



PJM60N20TE

N-Channel Enhancement Mode Power MOSFET

Product Summary

- $V_{DS} = 20V, I_D = 60A$
- $R_{DS(on)} < 6.5m\Omega @ V_{GS} = 4.5V$
- $R_{DS(on)} < 9m\Omega @ V_{GS} = 2.5V$

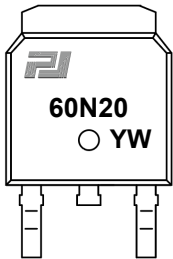
Features

- Advanced Trench Technology
- 100% Avalanche Tested
- 100% DVDS
- RoHS Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3
- Molding Compound Meets UL 94 V-0 Flammability Rating

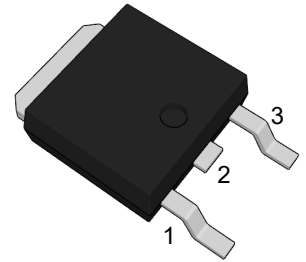
Application

- Load Switch
- PWM Application
- Power Management

Marking Code



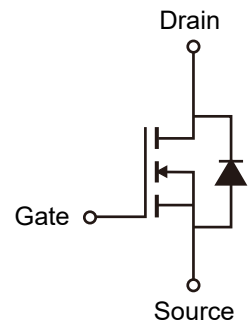
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(Top View)

Pin	Description
1	Gate
2	Drain
3	Source

Schematic Diagram



Absolute Maximum Ratings

Ratings at 25°C case temperature unless otherwise specified.

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 12	V
Drain Current-Continuous	$T_C = 25^\circ C$	I_D	60	A
	$T_C = 100^\circ C$		36	
Drain Current-Pulsed ^{Note1}		I_{DM}	240	A
Single Pulse Avalanche Energy ^{Note2}		E_{AS}	56	mJ
Maximum Power Dissipation		P_D	37	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ C$

Thermal Characteristics

Thermal Resistance, Junction-to-Ambient ^{Note3}	$R_{\theta JA}$	50	$^\circ C/W$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.4	$^\circ C/W$



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Electrical Characteristics

(T_J=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	20	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V	--	--	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±12V, V _{DS} =0V	--	--	±100	nA
Gate Threshold Voltage ^{Note4}	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.4	0.7	1.2	V
Drain-Source On-Resistance ^{Note4}	R _{DS(on)}	V _{GS} =4.5V, I _D =25A	--	4.7	6.5	mΩ
		V _{GS} =2.5V, I _D =15A	--	6.8	9	mΩ
Forward Transconductance ^{Note4}	g _{FS}	V _{DS} =5V, I _D =2A	--	13	--	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, f=1MHz	--	1640	--	pF
Output Capacitance	C _{oss}		--	282	--	pF
Reverse Transfer Capacitance	C _{rss}		--	261	--	pF
Gate Resistance	R _g	V _{DS} =0V, V _{GS} =0V, f=1MHz	--	2.5	--	Ω
Total Gate Charge	Q _g	V _{DS} =10V, I _D =20A, V _{GS} =4.5V	--	23	--	nC
Gate-Source Charge	Q _{gs}		--	4	--	nC
Gate-Drain Charge	Q _{gd}		--	7	--	nC
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V, I _D =20A, V _{GS} =4.5V, R _{GEN} =3Ω	--	12	--	nS
Turn-on Rise Time	t _r		--	33	--	nS
Turn-off Delay Time	t _{d(off)}		--	48	--	nS
Turn-off Fall Time	t _f		--	95	--	nS
Source-Drain Diode Characteristics						
Diode Forward Voltage ^{Note4}	V _{SD}	V _{GS} =0V, I _S =25A	--	--	1.2	V
Diode Forward Current	I _S		--	--	60	A
Reverse Recovery Time	t _{rr}	I _F =20A, di/dt=100A/μS	--	11	--	nS
Reverse Recovery Charge	Q _{rr}		--	2.5	--	nC

Note:

