

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

Device	$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	I_D Max $T_A = +25^\circ C$
Q1	30V	20m Ω @ $V_{GS} = 10V$	8A
		32m Ω @ $V_{GS} = 4.5V$	6.3A
Q2	30V	11.1m Ω @ $V_{GS} = 10V$	10.7A
		13.8m Ω @ $V_{GS} = 4.5V$	9.6A

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

- Mobile Computing
- Point of Load

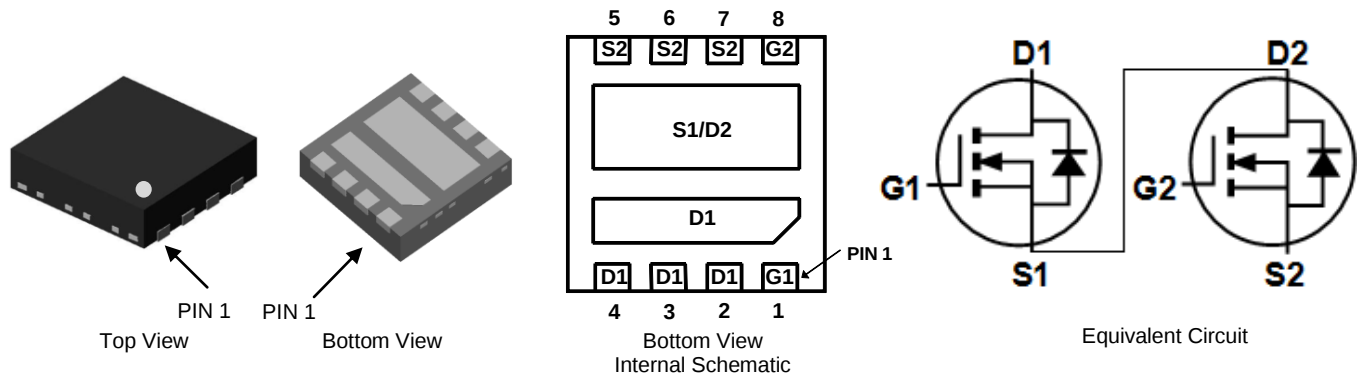
Features

- 0.6mm Profile – Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- 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 
- Weight: 0.02 grams (Approximate)

V-DFN3030-8 (Type K)

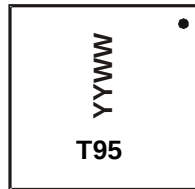


Ordering Information (Note 4)

Part Number	Case	Packaging
DMT3011LDT-7	V-DFN3030-8 (Type K)	3,000/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 <http://www.diodes.com/products/packages.html>.

Marking Information



T95 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 14 for 2014)
WW = Week Code (01 to 53)

Maximum Ratings (Q1 N-Channel) (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	30	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 5) V _{GS} = 10V	Steady State	T _A = +25°C T _C = +25°C	I _D	8 21.5	A
Maximum Body Diode Forward Current (Note 5)			I _S	2	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	55	A
Avalanche Current (L = 0.1mH)			I _{AS}	14	A
Avalanche Energy (L = 0.1mH)			E _{AS}	9.8	mJ

Maximum Ratings (Q2 N-Channel) (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	30	V
Gate-Source Voltage			V _{GSS}	+20 -16	V
Continuous Drain Current (Note 5) V _{GS} = 10V	Steady State	T _A = +25°C T _C = +25°C	I _D	10.7 28.9	A
Maximum Body Diode Forward Current (Note 5)			I _S	2	A
Pulsed Drain Current (10μs Pulse, Duty cycle = 1%)			I _{DM}	80	A
Avalanche Current (L = 0.1mH)			I _{AS}	18	A
Avalanche Energy (L = 0.1mH)			E _{AS}	16.2	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	65	°C/W
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.9	W
Thermal Resistance, Junction to Case (Note 5)	Steady State	R _{θJC}	9	°C/W
Total Power Dissipation (Note 5)	T _C = +25°C	P _D	13.9	W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Note: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate.

Electrical Characteristics (Q1 N-Channel) (@T_A = +25°C, unless otherwise specified.)

