

APM2506NU

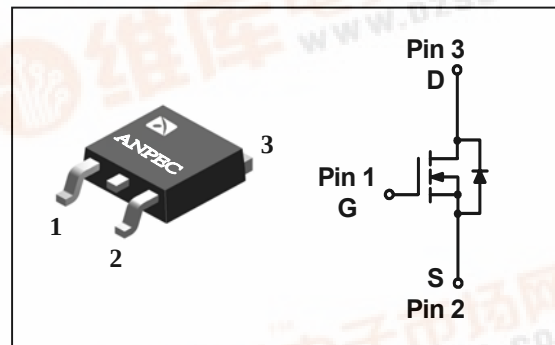


N-Channel Enhancement Mode MOSFET

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

APM2506N □□-□□□ Lead Free Code Handling Code Temp. Range Package Code	Package Code U : TO-252 Operating Junction Temp. Range C : -55 to 150°C Handling Code TU : Tube TR : Tape & Reel Lead Free Code L : Lead Free Device Blank : Original Device
APM2506N U: APM2506N XXXXX	XXXXX – Date Code

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

Notes :

* Current limited by bond wire

Electrical Characteristics ($T_A = 25^\circ\text{C}$)

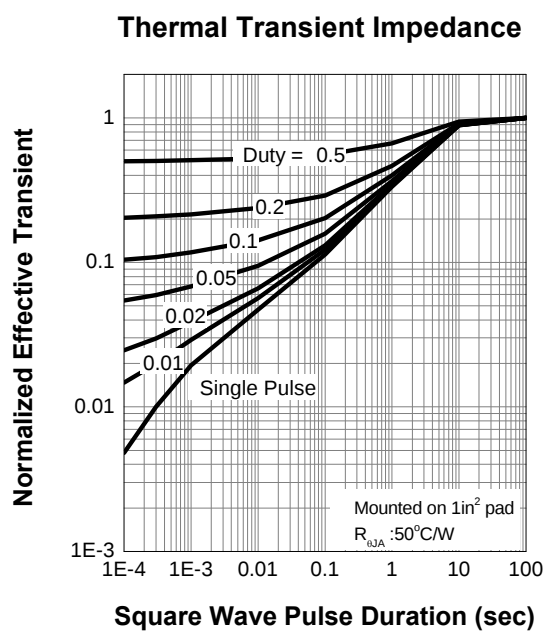
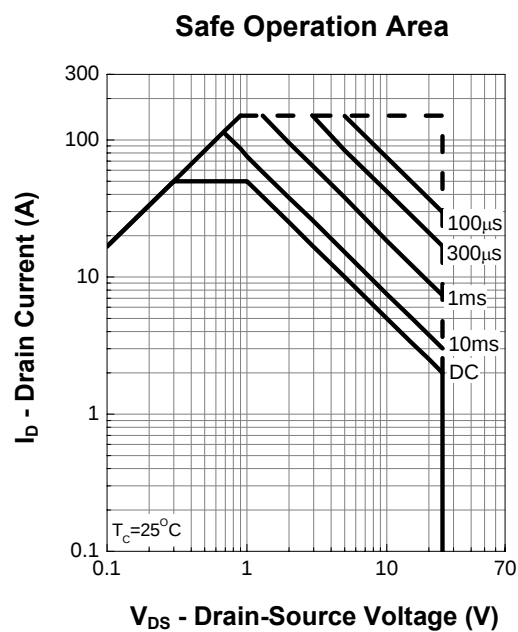
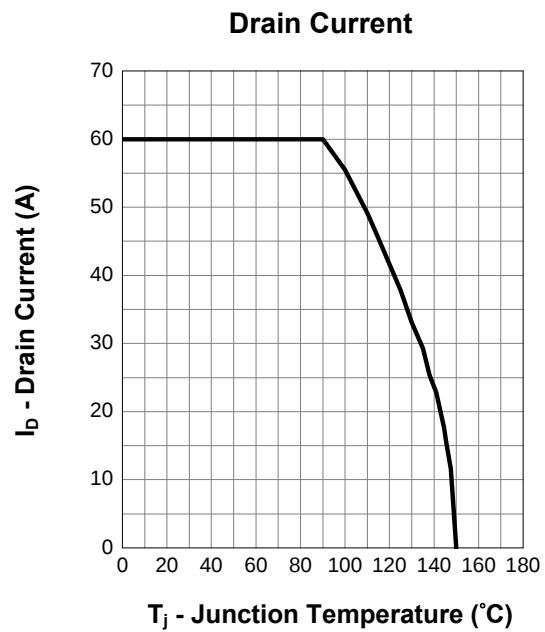
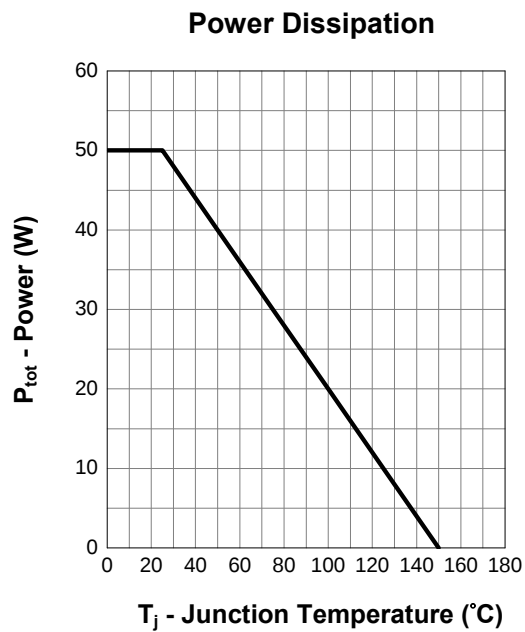
Symbol	Parameter	Test Condition	APM2506NU			Unit
			Min.	Typ.	Max.	
Drain-Source Avalanche Ratings						
E _{AS}	Drain-Source Avalanche Energy	I _D =45A, V _{DD} =15V			100	mJ
Static						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	25			V
I _{DSS}	Zero Gate Voltage Drain Current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

