N-Channel Enhancement Mode Power MOSFET

MTN18N50CF3

BV_{DSS}	**500V**
I_D@V_{GS}=10V, T_C=25°C	**18A**
$R_{DS(ON)}$@V_{GS}=10V, I_D=9A	**211mΩ(typ)**

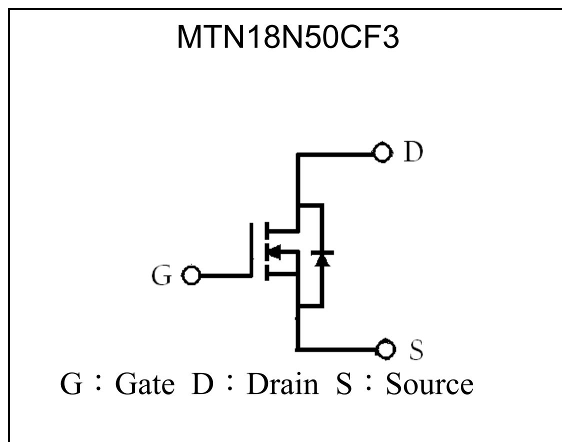
Features

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

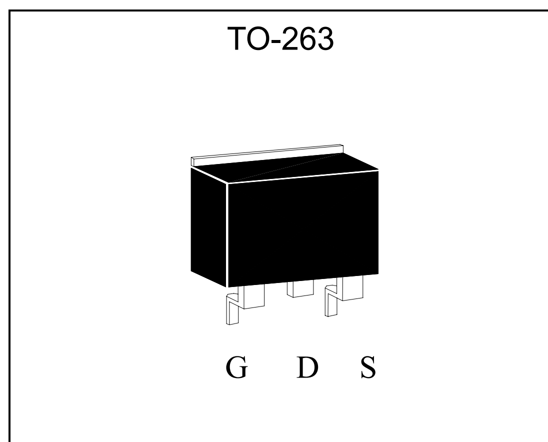
Applications

- Power Factor Correction
- Flat Panel Power
- Full and Half Bridge Power Supplies
- Two-Transistor Forward Power Supplies

Symbol

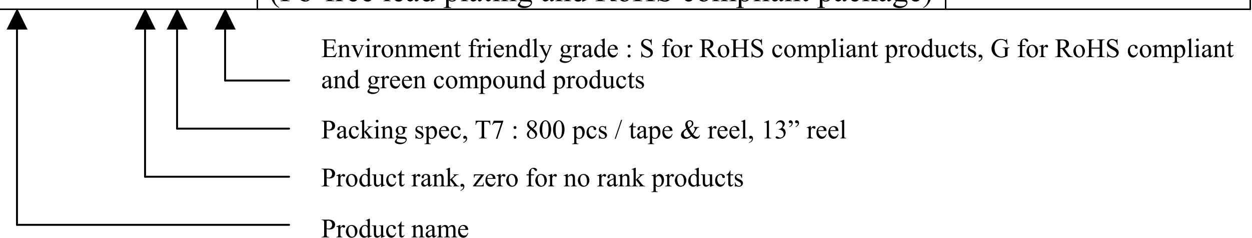


Outline



Ordering Information

Device	Package	Shipping
MTN18N50CF3-0-T7-X	TO-263 (Pb-free lead plating and RoHS compliant package)	800 pcs / Tape & Reel



Absolute Maximum Ratings (T_C=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage (Note 1)	V_{DS}	500	V
Gate-Source Voltage	V_{GS}	±30	
Continuous Drain Current @T_C=25°C, V_{GS}=10V	I_D	18*	A
Continuous Drain Current @T_C=100°C, V_{GS}=10V		11.4*	
Pulsed Drain Current @ V_{GS}=10V (Note 2)	I_{DM}	72*	
Single Pulse Avalanche Energy (Note 4)	E_{AS}	112	mJ
Avalanche Current (Note 2)	I_{AS}	18	A
Repetitive Avalanche Energy (Note 2)	E_{AR}	21	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.5	V/ns
Maximum Temperature for Soldering @ Lead at 0.125 in(3.175mm) from case for 10 seconds	T_L	300	°C
Total Power Dissipation (T_C=25℃)	P_D	208	W
Linear Derating Factor above 25℃		1.67	W/°C
Operating Junction and Storage Temperature	Tj, Tstg	-55~+150	°C

*Drain current limited by maximum junction temperature

Note : 1. T_J=+25℃ to +150℃.
2. Repetitive rating; pulse width limited by maximum junction temperature.
3. I_{SD}=18A, dI/dt<100A/μs, V_{DD}<BV_{DSS}, T_J=+150℃.
4. I_{AS}=15A, V_{DD}=30V, L=1mH, R_G=25Ω, starting T_J=+25℃. 100% tested by condition of L=0.1mH, I_{AS}=12A, V_{DD}=30V, V_{GS}=10V

