



UNI-SEMICONDUCTOR CO., LTD

宇力半导体有限公司



APG078N07K Data Sheet

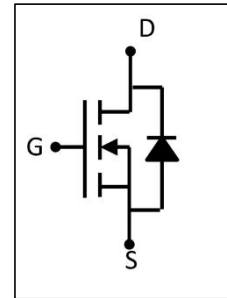
V 1.0

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Feature

- 70V,80A
- $R_{DS(ON)} < 7.8m\Omega$ @ $V_{GS}=10V$ TYP:6.7m Ω
- Advanced Trench Power MOSFET
- Provide Excellent $R_{DS(ON)}$ And Low Gate Charge

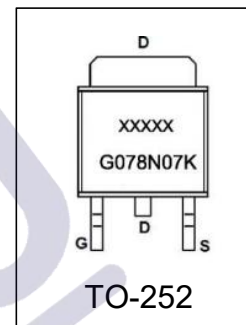
Schematic Diagram



Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch
- Rectifier

marking and pin assignment



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G078N07K	APG078N07K	TO-252	—	—	2500

ABSOLUTE MAXIMUM RATINGS (Ta=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	70	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_a = 25^\circ\text{C}$)	I_D	80	A
Continuous Drain Current ($T_a = 100^\circ\text{C}$)	I_D	56	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	280	A
Singel Pulsed Avalanche Energy ⁽²⁾	E_{AS}	160	mJ
Power Dissipation	P_D	45	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.05	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~+150	$^\circ\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS(Ta=25°C unless otherwise noted)

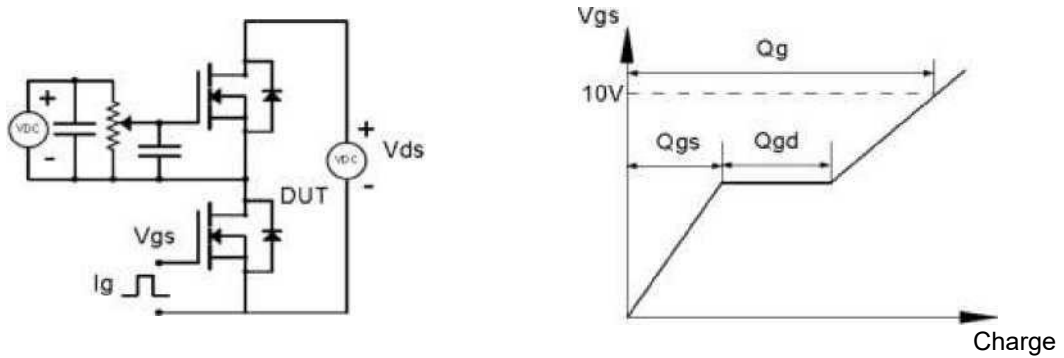
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	70	—	—	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 70V, V_{GS} = 0V$	—	—	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	—	—	± 100	nA
Gate threshold voltage ⁽³⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Drain-source on-resistanc ⁽³⁾	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$	—	6.7	7.8	m Ω
Forward tranconductance ⁽³⁾	g_{Fs}	$V_{DS} = 10V, I_D = 30A$	—	60	—	S
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 30V, V_{GS} = 0V, f = 1MHz$	—	1466	—	pF
Output Capacitance	C_{oss}		—	770	—	
Reverse Transfer Capacitance	C_{rss}		—	55	—	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DS} = 15V, I_D = 3A,$ $V_{GS} = 10V, R_G = 6\Omega$	—	8.4	—	ns
Turn-on rise time	t_r		—	9.0	—	
Turn-off delay time	$t_{d(off)}$		—	23.6	—	
Turn-off fall time	t_f		—	18	—	
Total Gate Charge	Q_g	$V_{DS} = 50V, I_D = 12A,$ $V_{GS} = 10V$	—	28	—	nC
Gate-Source Charge	Q_{gs}		—	5.2	—	
Gate-Drain Charge	Q_{gd}		—	6	—	
Source-Drain Diode characteristics						
Diode Forward voltag ⁽³⁾	V_{DS}	$V_{GS} = 0V, I_S = 30A$	—	—	1.2	V
Diode Forward current ⁽⁴⁾	I_S		—	—	80	A

Notes:

