

NTD2955

Power MOSFET 12 Amps, 60 Volts P-Channel DPAK

This Power MOSFET is designed to withstand high energy in the avalanche and commutation modes. Designed for low-voltage, high-speed switching applications in power supplies, converters, and power motor controls, these devices are particularly well suited for bridge circuits where diode speed and commutating safe operating areas are critical and offer an additional safety margin against unexpected voltage transients.

- Avalanche Energy Specified
- I_{DSS} and $V_{DS(on)}$ Specified at Elevated Temperature
- Designed for Low-Voltage, High-Speed Switching Applications and to Withstand High Energy in the Avalanche and Commutation Modes

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

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	60	Vdc
Gate-to-Source Voltage	V_{GS}	± 20	Vdc
– Continuous	V_{GSM}	± 25	Vpk
– Non-repetitive ($t_p \leq 10$ ms)			
Drain Current	I_D	12	Adc
– Continuous @ $T_a = 25^\circ\text{C}$	I_{DM}	36	Apk
– Single Pulse ($t_p \leq 10$ ms)			
Total Power Dissipation @ $T_a = 25^\circ\text{C}$	P_D	55	Watts
Operating and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$
Single Pulse Drain-to-Source Avalanche Energy – Starting $T_J = 25^\circ\text{C}$ ($V_{DD} = 25$ Vdc, $V_{GS} = 10$ Vdc, Peak $I_L = 12$ Apk, $L = 3.0$ mH, $R_G = 25 \Omega$)	E_{AS}	216	mJ
Thermal Resistance	$R_{\theta JC}$	2.73	$^\circ\text{C/W}$
– Junction-to-Case	$R_{\theta JA}$	71.4	
– Junction-to-Ambient (Note 1)	$R_{\theta JA}$	100	
– Junction-to-Ambient (Note 2)			
Maximum Lead Temperature for Soldering Purposes, 1/8 in. from case for 10 seconds	T_L	260	$^\circ\text{C}$

1. When surface mounted to an FR4 board using 1 in. pad size (Cu. area = 1.127 in^2)
2. When surface mounted to an FR4 board using the minimum recommended pad size (Cu. area = 0.412 in^2)

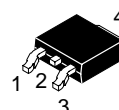
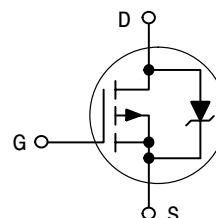


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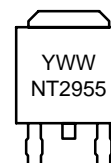
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$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D MAX
60 V	155 m Ω @ 10 V, 6 A	12 A

P-Channel

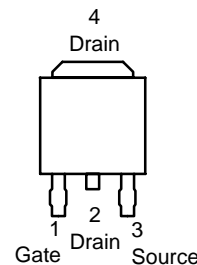


MARKING DIAGRAM



Y = Year
WW = Work Week
T = MOSFET

PIN ASSIGNMENT



ORDERING INFORMATION

Device	Package	Shipping†
NTD2955-1	DPAK	75 Units/Rail
NTD2955		75 Units/Rail
NTD2955T4		2500 Tape & Reel
NTD2955-1G	DPAK (Pb-Free)	75 Units/Rail
NTD2955G		75 Units/Rail
NTD2955T4G		2500 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.

NTD2955

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage (Note 3) (V _{GS} = 0 Vdc, I _D = 0.25 μA) (Positive Temperature Coefficient)	V _{(BR)DSS}	60 –	– 67	– –	Vdc mV/°C
Zero Gate Voltage Drain Current (V _{GS} = 0 Vdc, V _{DS} = 60 Vdc, T _J = 25°C) (V _{GS} = 0 Vdc, V _{DS} = 60 Vdc, T _J = 150°C)	I _{DSS}	– –	– –	10 100	μAdc
Gate-Body Leakage Current (V _{GS} = ± 20 Vdc, V _{DS} = 0 Vdc)	I _{GSS}	–	–	100	nAdc