Thermal Data

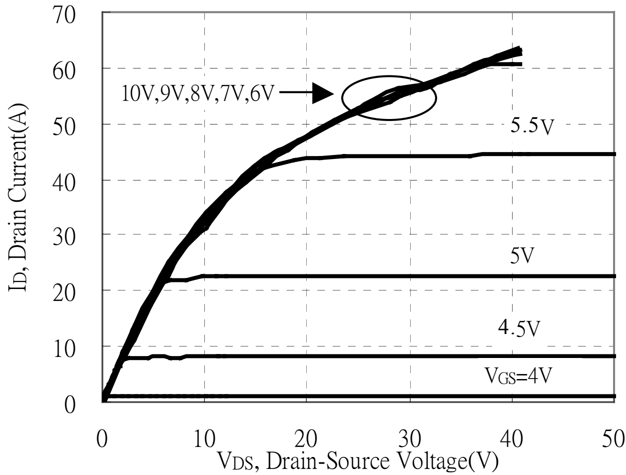
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	0.6	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	62.5	

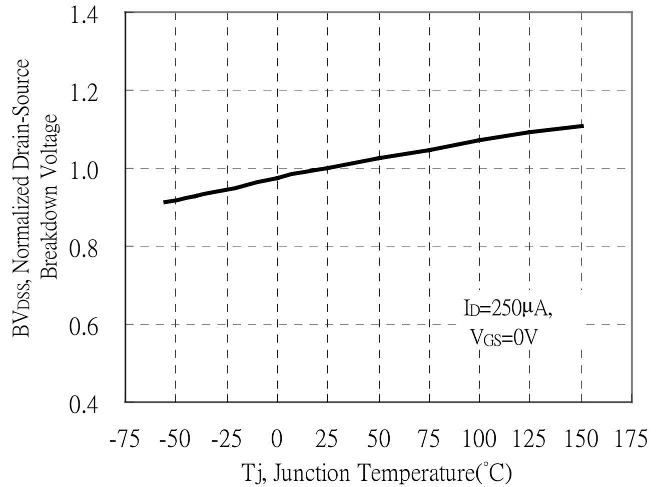
Characteristics (Tj=25°C, unless otherwise specified)

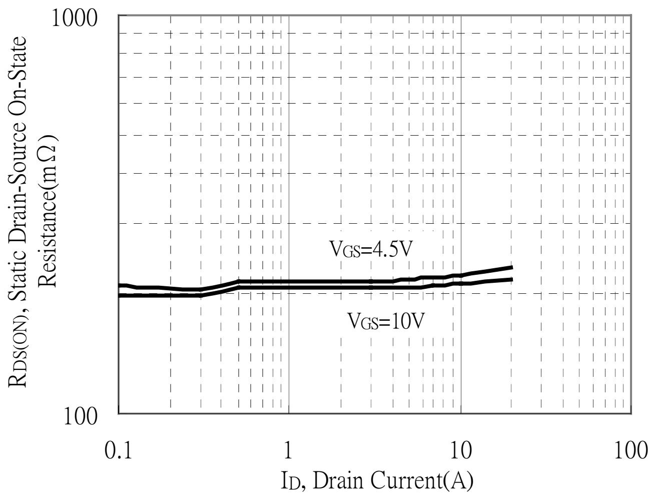
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	500	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.5	-	V/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	2.0	-	4.0	V	V_{DS} = V_{GS}, I_D=250μA
*G_{FS}	-	24	-	S	V_{DS} =15V, I_D=9A
I_{GSS}	-	-	±100	nA	V_{GS}=±30V
I_{DSS}	-	-	1	μA	V_{DS} =500V, V_{GS} =0V
	-	-	25		V_{DS} =400V, V_{GS} =0V, Tj=125°C
*$R_{DS(ON)}$	-	211	265	mΩ	V_{GS} =10V, I_D=9A
Dynamic					
*Qg	-	70.5	-	nC	I_D=18A, V_{DD}=400V, V_{GS}=10V
*Qgs	-	13.5	-		
*Qgd	-	20.9	-		
*$t_{d(ON)}$	-	31	-	ns	V_{DD}=250V, I_D=18A, V_{GS}=10V, R_G=25Ω
*tr	-	61	-		
*$t_{d(OFF)}$	-	239	-		
*t_f	-	88	-		
Ciss	-	3074	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	281	-		
Crss	-	48	-		
Source-Drain Diode					
*I_S	-	-	18	A	
*I_{SM}	-	-	72		
*V_{SD}	-	0.84	1.2	V	I_S=18A, V_{GS}=0V
*trr	-	350	-	ns	V_{GS}=0V, I_F=18A, dI_F/dt=100A/μs
*Qrr	-	4.1	-	μC	

