

N-Channel Enhancement Mode Power MOSFET

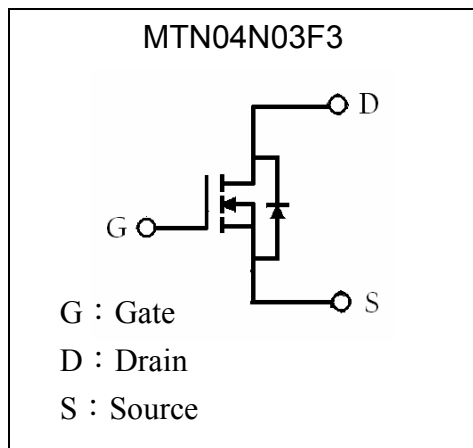
MTN04N03F3

BV_{DSS}	25V
I_D	80A
R_{DSON}	4m Ω

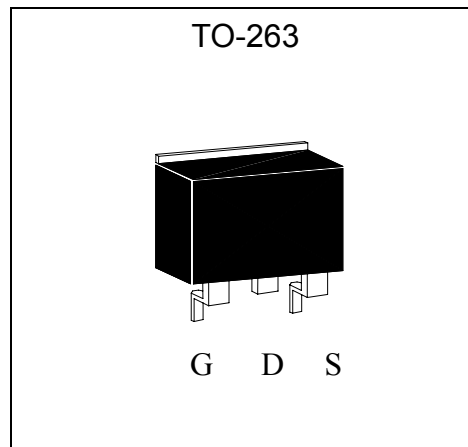
Features

- Low On-resistance
- Simple Drive Requirement
- Repetitive Avalanche Rated
- Fast Switching Characteristic
- RoHS compliant package

Symbol



Outline



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	25	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current @ Tc=25°C	I_D	80	A
Continuous Drain Current @ Tc=100°C	I_D	50	A
Pulsed Drain Current	I_{DM}	170 *1	A
Total Power Dissipation (Tc=25°C)	P_D	96	W
Linear Derating Factor		0.768	W/°C
Single Pulse Avalanche Energy	E_{AS}	140 *2	mJ
Repetitive Avalanche Energy @ L=0.05mH, duty≤1%	E_{AR}	40	mJ
Single Pulse Avalanche Current	I_{AS}	53	A
Operating Junction and Storage Temperature	T_j, T_{stg}	-55~+150	°C



Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	1.3	$^{\circ}C/W$
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	62	$^{\circ}C/W$

Note : *1. Pulse width limited by maximum junction temperature.
 *2. Starting $T_j=25^{\circ}C$, $V_{DD}=20V$, $L=0.1mH$, $R_G=25\Omega$, $I_{AS}=53A$.

Characteristics ($T_j=25^{\circ}C$, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	25	-	-	V	$V_{GS}=0, I_D=250\mu A$
$V_{GS(th)}$	1.0	1.5	3.0	V	$V_{DS} = V_{GS}, I_D=250\mu A$
* G_{FS}	-	30	-	S	$V_{DS} = 5V, I_D=24A$
I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20$
I_{DSS}	-	-	1	μA	$V_{DS} = 20V, V_{GS} = 0$
I_{DSS}	-	-	25	μA	$V_{DS} = 20V, V_{GS} = 0, T_j=125^{\circ}C$
* $I_{D(ON)}$	80	-	-	A	$V_{GS} = 10V, V_{DS} = 10V$
* $R_{DS(ON)}$	-	-	4	$m\Omega$	$V_{GS} = 10V, I_D=30A$
* $R_{DS(ON)}$	-	-	6.5	$m\Omega$	$V_{GS} = 5V, I_D=24A$
Dynamic					
* $Q_g(V_{GS}=10V)$	-	53	-	nC	$I_D=30A, V_{DS}=15V, V_{GS}=10V$
* $Q_g(V_{GS}=5V)$	-	30	-		
* Q_{gs}	-	8	-		
* Q_{gd}	-	17	-		
* $t_{d(ON)}$	-	22	-	ns	$V_{DS}=15V, I_D=25A, V_{GS}=10V, R_G=2.7\Omega$
* t_r	-	16	-		
* $t_{d(OFF)}$	-	65	-		
* t_f	-	10	-		
C_{iss}	-	4840	-	pF	$V_{GS}=0V, V_{DS}=15V, f=1MHz$
C_{oss}	-	620	-		
C_{rss}	-	435	-		
R_g	-	1.2	-	Ω	$V_{GS}=15mV, V_{DS}=0V, f=1MHz$
Source-Drain Diode					
* V_{SD}	-	-	1.3	V	$I_S=80A, V_{GS}=0V$
I_S	-	-	80	A	
I_{SM}	-	-	170	A	
* t_{rr}	-	32	-	ns	$I_S=80A, V_{GS}=0, dI/dt=100A/\mu s$
* Q_{rr}	-	12	-	nC	

*Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Ordering Information

Device	Package	Shipping
MTN04N03F3	TO-263 (RoHS compliant)	1000 pcs / Tape & Reel

Characteristic Curves

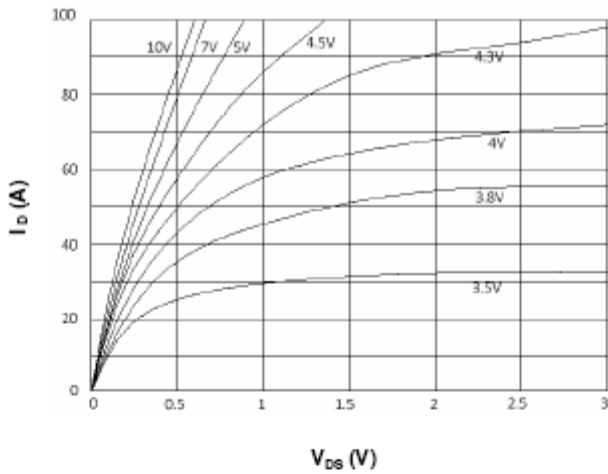


Fig 1. Typical Output Characteristics

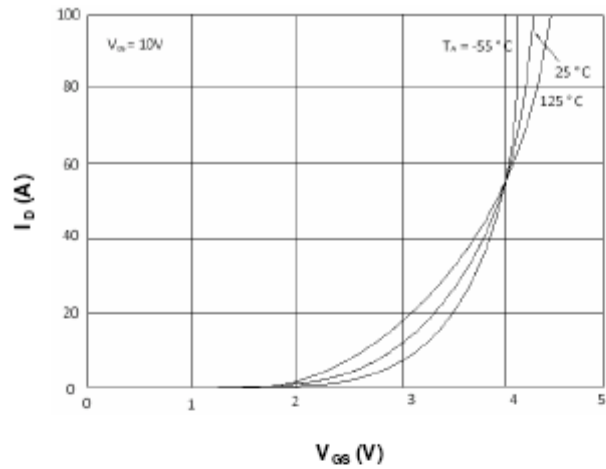


Fig 2. Transfer Characteristics

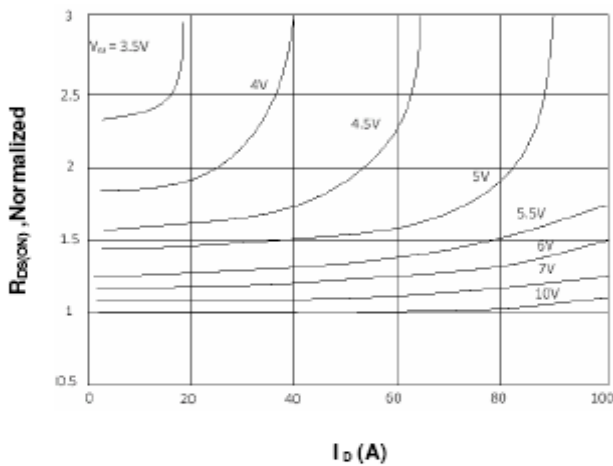