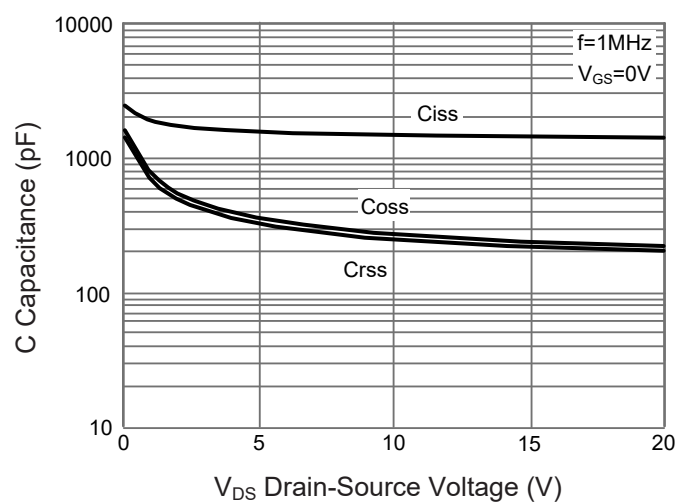
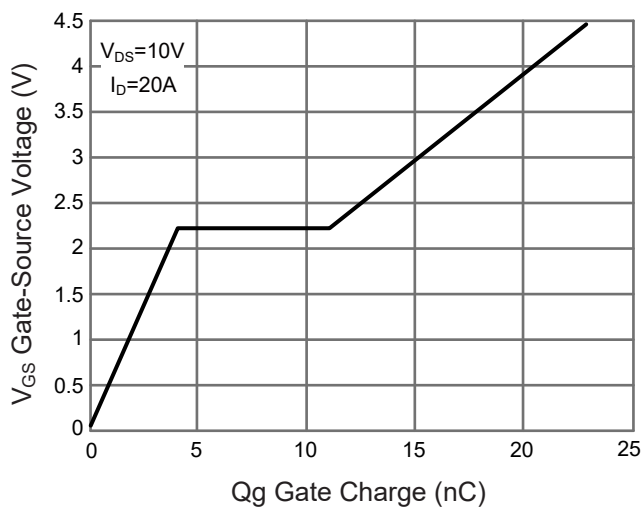
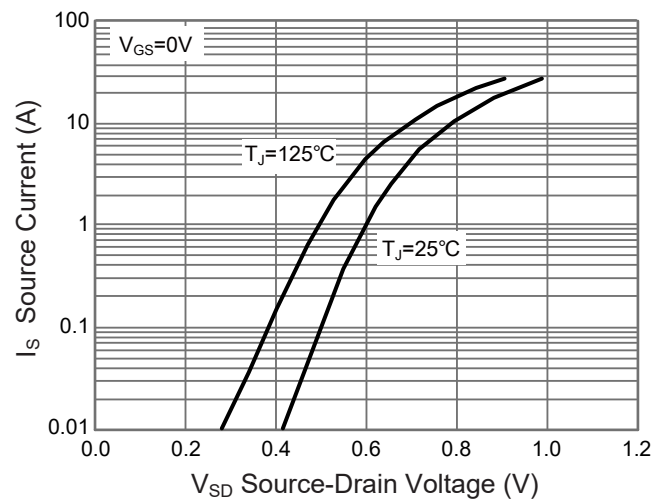
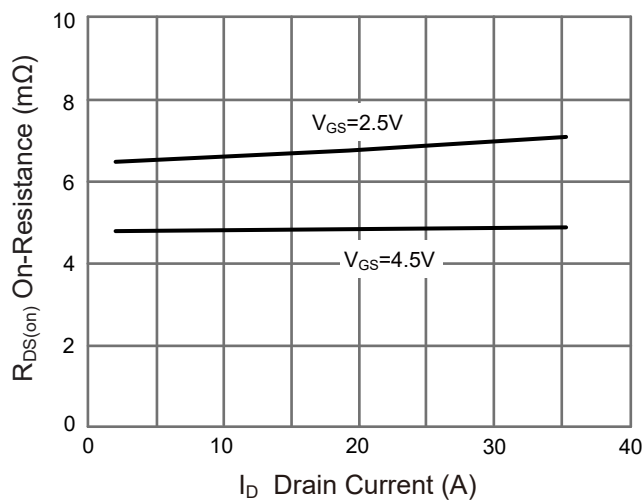
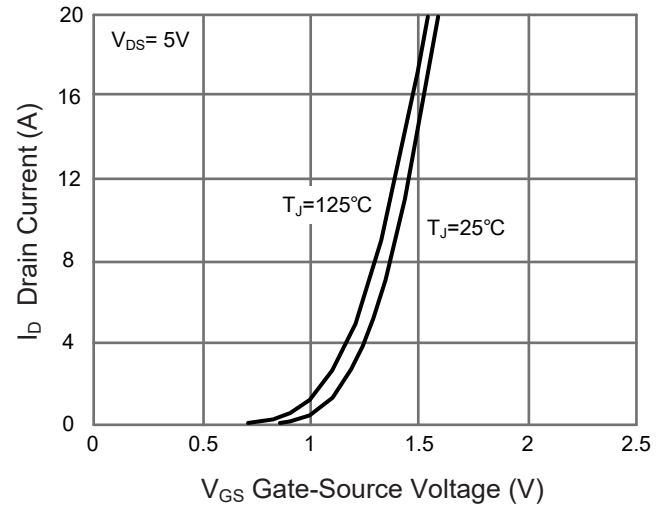
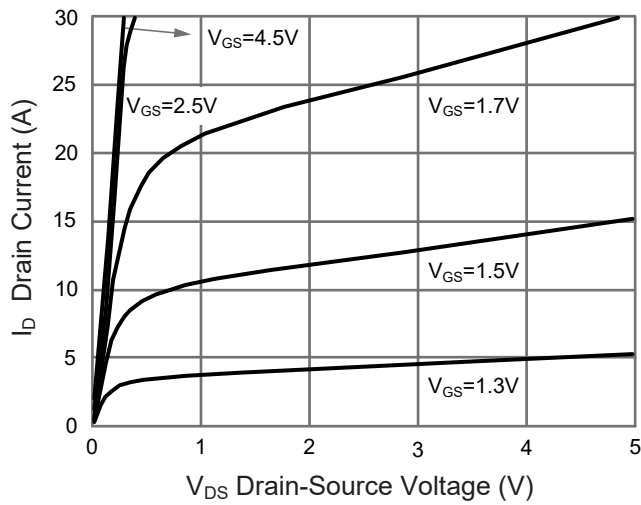
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. E_{AS} condition: T_J=25°C, V_{DD}=15V, V_G=10V, R_G=25Ω, L=0.5mH, I_{AS}=15A
3. Surface mounted on 1inch² FR-4 board with 2OZ copper
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%