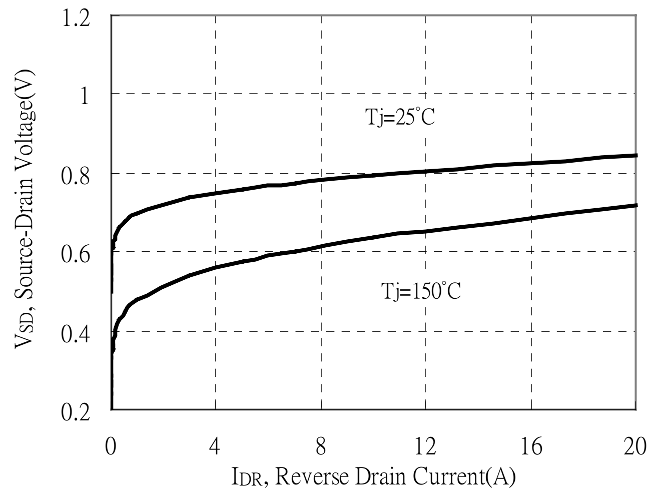
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

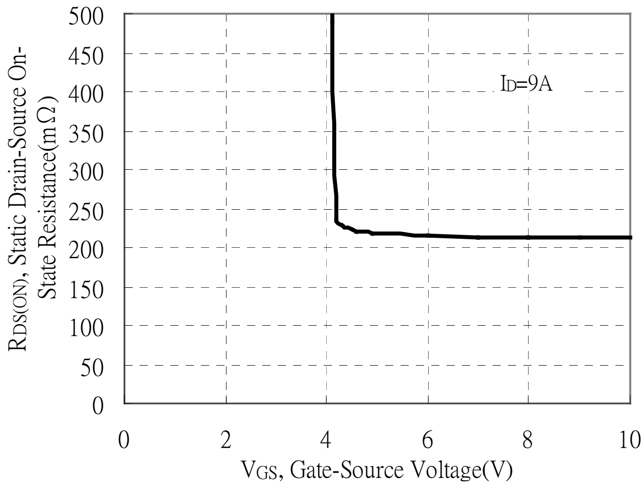
Typical Characteristics

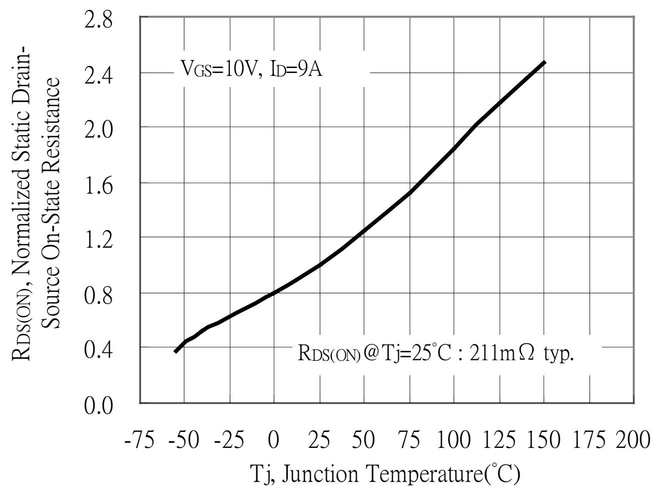