Fig 3. On-Resistance vs. Drain Current and Gate Voltage

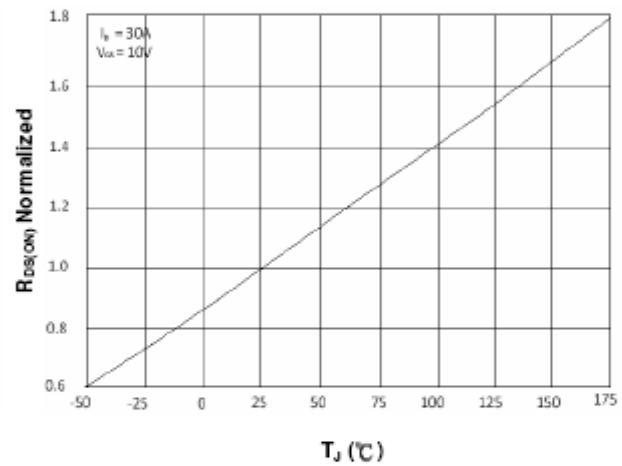


Fig 4. On-Resistance vs. Junction Temperature

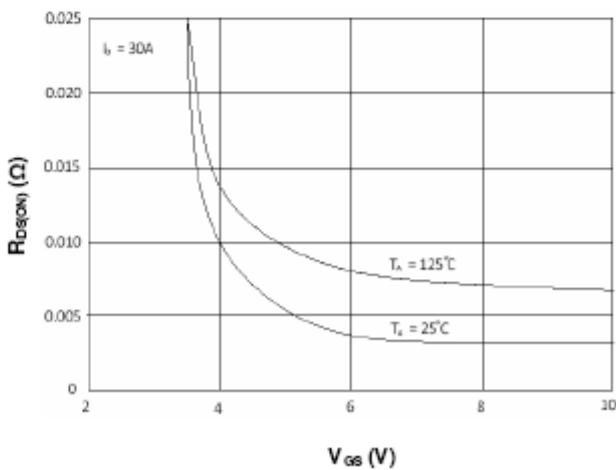


Fig 5. On-Resistance vs. Gate-Source Voltage

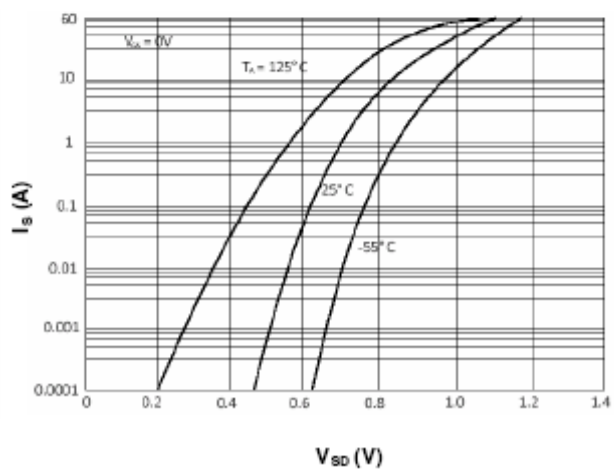


Fig 6. Body Diode Characteristics

Characteristic Curves(Cont.)

