

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _C = +25°C
-20V	16mΩ @ V _{GS} = -4.5V	-18A
	22mΩ @ V _{GS} = -2.5V	-15A

Description and Applications

This 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.

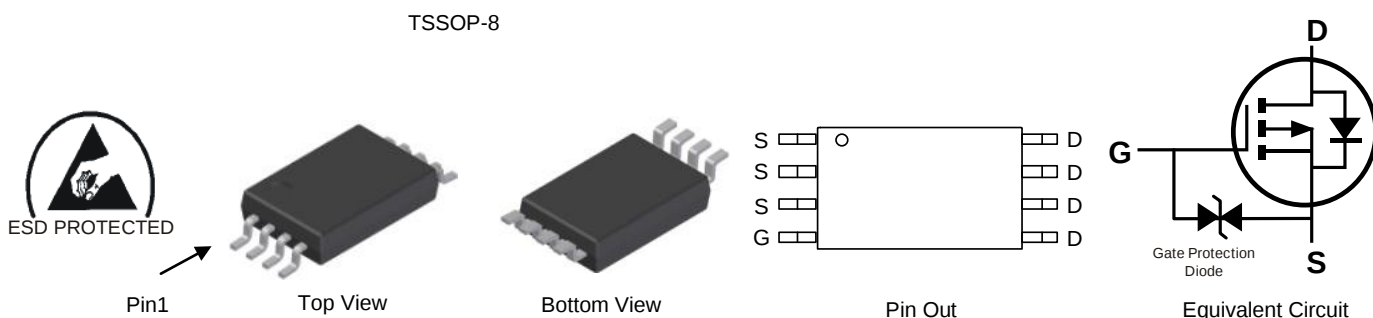
- Battery Management Application
- Power Management Functions
- DC-DC Converters

Features and Benefits

- Low Gate Threshold Voltage
- Low On-Resistance
- **ESD Protected Gate**
- **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**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMP2021UTSQ](#))**

Mechanical Data

- Case: TSSOP-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.039 grams (Approximate)

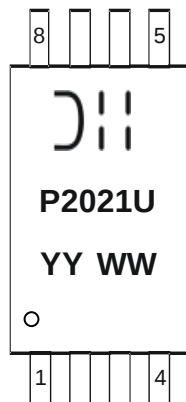


Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2021UTS-13	TSSOP-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 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/>.

Marking Information



DII = Manufacturer's Marking
 P2021U = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 17 = 2017)
 WW = Week (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-20	V
Gate-Source Voltage			V _{GSS}	±10	V
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-7.4 -5.9	A
	Steady State	T _C = +25°C T _C = +70°C	I _D	-18 -14	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	-55	A
Continuous Source-Drain Diode Current (Note 6)		T _A = +25°C	I _S	-2	A
Pulsed Source-Drain Diode Current (10μs Pulse, Duty Cycle = 1%)			I _{SM}	-20	A
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	-25	A
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	32	mJ

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	146	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.3	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	95	°C/W
Thermal Resistance, Junction to Case (Note 6)	Steady State	R _{θJC}	16	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	-20	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1	μA	V _{DS} = -20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	μA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	-0.35	—	-1.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	12	16	mΩ	V _{GS} = -4.5V, I _D = -4.5A
			15	22		V _{GS} = -2.5V, I _D = -4.5A
			19	40		V _{GS} = -1.8V, I _D = -2.5A
Diode Forward Voltage	V _{SD}	—	-0.8	-1.2	V	V _{GS} = 0V, I _S = -1.0A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iSS}	—	2,760	—	pF	V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	262	—		
Reverse Transfer Capacitance	C _{rss}	—	220	—		
Gate Resistance	R _g	—	16	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	34	—	nC	V _{DS} = -15V, I _D = -4.0A
Total Gate Charge (V _{GS} = -8V)	Q _g	—	59	—		
Gate-Source Charge	Q _{gs}	—	3.5	—		
Gate-Drain Charge	Q _{gd}	—	8.3	—		
Turn-On Delay Time	t _{D(ON)}	—	7.5	—	ns	V _{DS} = -15V, V _{GS} = -4.5V, R _G = 1Ω, I _D = -4.0A
Turn-On Rise Time	t _r	—	25	—		
Turn-Off Delay Time	t _{D(OFF)}	—	125	—		
Turn-Off Fall Time	t _f	—	96	—		
Reverse Recovery Time	t _{RR}	—	48	—	ns	I _F = -1.0A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	—	33	—	nC	I _F = -1.0A, di/dt = 100A/μs

