

Product Summary

Device	V _{(BR)DSS}	R _{Ds(ON)} Max	I _D Max T _C = +25°C (Note 10)
Q1 & Q2	30V	11.1mΩ @ V _{GS} = 10V	30A
		13.8mΩ @ V _{GS} = 4.5V	28A
		22.0mΩ @ V _{GS} = 3.8V	22A

Description

This new generation 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

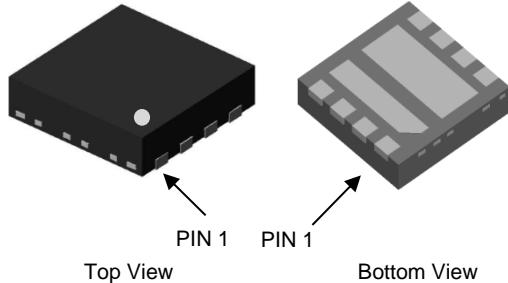
- General Purpose Interfacing Switch
- Power Management Functions

Features and Benefits

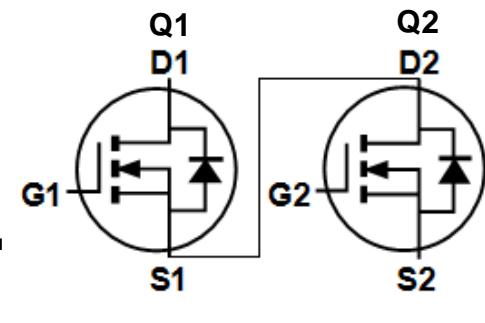
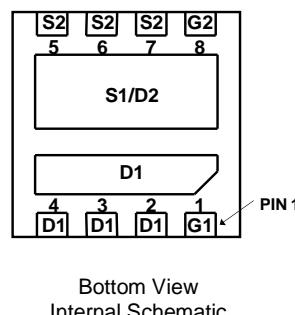
- Low Gate Threshold Voltage
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)

Mechanical Data

- Case: V-DFN3030-8 (Type K)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.02 grams (Approximate)



V-DFN3030-8 (Type K)



Equivalent Circuit

Ordering Information (Note 4)

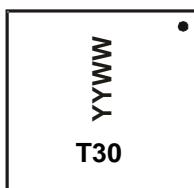
Part Number	Case	Packaging
DMT3009LDT-7	V-DFN3030-8 (Type K)	3,000/Tape & Reel

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 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.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

V-DFN3030-8 (Type K)



T30= Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 16 = 2016)
WW = Week Code (01 to 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Q1&Q2	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	+20, -16	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State (Note 10)	$T_C = +25^\circ\text{C}$ $T_C = +70^\circ\text{C}$	I_D	30 25	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	14 11	A
Maximum Body Diode Forward Current (Note 6)			I_S	2.1	A
Pulsed Drain Current (100 μs Pulse, Duty Cycle = 1%)			I_{DM}	100	A
Avalanche Current (Note 7) $L = 0.1\text{mH}$			I_{AS}	19.3	A
Avalanche Energy (Note 7) $L = 0.1\text{mH}$			E_{AS}	18.6	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	1.2	W
		0.8	
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	107	°C/W
		63	
Total Power Dissipation (Note 6)	P_D	2.0	W
		1.2	
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	64	°C/W
		39	
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	7.6	
Operating and Storage Temperature Range	T_J, T_{STG}	-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 1-inch square copper plate.

