

# N-Channel Enhancement Mode Power MOSFET

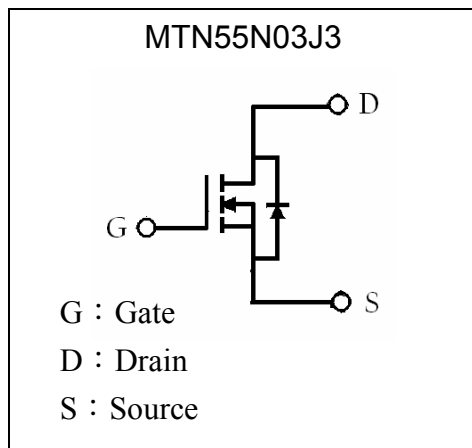
## MTN55N03J3

$BV_{DSS}$	25V
$I_D$	55A
$R_{DSON}$	6m $\Omega$

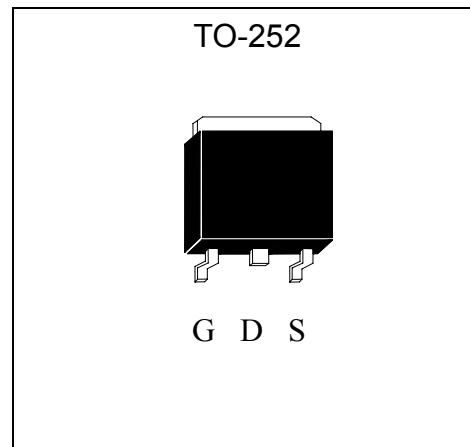
### Features

- Dynamic dv/dt Rating
- 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 @ $V_{GS}=10V, T_c=25^\circ C$	$I_D$	55	A
Continuous Drain Current @ $V_{GS}=10V, T_c=100^\circ C$	$I_D$	35	A
Pulsed Drain Current	$I_{DM}$	215 *1	A
Total Power Dissipation ( $T_c=25^\circ C$ )	$P_d$	62.5	W
Linear Derating Factor		0.5	W/°C
Single Pulse Avalanche Energy	$E_{AS}$	240 *2	mJ
Single Pulse Avalanche Current	$I_{AS}$	31	A
Operating Junction and Storage Temperature	$T_j, T_{stg}$	-55~+150	°C

Note : \*1. Pulse width limited by safe operating area

\*2.  $T_j=25^\circ C, V_{DD}=20V, L=0.1mH, R_G=25\Omega, I_{AS}=10A$



**Thermal Data**

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	2.0	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	110	°C/W

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

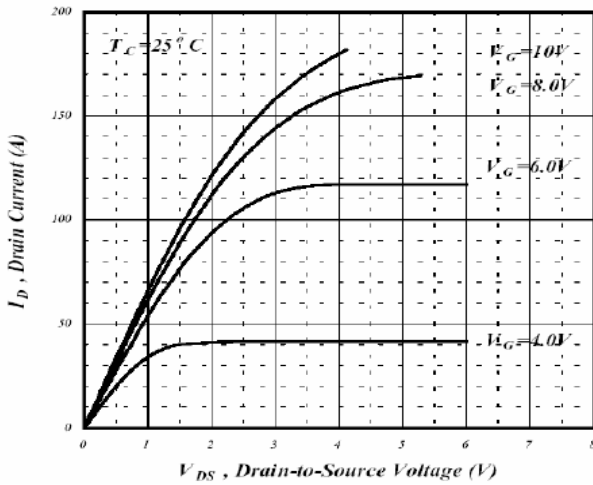
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
$BV_{DSS}$	25	-	-	V	$V_{GS}=0, I_D=250\mu A$
$\Delta BV_{DSS}/\Delta T_j$	-	0.037	-	V/°C	Reference to 25°C, $I_D=1mA$
$V_{GS(th)}$	1.0	-	3.0	V	$V_{DS} = V_{GS}, I_D=250\mu A$
$G_{FS}$	-	30	-	S	$V_{DS} = 10V, I_D=28A$
$I_{GSS}$	-	-	±100	nA	$V_{GS}=\pm 20$
$I_{DSS}$	-	-	1	μA	$V_{DS} = 25V, V_{GS} = 0$
$I_{DSS}$	-	-	25	μA	$V_{DS} = 20V, V_{GS} = 0, T_j=150^\circ C$
* $R_{DS(ON)}$	-	4.5	6	mΩ	$V_{GS} = 10V, I_D=30A$
* $R_{DS(ON)}$	-	7	9	mΩ	$V_{GS} = 4.5V, I_D=30A$
<b>Dynamic</b>					
* $Q_g$	-	16.8	-	nC	$I_D=28A, V_{DS}=20V, V_{GS}=5V$
* $Q_{gs}$	-	6.0	-		
* $Q_{gd}$	-	4.9	-		
* $t_{d(ON)}$	-	15.1	-	ns	$V_{DS}=15V, I_D=28A, V_{GS}=10V,$ $R_G=3.3\Omega, R_D=0.53\Omega$
* $t_r$	-	4	-		
* $t_{d(OFF)}$	-	45.2	-		
* $t_f$	-	7.6	-		
$C_{iss}$	-	2326	-	pF	$V_{GS}=0V, V_{DS}=25V, f=1MHz$
$C_{oss}$	-	331	-		
$C_{rss}$	-	174	-		
<b>Source-Drain Diode</b>					
* $V_{SD}$	-	-	1.5	V	$I_S=20A, V_{GS}=0V$
* $I_S$	-	-	55	A	$V_D=V_G=0, V_S=1.5V$