Notes :

a : Pulse test ; pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$

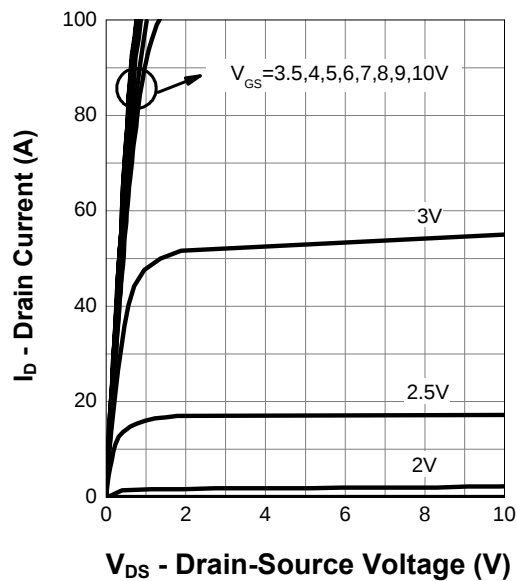
b : Guaranteed by design, not subject to production testing

Typical Characteristics

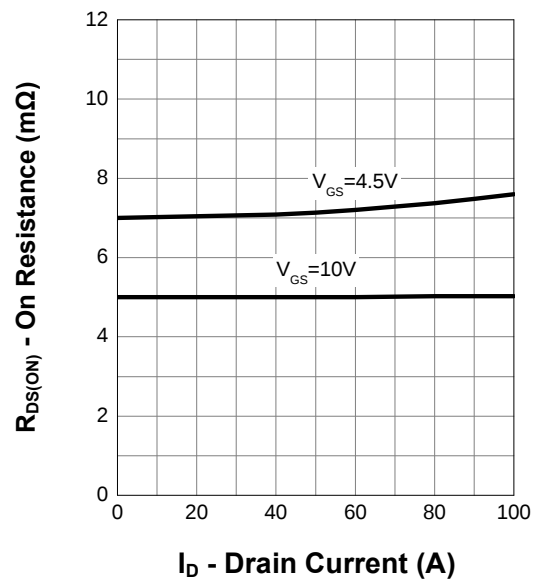