7. UIS in production with $L = 0.1\text{mH}$, starting $T_A = +25^\circ\text{C}$.

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$\text{V}_{\text{DS}} = 24\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$
Zero Gate Voltage Drain Current $\text{T}_J = +150^\circ\text{C}$ (Note 9)	I_{DSS}	—	—	100	μA	$\text{V}_{\text{DS}} = 24\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$\text{V}_{\text{GS}} = 20\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$ $\text{V}_{\text{GS}} = -16\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$\text{V}_{\text{GS(TH)}}$	1	—	3	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$, $\text{I}_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS(ON)}}$	—	7.2	11.1	mΩ	$\text{V}_{\text{GS}} = 10\text{V}$, $\text{I}_D = 14.4\text{A}$
		—	10.5	13.8		$\text{V}_{\text{GS}} = 4.5\text{V}$, $\text{I}_D = 7\text{A}$
		—	13	22.0		$\text{V}_{\text{GS}} = 3.8\text{V}$, $\text{I}_D = 5\text{A}$
Diode Forward Voltage	V_{SD}	—	—	1.2	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_S = 10\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{ISS}	—	748	1,500	pF	$\text{V}_{\text{DS}} = 15\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$
Output Capacitance	C_{OSS}	—	447	895		
Reverse Transfer Capacitance	C_{RSS}	—	43	90		
Gate Resistance	R_G	—	1.0	2.0	Ω	$\text{V}_{\text{DS}} = 0\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$
Total Gate Charge ($\text{V}_{\text{GS}} = 10\text{V}$)	Q_G	—	13.8	20	nC	$\text{V}_{\text{DS}} = 15\text{V}$, $\text{I}_D = 14.4\text{A}$
Total Gate Charge ($\text{V}_{\text{GS}} = 4.5\text{V}$)	Q_G	—	6.4	9		
Gate-Source Charge	Q_{GS}	—	2.2	5		
Gate-Drain Charge	Q_{GD}	—	2.2	5		
Turn-On Delay Time	$\text{t}_{\text{D(ON)}}$	—	3.5	7	ns	$\text{V}_{\text{GS}} = 10\text{V}$, $\text{V}_{\text{DD}} = 15\text{V}$, $\text{R}_G = 1\Omega$, $\text{I}_D = 10\text{A}$
Turn-On Rise Time	t_R	—	5.0	10		
Turn-Off Delay Time	$\text{t}_{\text{D(OFF)}}$	—	8.6	17		
Turn-Off Fall Time	t_F	—	1.4	3		
Body Diode Reverse Recovery Time	t_{RR}	—	18	33	ns	$\text{I}_F = 10\text{A}$, $\text{di}/\text{dt} = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{RR}	—	7.7	15	nC	$\text{I}_F = 10\text{A}$, $\text{di}/\text{dt} = 100\text{A}/\mu\text{s}$

Notes: 8. Short duration pulse test used to minimize self-heating effect.

