

Product Summary

BV_{DSS}	$R_{DS(ON)}$ max	I_D max $T_C = +25^\circ C$
30V	20m Ω @ $V_{GS} = 4.5V$	15A
	25m Ω @ $V_{GS} = 2.5V$	14A

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.

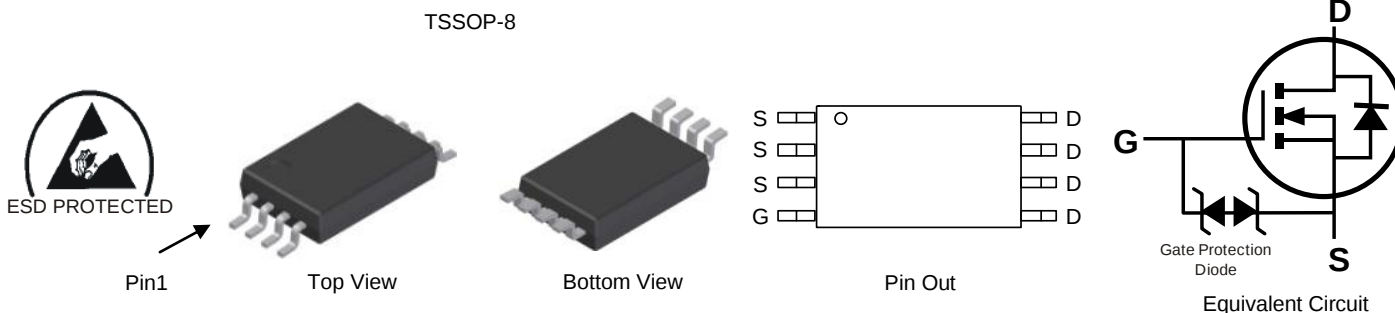
- Battery Management Application
- Power Management Functions
- DC-DC Converters

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**

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 
- Weight: 0.039 grams (Approximate)

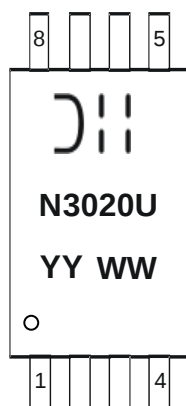


Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3020UTS-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



 = Manufacturer's Marking
 N3020U = 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}	30	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 7) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	6.8 5.4	A
	Steady State	T _C = +25°C T _C = +70°C	I _D	15 12	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	50	A
Continuous Source-Drain Diode Current (Note 7)			I _S	2.5	A
Pulsed Source-Drain Diode Current (10μs Pulse, Duty Cycle = 1%)			I _{SM}	20	A
Avalanche Current (Note 8) L = 0.1mH			I _{AS}	17	A
Avalanche Energy (Note 8) L = 0.1mH			E _{AS}	19	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	0.85	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	150	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.4	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	90	°C/W
Thermal Resistance, Junction to Case (Note 6)		R _{θJC}	17	
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}	30	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1	μA	V _{DS} = 30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	μA	V _{GS} = ±10V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	0.4	—	1.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	15	20	mΩ	V _{GS} = 4.5V, I _D = 4.5A
			18	25		V _{GS} = 2.5V, I _D = 3.5A
			25	50		V _{GS} = 1.8V, I _D = 2.0A
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}	—	1304	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	87	—		
Reverse Transfer Capacitance	C _{rss}	—	80	—		
Gate Resistance	R _g	—	1.3	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	15	—	nC	V _{DS} = 15V, I _D = 4.5A
Total Gate Charge (V _{GS} = 8V)	Q _g	—	27	—		
Gate-Source Charge	Q _{gs}	—	2.0	—		
Gate-Drain Charge	Q _{gd}	—	2.1	—		
Turn-On Delay Time	t _{D(ON)}	—	4.1	—	ns	V _{DS} = 15V, V _{GS} = 4.5V, R _G = 1Ω, I _D = 4.5A
Turn-On Rise Time	t _r	—	4.8	—		
Turn-Off Delay Time	t _{D(OFF)}	—	20.5	—		
Turn-Off Fall Time	t _f	—	3.2	—		
Reverse Recovery Time	t _{RR}	—	7.1	—	ns	I _F = 1.0A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	—	1.7	—	nC	

- 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.