Typical Characteristics

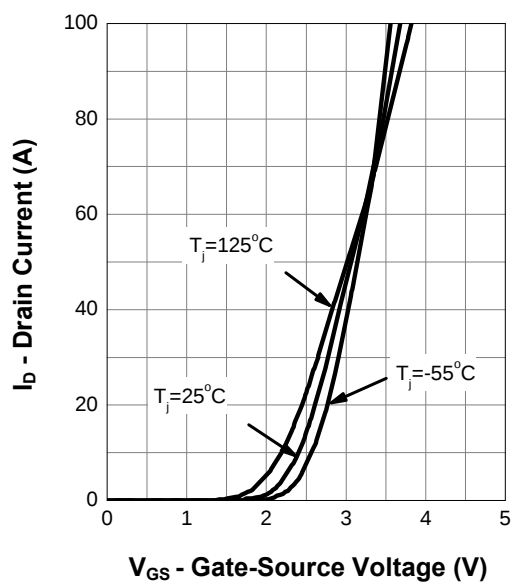
Output Characteristics



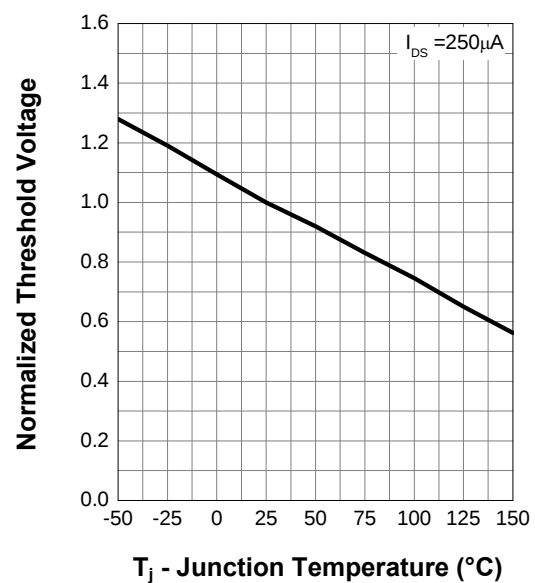
Drain-Source On Resistance



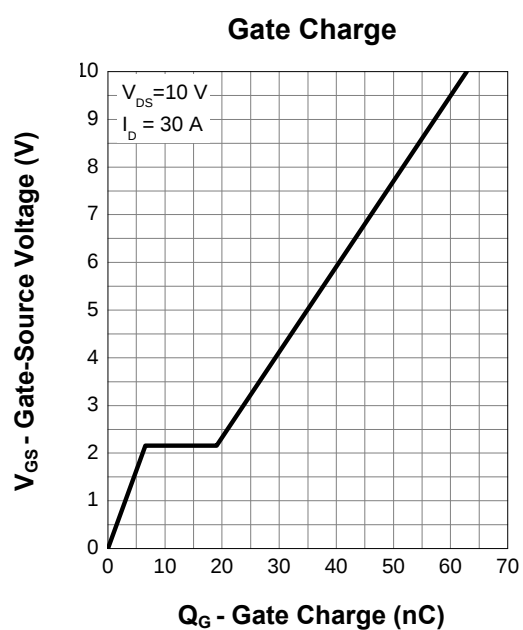