9. Guaranteed by design. Not subject to product testing.

10. Package limited.

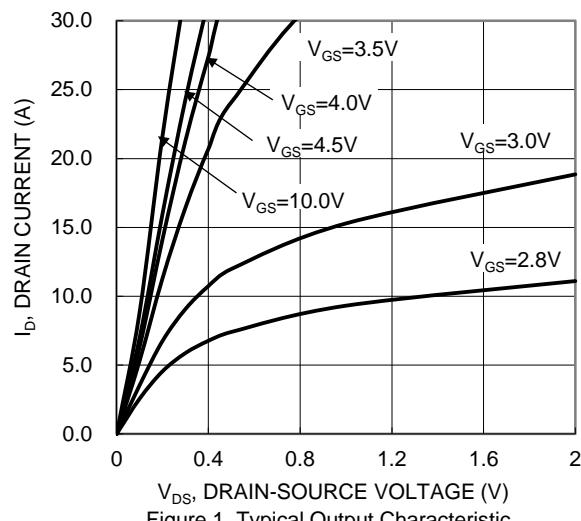


Figure 1. Typical Output Characteristic

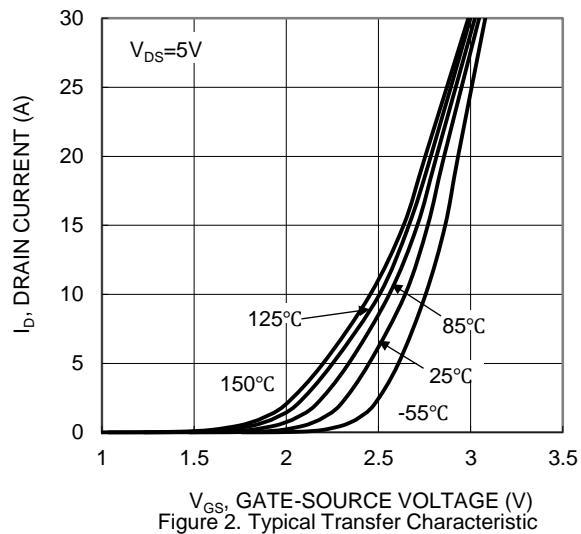


Figure 2. Typical Transfer Characteristic

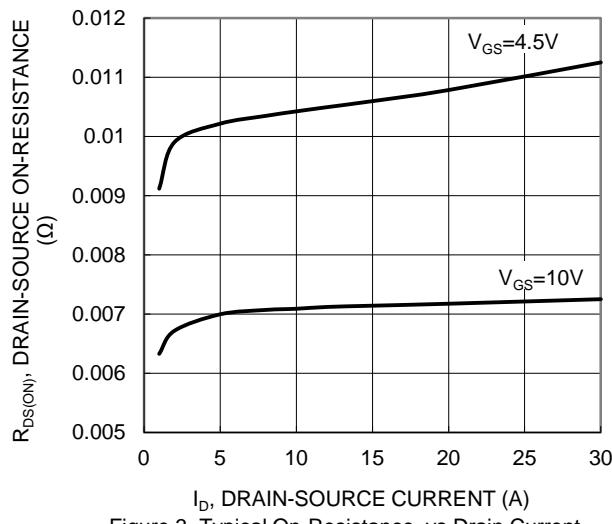


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

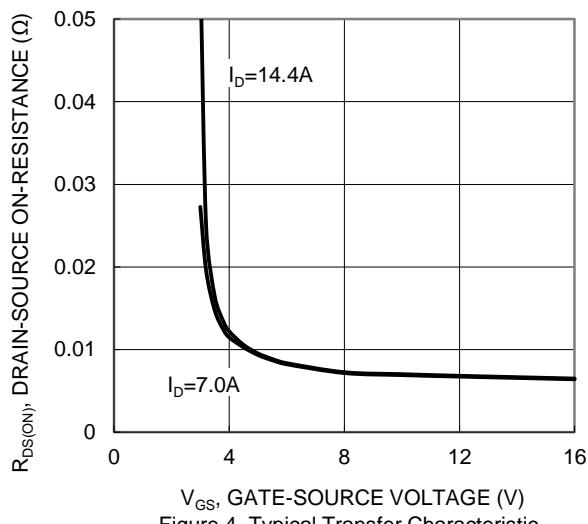


Figure 4. Typical Transfer Characteristic

