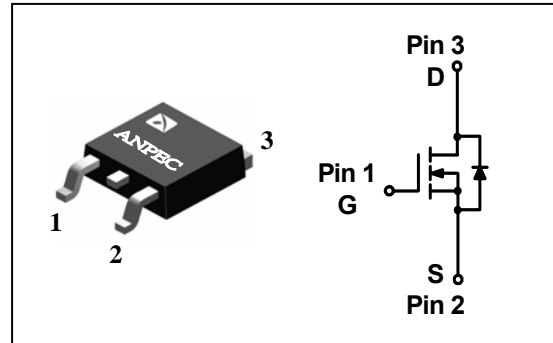


## N-Channel Enhancement Mode MOSFET

### Features

- 25V/60A,  
 $R_{DS(ON)} = 5m\Omega$  (typ.) @  $V_{GS} = 10V$   
 $R_{DS(ON)} = 7m\Omega$  (typ.) @  $V_{GS} = 4.5V$
- Super High Dense Cell Design
- Avalanche Rated
- Reliable and Rugged


### Pin Description



### Applications

- Power Management in Desktop Computer or DC/DC Converters

### Ordering and Marking Information

<p>APM2506N <span style="font-family: monospace;">□□-□□□</span></p> <div style="display: flex; align-items: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <span style="font-size: 2em; margin-right: 5px;">-</span> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 10px; height: 10px; margin-right: 5px;"></div> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 10px; height: 10px;"></div> </div> <ul style="list-style-type: none"> <li style="margin-left: 20px;">Lead Free Code</li> <li style="margin-left: 20px;">Handling Code</li> <li style="margin-left: 20px;">Temp. Range</li> <li style="margin-left: 20px;">Package Code</li> </ul>	<p>Package Code U : TO-252</p> <p>Operating Junction Temp. Range C : -55 to 150°C</p> <p>Handling Code TU : Tube TR : Tape &amp; Reel</p> <p>Lead Free Code L : Lead Free Device Blank : Original Device</p>
<p>APM2506N U:</p> <div style="border: 1px solid black; padding: 5px; display: inline-block; text-align: center;">               APM2506N              XXXXX         </div>	<p>XXXXX – Date Code</p>

ANPEC reserves the right to make changes to improve reliability or manufacturability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

## Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
<b>Common Ratings (T<sub>A</sub> = 25°C)</b>				
V <sub>DSS</sub>	Drain-Source Voltage	±25	V	
V <sub>GSS</sub>	Gate-Source Voltage	±20		
T <sub>J</sub>	Maximum Junction Temperature	150	°C	
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C	
<b>Mounted on Large Heat Sink</b>				
I <sub>DP</sub>	300µs Pulse Drain Current Tested	T <sub>C</sub> =25°C	150	A
		T <sub>C</sub> =100°C	80	
I <sub>D</sub>	Continuous Drain Current	T <sub>C</sub> =25°C	60*	A
		T <sub>C</sub> =100°C	40	
P <sub>D</sub>	Maximum Power Dissipation	T <sub>C</sub> =25°C	50	W
		T <sub>C</sub> =100°C	20	
R <sub>θJC</sub>	Thermal Resistance-Junction to Case	2.5	°C/W	
<b>Mounted on PCB of 1in<sup>2</sup> pad area</b>				
I <sub>DP</sub>	300µs Pulse Drain Current Tested	T <sub>A</sub> =25°C	150	A
		T <sub>A</sub> =100°C	80	
I <sub>D</sub>	Continuous Drain Current	T <sub>A</sub> =25°C	17	A
		T <sub>A</sub> =100°C	10	
P <sub>D</sub>	Maximum Power Dissipation	T <sub>A</sub> =25°C	2.5	W
		T <sub>A</sub> =100°C	1	
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient	50	°C/W	
<b>Mounted on PCB of Minimum Footprint</b>				
I <sub>DP</sub>	300µs Pulse Drain Current Tested	T <sub>A</sub> =25°C	150	A
		T <sub>A</sub> =100°C	80	
I <sub>D</sub>	Continuous Drain Current	T <sub>A</sub> =25°C	13	A
		T <sub>A</sub> =100°C	7	
P <sub>D</sub>	Maximum Power Dissipation	T <sub>A</sub> =25°C	1.5	°C/W
		T <sub>A</sub> =100°C	0.5	°C/W
R <sub>θJA</sub>	Thermal Resistance-Junction to Ambient	75	°C/W	