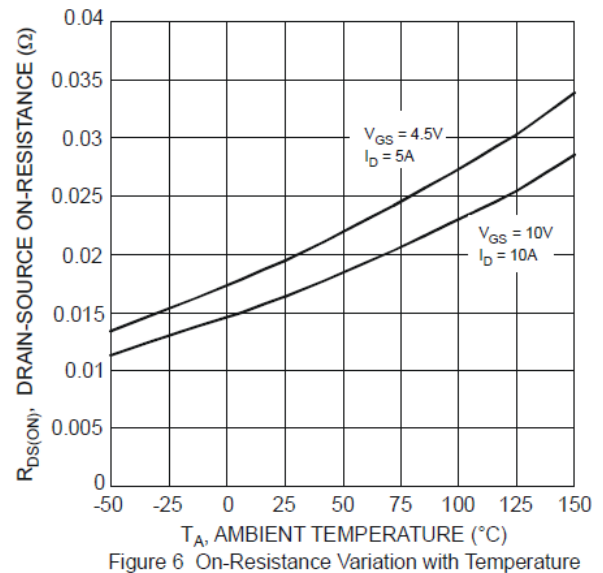
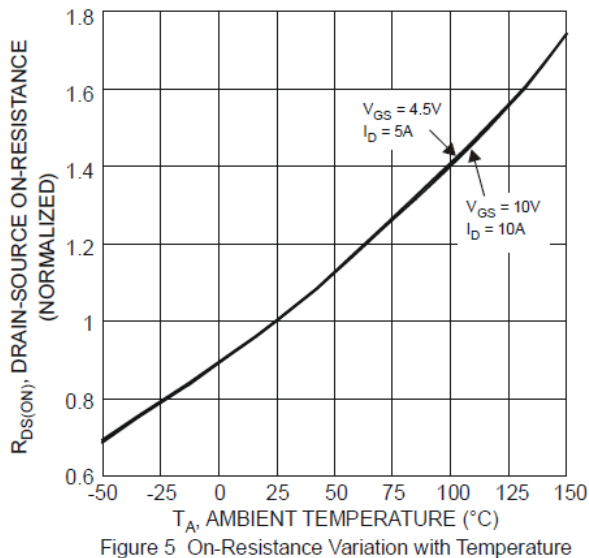
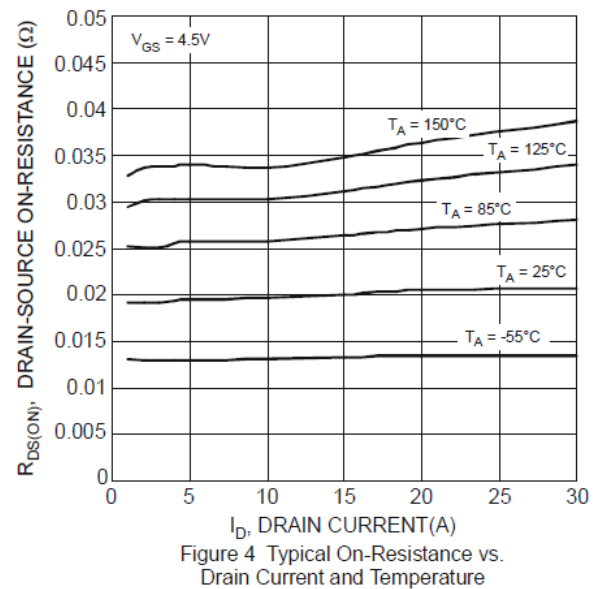
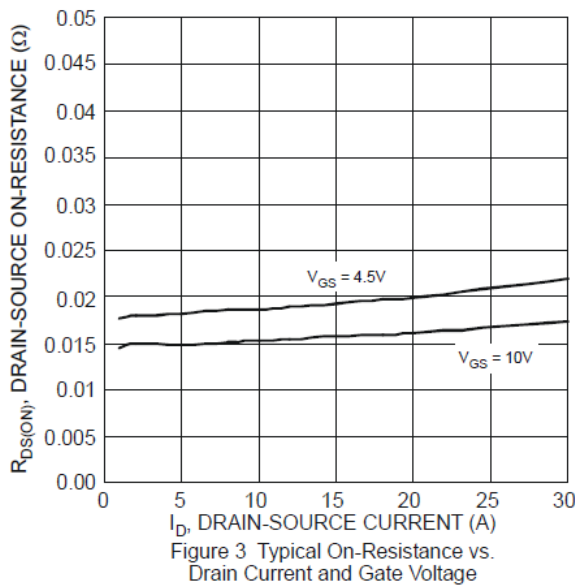
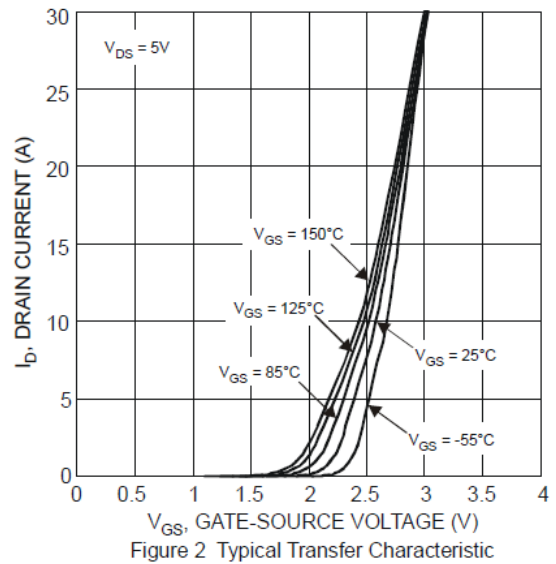
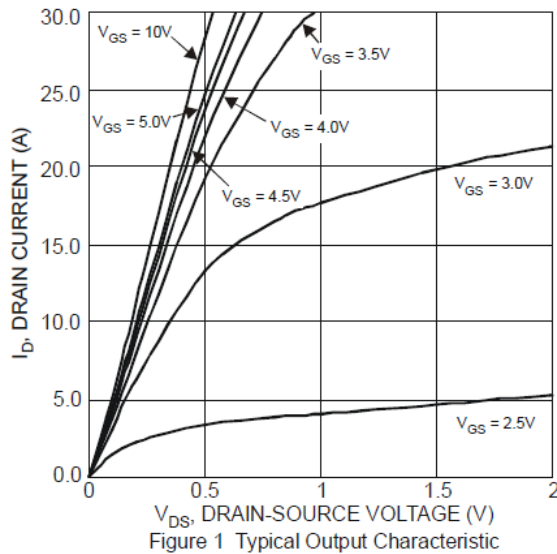
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV _{DSS}	30	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 24V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	V _{GS(TH)}	1	—	3	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	20	mΩ	V _{GS} = 10V, I _D = 6A
		—	—	32		V _{GS} = 4.5V, I _D = 5A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 6A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{iss}	—	641	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	66	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	50	—	pF	
Gate Resistance	R _g	—	2.2	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 10V)	Q _g	—	13.2	—	nC	V _{DS} = 15V, I _D = 10A
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	6	—	nC	
Gate-Source Charge	Q _{gs}	—	1.7	—	nC	
Gate-Drain Charge	Q _{gd}	—	2.2	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.3	—	nS	V _{GS} = 10V, V _{DS} = 15V, R _G = 6Ω, I _D = 1A
Turn-On Rise Time	t _r	—	4.4	—	nS	
Turn-Off Delay Time	t _{D(OFF)}	—	22.3	—	nS	
Turn-Off Fall Time	t _f	—	5.3	—	nS	I _F = 11A, di/dt = 100A/μs
Reverse Recovery Time	t _{RR}	—	11.4	—	nS	
Reverse Recovery Charge	Q _{RR}	—	8.2	—	nC	