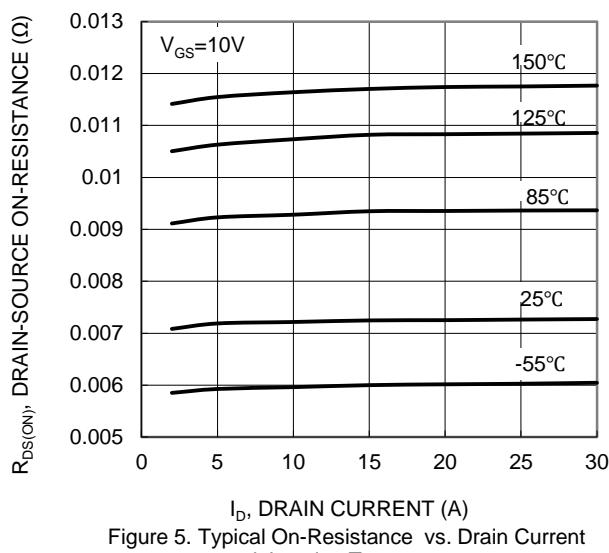


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

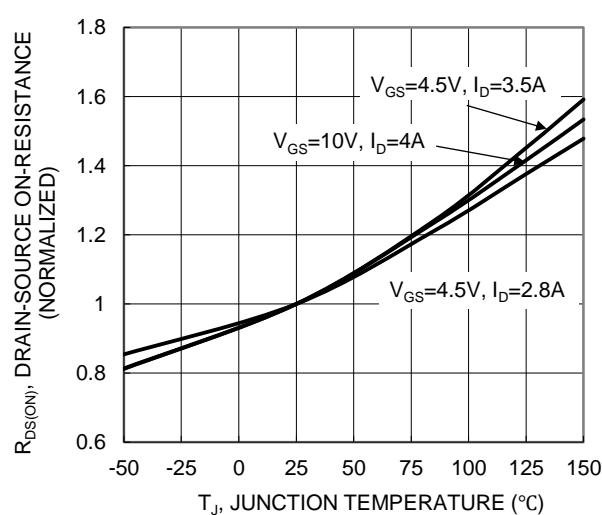
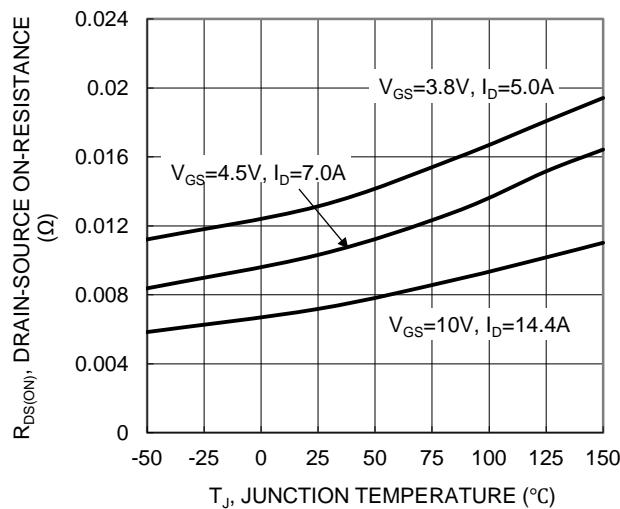
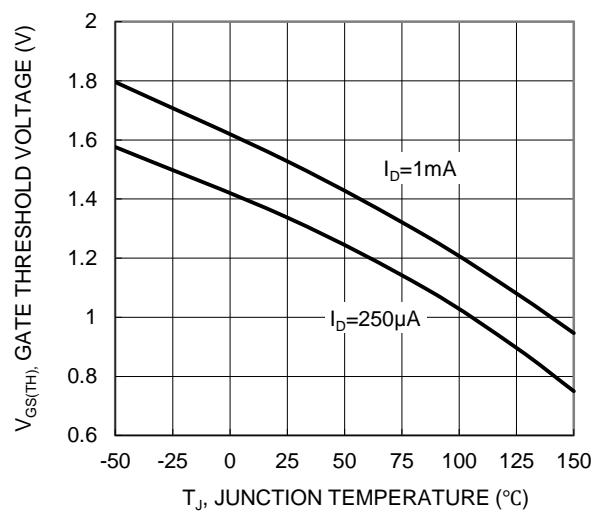


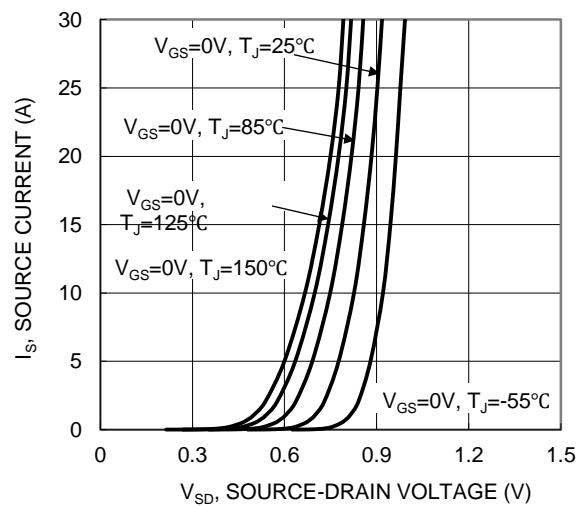
Figure 6. On-Resistance Variation with Junction Temperature



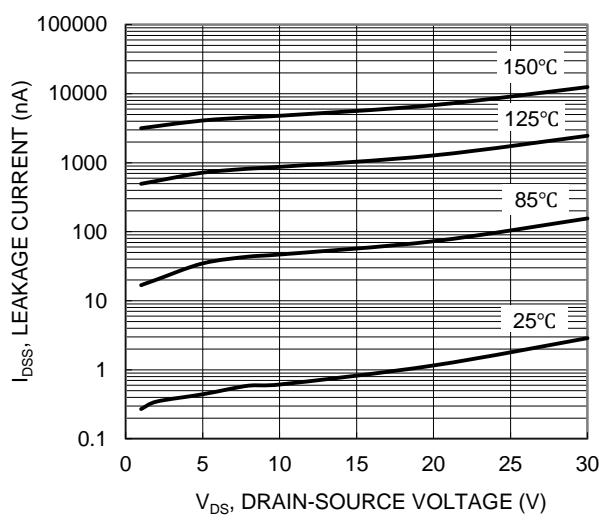
V_{GS} = 3.8V, I_D = 5.0A
 V_{GS} = 4.5V, I_D = 7.0A
 V_{GS} = 10V, I_D = 14.4A