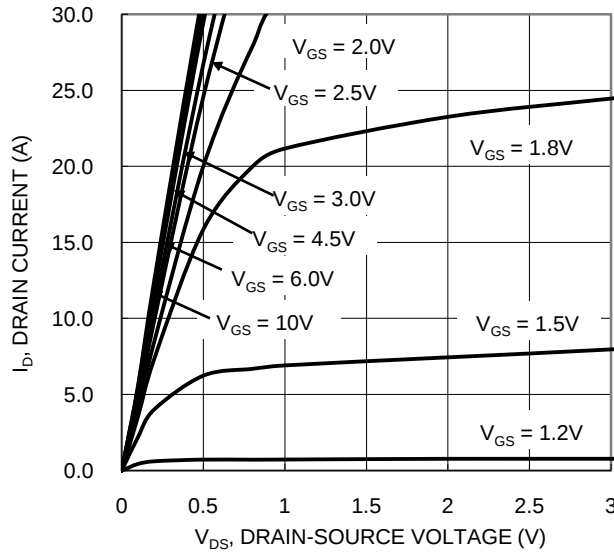


Figure 1. Typical Output Characteristic

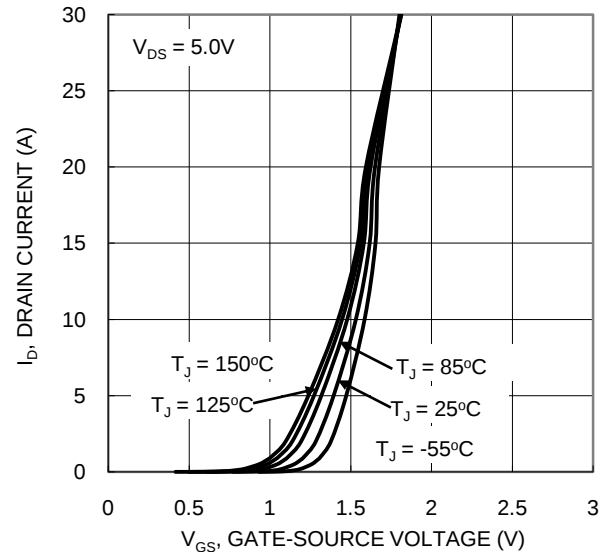


Figure 2. Typical Transfer Characteristic

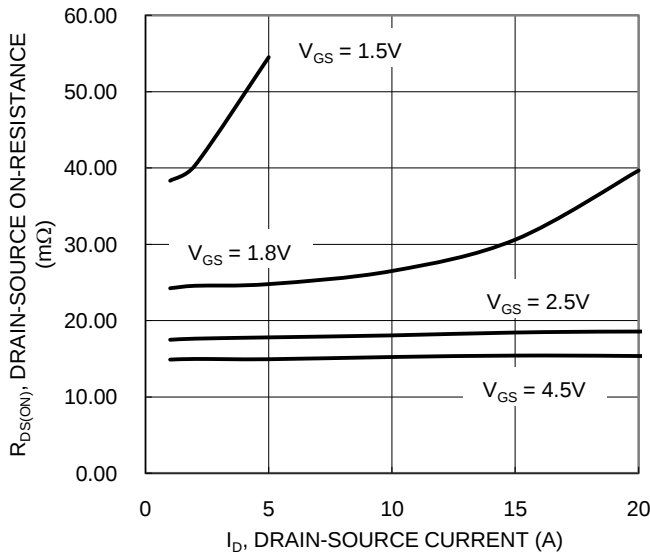


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