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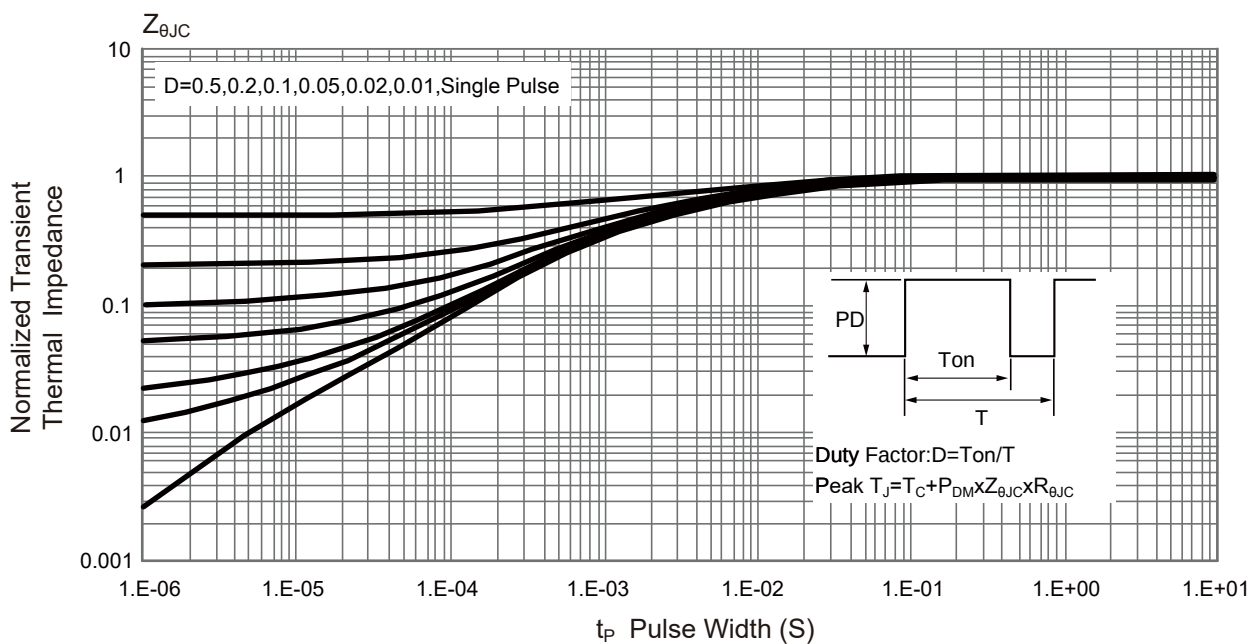
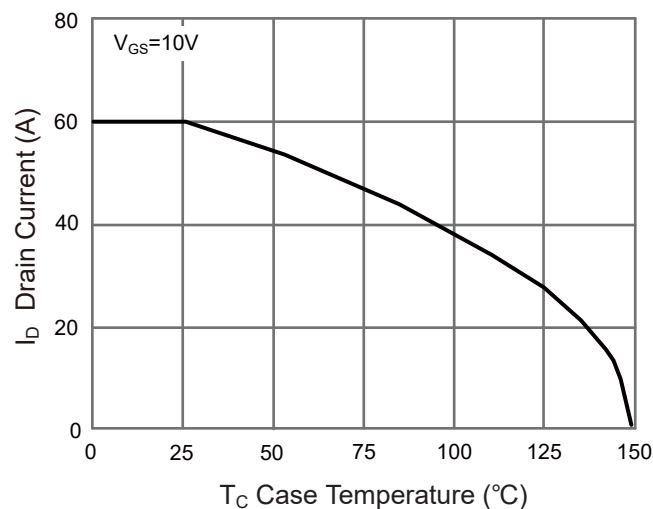