Notes :

\* Current limited by bond wire

## Electrical Characteristics (T<sub>A</sub>=25°C)

Symbol	Parameter	Test Condition	APM2506NU			Unit
			Min.	Typ.	Max.	
<b>Drain-Source Avalanche Ratings</b>						
E <sub>AS</sub>	Drain-Source Avalanche Energy	I <sub>D</sub> =45A, V <sub>DD</sub> =15V			100	mJ
<b>Static</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA	25			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V			1	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	1	1.5	2	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
R <sub>DS(ON)</sub> <sup>a</sup>	Drain-Source On-state Resistance	V <sub>GS</sub> =10V, I <sub>DS</sub> =40A		5	6	mΩ
		V <sub>GS</sub> =4.5V, I <sub>DS</sub> =20A		7	10	
<b>Diode</b>						
V <sub>SD</sub> <sup>a</sup>	Diode Forward Voltage	I <sub>SD</sub> =20A, V <sub>GS</sub> =0V		0.7	1.3	V
I <sub>S</sub>	Diode continuous forward current	T <sub>A</sub> =25°C			40	A
<b>Dynamic<sup>b</sup></b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V V <sub>DS</sub> =15V Frequency=1.0MHz		3000		pF
C <sub>oss</sub>	Output Capacitance			670		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			360		pF
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =15V, R <sub>L</sub> =15Ω I <sub>DS</sub> =1A, V <sub>GEN</sub> =10V, R <sub>G</sub> =6Ω		13	20	ns
T <sub>r</sub>	Turn-on Rise Time			9	15	ns
t <sub>d(OFF)</sub>	Turn-off Delay Time			43	66	ns
T <sub>f</sub>	Turn-off Fall Time			14	28	ns
<b>Gate Charge<sup>b</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>DS</sub> =20A		32	42	nC
Q <sub>gs</sub>	Gate-Source Charge			6.6		nC
Q <sub>gd</sub>	Gate-Drain Charge			12.4		nC

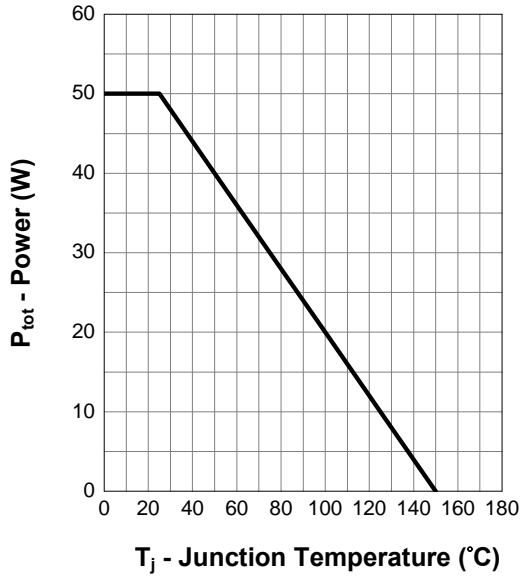
Notes :

a : Pulse test ; pulse width≤300μs, duty cycle≤2%

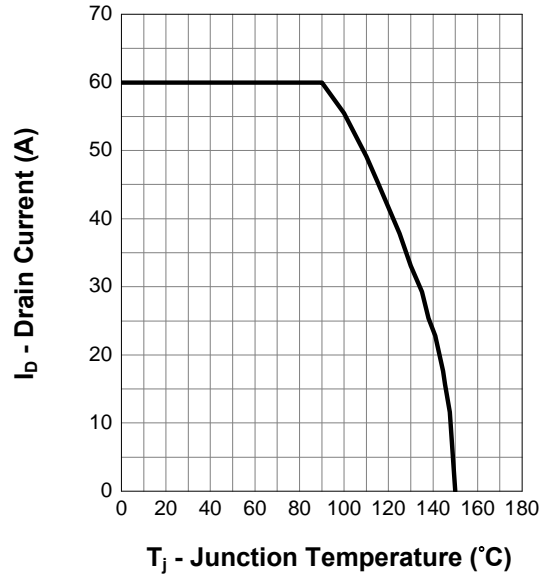
b : Guaranteed by design, not subject to production testing

