

NTMFS4851N

Power MOSFET

30 V, 66 A, Single N-Channel, SO-8FL

Features

- Low $R_{DS(on)}$ to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Optimized Gate Charge to Minimize Switching Losses
- Thermally Enhanced SO8 Package
- These are Pb-Free Devices

Applications

- Refer to Application Note AND8195/D
- CPU Power Delivery
- DC-DC Converters
- High Side Switching

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		V_{DSS}	30	V	
Gate-to-Source Voltage		V_{GS}	± 16	V	
Continuous Drain Current $R_{\theta JA}$ (Note 1)	Steady State	$T_A = 25^{\circ}\text{C}$	I_D	15	A
		$T_A = 85^{\circ}\text{C}$		10.8	
Power Dissipation $R_{\theta JA}$ (Note 1)		$T_A = 25^{\circ}\text{C}$	P_D	2.16	W
Continuous Drain Current $R_{\theta JA} \leq 10 \text{ sec}$		$T_A = 25^{\circ}\text{C}$	I_D	24.3	A
		$T_A = 85^{\circ}\text{C}$		17.5	
Power Dissipation $R_{\theta JA}, t \leq 10 \text{ sec}$		$T_A = 25^{\circ}\text{C}$	P_D	5.67	W
Continuous Drain Current $R_{\theta JA}$ (Note 2)		$T_A = 25^{\circ}\text{C}$	I_D	9.5	A
		$T_A = 85^{\circ}\text{C}$		6.9	
Power Dissipation $R_{\theta JA}$ (Note 2)		$T_A = 25^{\circ}\text{C}$	P_D	0.87	W
Continuous Drain Current $R_{\theta JC}$ (Note 1)		$T_C = 25^{\circ}\text{C}$	I_D	66	A
	$T_C = 85^{\circ}\text{C}$	47.8			
Power Dissipation $R_{\theta JC}$ (Note 1)	$T_C = 25^{\circ}\text{C}$	P_D	41.7	W	
Pulsed Drain Current	$t_p=10\mu\text{s}$	$T_A = 25^{\circ}\text{C}$	I_{DM}	132	A
Current limited by package		$T_A = 25^{\circ}\text{C}$	$I_{Dmaxpkg}$	100	A
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$	
Source Current (Body Diode)		I_S	41.7	A	
Drain to Source dV/dt		dV/dt	6	V/ns	
Single Pulse Drain-to-Source Avalanche Energy ($V_{DD} = 50 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_L = 27 \text{ A}_{pk}$, $L = 0.3 \text{ mH}$, $R_G = 25 \Omega$)		EAS	109	mJ	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	$^{\circ}\text{C}$	

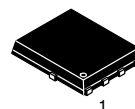
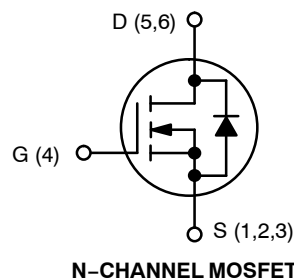
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



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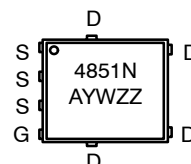
<http://onsemi.com>

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ MAX}$	$I_D \text{ MAX}$
30 V	5.9 m Ω @ 10 V	66 A
	8.7 m Ω @ 4.5 V	



SO-8 FLAT LEAD
CASE 488AA
STYLE 1

MARKING DIAGRAM



A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

ORDERING INFORMATION

Device	Package	Shipping†
NTMFS4851NT1G	SO-8FL (Pb-Free)	1500 / Tape & Reel
NTMFS4851NT3G	SO-8FL (Pb-Free)	5000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case (Drain)	$R_{\theta JC}$	3.0	°C/W
Junction-to-Ambient – Steady State (Note 1)	$R_{\theta JA}$	57.8	
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	143.5	
Junction-to-Ambient – $t \leq 10$ sec	$R_{\theta JA}$	22.1	

1. Surface-mounted on FR4 board using 1 sq-in pad, 1 oz Cu.
2. Surface-mounted on FR4 board using the minimum recommended pad size.