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 250 μAdc) (Negative Temperature Coefficient)	V _{GS(th)}	2.0 –	2.8 4.5	4.0 –	Vdc mV/°C
Static Drain-Source On-State Resistance (V _{GS} = 10 Vdc, I _D = 6.0 Adc)	R _{DS(on)}	–	0.155	0.180	Ω
Drain-to-Source On-Voltage (V _{GS} = 10 Vdc, I _D = 12 Adc) (V _{GS} = 10 Vdc, I _D = 6.0 Adc, T _J = 150°C)	V _{DS(on)}		1.86 –	2.6 2.0	Vdc
Forward Transconductance (V _{DS} = 10 Vdc, I _D = 6.0 Adc)	g _{FS}		8.0	–	Mhos

DYNAMIC CHARACTERISTICS

Input Capacitance	(V _{DS} = 25 Vdc, V _{GS} = 0 Vdc, F = 1.0 MHz)	C _{iss}	–	500	750	pF
Output Capacitance		C _{oss}	–	150	250	
Reverse Transfer Capacitance		C _{rss}	–	50	100	

SWITCHING CHARACTERISTICS (Notes 3 and 4)

Turn-On Delay Time	(V _{DD} = 30 Vdc, I _D = 12 A, V _{GS} = 10 V, R _G = 9.1 Ω)	t _{d(on)}	–	10	20	ns
Rise Time		t _r	–	45	85	
Turn-Off Delay Time		t _{d(off)}	–	26	40	
Fall Time		t _f	–	48	90	
Gate Charge	(V _{DS} = 48 Vdc, V _{GS} = 10 Vdc, I _D = 12 A,)	Q _T	–	15	30	nC
		Q _{GS}	–	4.0	–	
		Q _{GD}	–	7.0	–	

DRAIN-SOURCE DIODE CHARACTERISTICS (Note 3)

Diode Forward On-Voltage (I _S = 12 Adc, V _{GS} = 0 V) (I _S = 12 Adc, V _{GS} = 0 V, T _J = 150°C)	V _{SD}	– –	1.6 1.3	2.5 –	Vdc
Reverse Recovery Time (I _S = 12 A, dI _S /dt = 100 A/μs, V _{GS} = 0 V)	t _{rr}	–	50		ns
	t _a	–	40	–	
	t _b	–	10	–	
Reverse Recovery Stored Charge	Q _{RR}	–	0.10	–	μC

3. Indicates Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%

4. Switching characteristics are independent of operating junction temperature

TYPICAL PERFORMANCE CURVES ($T_J = 25^\circ\text{C}$ unless otherwise noted)