Typical Characteristics

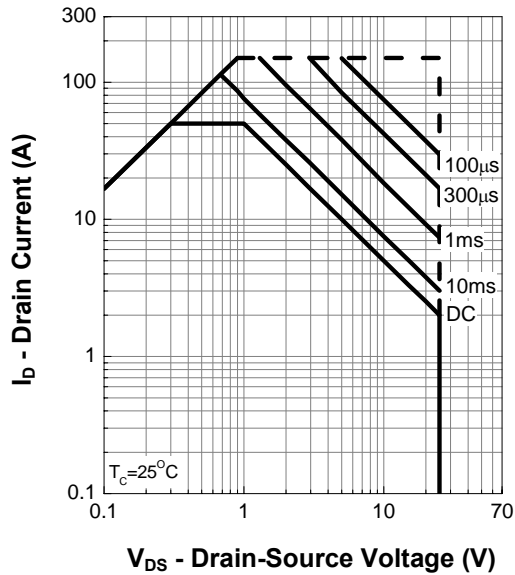
Power Dissipation



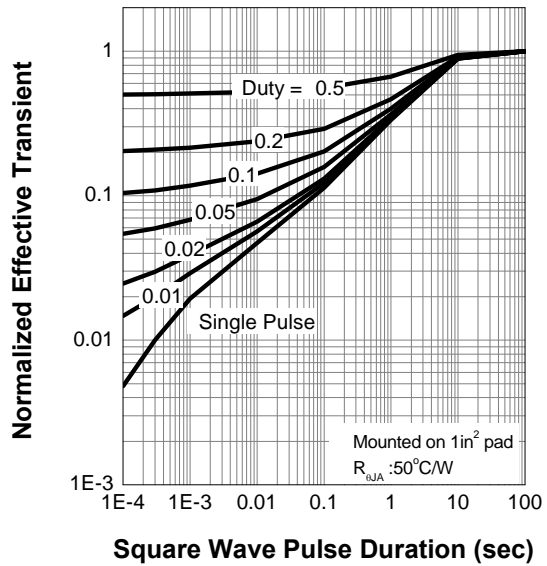
Drain Current



Safe Operation Area

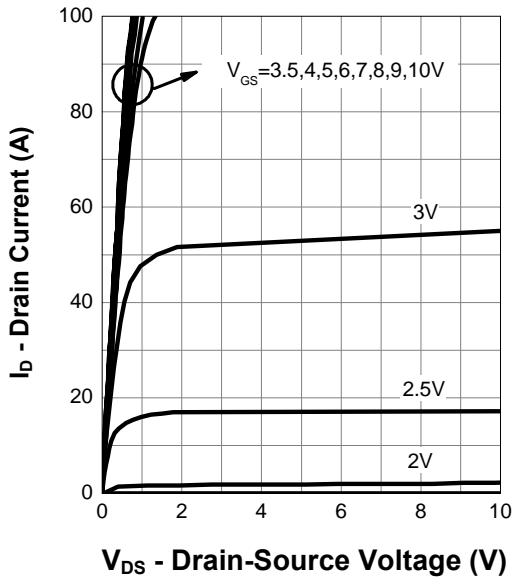


Thermal Transient Impedance

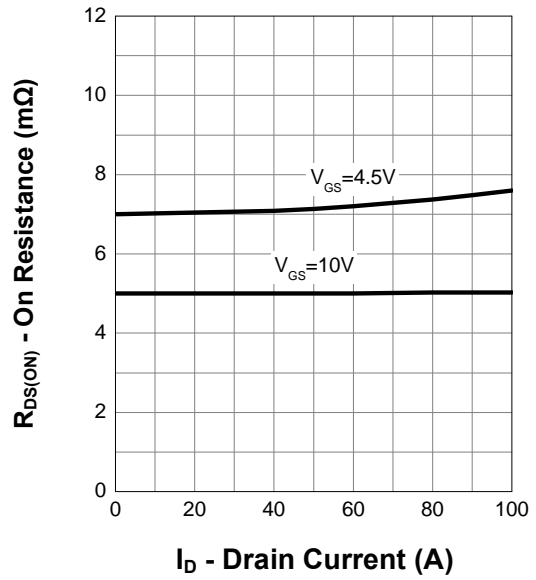