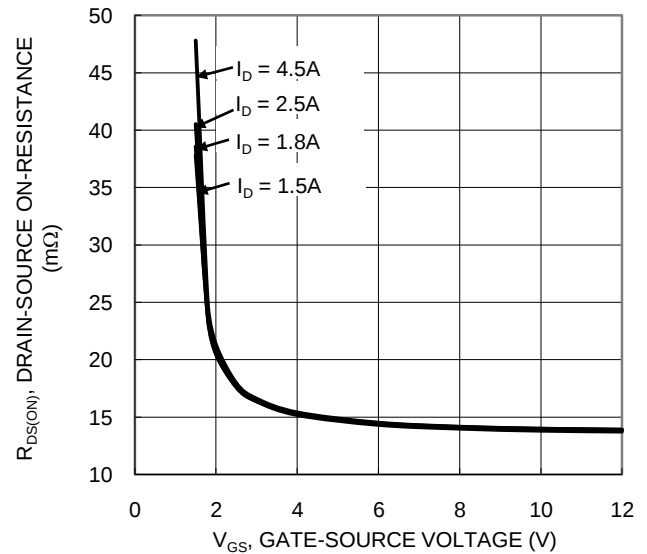


Figure 4. Typical Transfer Characteristic

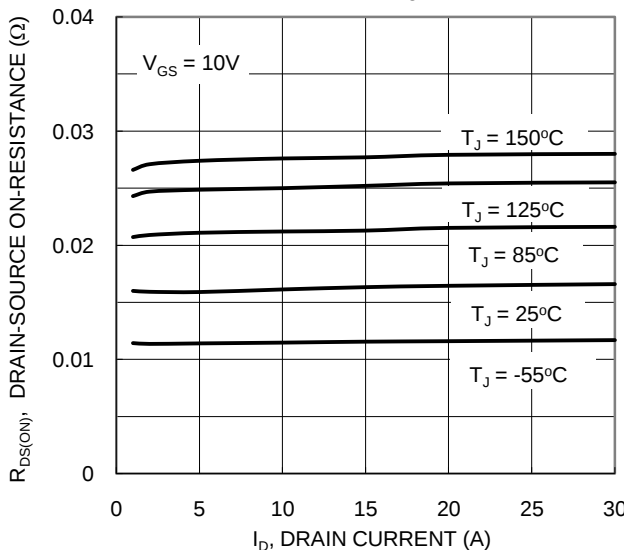


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

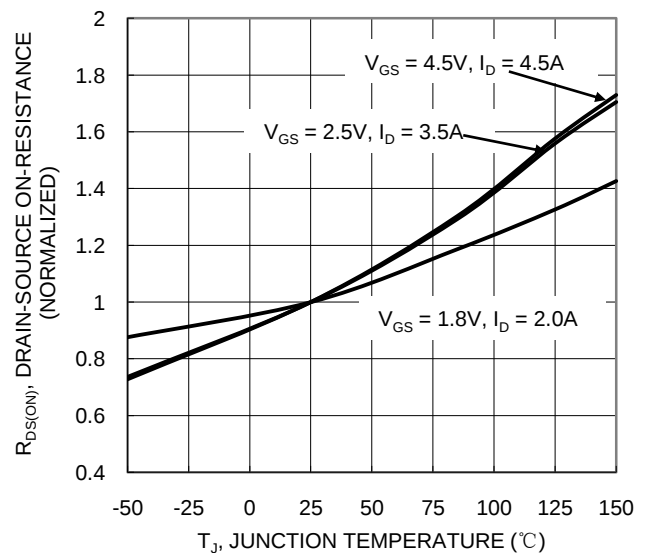
