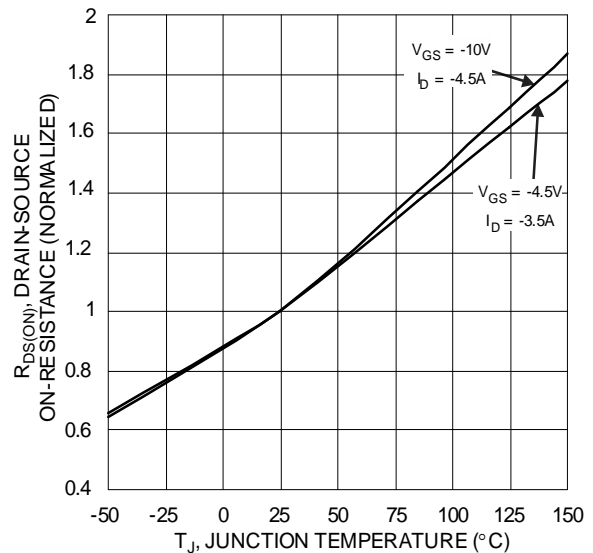
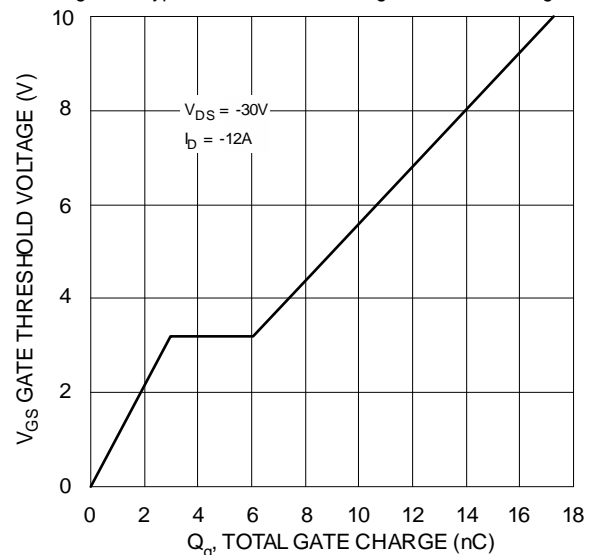
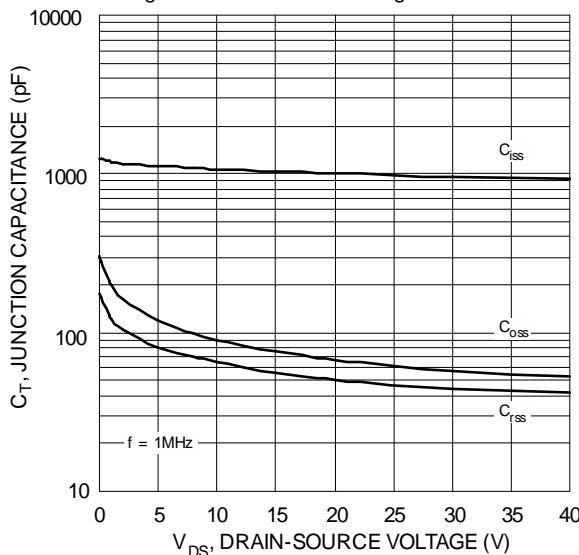
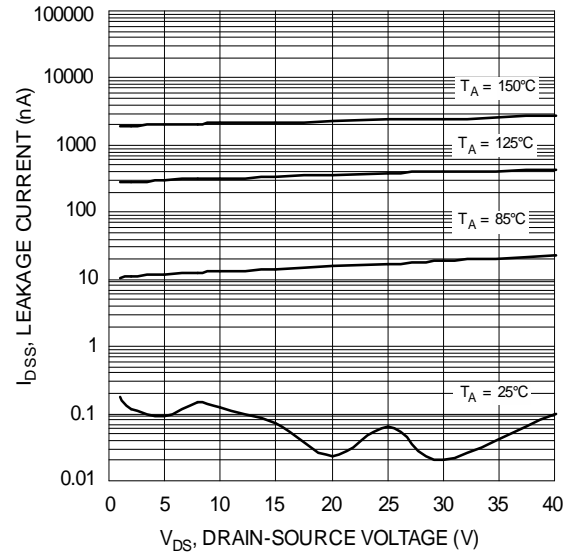
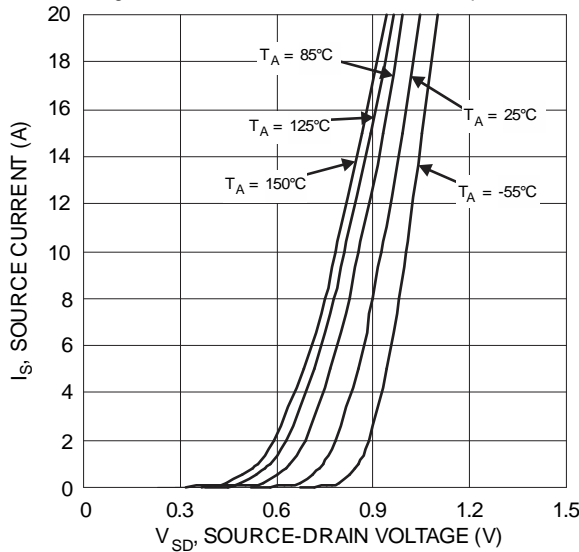