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

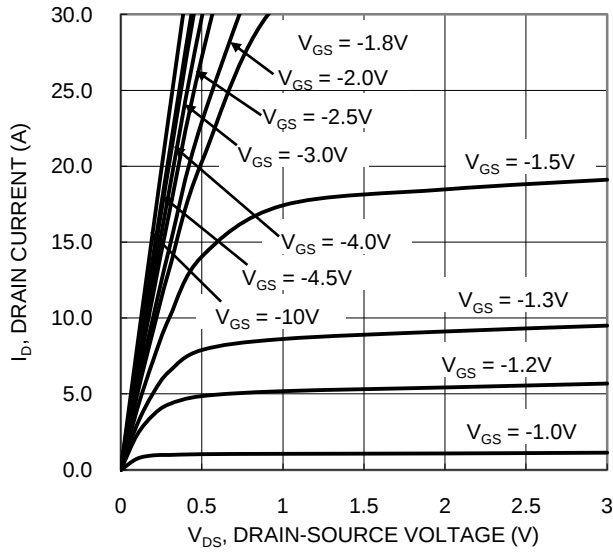


Figure 1. Typical Output Characteristic

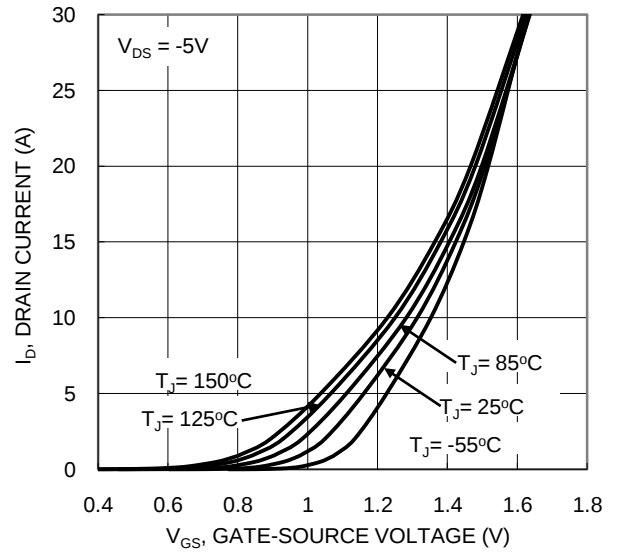


Figure 2. Typical Transfer Characteristic

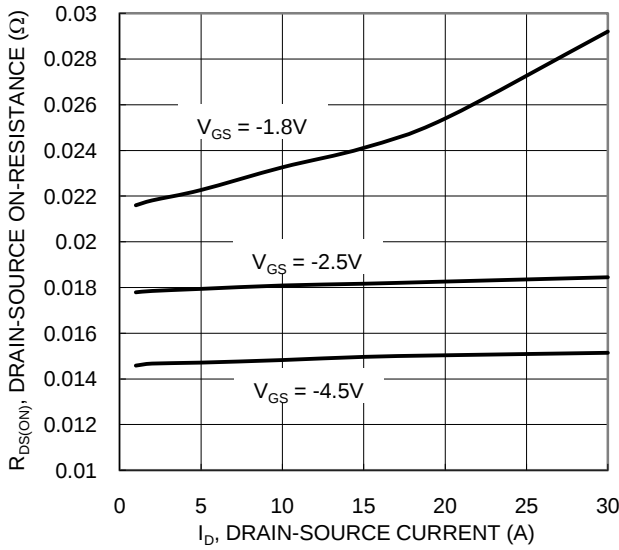