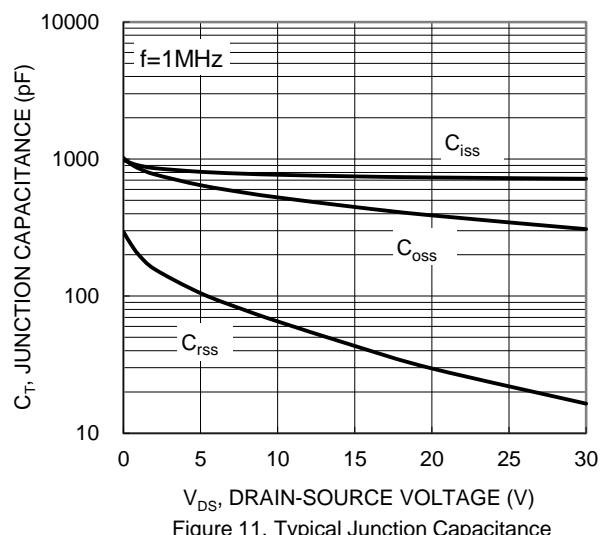
I_D = 1mA
 I_D = 250μA



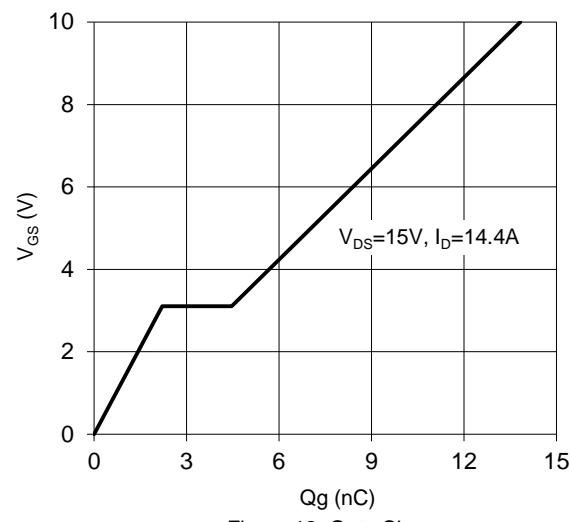
V_{GS} = 0V, T_J = 25°C
 V_{GS} = 0V, T_J = 85°C
 V_{GS} = 0V, T_J = 125°C
 V_{GS} = 0V, T_J = 150°C
 V_{GS} = 0V, T_J = -55°C