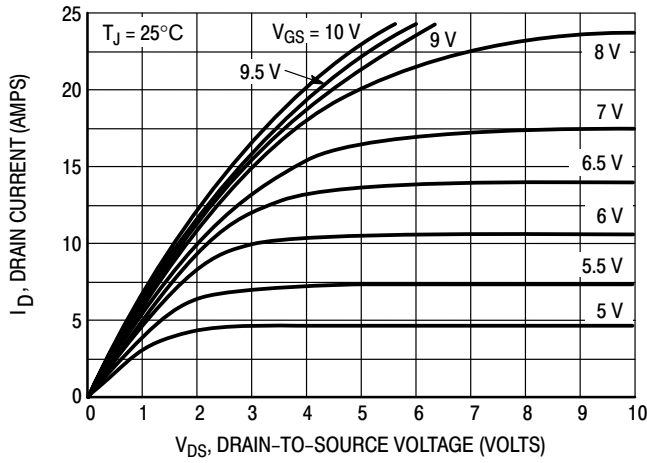


Figure 1. On-Region Characteristics

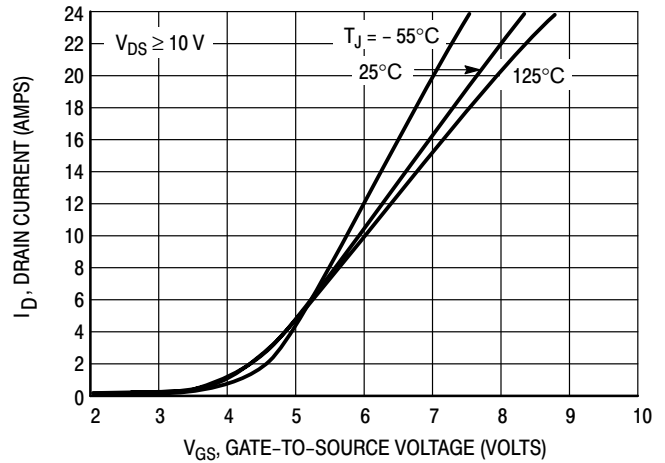


Figure 2. Transfer Characteristics

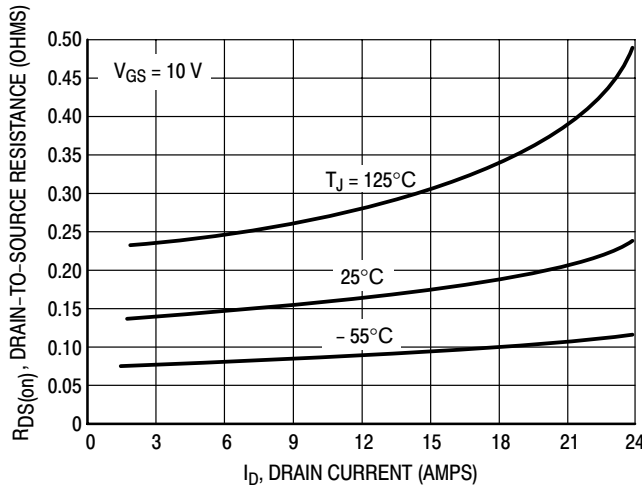


Figure 3. On-Resistance versus Drain Current and Temperature

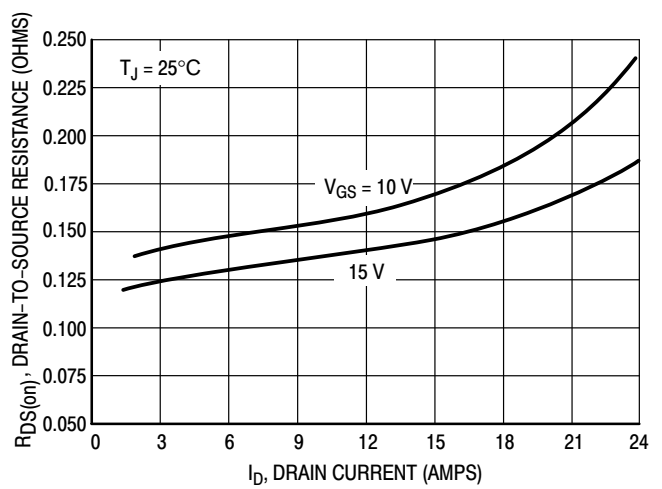


Figure 4. On-Resistance versus Drain Current and Gate Voltage

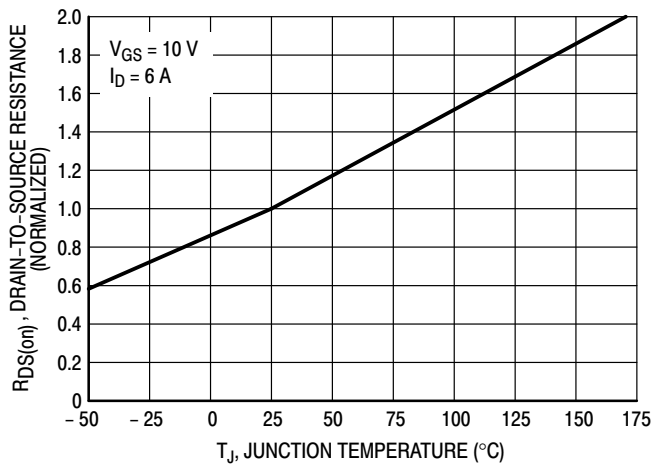


Figure 5. On-Resistance Variation with Temperature

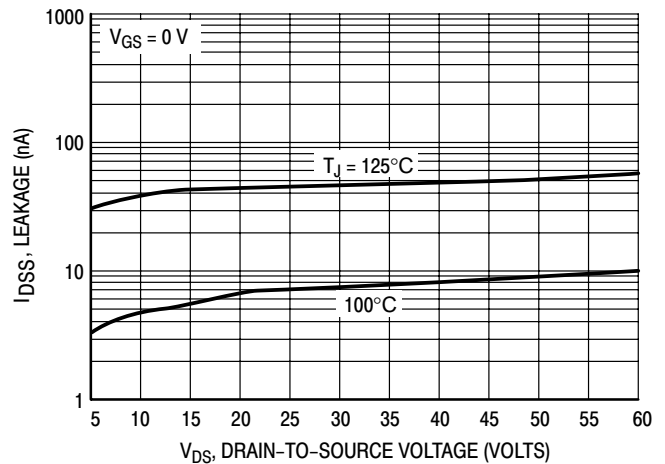