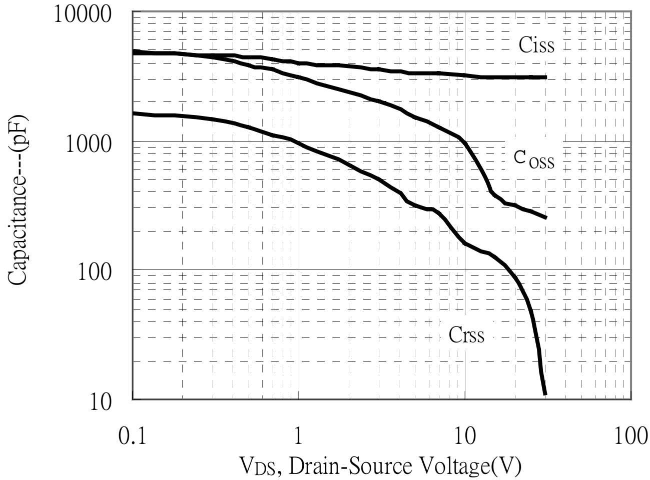


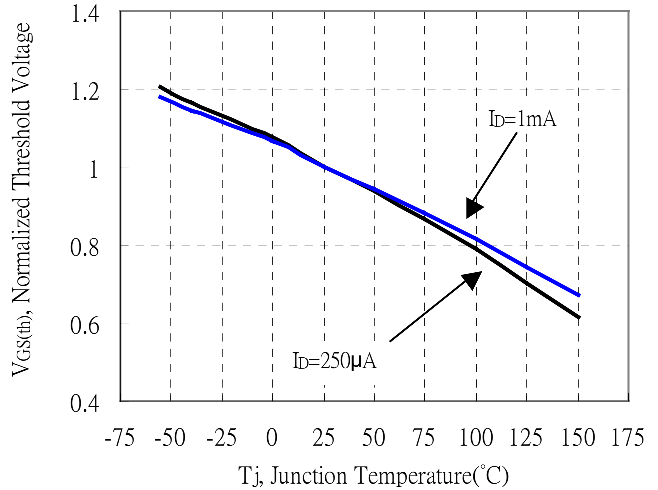


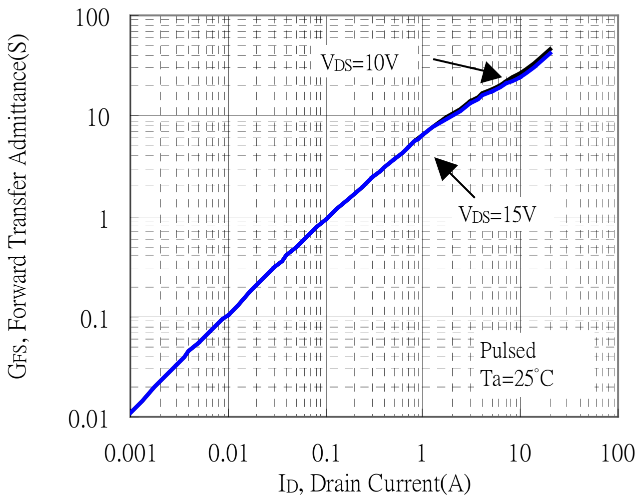


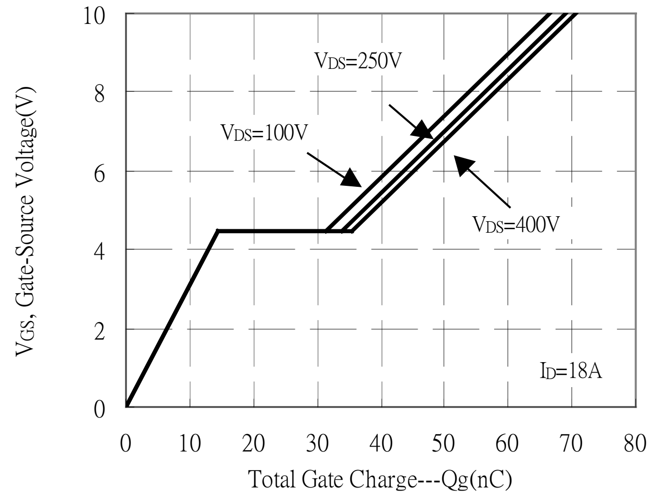


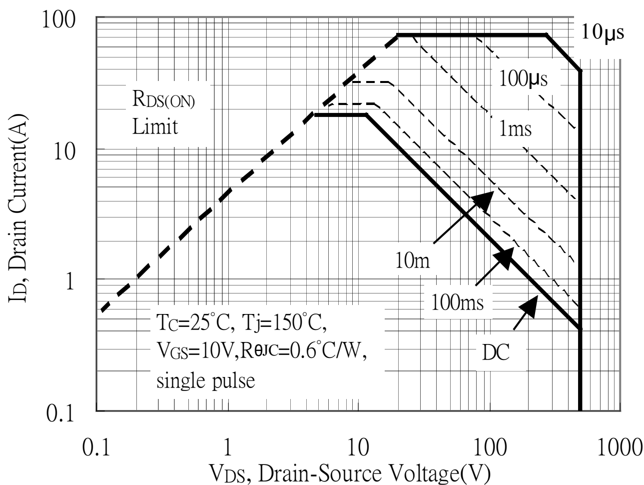
Typical Characteristics(Cont.)