I_DSS , LEAKAGE CURRENT (nA)
 V_{DS} , DRAIN-SOURCE VOLTAGE (V)
150°C
125°C
85°C
25°C



f = 1MHz
 C_{iss}
 C_{oss}
 C_{rss}



V_{DS} = 15V, I_D = 14.4A

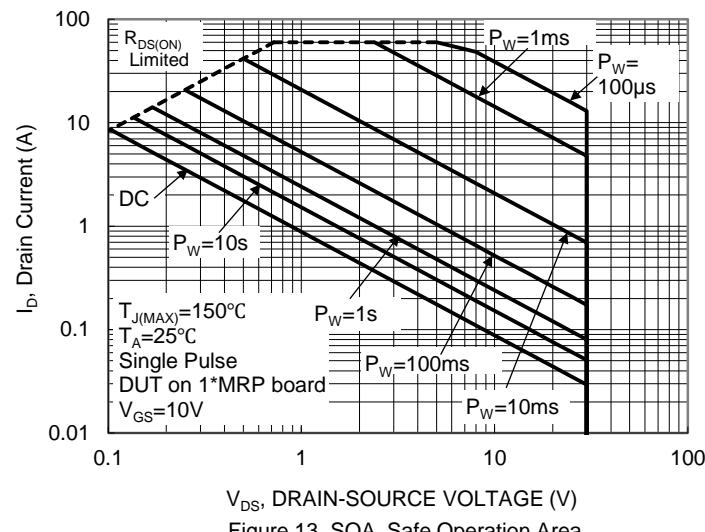


Figure 13. SOA, Safe Operation Area

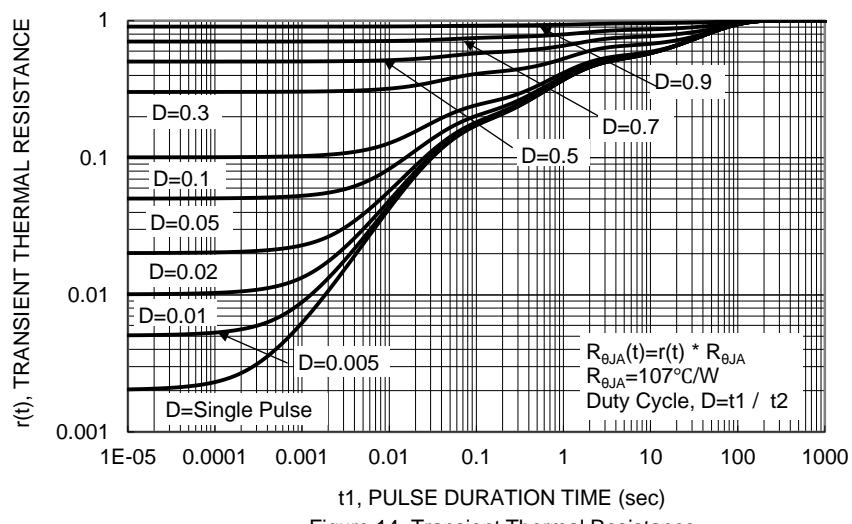
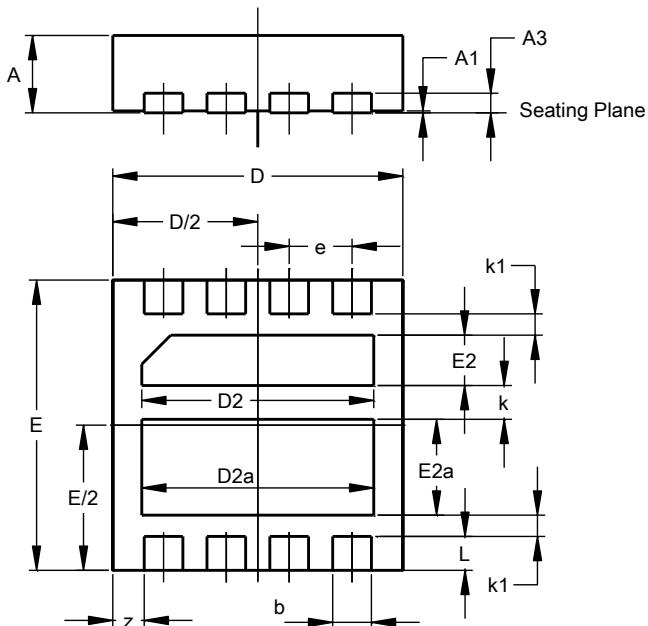


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

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

V-DFN3030-8 (Type K)

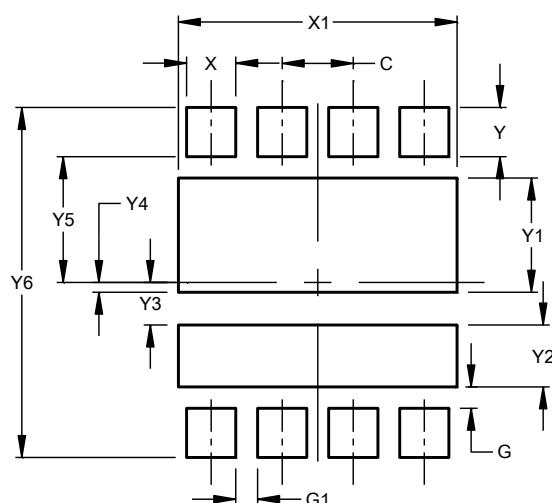


V-DFN3030-8 (Type K)			
Dim	Min	Max	Typ
A	0.77	0.85	0.80
A1	0.00	0.05	0.02
A3	0.20BSC		
b	0.35	0.45	0.40
D	2.95	3.050	3.00
D2	2.30	2.50	2.40
D2a	2.30	2.50	2.40
E	2.95	3.050	3.00
E2	0.42	0.62	0.52
E2a	0.89	1.09	0.99
e	0.65BSC		
k	-	-	0.35
k1	-	-	0.22
L	0.30	0.40	0.35
z	0.325BSC		
All Dimensions in mm			

Suggested Pad Layout

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

V-DFN3030-8 (Type K)



Dimensions	Value (in mm)
C	0.650
G	0.195
G1	0.200
X	0.450
X1	2.550
Y	0.450
Y1	1.044
Y2	0.566
Y3	0.389
Y4	0.089
Y5	1.150
Y6	3.200

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