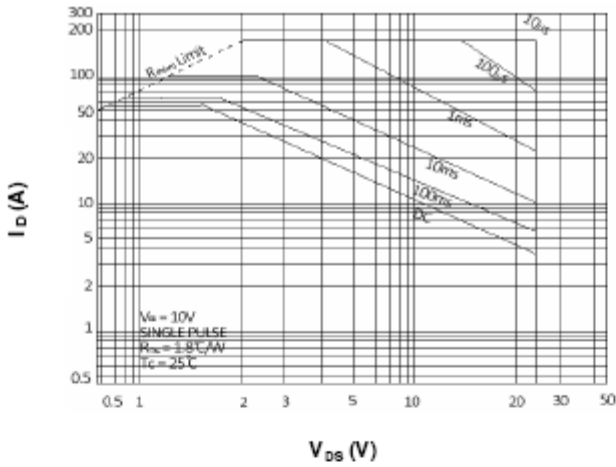


Fig 7. Maximum Safe Operating Area

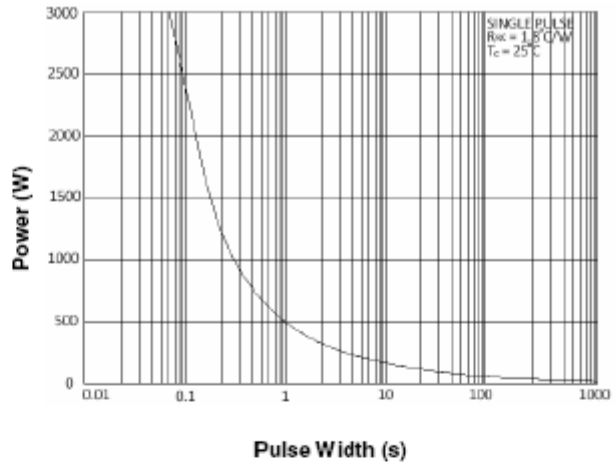


Fig 8. Single Pulse Maximum Power Dissipation