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			25		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 24\text{ V}$	$T_J = 25^\circ\text{C}$		1	μA
			$T_J = 125^\circ\text{C}$		10	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 16\text{ V}$			± 100	nA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\text{ }\mu\text{A}$	1.45	1.8	2.5	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			4.6		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V to } 11.5\text{ V}$	$I_D = 30\text{ A}$	4.3	5.9	m Ω
			$I_D = 15\text{ A}$	4.2		
		$V_{GS} = 4.5\text{ V}$	$I_D = 30\text{ A}$	6.6	8.7	
			$I_D = 15\text{ A}$	6.5		
Forward Transconductance	g_{FS}	$V_{DS} = 1.5\text{ V}, I_D = 30\text{ A}$		62		S

CHARGES AND CAPACITANCES

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = 12\text{ V}$		1850		pF
Output Capacitance	C_{OSS}			333		
Reverse Transfer Capacitance	C_{RSS}			170		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V}; I_D = 30\text{ A}$		13.5	20	nC
Threshold Gate Charge	$Q_{G(TH)}$			1.7		
Gate-to-Source Charge	Q_{GS}			5.1		
Gate-to-Drain Charge	Q_{GD}			4.5		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 11.5\text{ V}, V_{DS} = 15\text{ V}, I_D = 30\text{ A}$		32		nC

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 15\text{ V}, I_D = 15\text{ A}, R_G = 3.0\text{ }\Omega$		14.4		ns
Rise Time	t_r			39.8		
Turn-Off Delay Time	$t_{d(OFF)}$			18.6		
Fall Time	t_f			5.2		

3. Pulse Test: pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
4. Switching characteristics are independent of operating junction temperatures.

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ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
SWITCHING CHARACTERISTICS (Note 4)						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 11.5\text{ V}, V_{DS} = 15\text{ V},$ $I_D = 15\text{ A}, R_G = 3.0\ \Omega$		9.5		ns
Rise Time	t_r			22		
Turn-Off Delay Time	$t_{d(OFF)}$			25		
Fall Time	t_f			4.6		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V},$ $I_S = 30\text{ A}$	$T_J = 25^\circ\text{C}$		0.84	1.0	V
			$T_J = 125^\circ\text{C}$		0.73		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, dI_S/dt = 100\text{ A}/\mu\text{s},$ $I_S = 30\text{ A}$			13.2		ns
Charge Time	t_a				8.5		
Discharge Time	t_b				4.7		
Reverse Recovery Charge	Q_{RR}				3.5		nC

PACKAGE PARASITIC VALUES

Source Inductance	L_S	$T_A = 25^\circ\text{C}$		0.93		nH
Drain Inductance	L_D			0.005		
Gate Inductance	L_G			1.84		
Gate Resistance	R_G			0.9		Ω

- Pulse Test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.
- Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