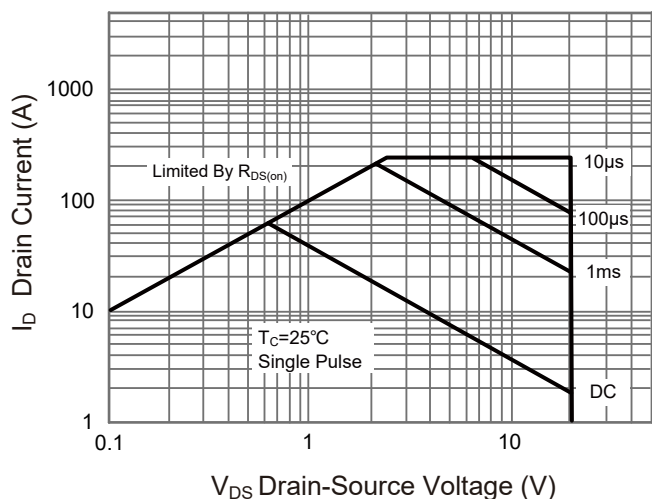
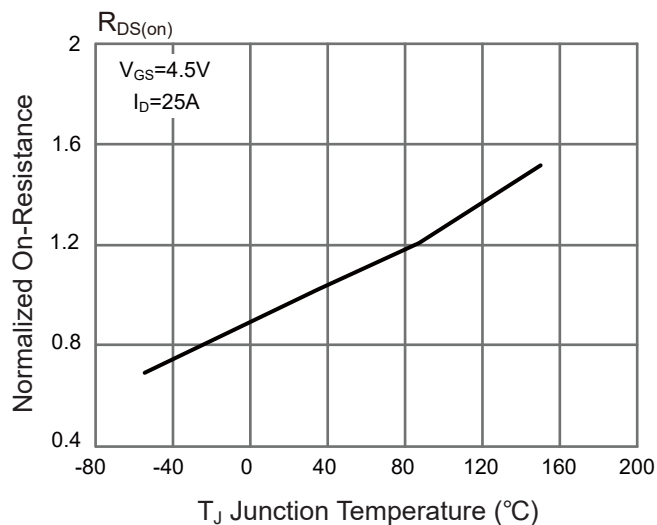
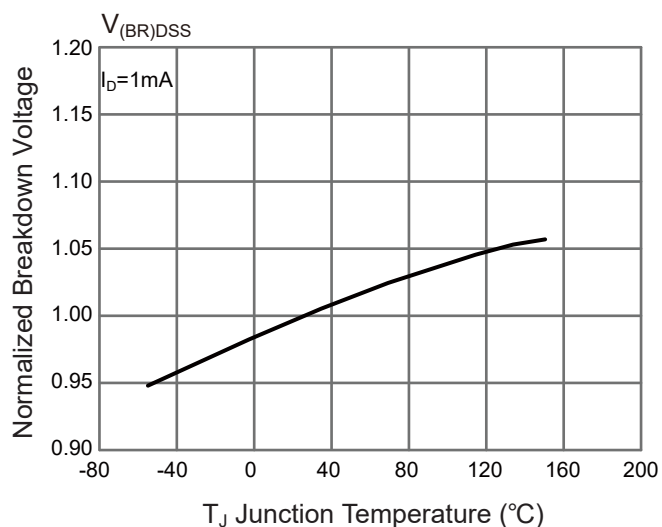
Typical Characteristic Curves