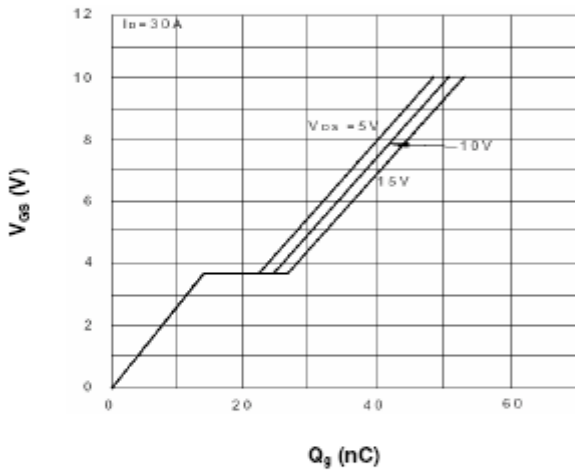


Fig 9. Gate Charge Characteristics

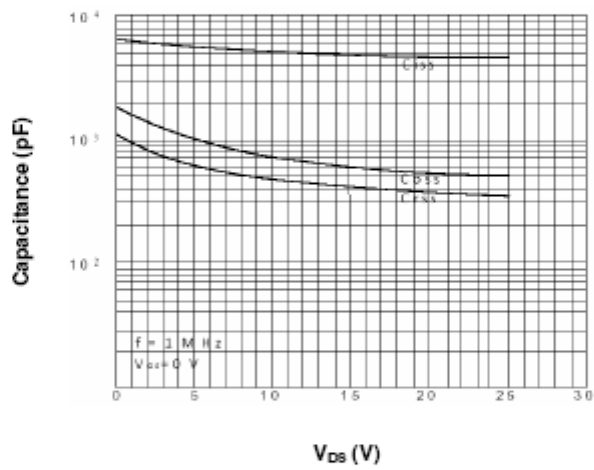