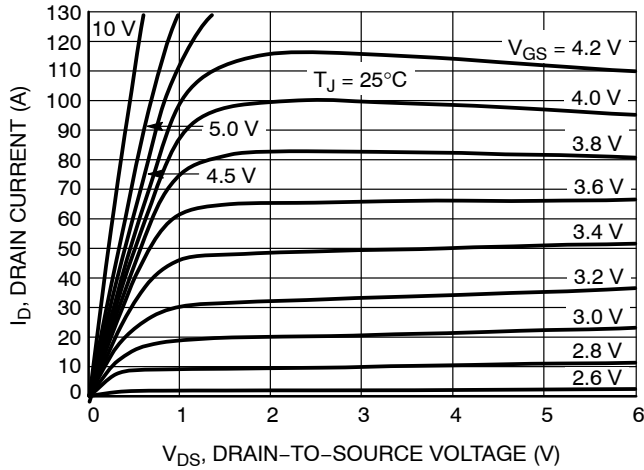


Figure 1. On-Region Characteristics

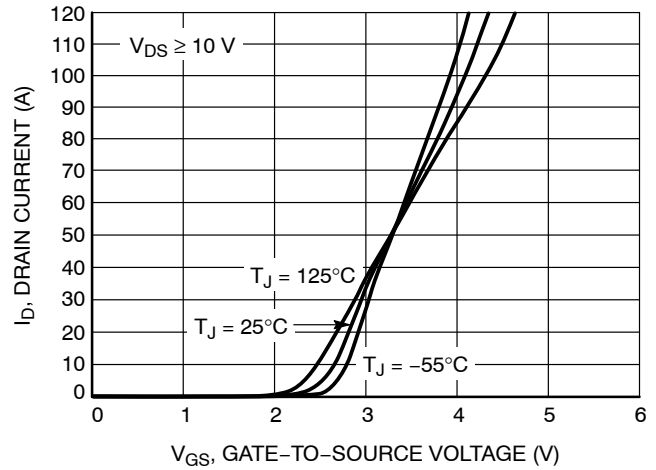


Figure 2. Transfer Characteristics

TYPICAL CHARACTERISTICS

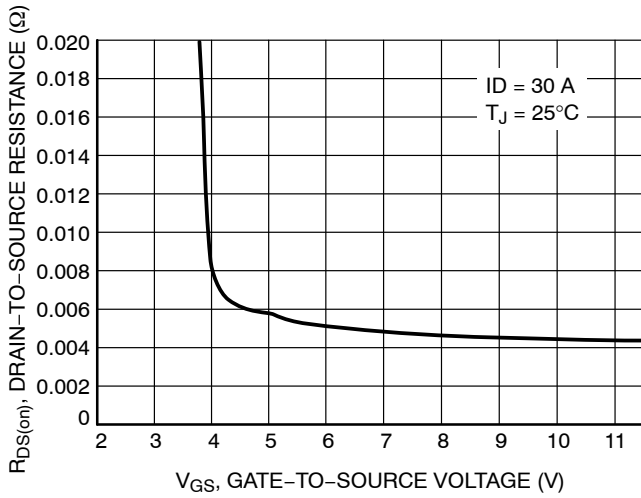


Figure 3. On-Resistance vs. Gate-to-Source Voltage

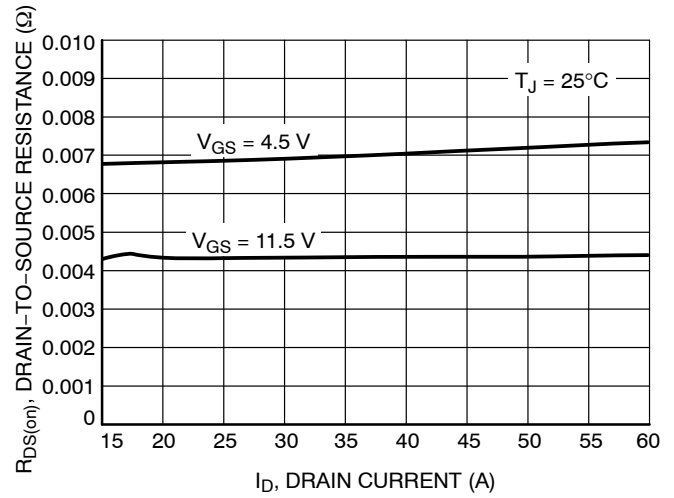


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

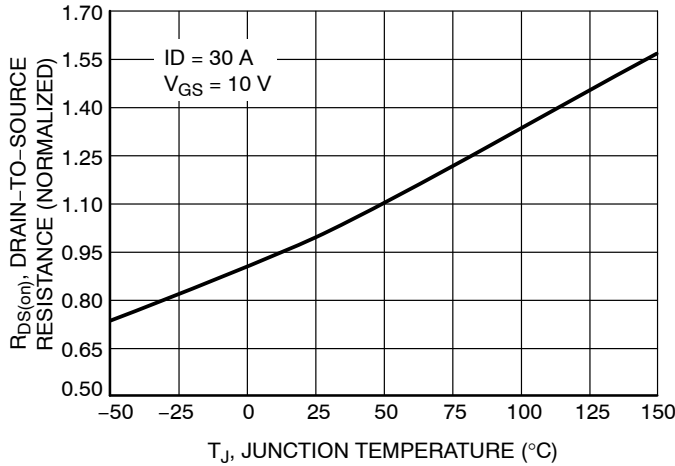


Figure 5. On-Resistance Variation with Temperature