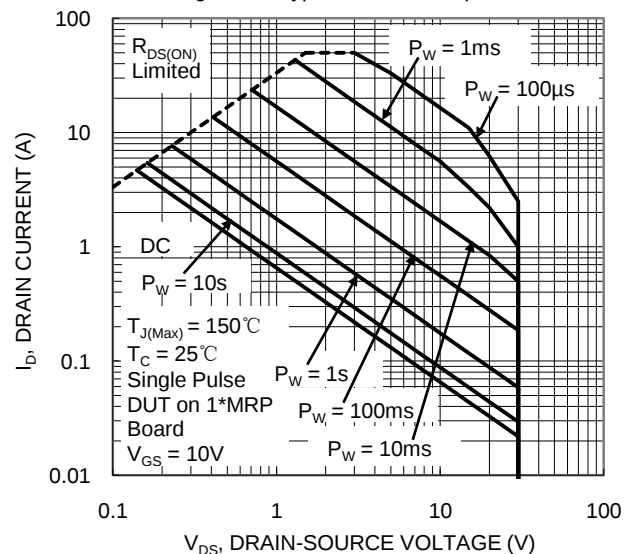
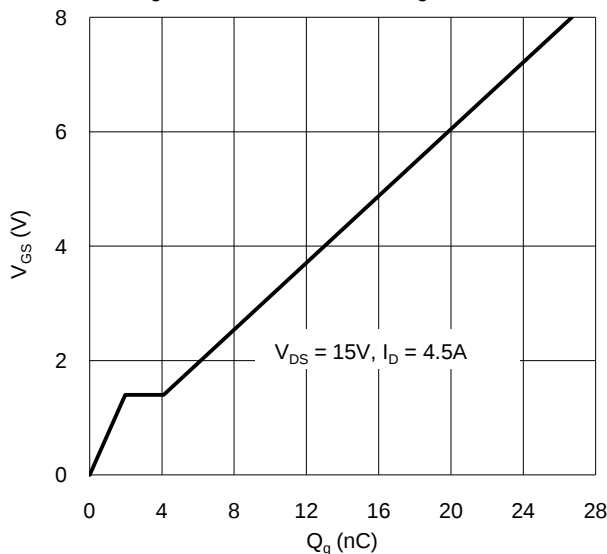
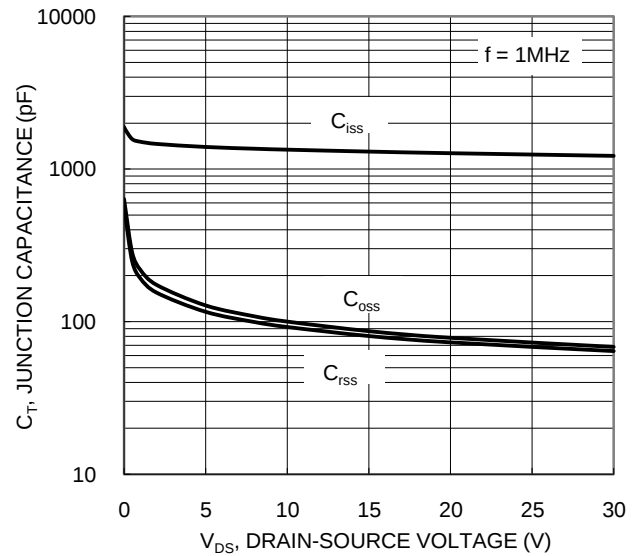
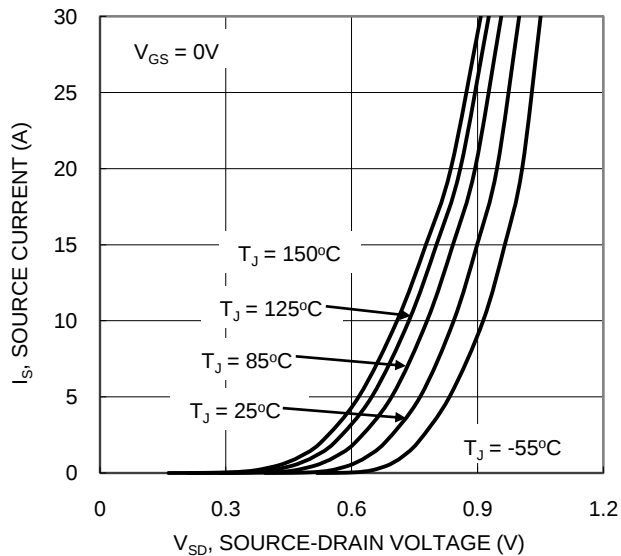
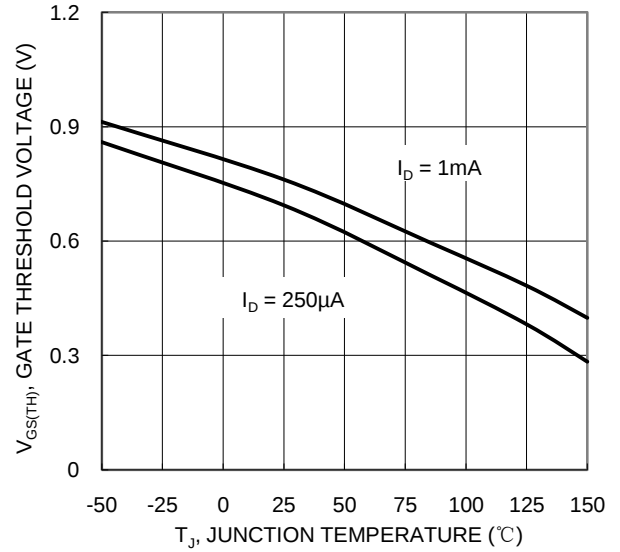
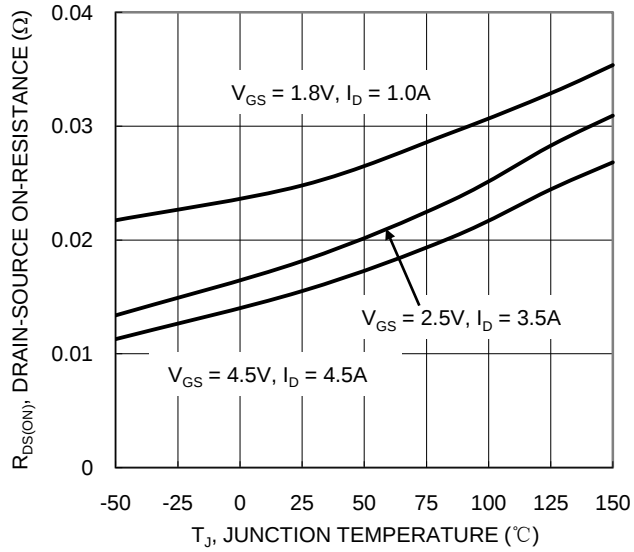