Fig 10. Typical Capacitance Characteristics

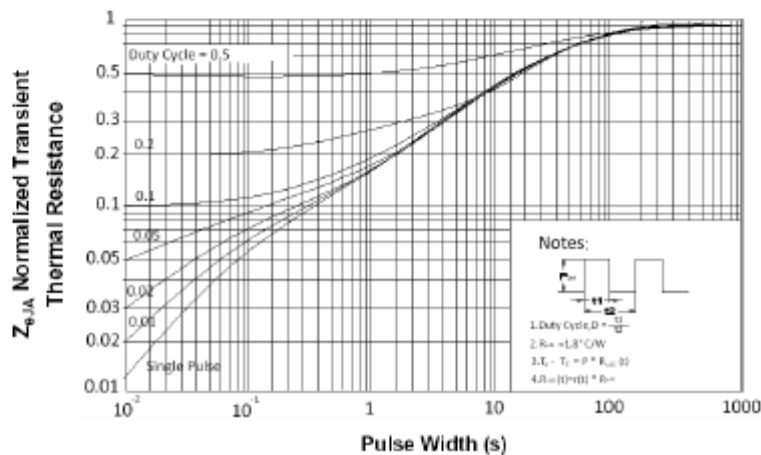
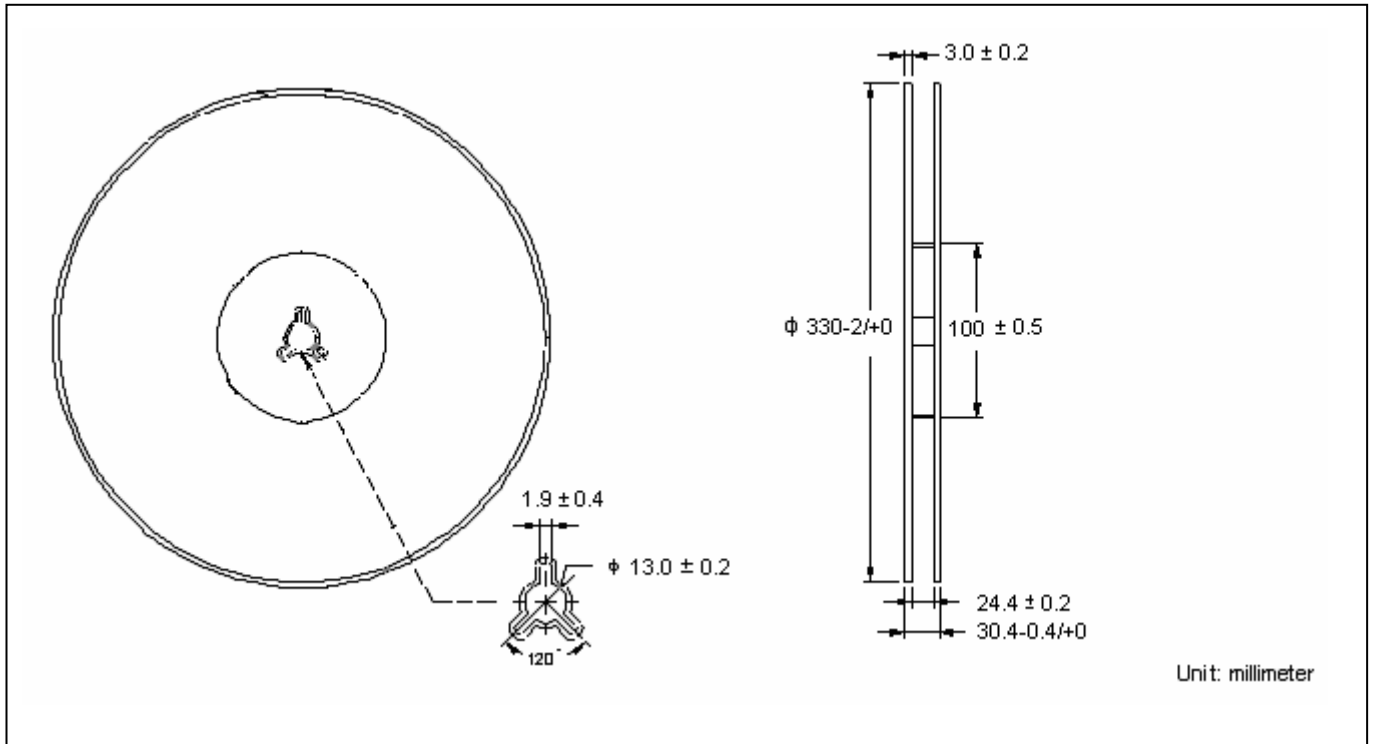
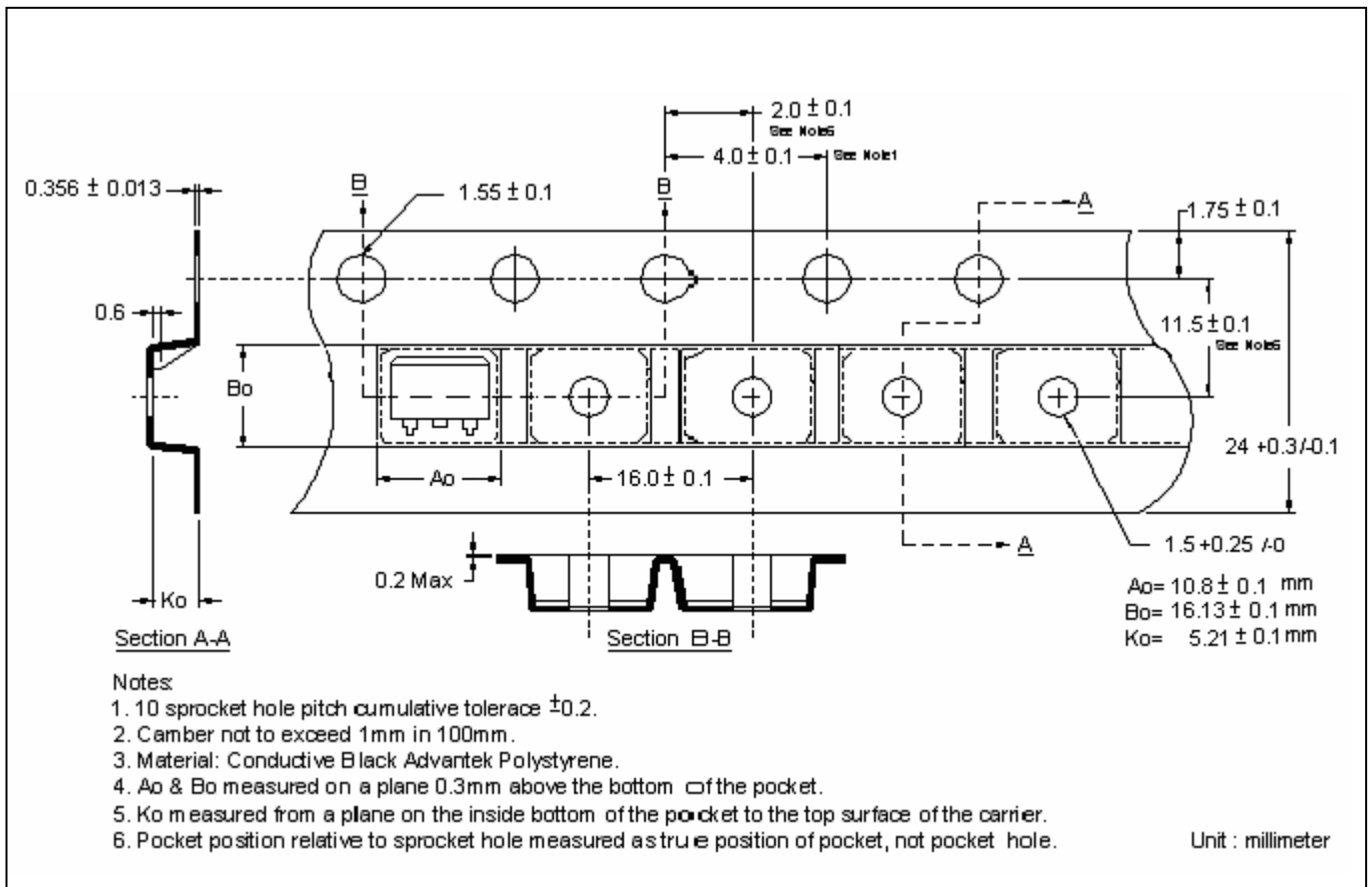