## Typical Characteristics

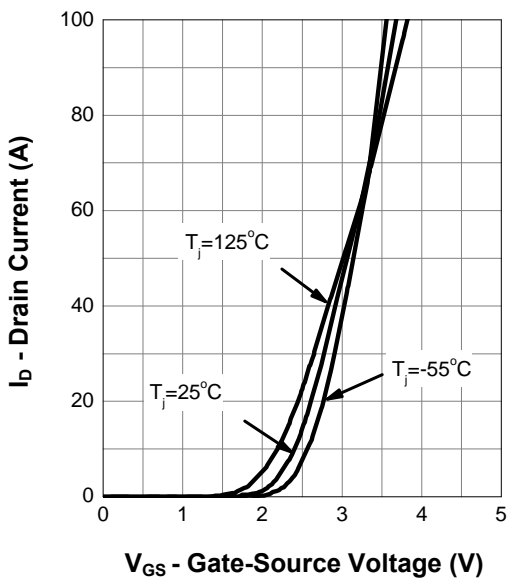
Output Characteristics



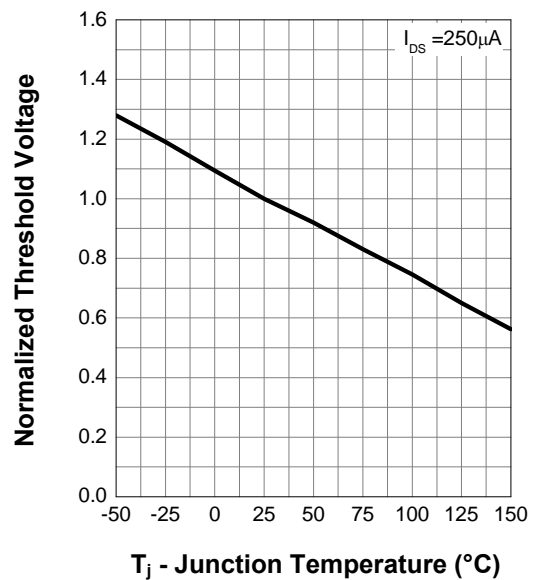
Drain-Source On Resistance



Transfer Characteristics

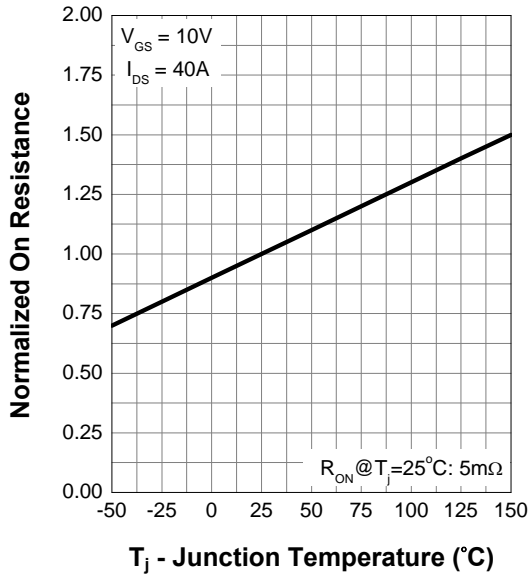


Gate Threshold Voltage

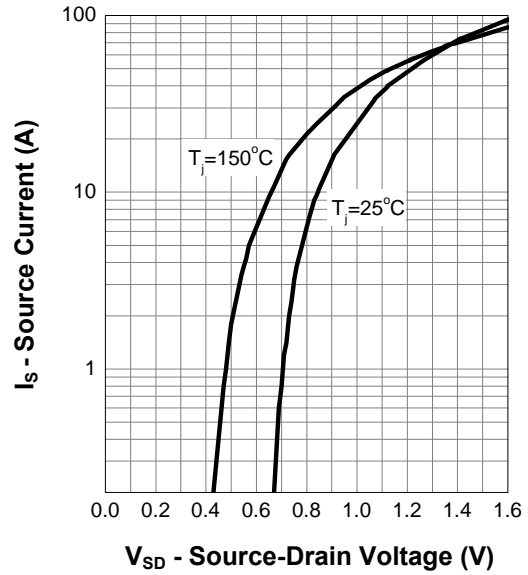


Typical Characteristics

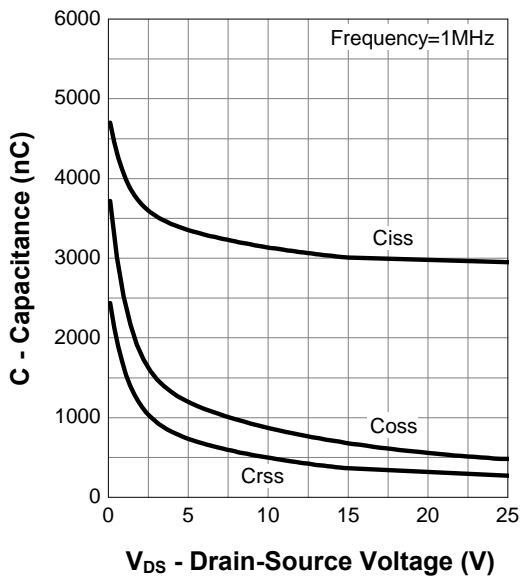