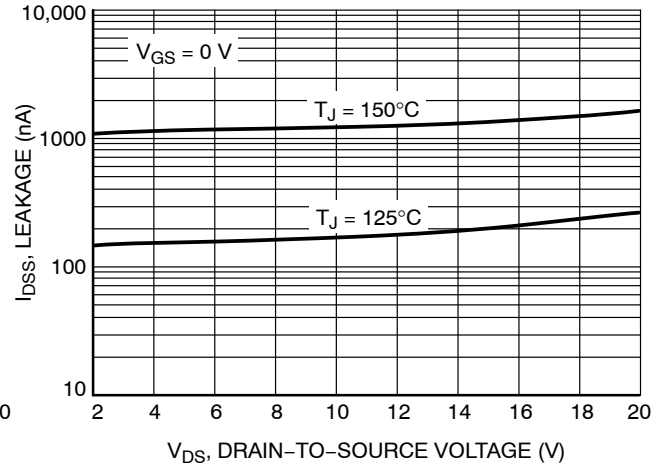


Figure 6. Drain-to-Source Leakage Current vs. Voltage

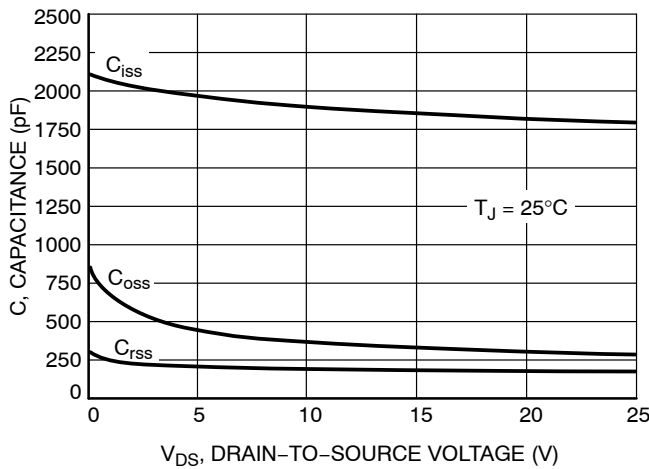


Figure 7. Capacitance Variation

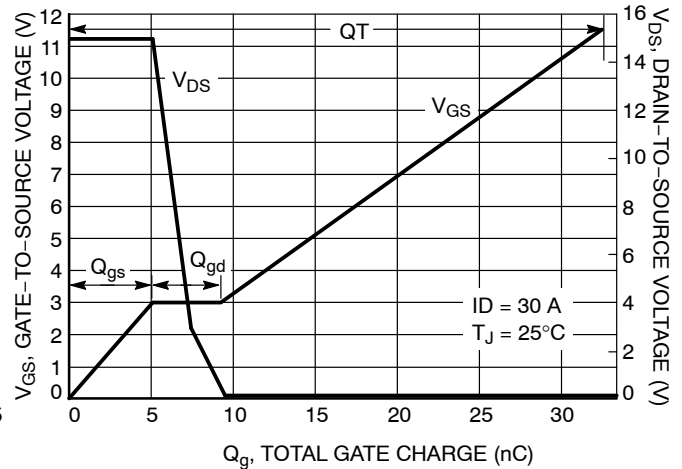


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

TYPICAL CHARACTERISTICS

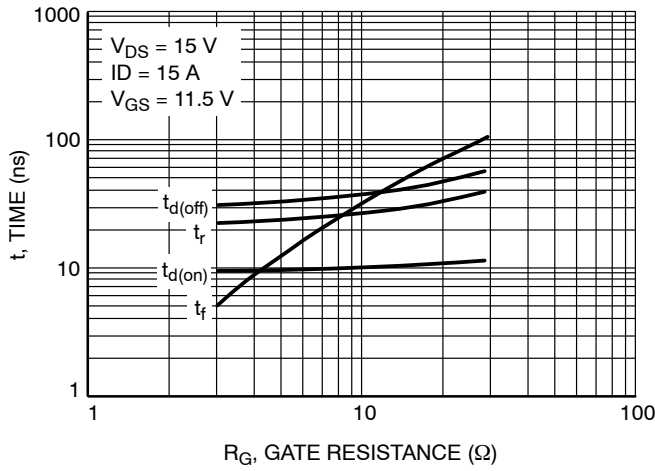


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

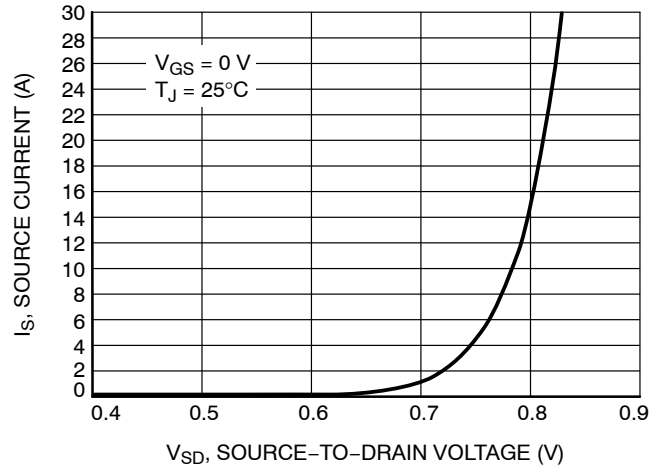


Figure 10. Diode Forward Voltage vs. Current