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Test Circuit

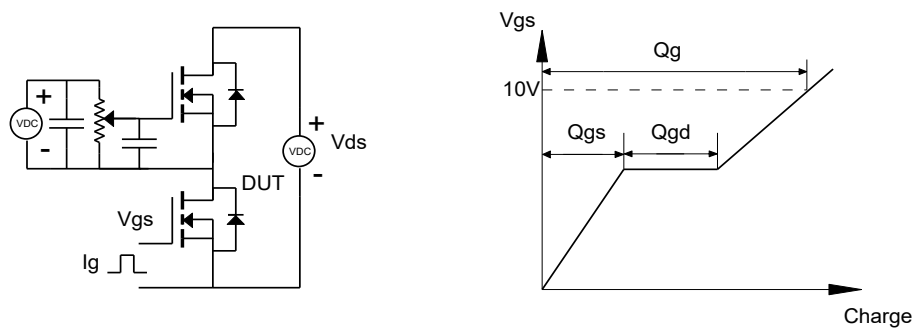


Figure 1: Gate Charge Test Circuit & Waveform

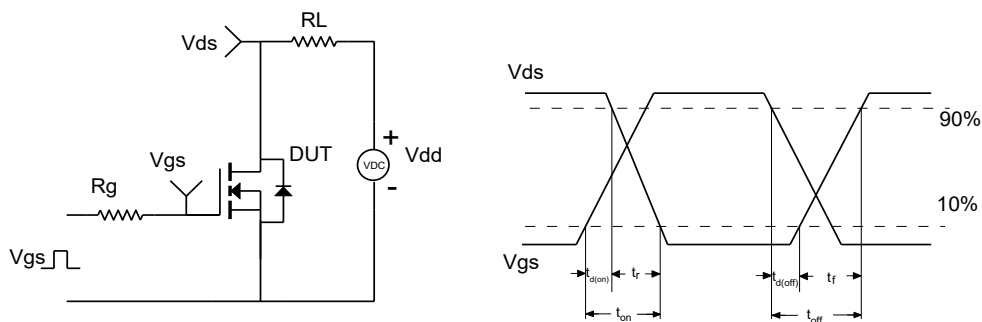


Figure 2: Resistive Switching Test Circuit & Waveform

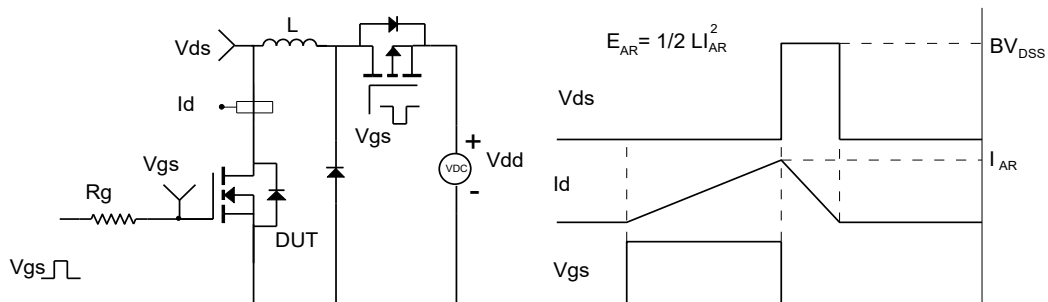


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

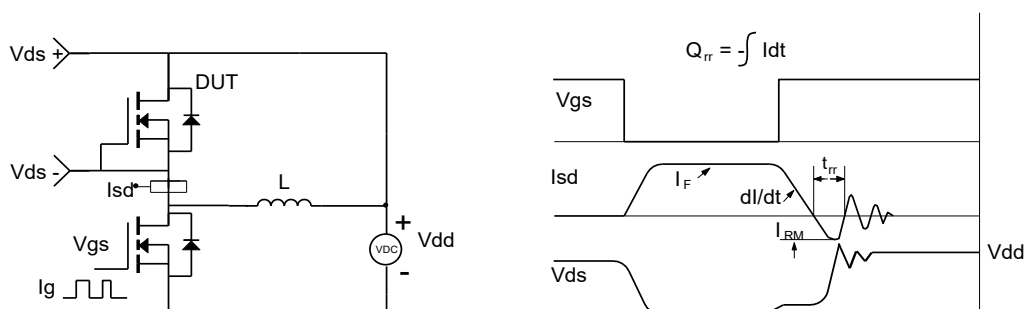


Figure 4: Diode Recovery Test Circuit & Waveform



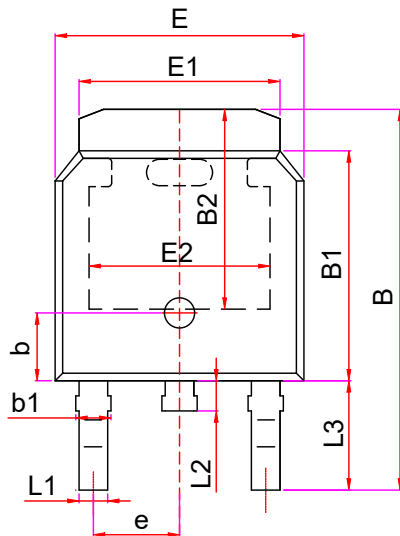
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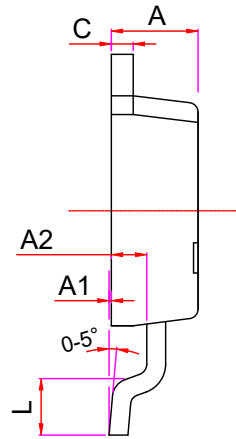
Package Outline

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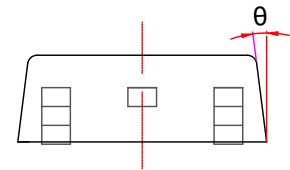
Dimensions in mm



TOP VIEW