Figure 6. On-Resistance Variation with Temperature



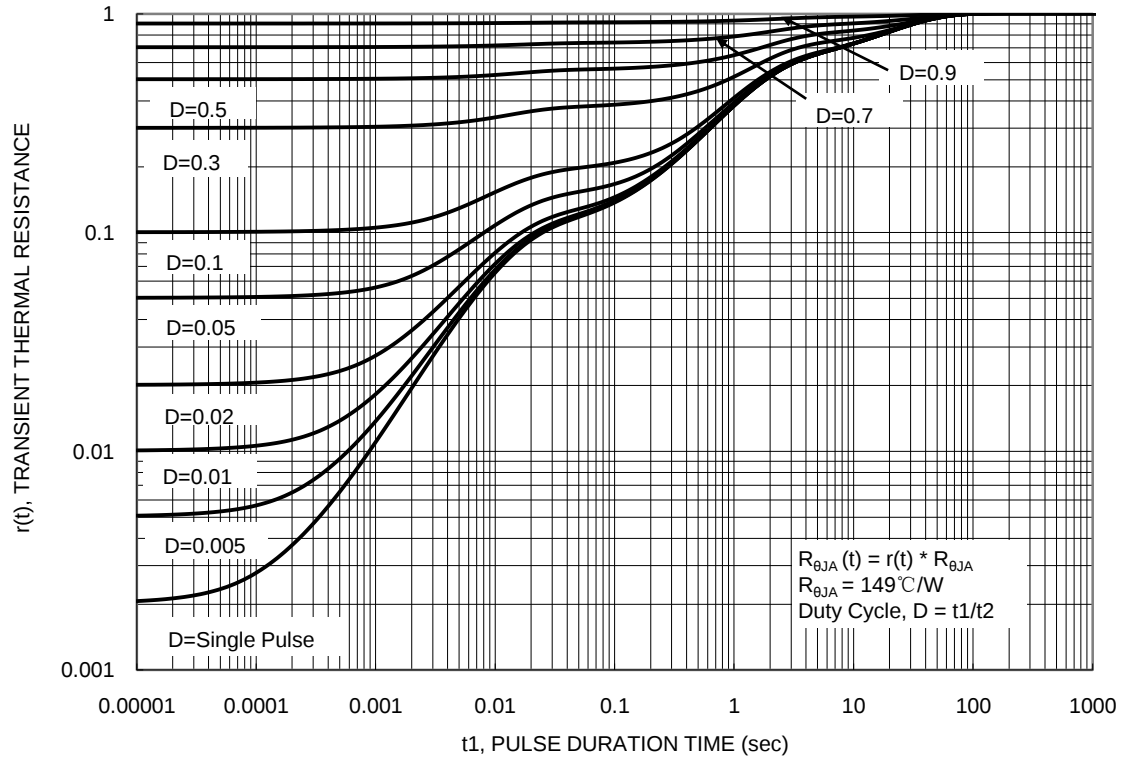
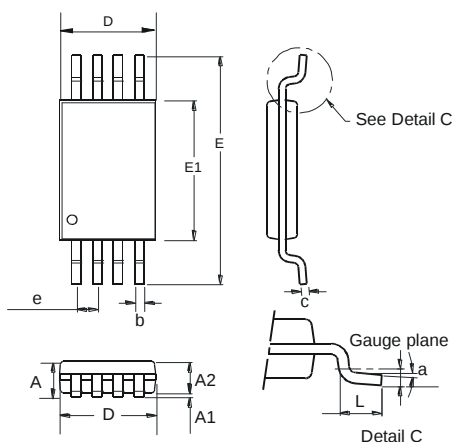


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

TSSOP-8

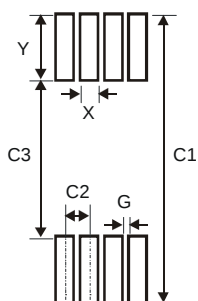


TSSOP-8			
Dim	Min	Max	Typ
a	0.09	—	—
A	—	1.20	—
A1	0.05	0.15	—
A2	0.825	1.025	0.925
b	0.19	0.30	—
c	0.09	0.20	—
D	2.90	3.10	3.025
e	—	—	0.65
E	—	—	6.40
E1	4.30	4.50	4.425
L	0.45	0.75	0.60
All Dimensions in mm			

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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