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

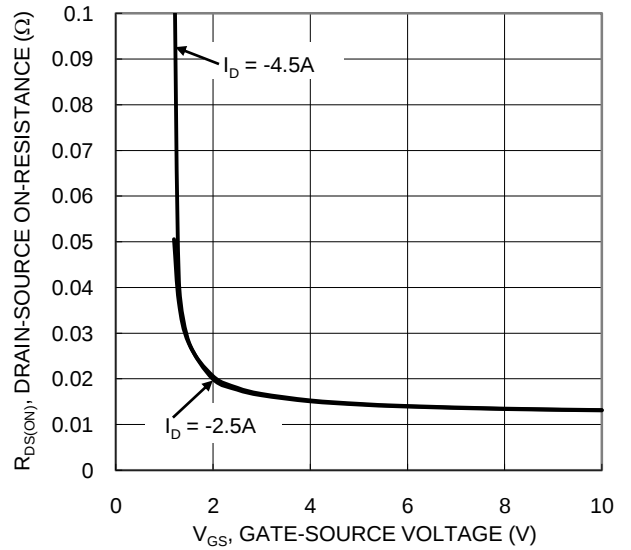


Figure 4. Typical Transfer Characteristic

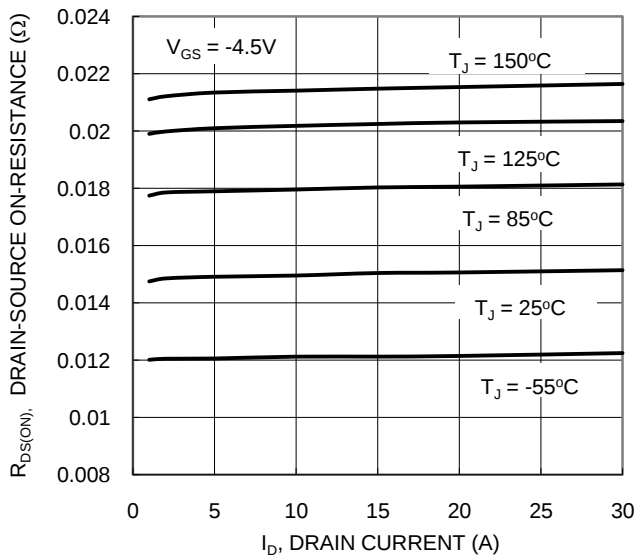


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

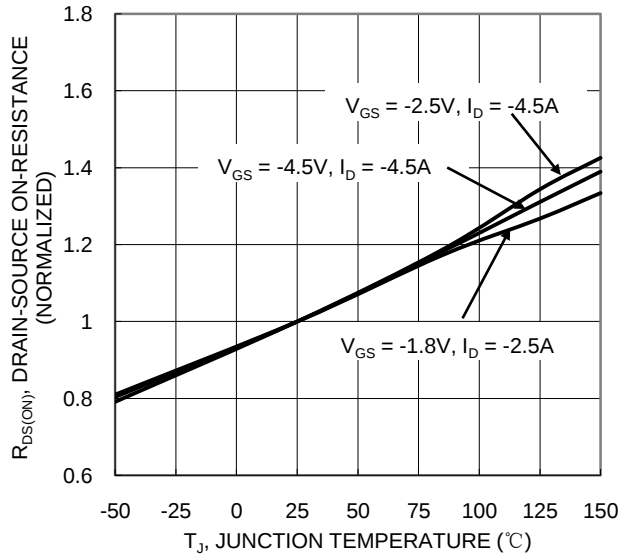