Electrical Characteristics (Q2 N-Channel) (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV _{DSS}	30	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	μA	V _{DS} = 24V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = +20V, V _{DS} = 0V V _{GS} = -16V, V _{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	V _{GS(TH)}	1	—	3	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	11.1	mΩ	V _{GS} = 10V, I _D = 9A
		—	—	13.8		V _{GS} = 4.5V, I _D = 7A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 9A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{iss}	—	748	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	447	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	43	—	pF	
Gate Resistance	R _g	—	1.0	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 10V)	Q _g	—	13.8	—	nC	V _{DS} = 15V, I _D = 14.4A
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	6.4	—	nC	
Gate-Source Charge	Q _{gs}	—	2.2	—	nC	
Gate-Drain Charge	Q _{gd}	—	2.2	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.5	—	ns	V _{GS} = 10V, V _{DS} = 15V, R _G = 1Ω, I _D = 10A
Turn-On Rise Time	t _r	—	5.0	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	8.6	—	ns	
Turn-Off Fall Time	t _f	—	1.4	—	ns	I _F = 10A, di/dt = 100A/μs
Reverse Recovery Time	t _{RR}	—	18	—	ns	
Reverse Recovery Charge	Q _{RR}	—	7.7	—	nC	

Notes: 6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

Typical Characteristics (Q1 N-Channel)