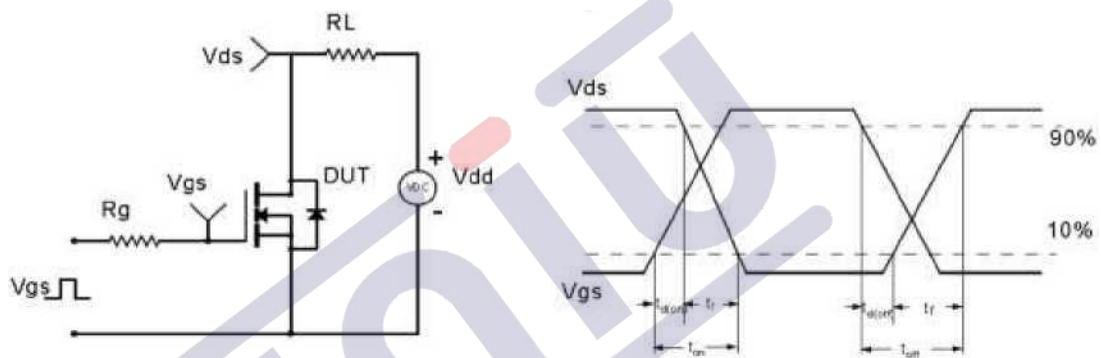
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: $T_J = 25^\circ C, V_{DD} = 10V, R_G = 20\Omega, L = 0.5mH, I_{AS} = 25A$
3. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
4. Surface Mounted on FR4 Board, $t \leq 10$ sec

Test Circuit & Waveform

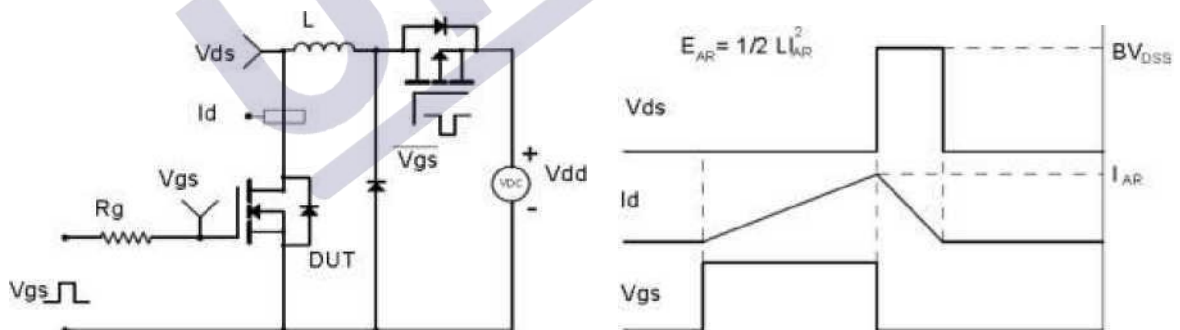
Gate Charge Test Circuit & Waveform



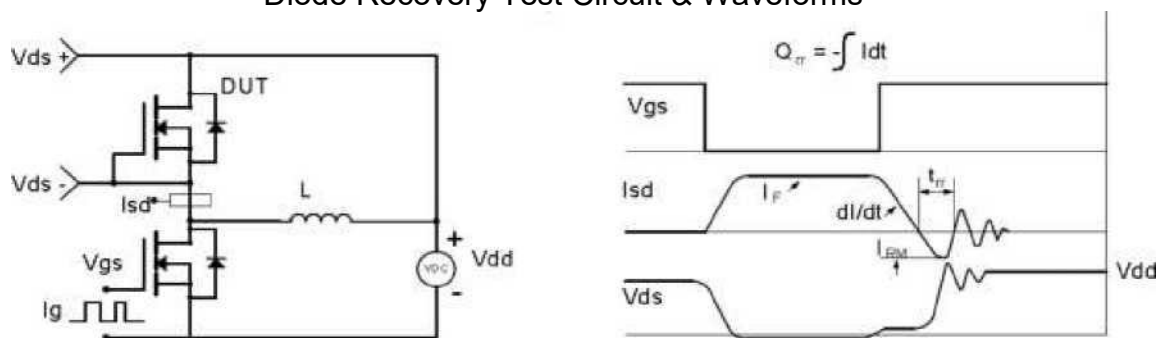
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (LUS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Electronic and Thermal Characteristics