Figure 6. Drain-To-Source Leakage Current versus Voltage

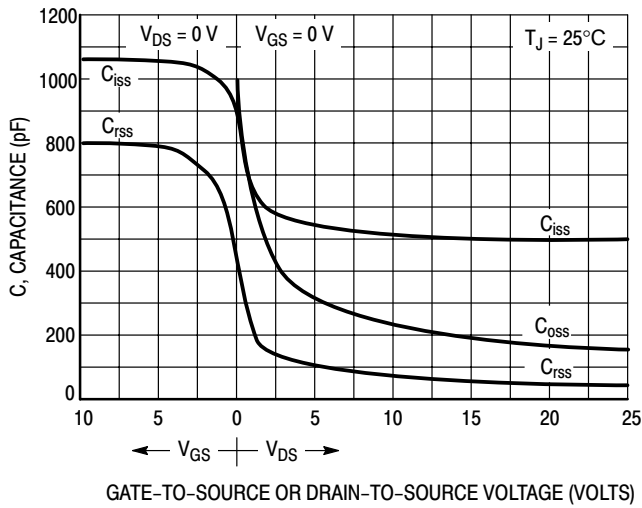


Figure 7. Capacitance Variation

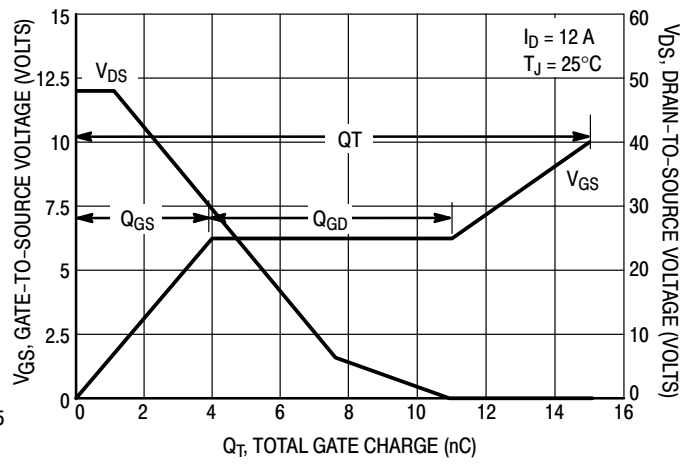


Figure 8. Gate-To-Source and Drain-To-Source Voltage versus Total Charge

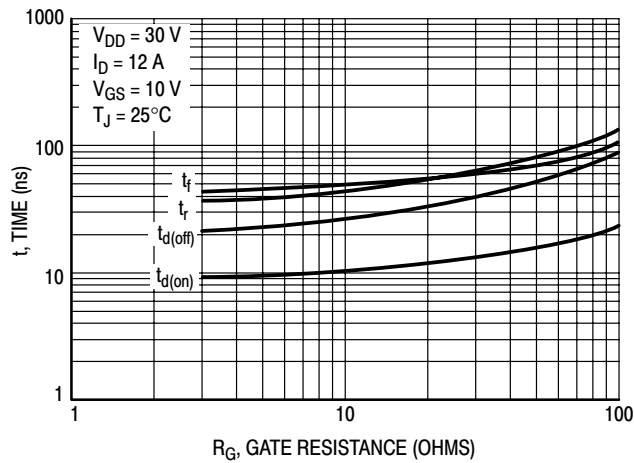


Figure 9. Resistive Switching Time Variation versus Gate Resistance

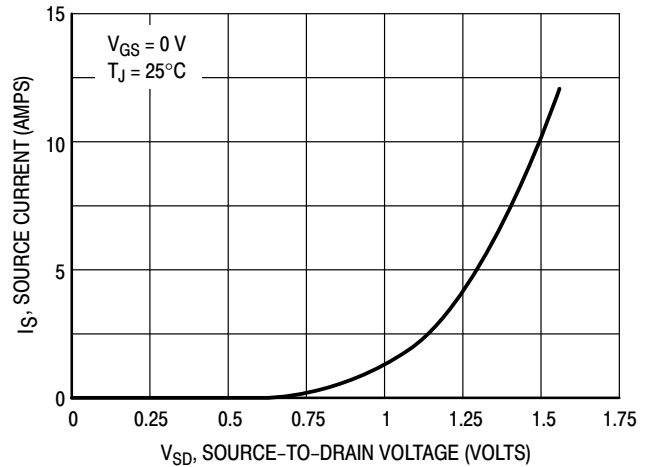


Figure 10. Diode Forward Voltage versus Current