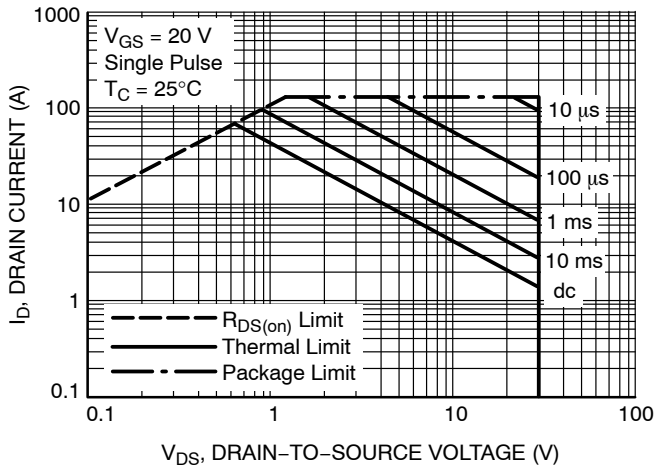


Figure 11. Maximum Rated Forward Biased Safe Operating Area

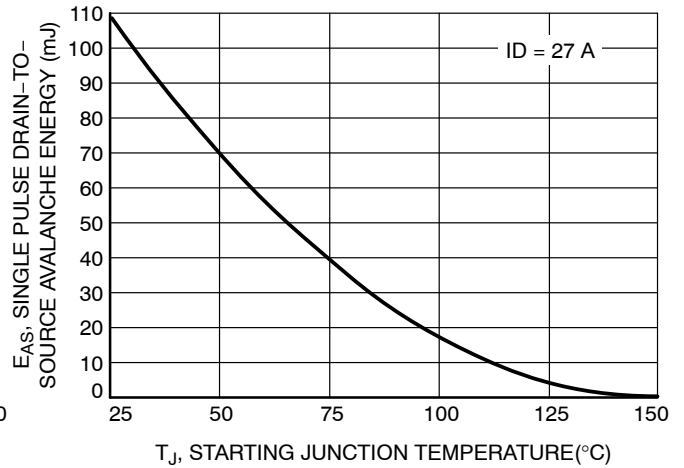


Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature

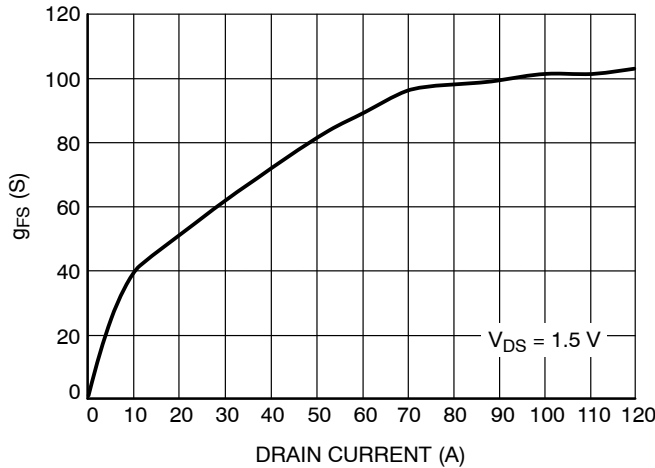


Figure 13. g_{FS} vs. Drain Current

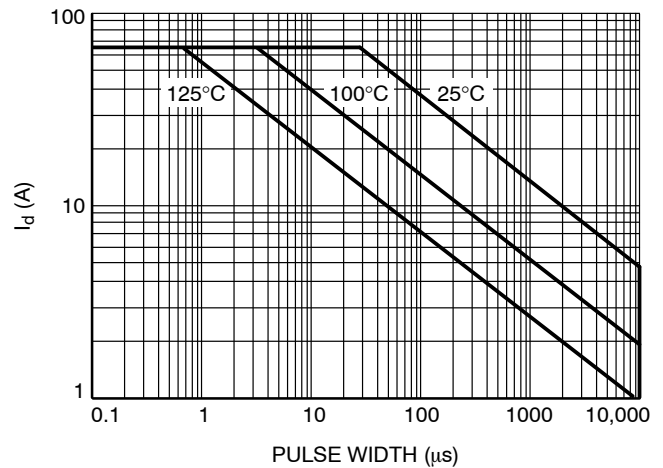


Figure 14. Avalanche Characteristics



**Стандарт
Электрон
Связь**

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