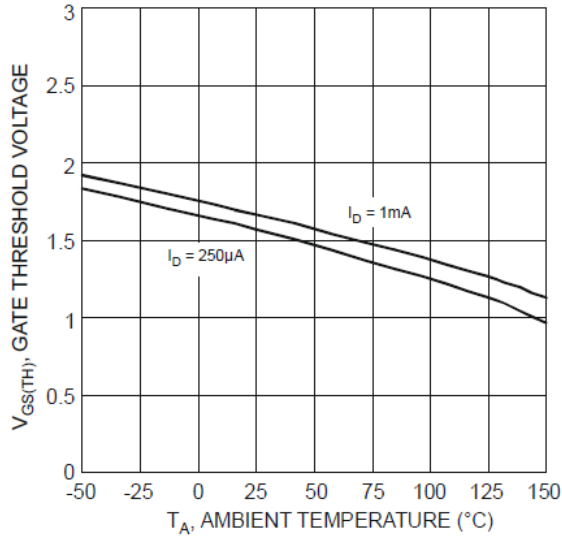


Figure 7 Gate Threshold Variation vs. Ambient Temperature

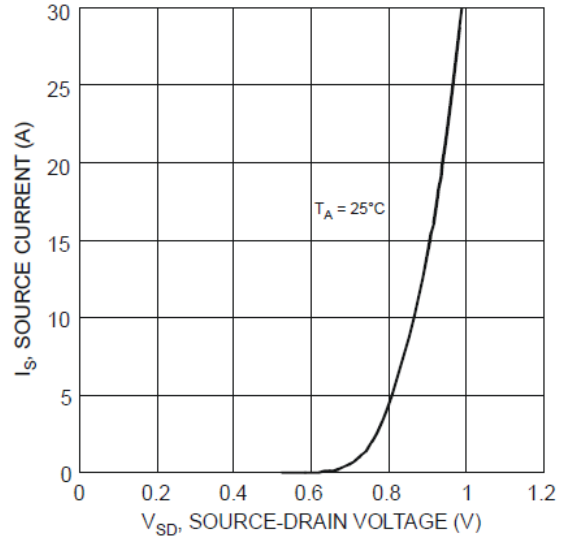


Figure 8 Diode Forward Voltage vs. Current

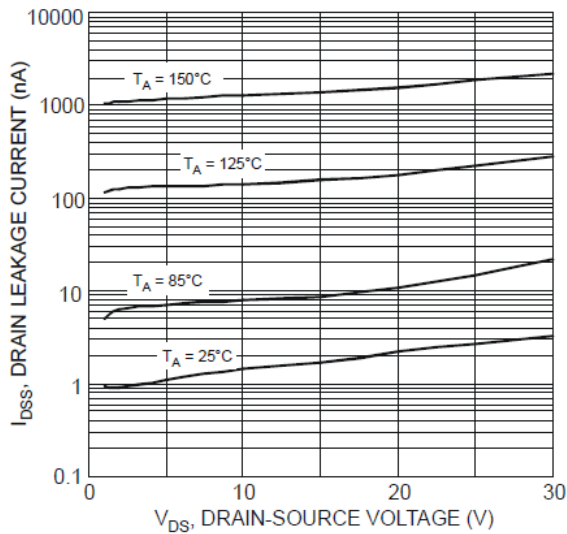


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

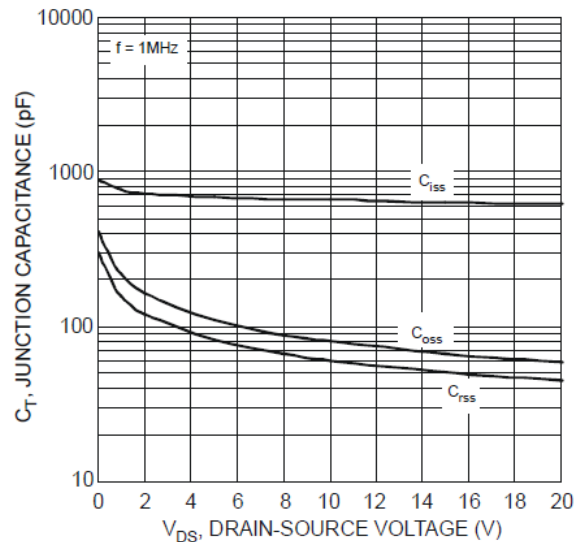


Figure 10 Typical Junction Capacitance

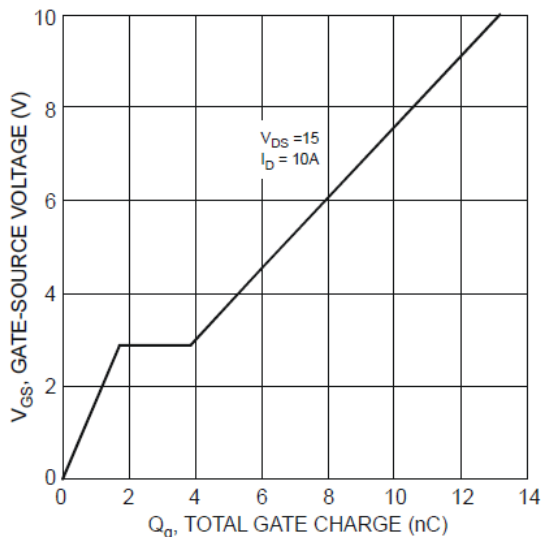


Figure 11 Gate-Source Voltage vs. Total Gate Charge

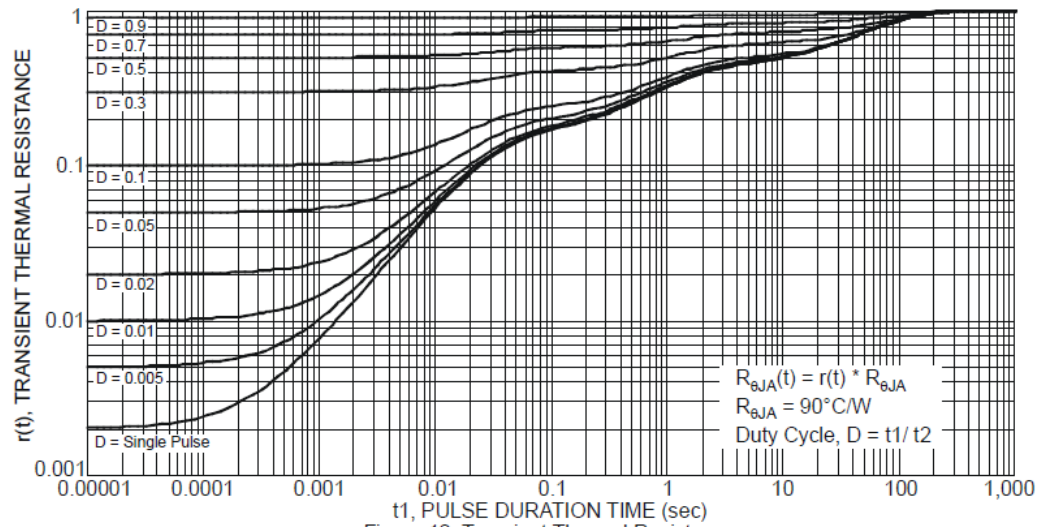


Figure 12 Transient Thermal Resistance

Typical Characteristics (Q2 N-Channel)