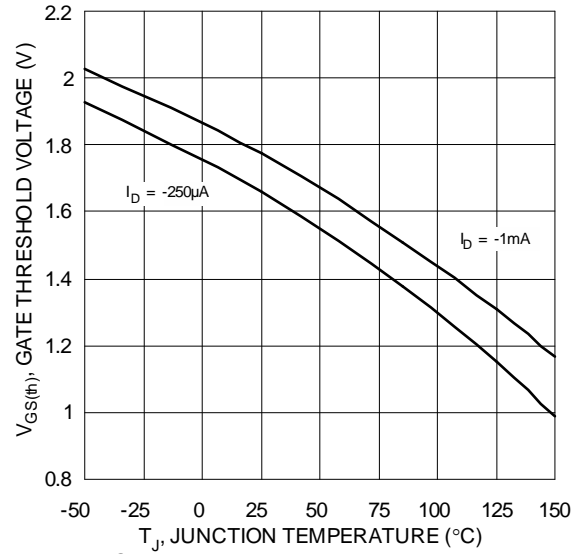
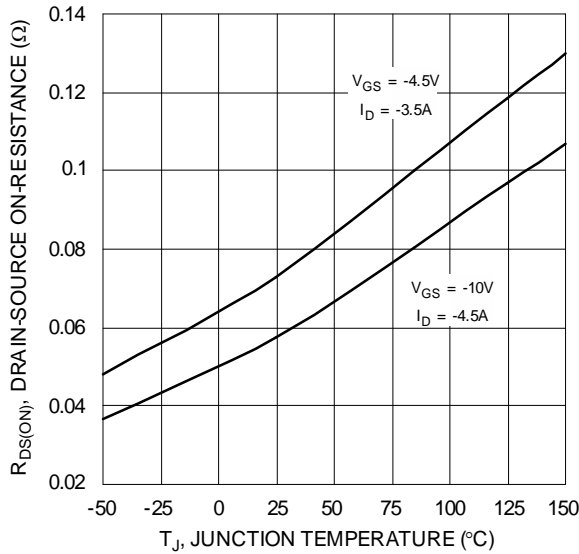
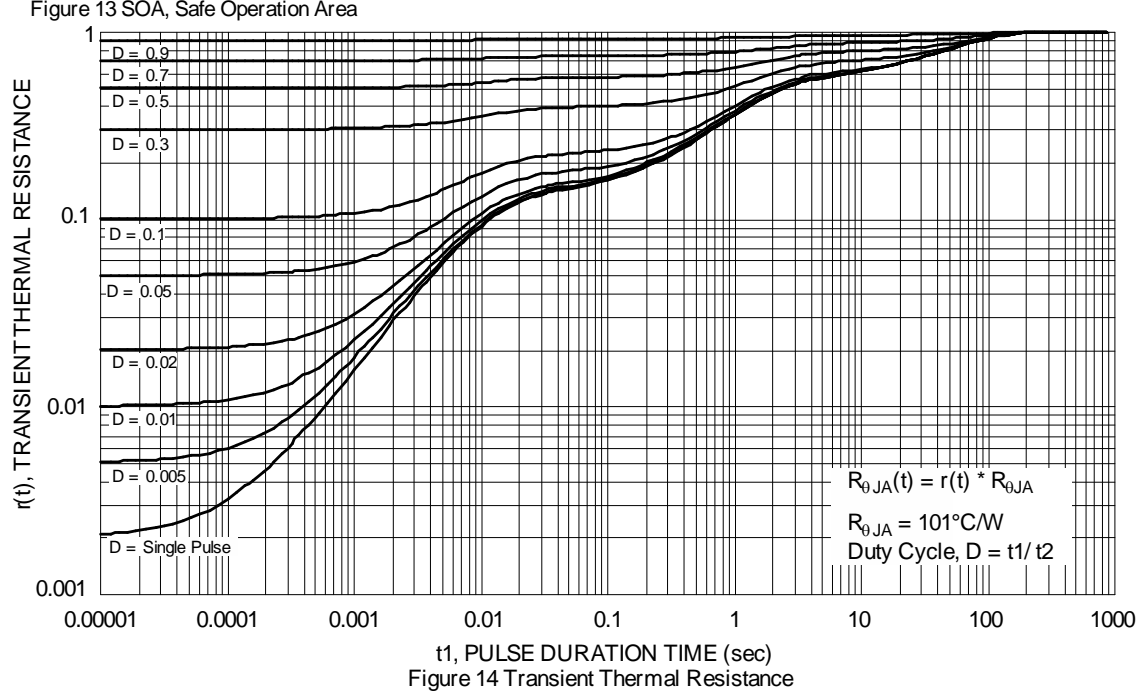
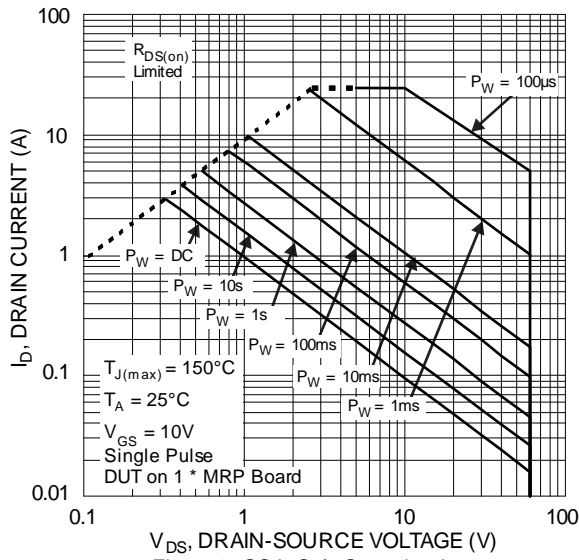