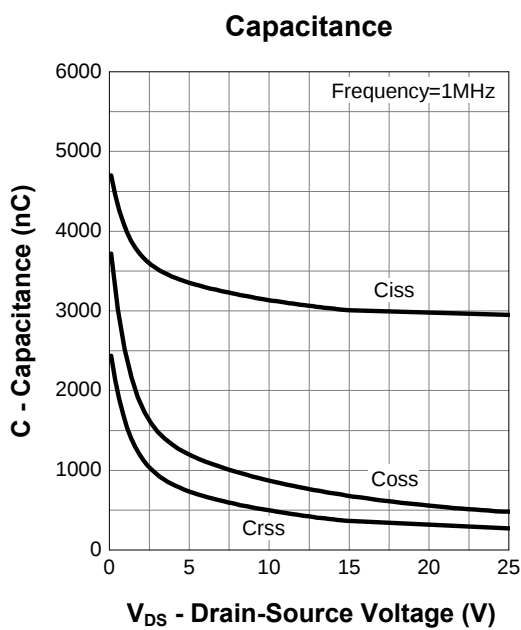
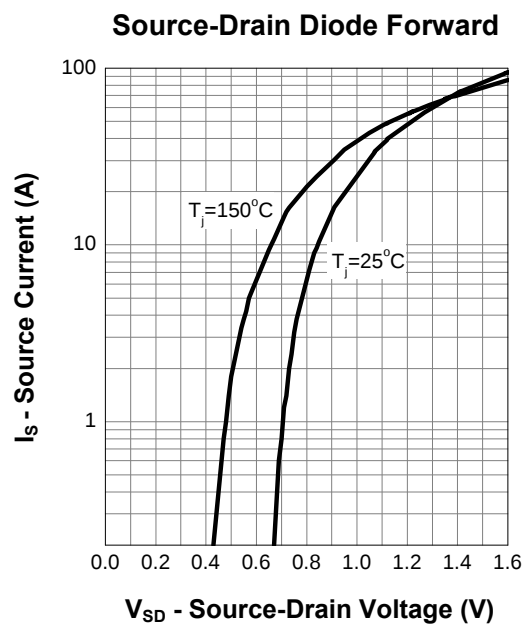
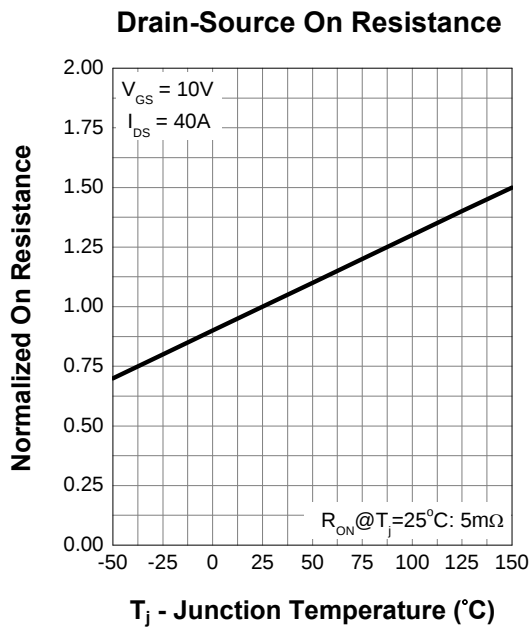
Transfer Characteristics



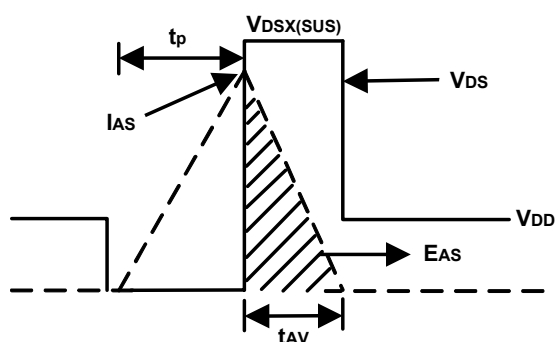
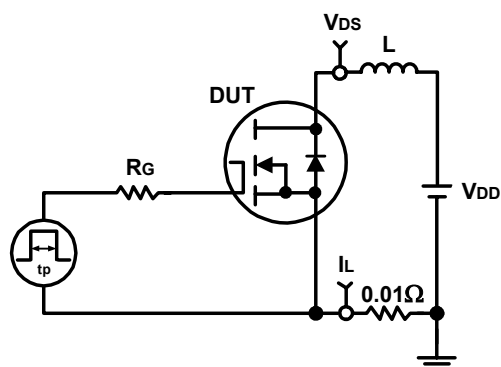
Gate Threshold Voltage