SIDE VIEW

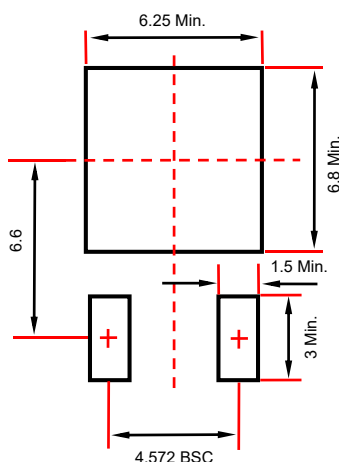


BOTTOM VIEW

Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	2.200	2.300	2.400	0.087	0.090	0.094
A1	0.000	-	0.120	0.000	-	0.005
A2	0.950	1.000	1.050	0.037	0.039	0.041
C	0.508 REF			0.020 REF		
L	1.400	1.500	1.600	0.055	0.059	0.063
E	6.500	6.600	6.700	0.256	0.260	0.264
E1	5.200	5.400	5.600	0.205	0.213	0.220
E2	4.600	4.800	5.000	0.181	0.189	0.197
B	9.900	10.100	10.300	0.390	0.398	0.406
B1	6.000	6.100	6.200	0.236	0.240	0.244
B2	5.100	5.300	5.500	0.201	0.209	0.217
b	1.700	1.800	1.900	0.067	0.071	0.075
b1	1.000MAX			0.039MAX		
L1	0.600	0.750	0.900	0.024	0.030	0.035
L2	0.700	0.900	1.100	0.028	0.035	0.043
L3	2.950REF			0.116REF		
e	2.286BSC			0.090BSC		
θ	7°			7°		