Drain-Source On Resistance



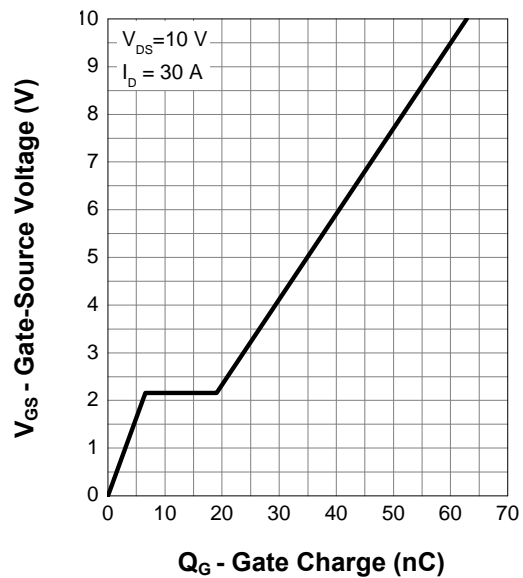
Source-Drain Diode Forward



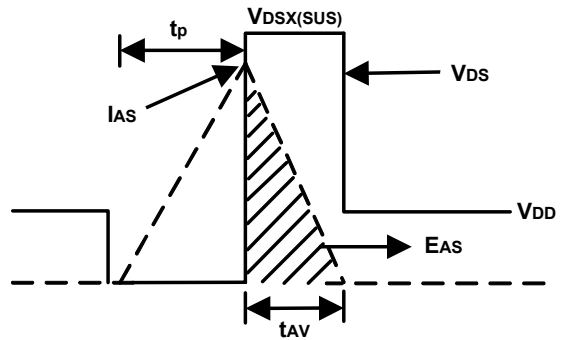
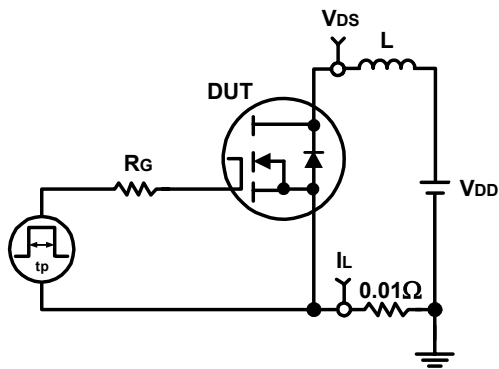
Capacitance



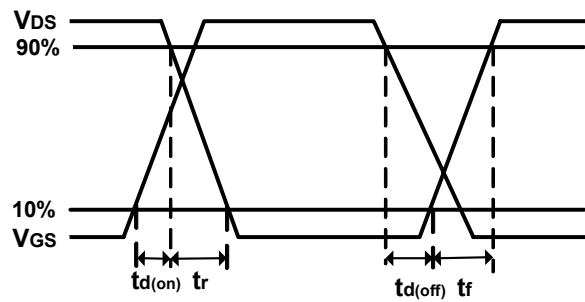
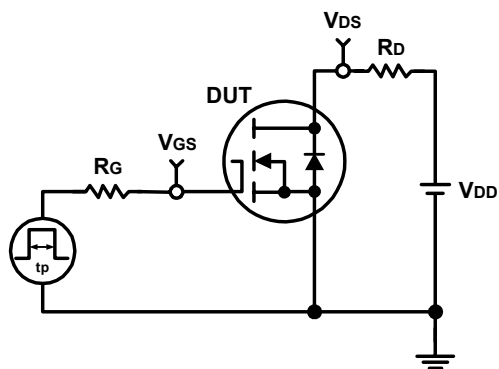
Gate Charge