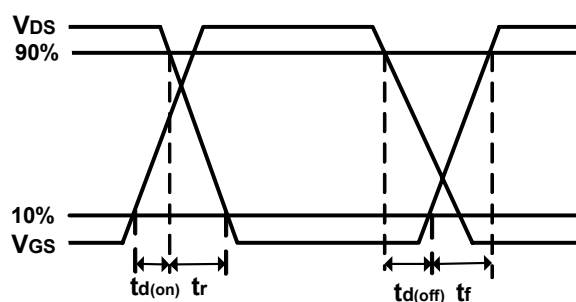
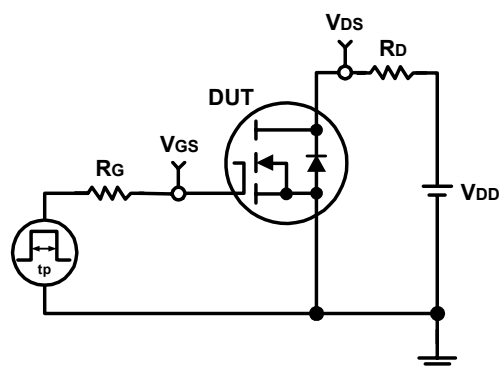
Typical Characteristics



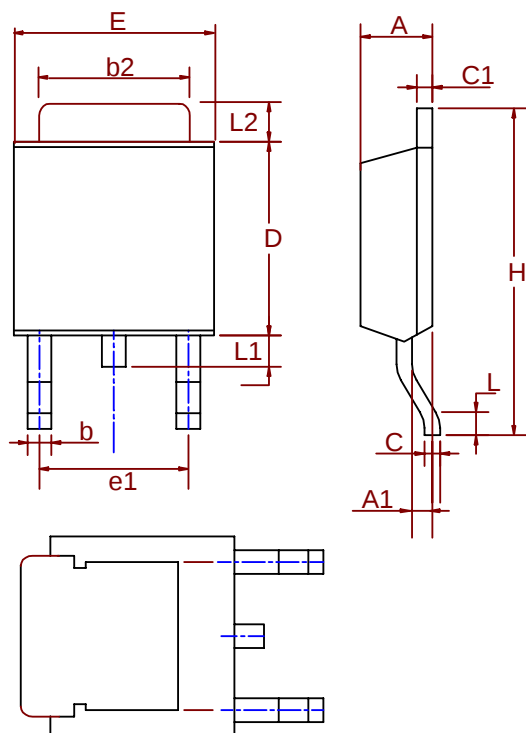
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Package information