Suggested Pad Layout

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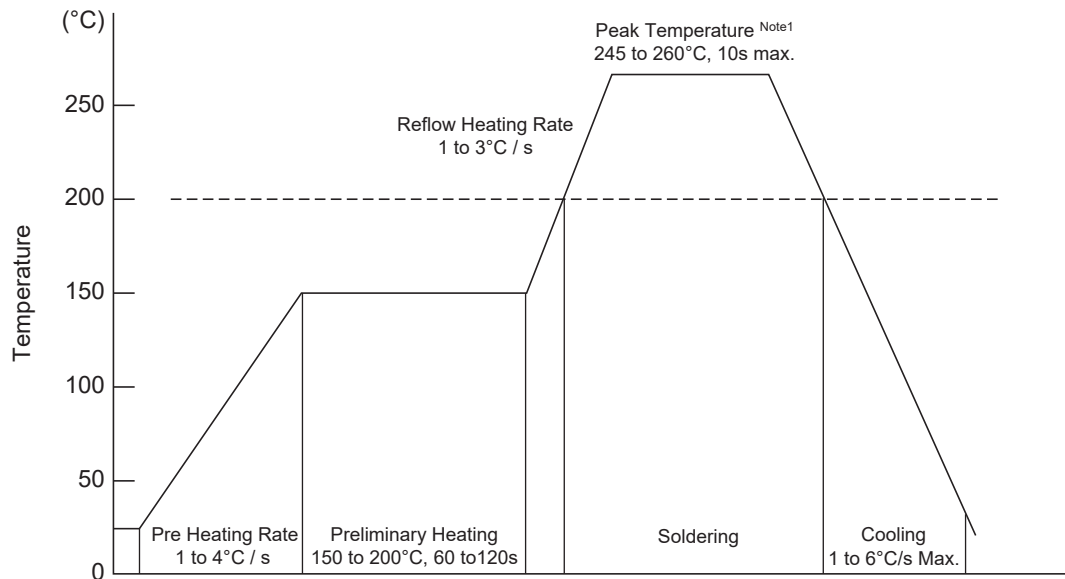
Note:

1. Package Body Sizes Exclude Mold Flash and Gate Burrs
2. Controlling Dimension: In millimeters
3. General Tolerance: $\pm 0.1\text{mm}$
4. The Pad Layout is for reference purposes only



Conditions of Soldering and Storage

◆ Recommended condition of Reflow Soldering(Pb-Free Solder)



Recommended peak temperature is over 245°C. If peak temperature is below 245°C, you may adjust the following parameters:

- Time length of peak temperature (longer)
- Time length of soldering (longer)
- Thickness of solder paste (thicker)

Note1:

Maximum thermal excursion allowed during the reflow assembly is as follow:

- Temperature: 255°C~260°C
- Duration at peak soak : 30 seconds
- Number of reflow: 3
- **Conditions of hand soldering** ^{Note2}

- Temperature: 320±10°C
- Time: 3s max.
- Times: one time

Note2: Not recommended for mass production, an engineering project, or re-work, it is allowed. It should be used with caution

● **Storage conditions**

● **Temperature**

5 to 30°C

● **Humidity**

≤ 60% RH

● **Floor Life**

168 Hours

● **Recommended period**

Five year after manufacturing(Depends on storage conditions)