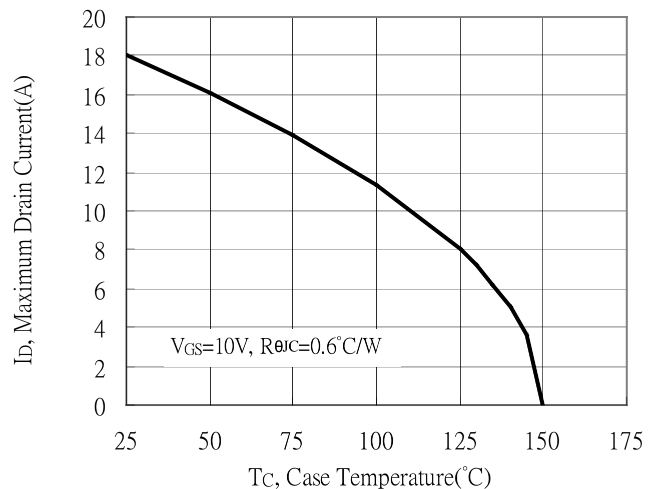




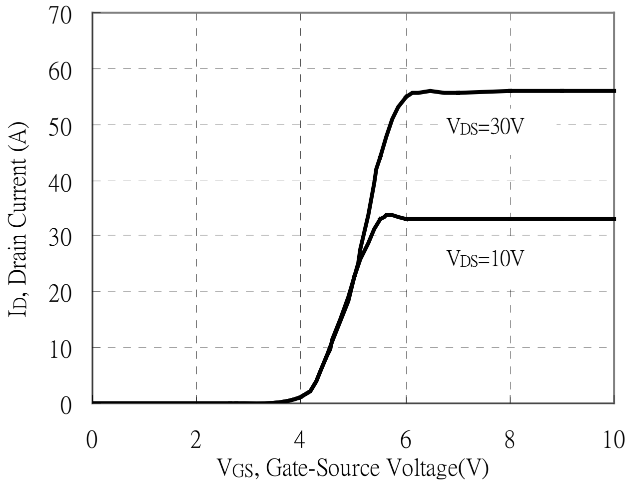


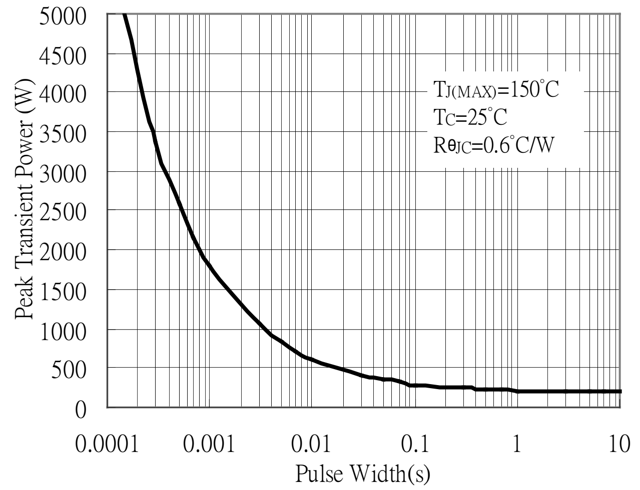