Figure 6 On-Resistance Variation with Temperature

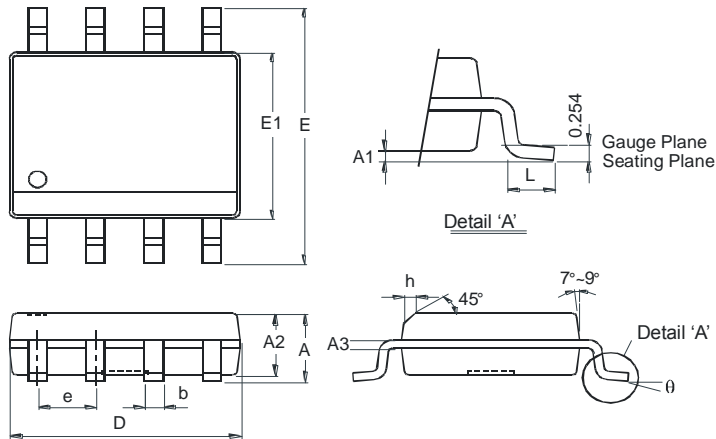




## Package Outline Dimensions

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

### SO-8

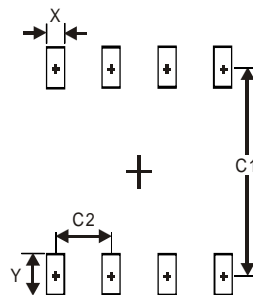


SO-8		
Dim	Min	Max
A	—	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	—	0.35
L	0.62	0.82
θ	0°	8°
All Dimensions in mm		

## Suggested Pad Layout

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

### SO-8



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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