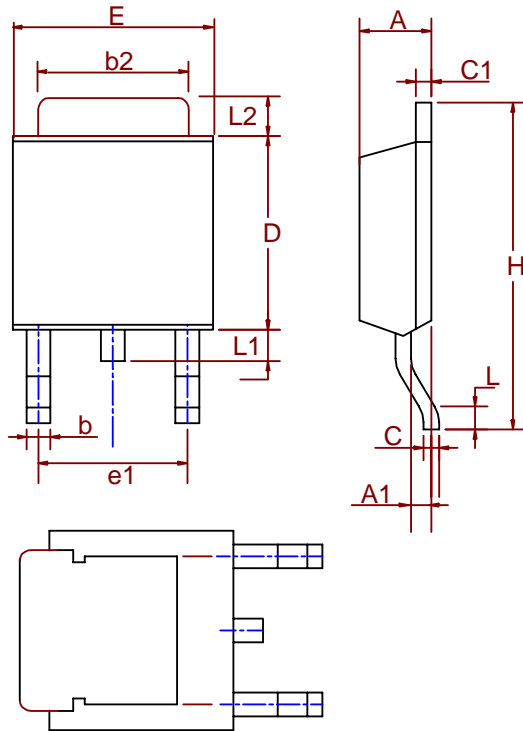
### Avalanche Test Circuit and Waveforms



### Switching Time Test Circuit and Waveforms



Package information



Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.18	2.39	0.086	0.094
A1	0.89	1.27	0.035	0.050
b	0.508	0.89	0.020	0.035
b2	5.207	5.461	0.205	0.215
C	0.46	0.58	0.018	0.023
C1	0.46	0.58	0.018	0.023
D	5.334	6.22	0.210	0.245
E	6.35	6.73	0.250	0.265
e1	3.96	5.18	0.156	0.204
H	9.398	10.41	0.370	0.410
L	0.51		0.020	
L1	0.64	1.02	0.025	0.040
L2	0.89	2.032	0.035	0.080

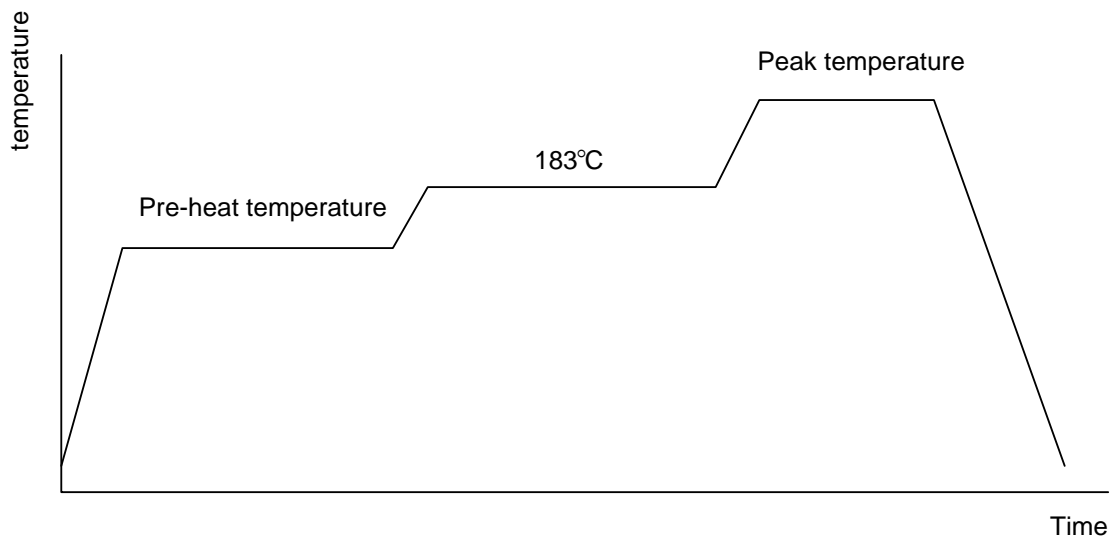


## Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material : 90/10 or 63/37 SnPb)
Lead Solderability	Meets EIA Specification RSI86-91, ANSI/J-STD-002 Category 3.