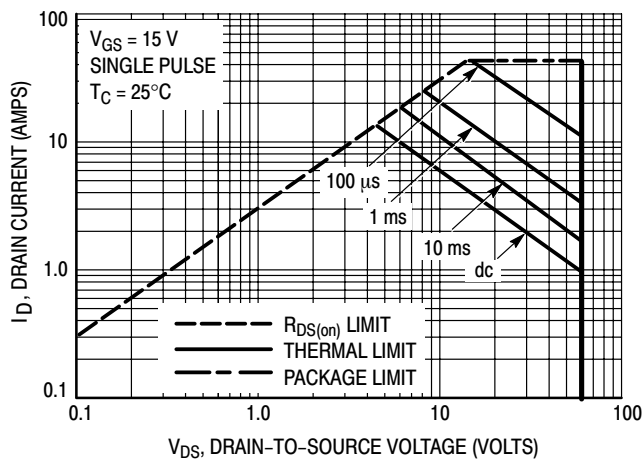


Figure 11. Maximum Rated Forward Biased Safe Operating Area

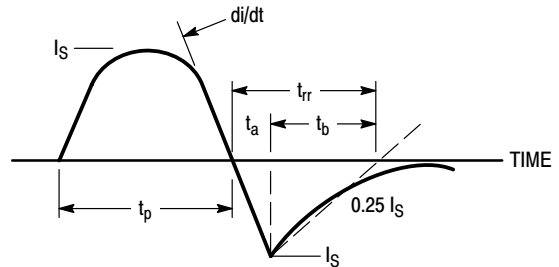


Figure 12. Diode Reverse Recovery Waveform

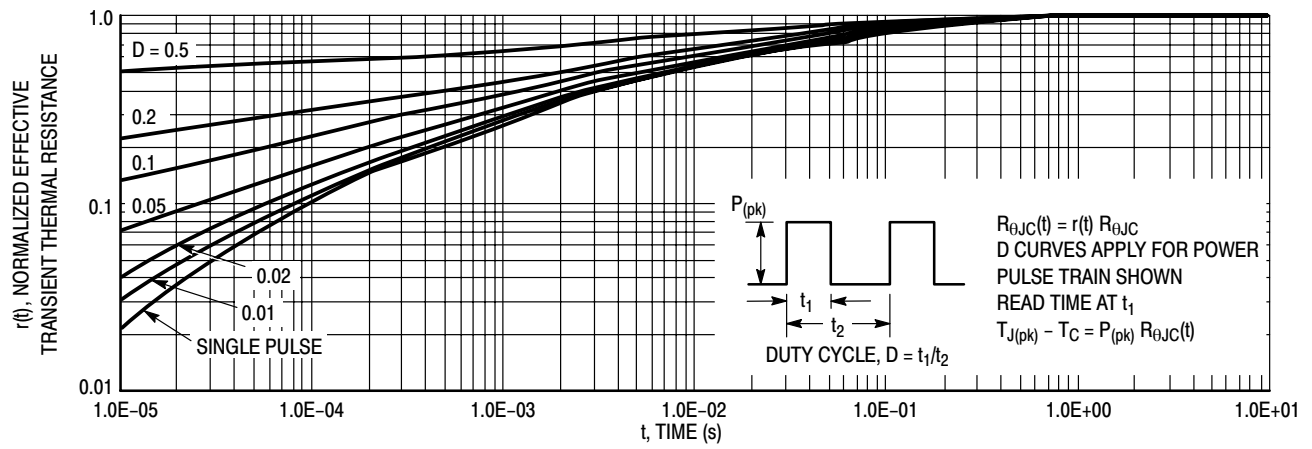
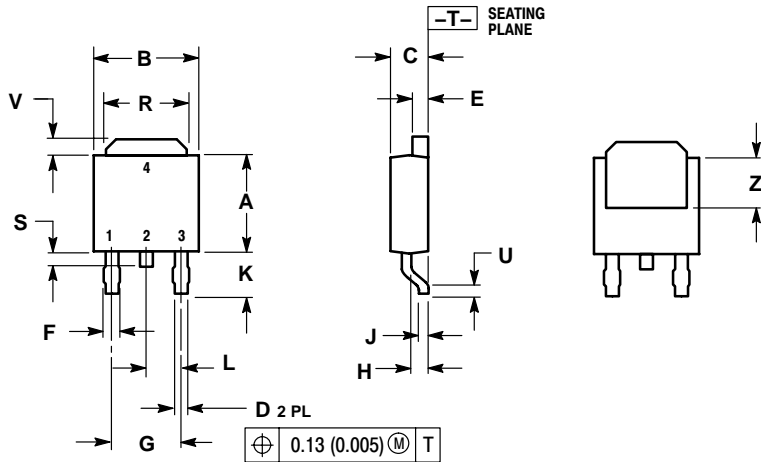


Figure 13. Thermal Response

NTD2955

PACKAGE DIMENSIONS

DPAK CASE 369A-13 ISSUE AB



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.250	5.97	6.35
B	0.250	0.265	6.35	6.73
C	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
E	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
G	0.180 BSC		4.58 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.102	0.114	2.60	2.89
L	0.090 BSC		2.29 BSC	
R	0.175	0.215	4.45	5.46
S	0.020	0.050	0.51	1.27
U	0.020	---	0.51	---
V	0.030	0.050	0.77	1.27
Z	0.138	---	3.51	---

- STYLE 2:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

SOLDERING FOOTPRINT*

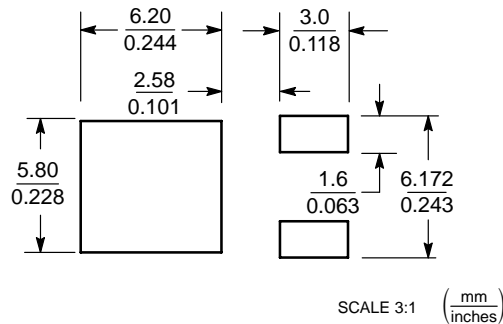


Figure 14. DPAK

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