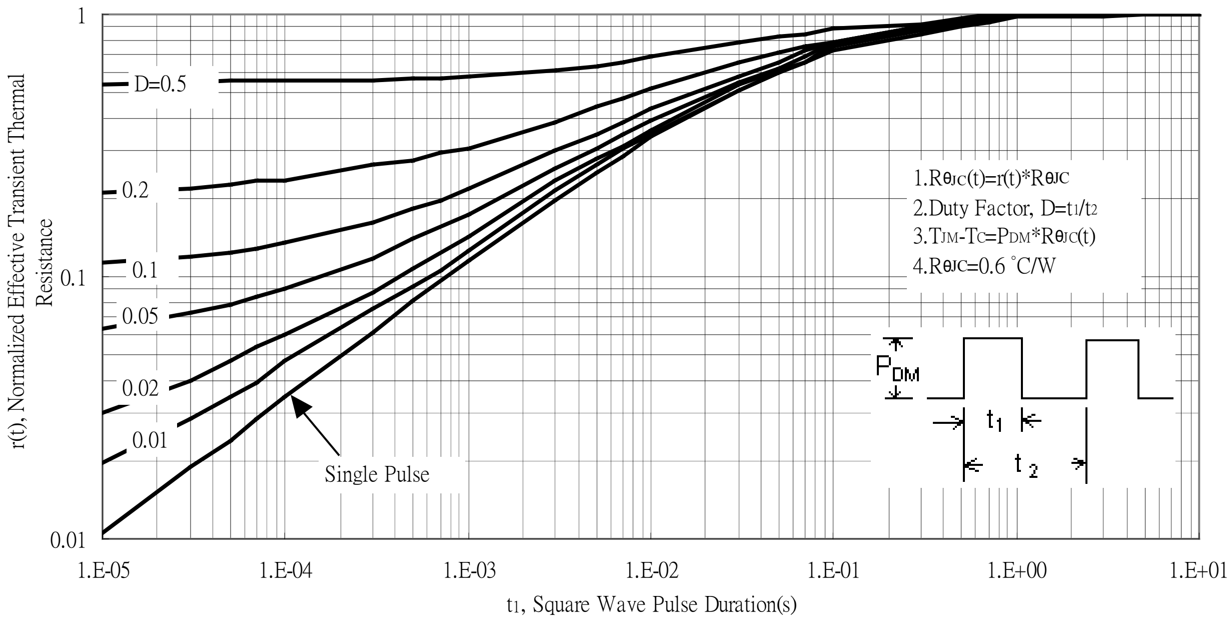




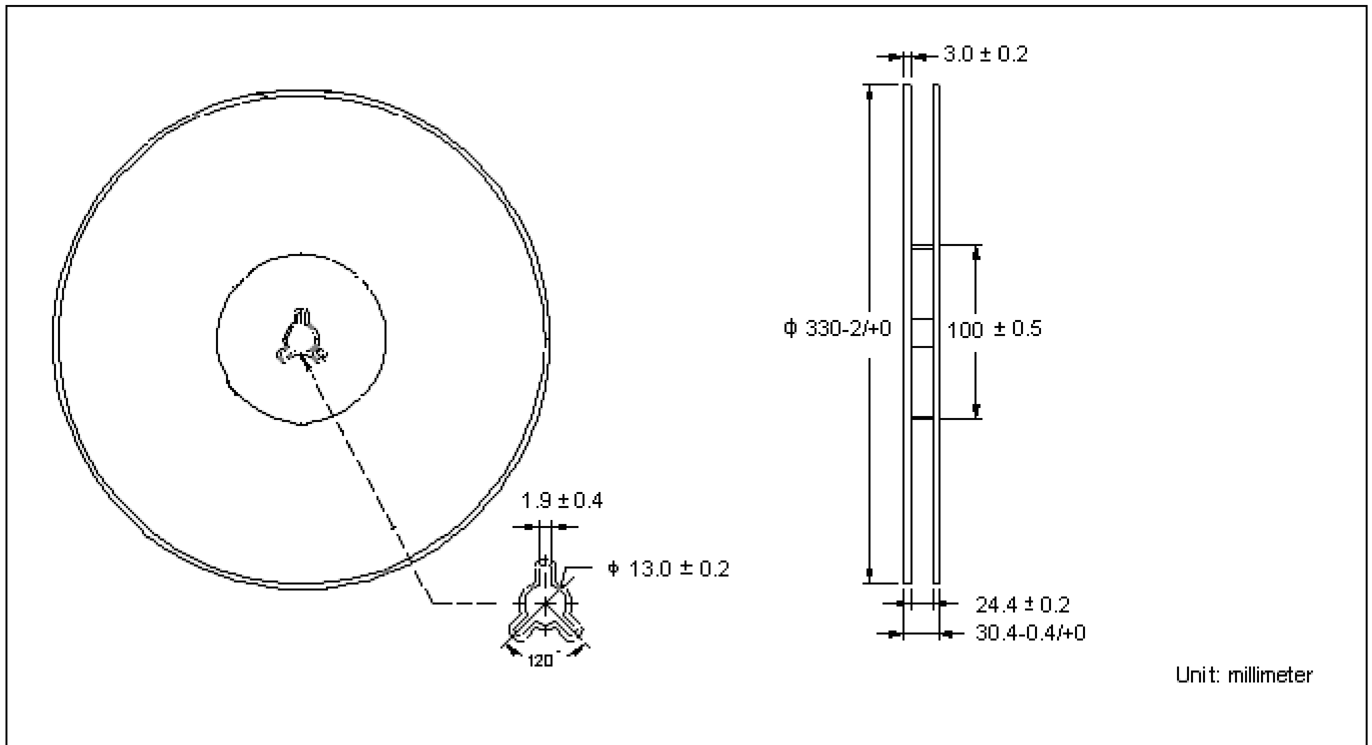
Typical Characteristics(Cont.)