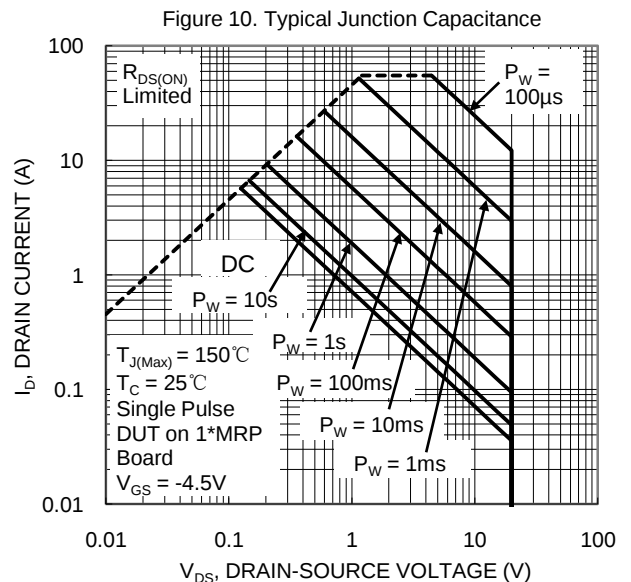
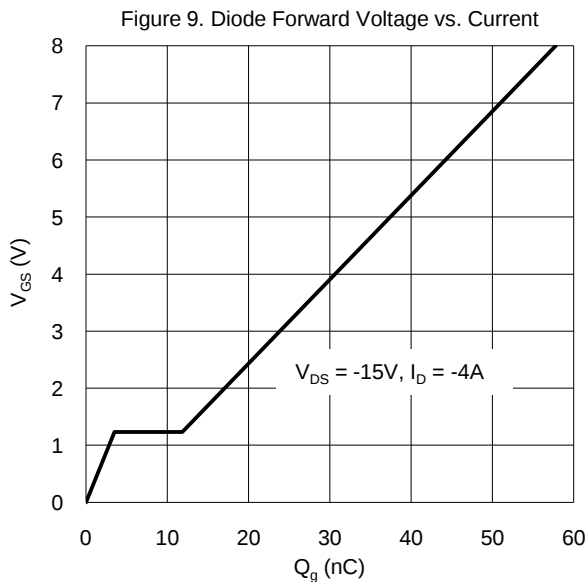
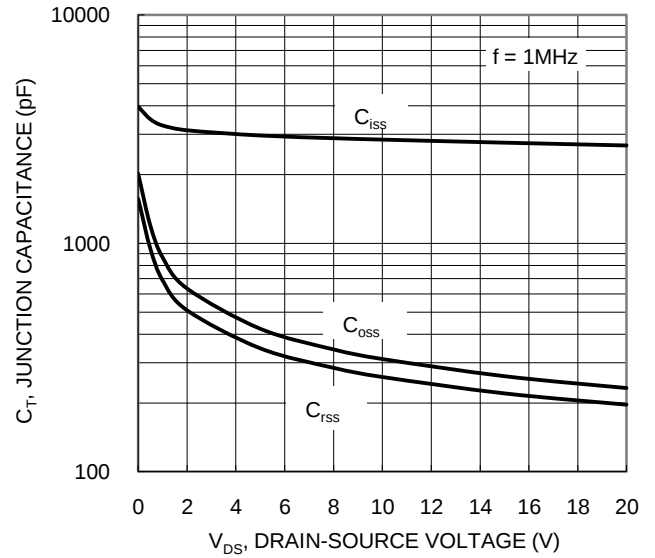
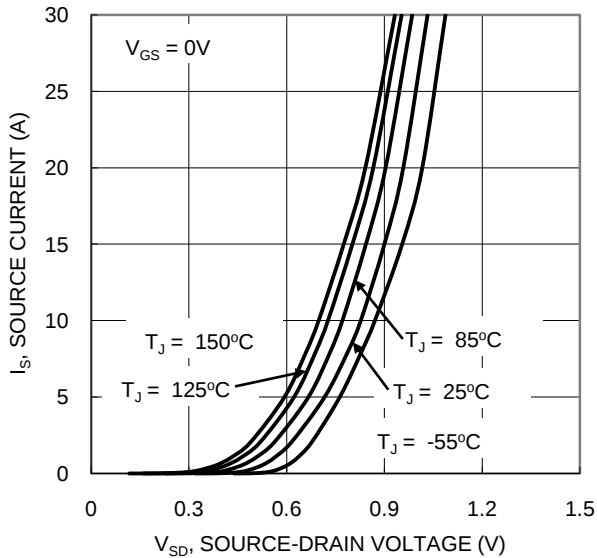
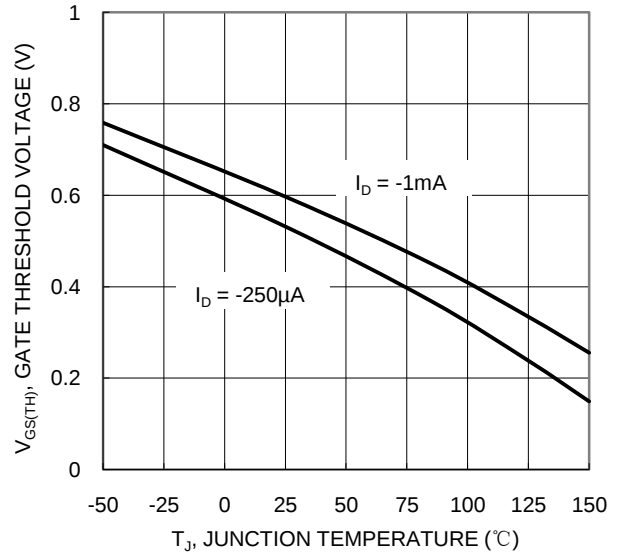
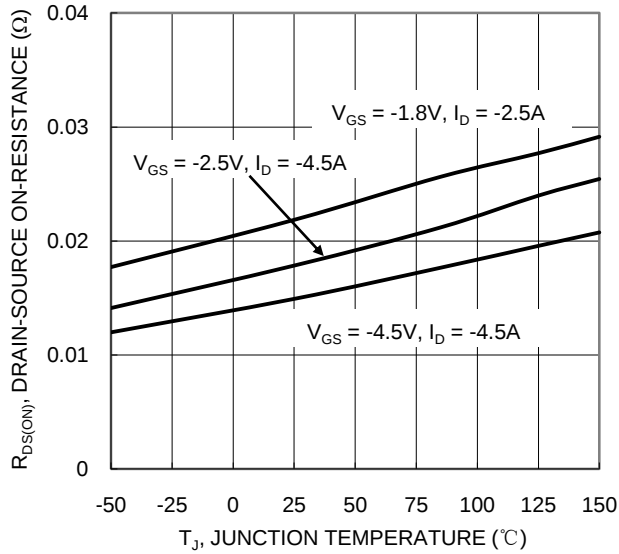