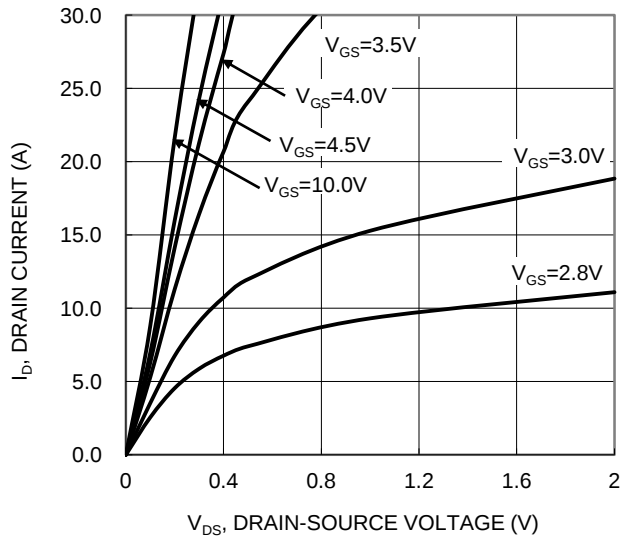


Figure 13. Typical Output Characteristic

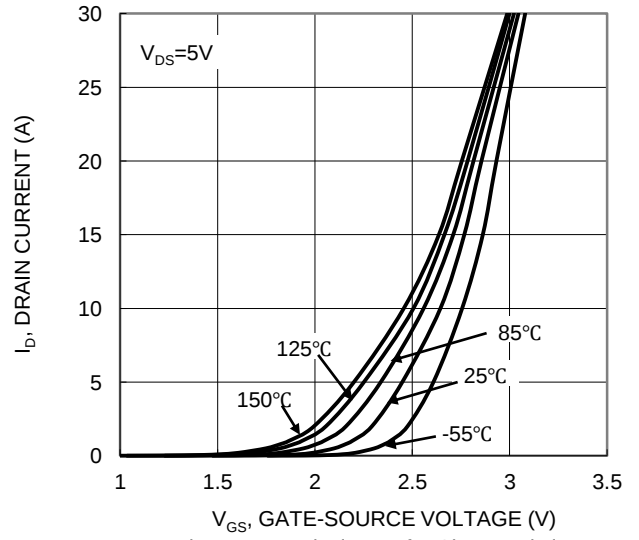


Figure 14. Typical Transfer Characteristic

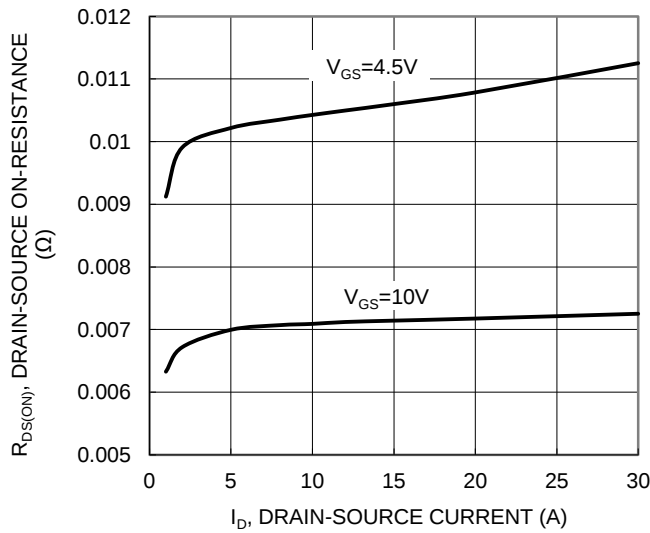


Figure 15. Typical On-Resistance vs. Drain Current and Gate Voltage