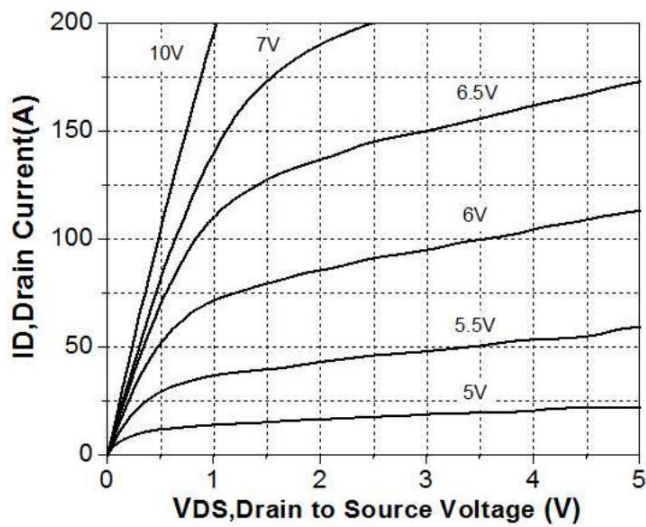


Figure 1. On-Region Characteristics

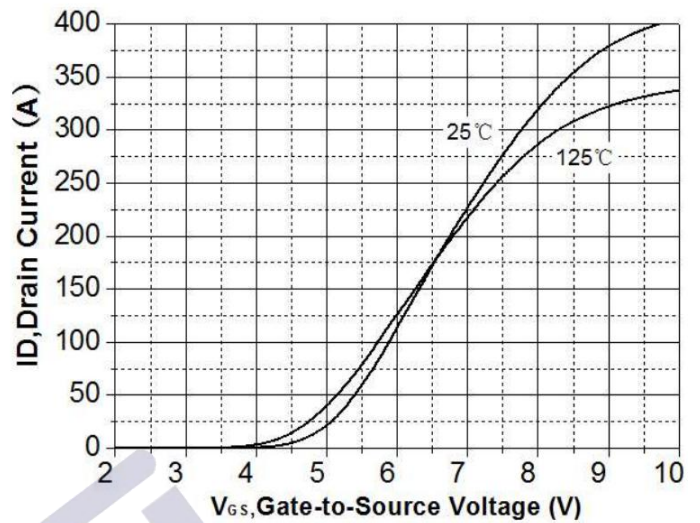


Figure 2. Transfer Characteristics

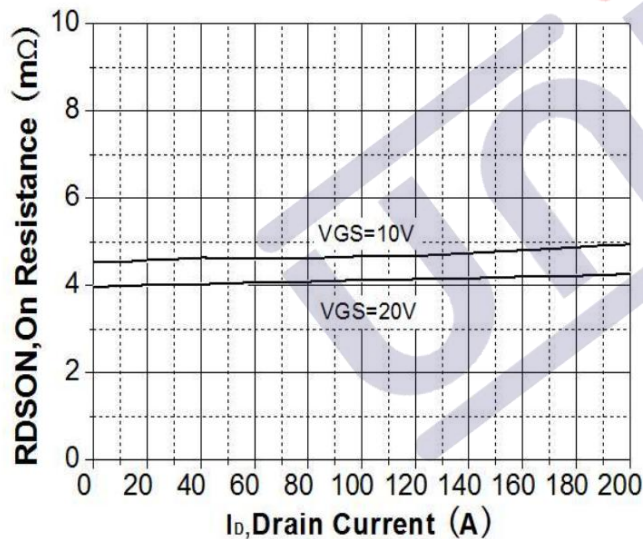


Figure 3. On-Resistance Variation vs Drain Current

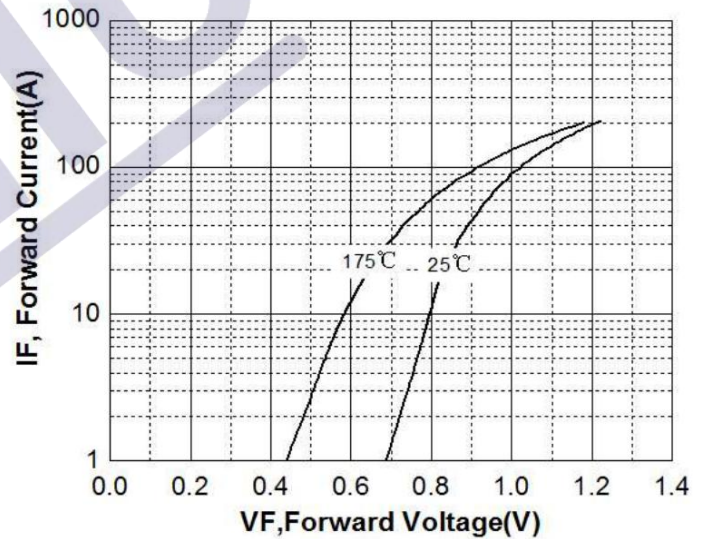


Figure 4. Body Diode Forward Voltage Vs Reverse Drain Current

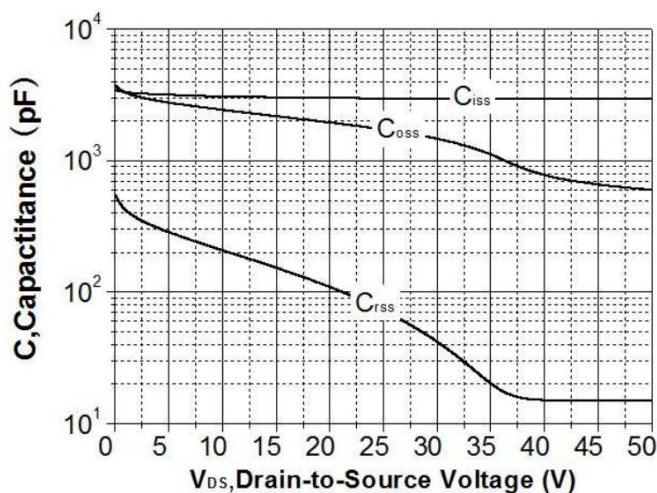


Figure 5. Capacitance Characteristics

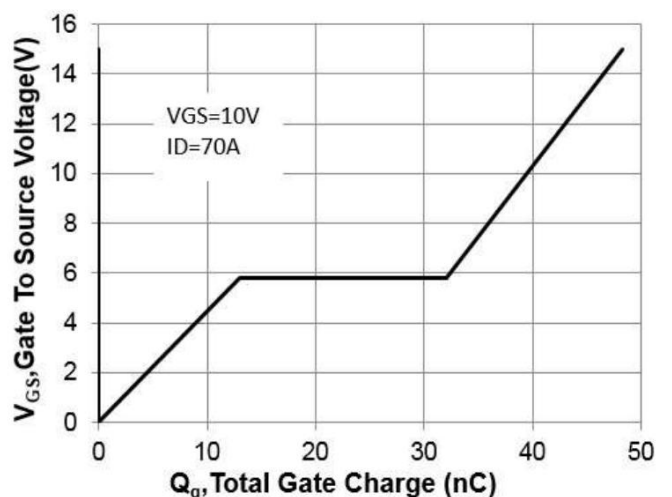