## Reflow Condition

(IR/Convection or VPR Reflow)



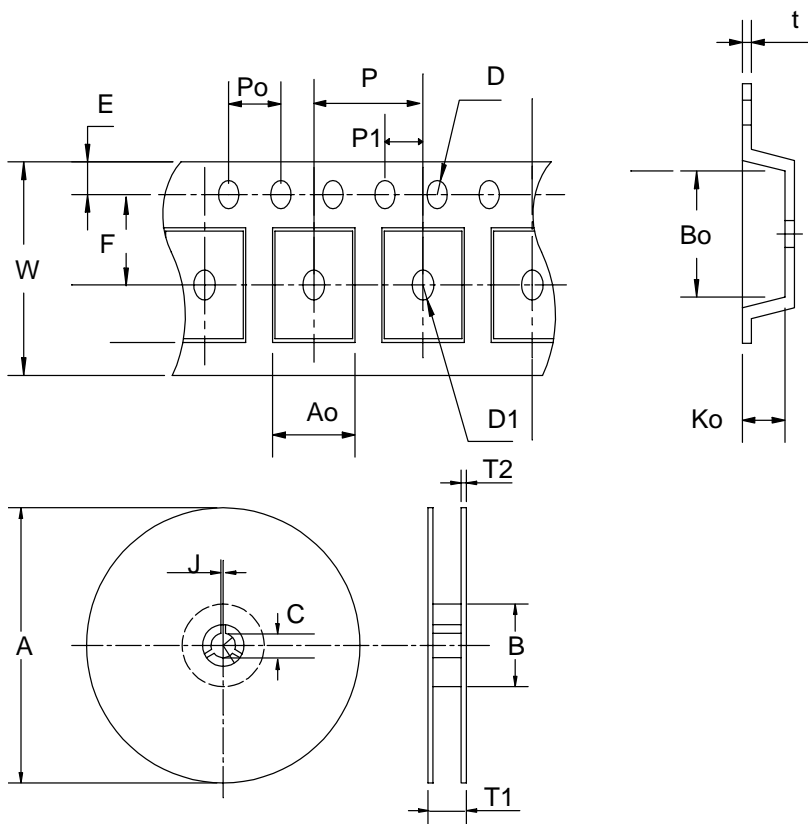
## Classification Reflow Profiles

	Convection or IR/ Convection	VPR
Average ramp-up rate (183°C to Peak)	3°C/ second max.	10°C /second max.
Preheat temperature (125 ± 25°C)	120 seconds max.	
Temperature maintained above 183°C	60~150 seconds	
Time within 5°C of actual peak temperature	10~20 seconds	60 seconds
Peak temperature range	220 + 5/-0°C or 235 +5°C/-0°C	215~ 219 °C or 235 +5°C/-0°C
Ramp-down rate	6°C /second max.	10°C /second max.
Time 25°C to peak temperature	6 minutes max.	

Reliability test program

Test item	Method	Description
SOLDERABILITY	MIL-STD-883D-2003	245°C,5 SEC
HOLT	MIL-STD 883D-1005.7	1000 Hrs Bias @125°C
PCT	JESD-22-B, A102	168 Hrs, 100% RH, 121°C
TST	MIL-STD 883D-1011.9	-65°C ~ 150°C, 200 Cycles

Carrier Tape & Reel Dimension



Application	A	B	C	J	T1	T2	W	P	E
TO-252	330±3	100±2	13±0.5	2±0.5	16.4+0.3 -0.2	2.5±0.5	16+0.3 16-0.1	8±0.1	1.75±0.1
	F	D	D1	Po	P1	Ao	Bo	Ko	t
	7.5±0.1	1.5±0.1	1.5±0.25	4.0±0.1	2.0±0.1	6.8±0.1	10.4±0.1	2.5±0.1	0.3±0.05

(mm)

## Cover Tape Dimensions

Application	Carrier Width	Cover Tape Width	Devices Per Reel
TO-252	16	13.3	2500

## Customer Service

Anpec Electronics Corp.

Head Office :

5F, No. 2 Li-Hsin Road, SBIP,

Hsin-Chu, Taiwan, R.O.C.

Tel : 886-3-5642000

Fax : 886-3-5642050

Taipei Branch :

7F, No. 137, Lane 235, Pac Chiao Rd.,

Hsin Tien City, Taipei Hsien, Taiwan, R. O. C.

Tel : 886-2-89191368

Fax : 886-2-89191369