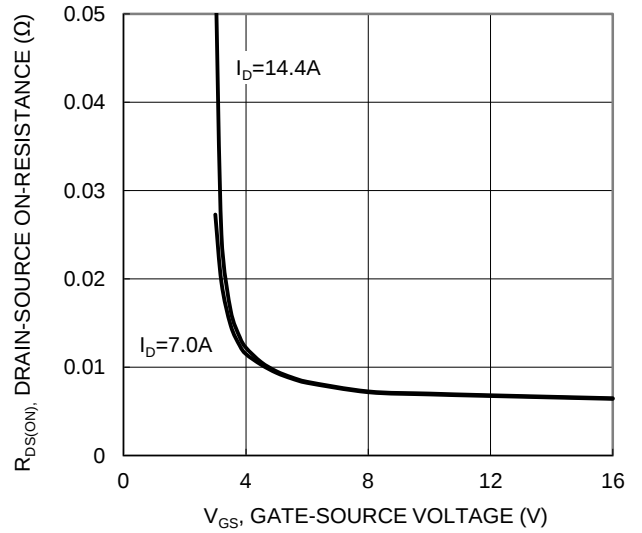


Figure 16. Typical Transfer Characteristic

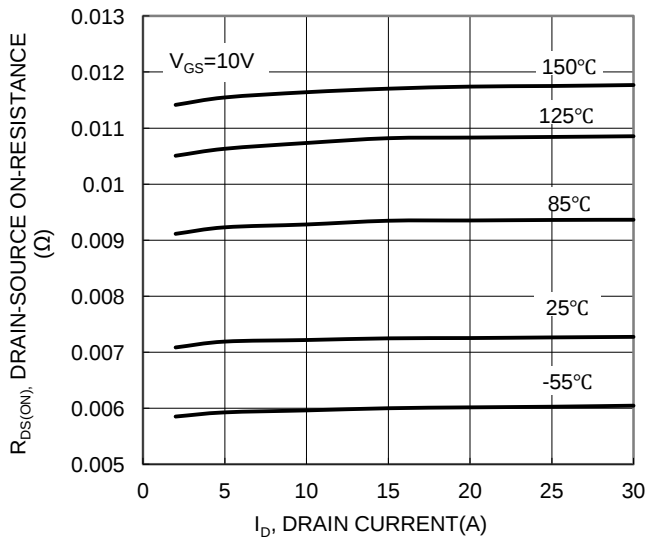


Figure 17. Typical On-Resistance vs. Drain Current and Junction Temperature

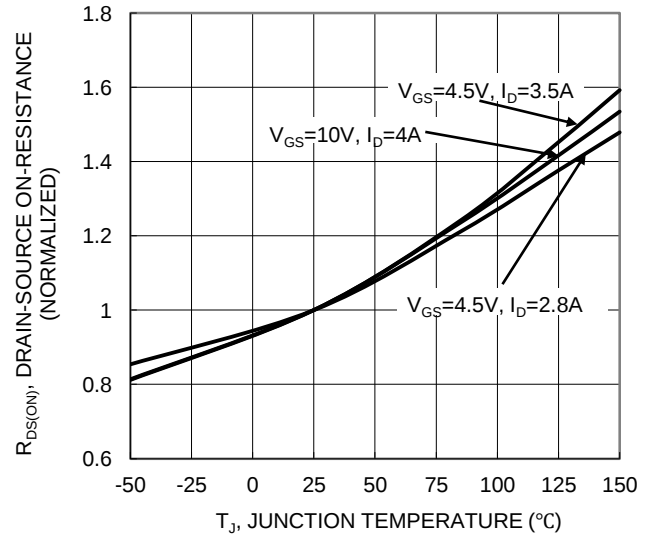