Figure 6. On-Resistance Variation with Junction Temperature



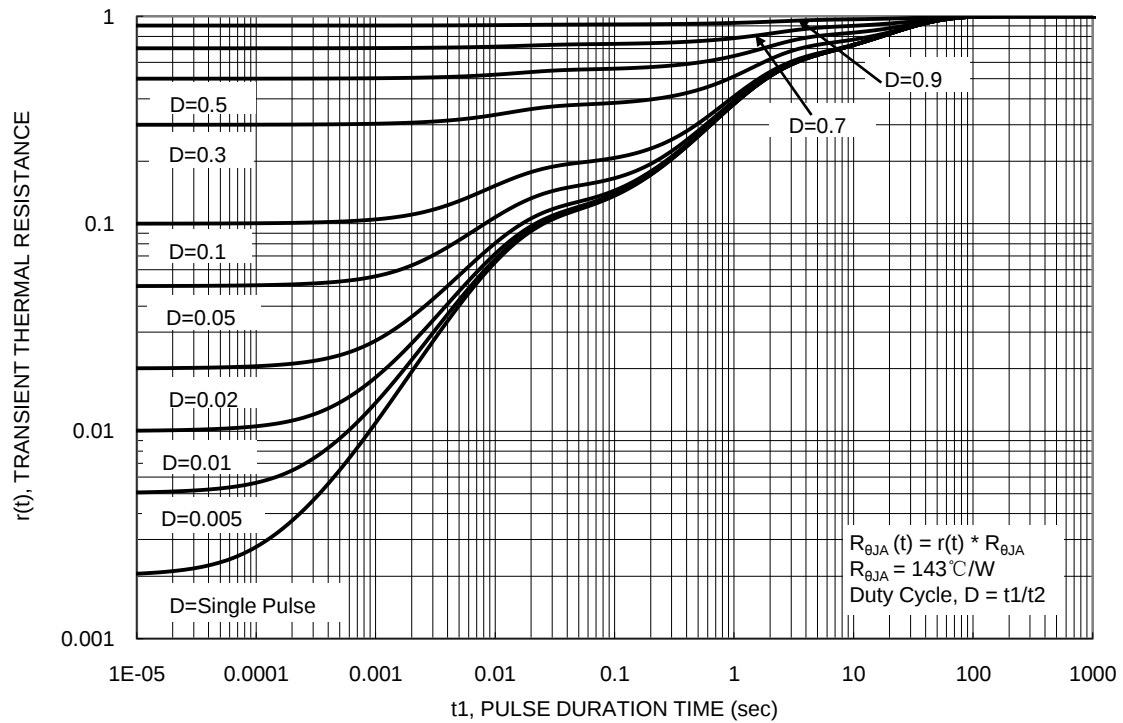
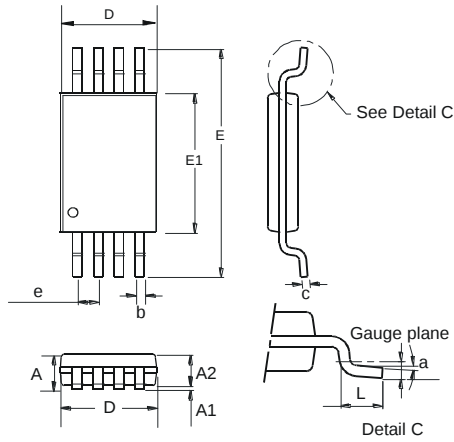


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

TSSOP-8

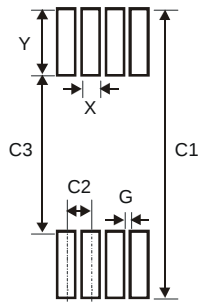


TSSOP-8			
Dim	Min	Max	Typ
a	0.09	—	—
A	—	1.20	—
A1	0.05	0.15	—
A2	0.825	1.025	0.925
b	0.19	0.30	—
c	0.09	0.20	—
D	2.90	3.10	3.025
e	—	—	0.65
E	—	—	6.40
E1	4.30	4.50	4.425
L	0.45	0.75	0.60
All Dimensions in mm			

Suggested Pad Layout

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

TSSOP-8



Dimensions	Value (in mm)
X	0.45
Y	1.78
C1	7.72
C2	0.65
C3	4.16
G	0.20

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