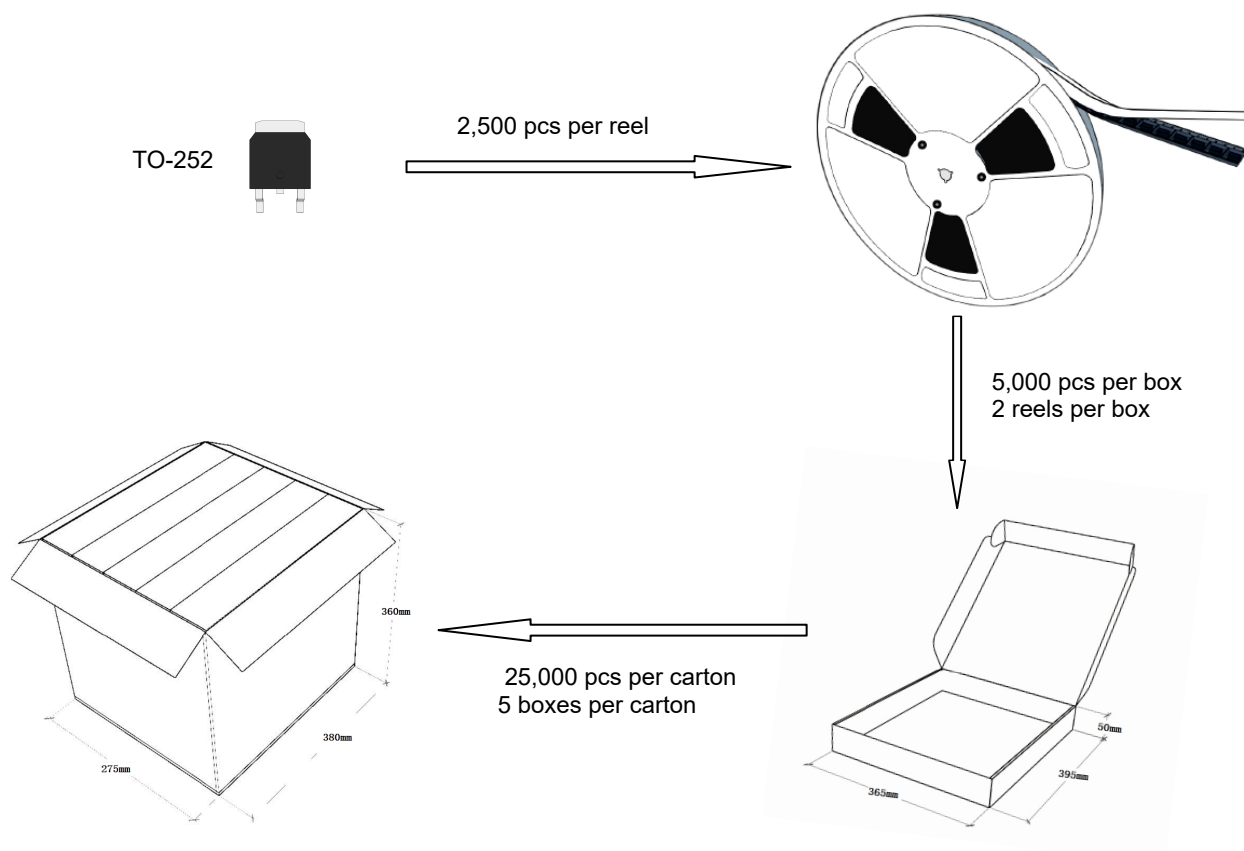


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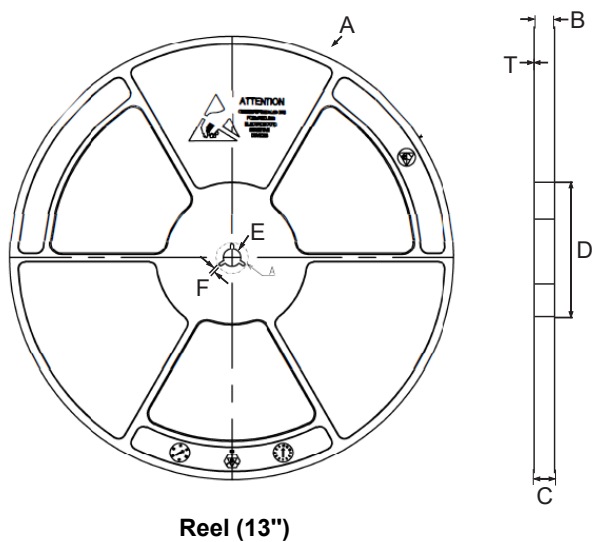
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Package Specifications

- The method of packaging



◆ reel data



Symbol	Value(unit:mm)
A	$\Phi 330.2 \pm 1$
B	17 ± 0.5
C	21.2 ± 2
D	$\Phi 100 \pm 0.5$
E	$\Phi 13.4 \pm 0.2$
F	2.3 ± 0.2
T	2.1 ± 0.2



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◆ Embossed tape data