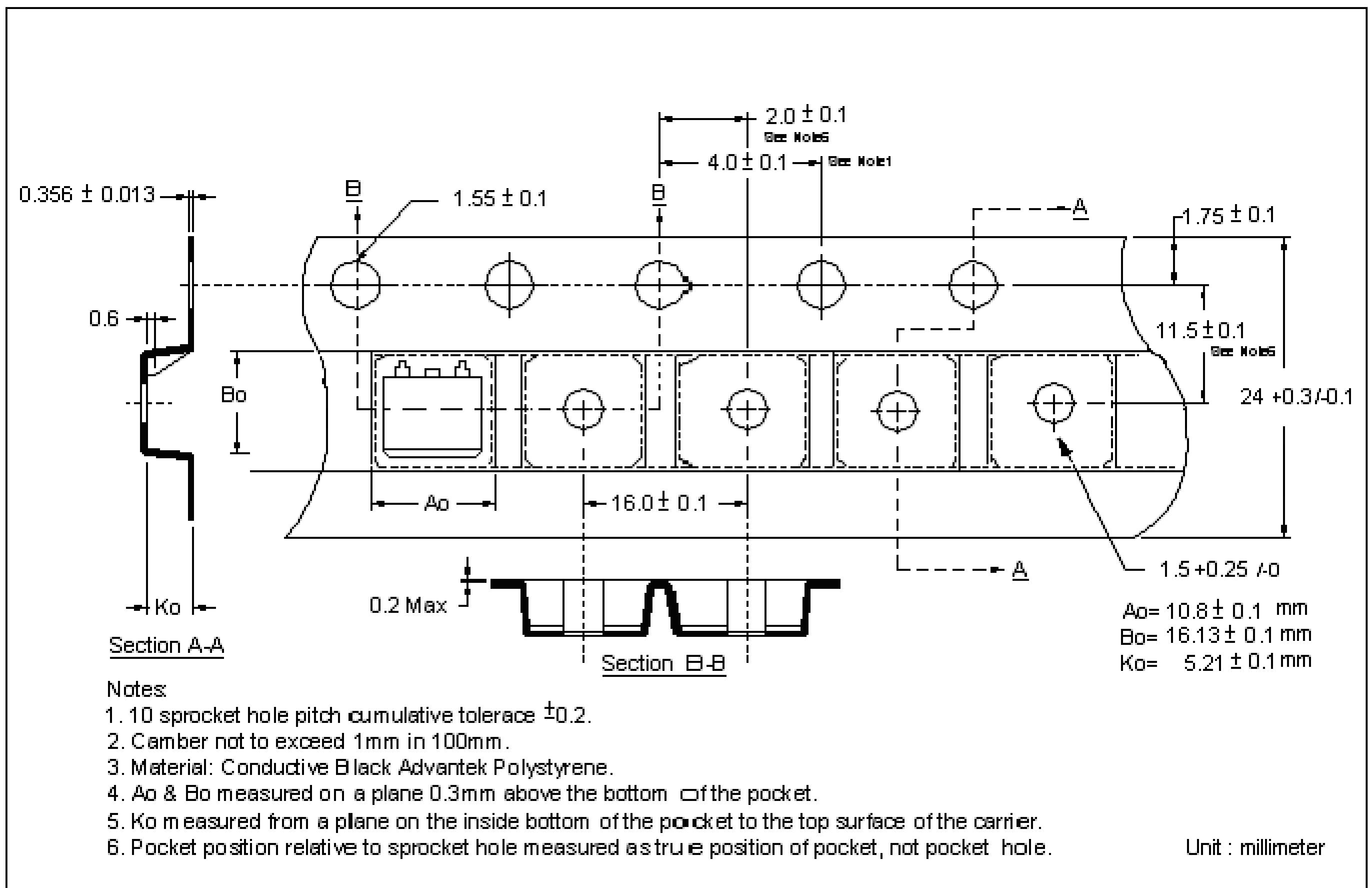




Reel Dimension



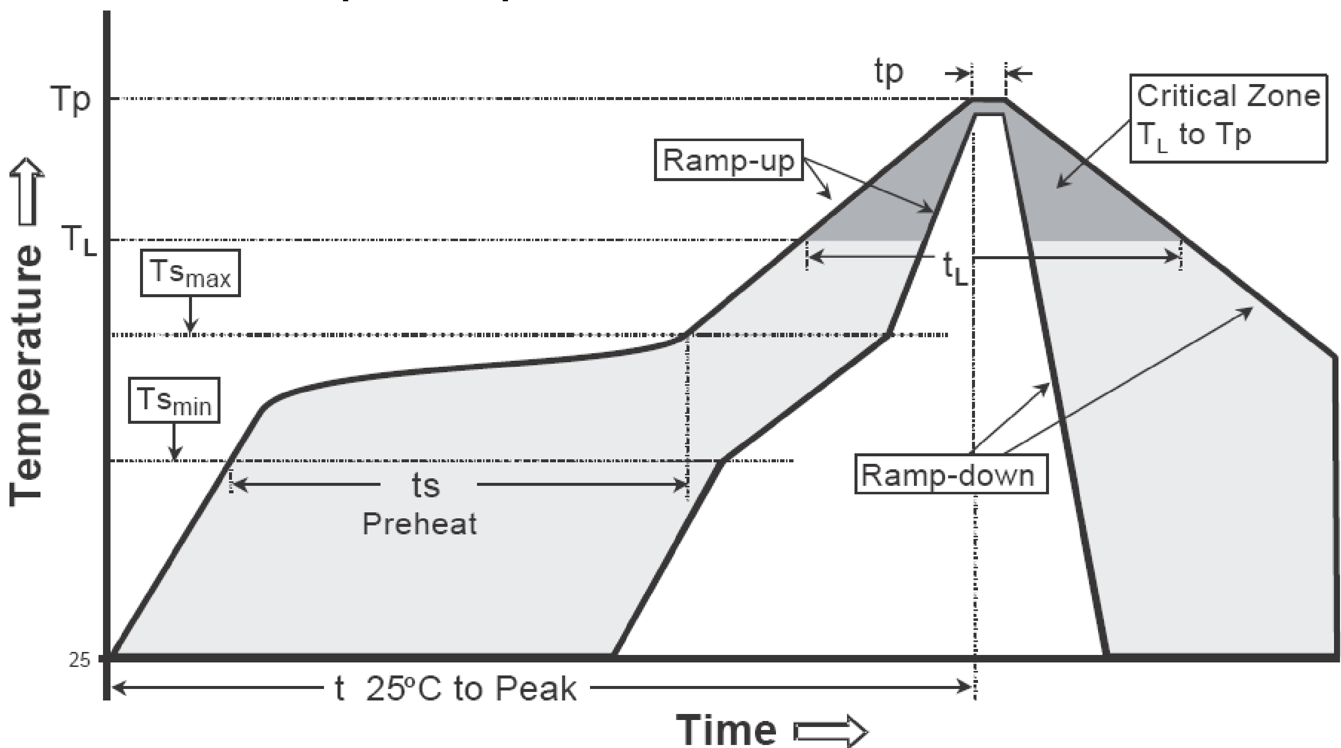
Carrier Tape Dimension



Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

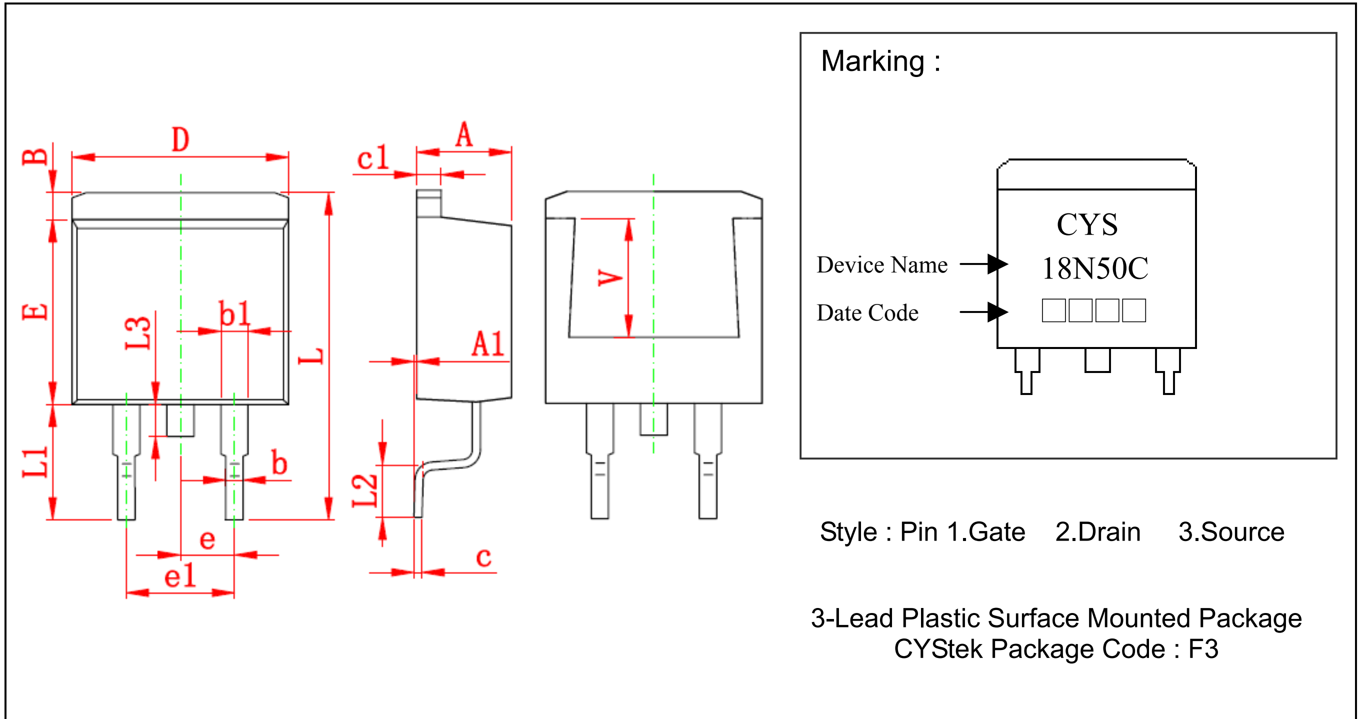
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time(ts $_{min}$ to ts $_{max}$)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(T_P)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

TO-263 Dimension



*:Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184	E	8.500	8.900	0.335	0.350
A1	0.000	0.150	0.000	0.006	e	*2.540		*0.100	
B	1.170	1.370	0.046	0.054	e1	4.980	5.180	0.196	0.204
b	0.710	0.910	0.028	0.036	L	15.050	15.450	0.593	0.608
b1	1.170	1.370	0.046	0.054	L1	5.080	5.480	0.200	0.216
c	0.310	0.530	0.012	0.021	L2	2.340	2.740	0.092	0.108
c1	1.170	1.370	0.046	0.054	L3	1.300	1.700	0.051	0.067
D	10.010	10.310	0.394	0.406	V	5.600 REF		0.220 REF	

Notes : 1.Controlling dimension : millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material :

- Lead : Pure tin plated.
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0.

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