Figure 6. Gate Charge Characteristics

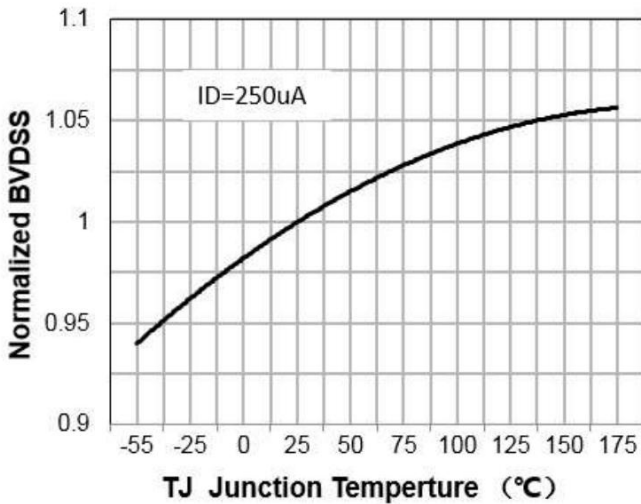


Figure 7. Breakdown Voltage Variation vs Temperature

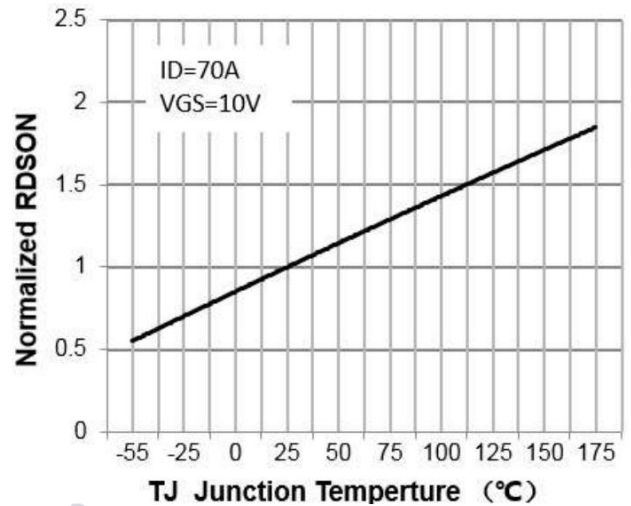


Figure 8. On-Resistance Variation vs Temperature

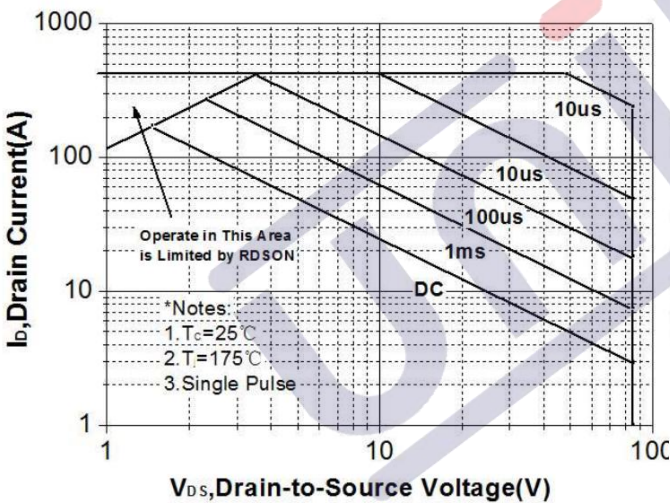


Figure 9. Maximum Safe Operating Area

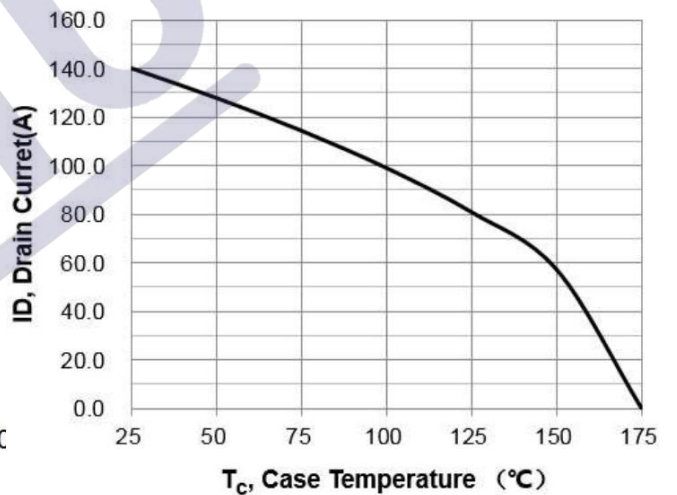


Figure 10. Maximum Drain Current vs Case Temperature

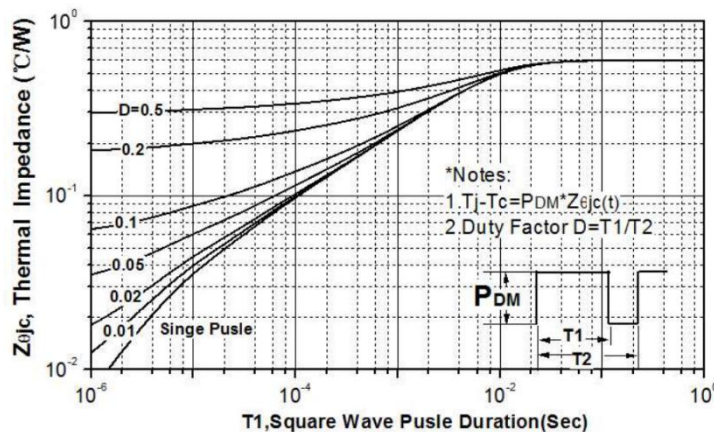
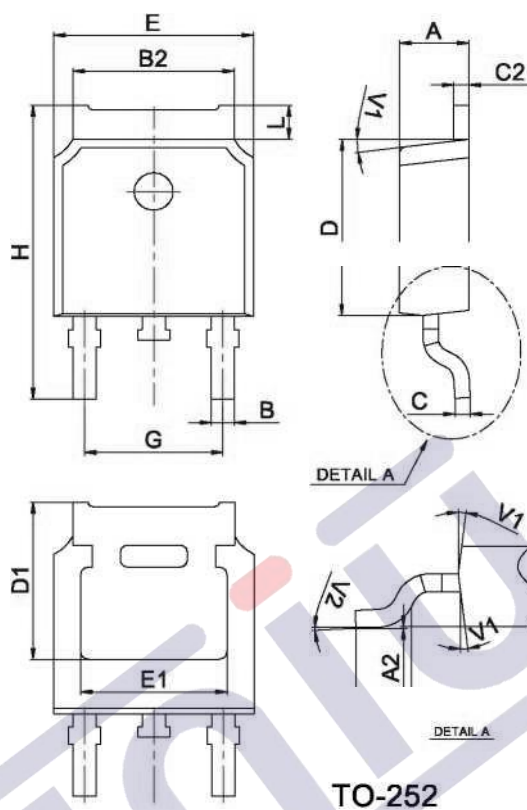


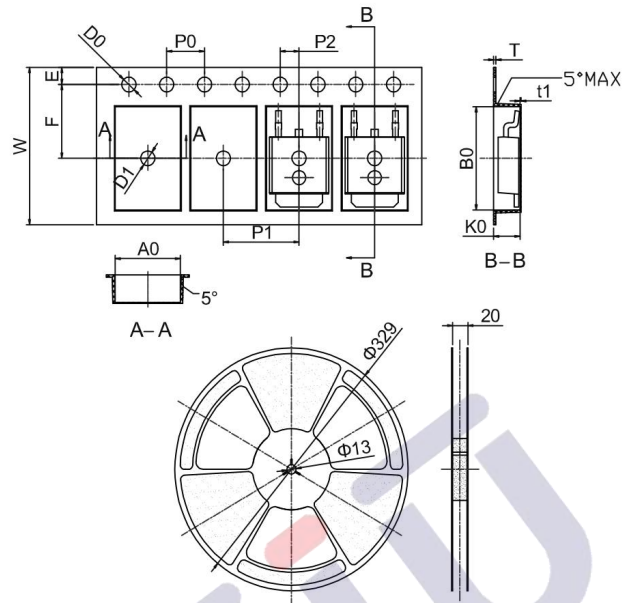
Figure 11. Transient Thermal Response Curve

TO-252 Package Information



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10	—	2.50	0.083	—	0.098
A2	0	—	0.10	0	—	0.004
B	0.66	—	0.86	0.026	—	0.034
B2	5.18	—	5.48	0.202	—	0.216
C	0.40	—	0.60	0.016	—	0.024
C2	0.44	—	0.58	0.017	—	0.023
D	5.90	—	6.30	0.232	—	0.248
D1	5.30REF			0.209REF		
E	6.40	—	6.80	0.252	—	0.268
E1	4.63	—	—	0.182	—	—
G	4.47	—	4.67	0.176	—	0.184
H	9.50	—	10.70	0.374	—	0.421
L	1.09	—	1.21	0.043	—	0.048
L2	1.35	—	1.65	0.053	—	0.065
V1	—	7°	—	—	7°	—
V2	0°	—	6°	0°	—	6°

Reel Spectification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ-	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
DO	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1,90	2,00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24	—	0.27	0.009	—	0.011
t1	0.10	—	—	0.004	—	—
10P0	39.80	40.00	40.20	1.567	1.575	1.583

1.版本记录

DATE	REV.	DESCRIPTION
2018/08/19	1.0	First Release

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