Fig 11. Normalized Maximum Transient Thermal Impedance

Reel Dimension



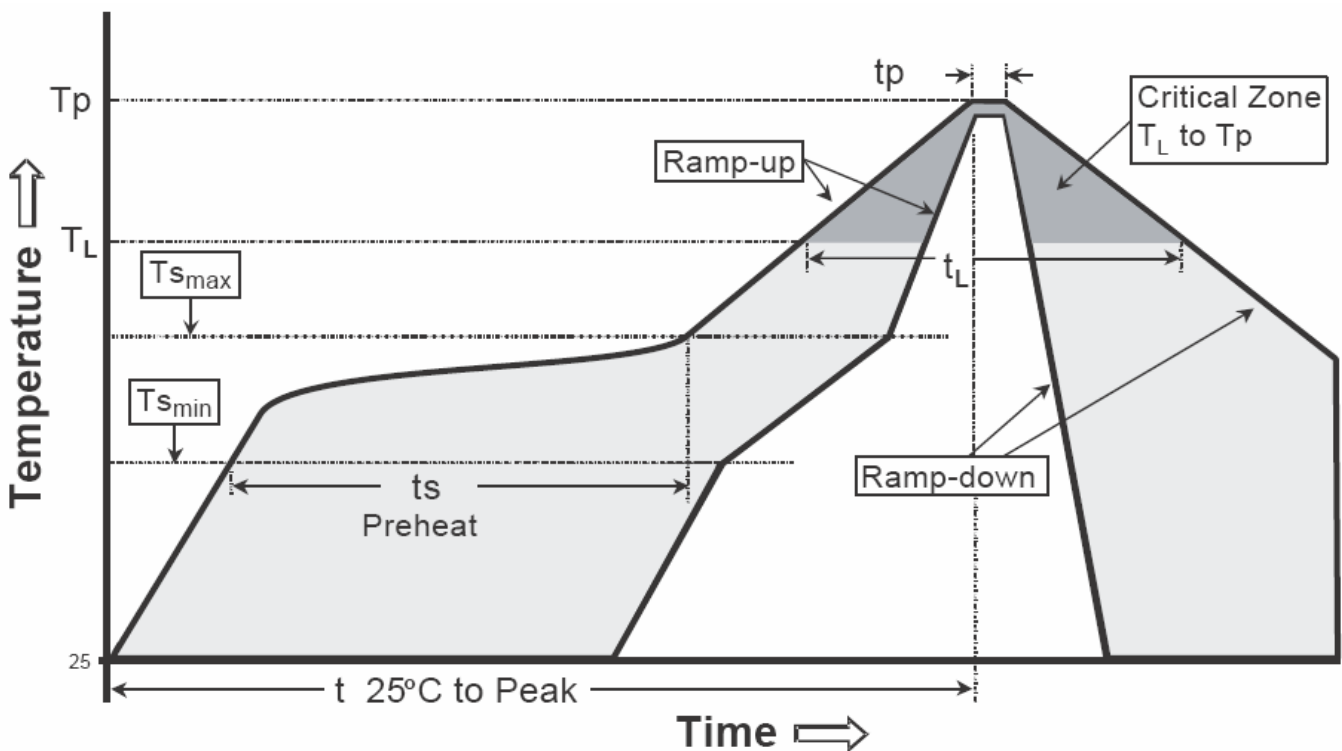
Carrier Tape Dimension



Recommended wave soldering condition

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

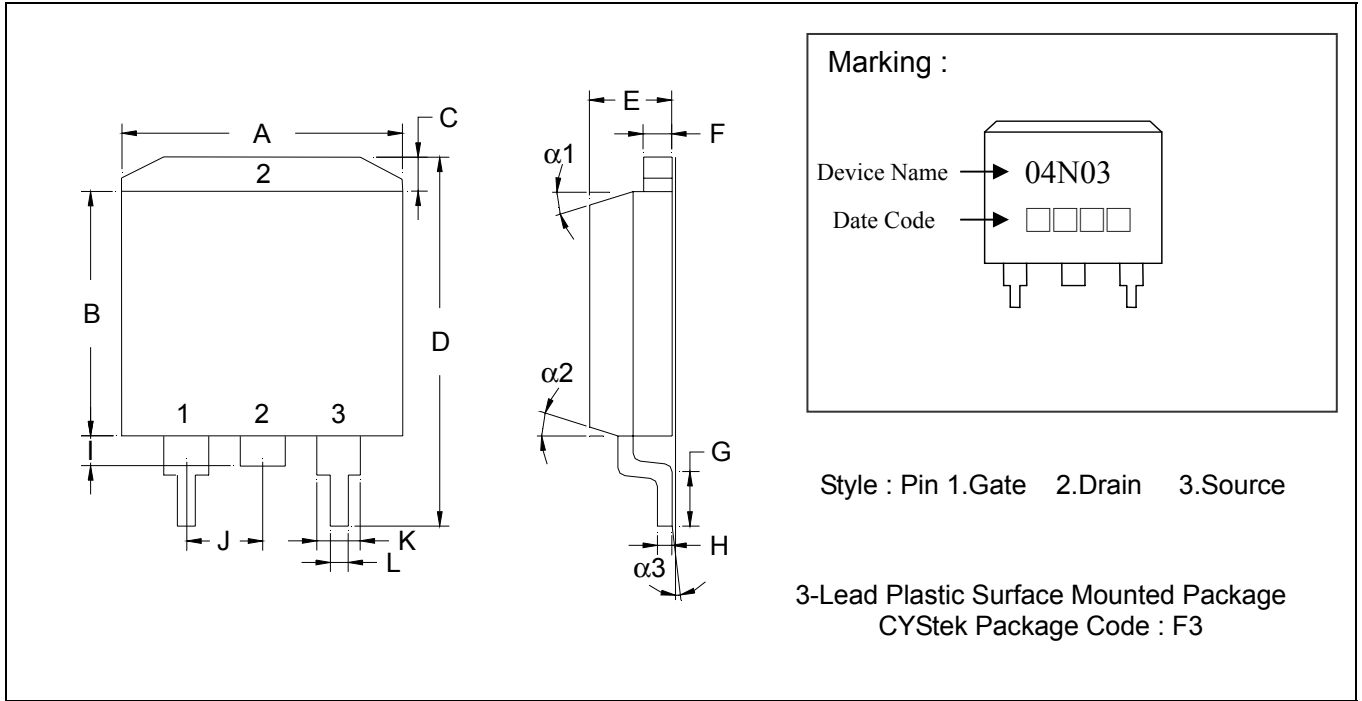
Recommended temperature profile for IR reflow



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($T_{s \text{ min}}$)	100°C	150°C
-Temperature Max($T_{s \text{ max}}$)	150°C	200°C
-Time($t_{s \text{ min}}$ to $t_{s \text{ max}}$)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T_L)	183°C	217°C
- Time (t_L)	60-150 seconds	60-150 seconds
Peak Temperature(T_P)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(t_p)	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	0.3800	0.4050	9.65	10.29	I	0.0500	0.0700	1.27	1.78
B	0.3300	0.3700	8.38	9.40	J	-	*0.1000	-	*2.54
C	-	0.0550	-	1.40	K	0.0450	0.0550	1.14	1.40
D	0.5750	0.6250	14.61	15.88	L	0.0200	0.0390	0.51	0.99
E	0.1600	0.1900	4.06	4.83	$\alpha 1$	-	-	6°	8°
F	0.0450	0.0550	1.14	1.40	$\alpha 2$	-	-	6°	8°
G	0.0900	0.1100	2.29	2.79	$\alpha 3$	-	-	0°	5°
H	0.0180	0.0290	0.46	0.74					

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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