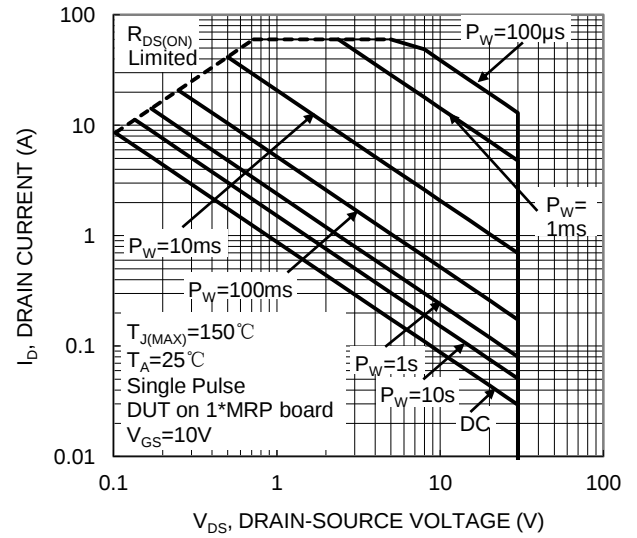
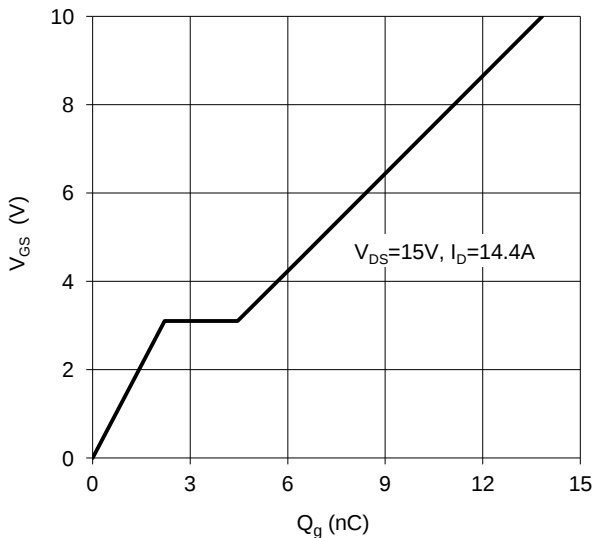
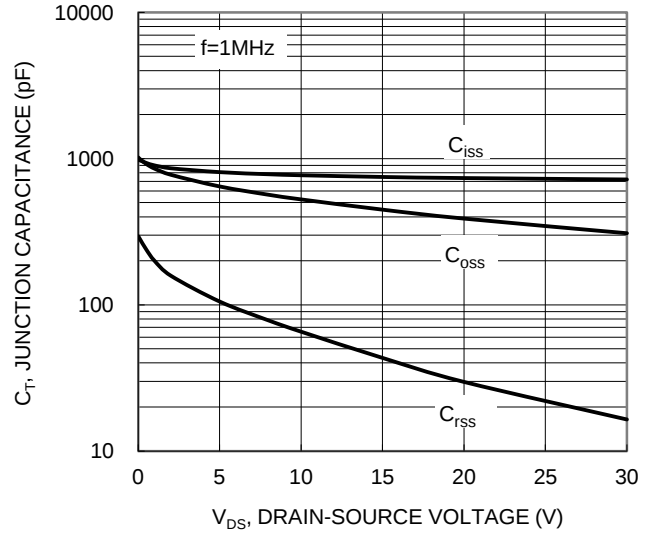
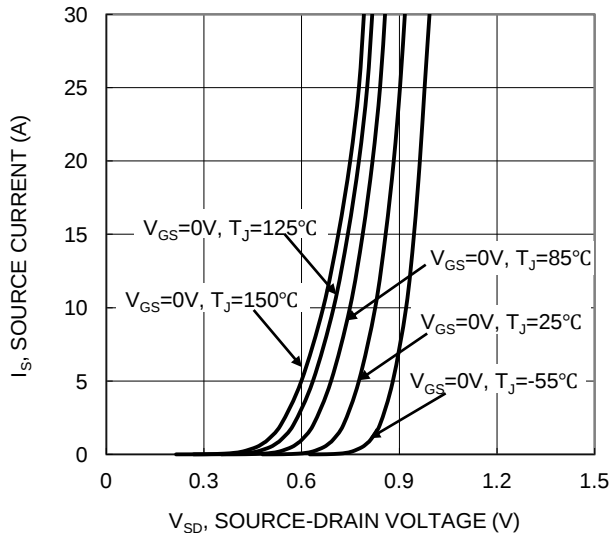
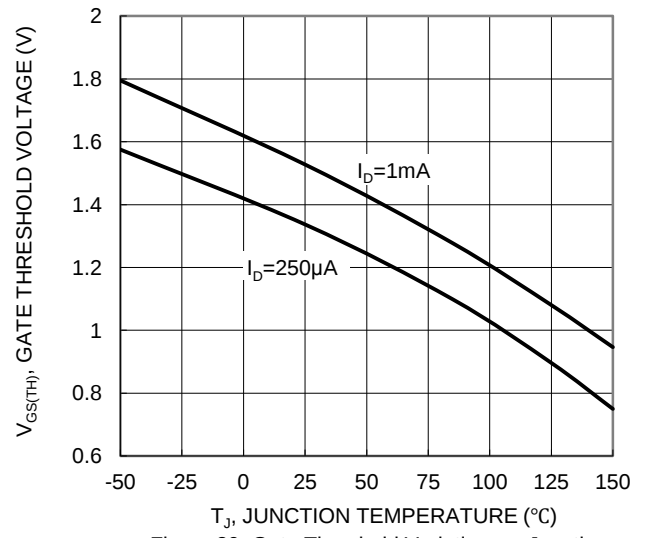
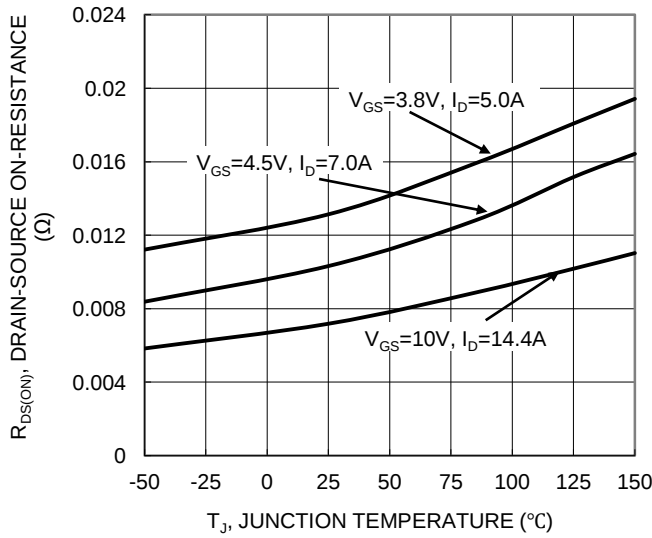