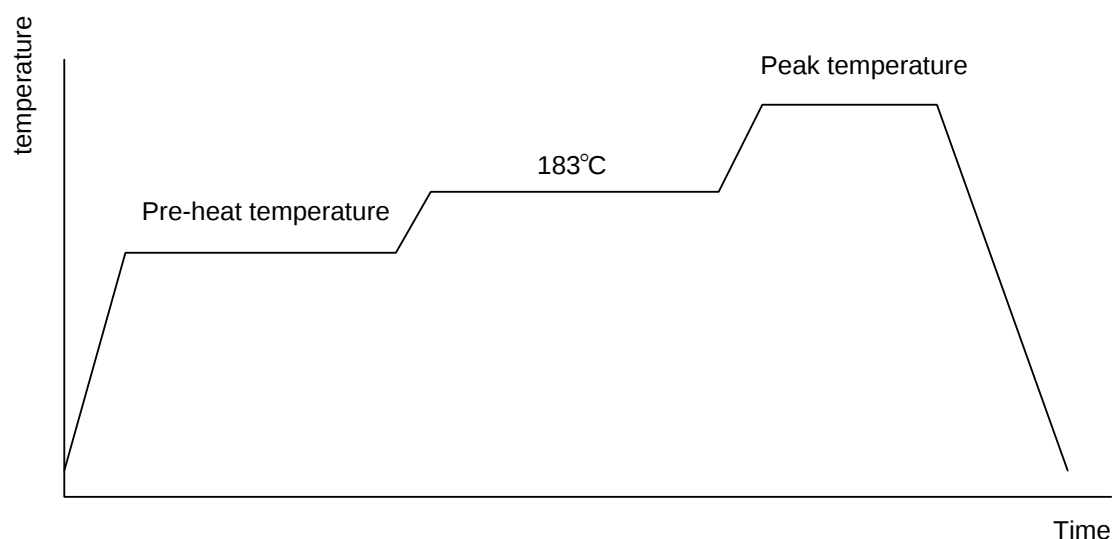
Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.18	2.39	0.086	0.094
A1	0.89	1.27	0.035	0.050
b	0.508	0.89	0.020	0.035
b2	5.207	5.461	0.205	0.215
C	0.46	0.58	0.018	0.023
C1	0.46	0.58	0.018	0.023
D	5.334	6.22	0.210	0.245
E	6.35	6.73	0.250	0.265
e1	3.96	5.18	0.156	0.204
H	9.398	10.41	0.370	0.410
L	0.51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



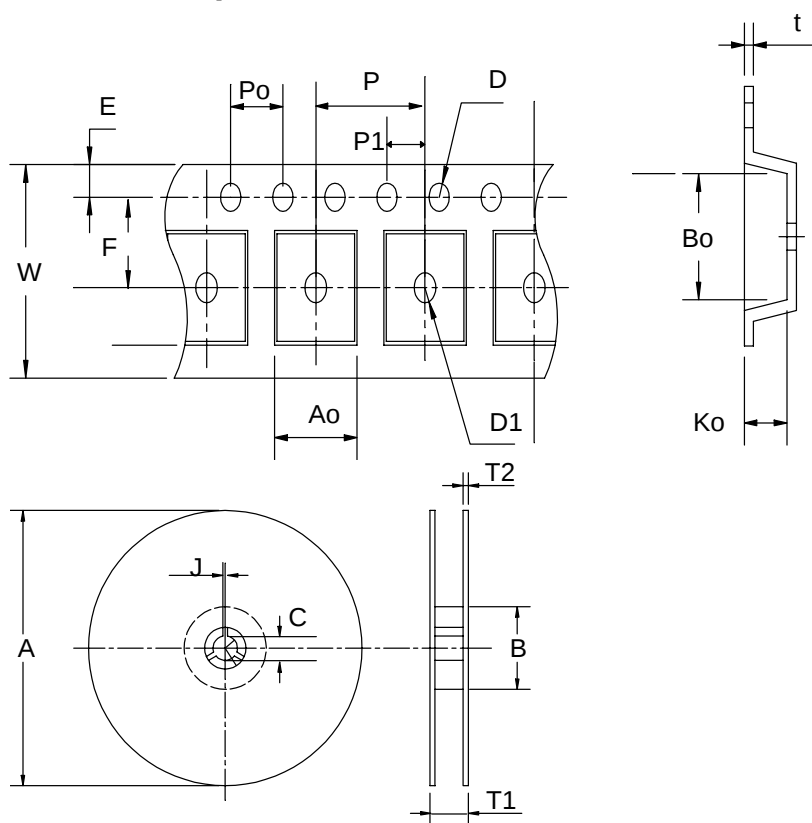
Classification Reflow Profiles

	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	P0	P1	A0	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