Figure 18. On-Resistance Variation with Junction Temperature



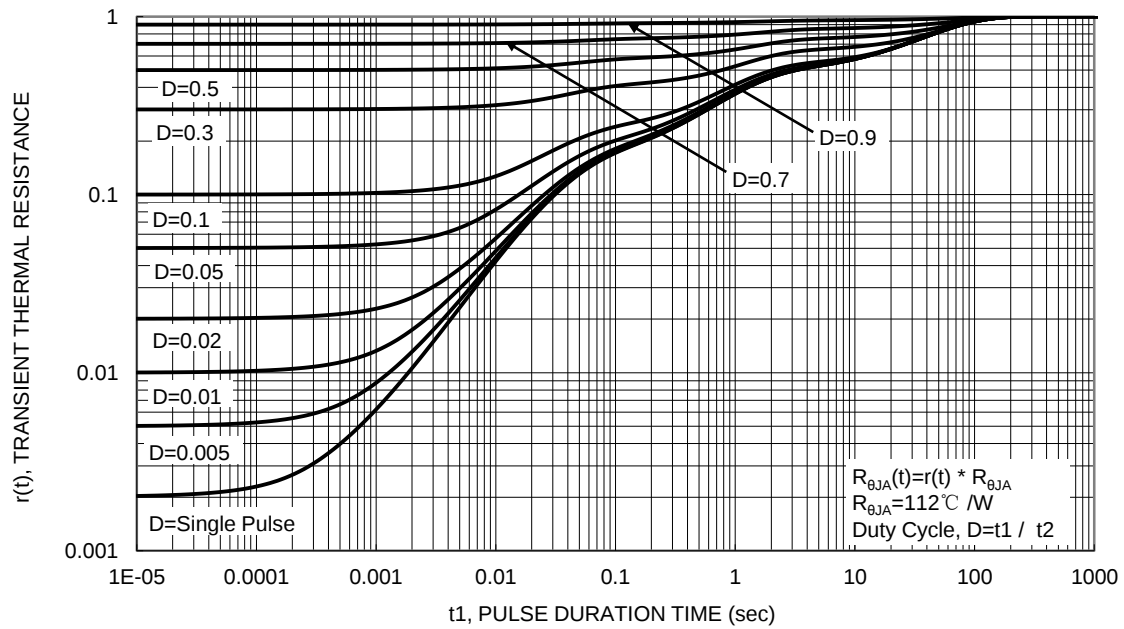
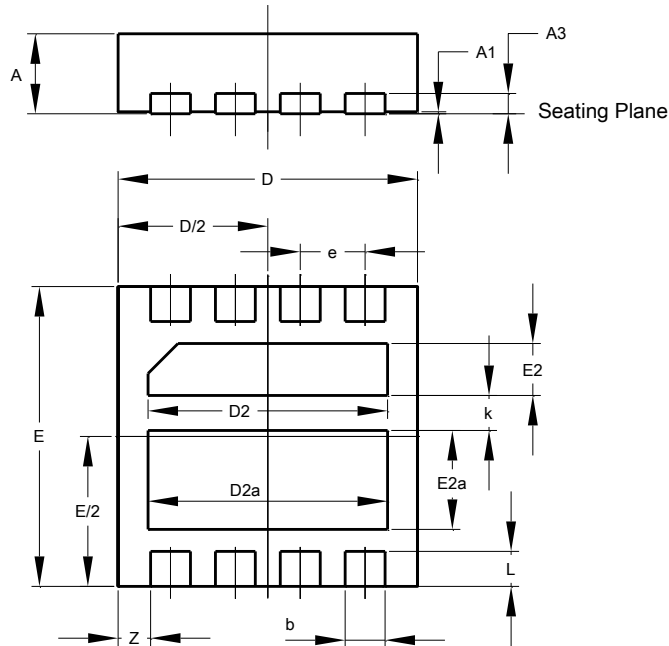


Figure 25. Transient Thermal Resistance

Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

V-DFN3030-8 (Type K)

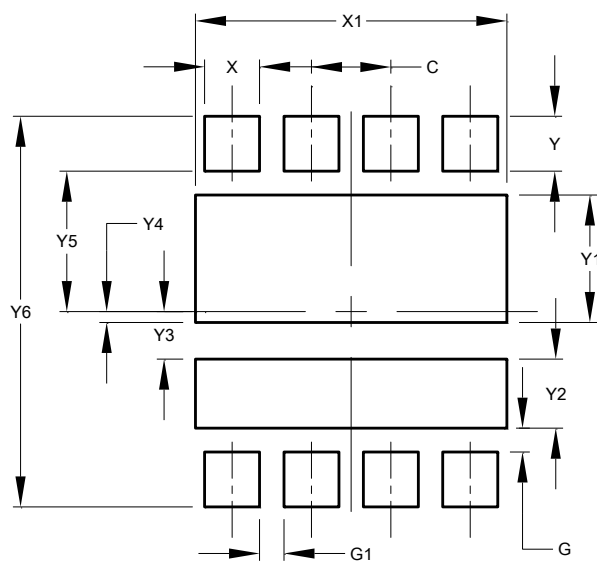


V-DFN3030-8 (Type K)			
Dim	Min	Max	Typ
A	0.77	0.85	0.80
A1	0	0.05	0.02
A3	0.20BSC		
b	0.35	0.45	0.40
D	2.95	3.050	3.00
D2	2.30	2.50	2.40
D2a	2.30	2.50	2.40
E	2.95	3.050	3.00
E2	0.42	0.62	0.52
E2a	0.89	1.09	0.99
e	0.65BSC		
k	-	-	0.35
L	0.30	0.40	0.35
z	0.325BSC		
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> 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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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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