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

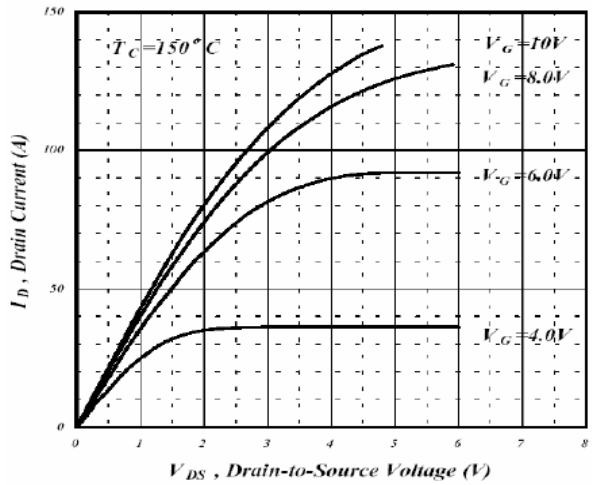
**Ordering Information**

Device	Package	Shipping	Marking
MTN55N03J3	TO-252 (RoHS compliant)	2500 pcs / Tape & Reel	55N03

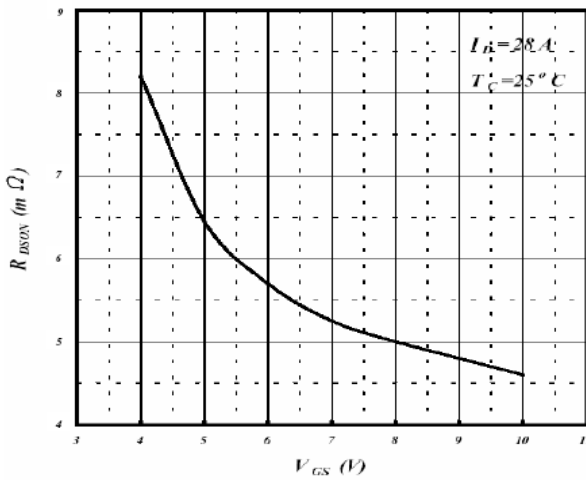
**Characteristic Curves**



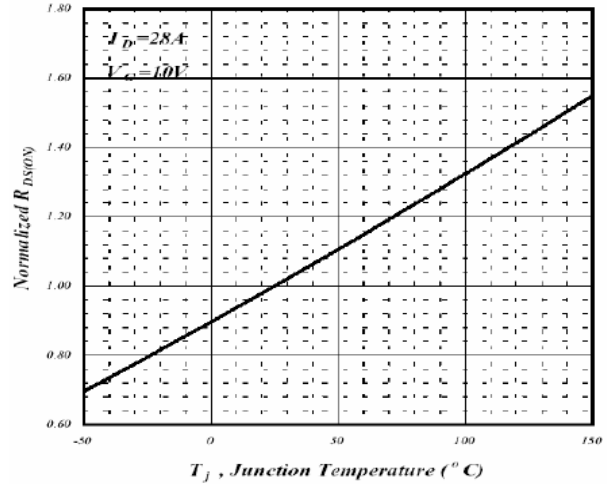
**Fig 1. Typical Output Characteristics**



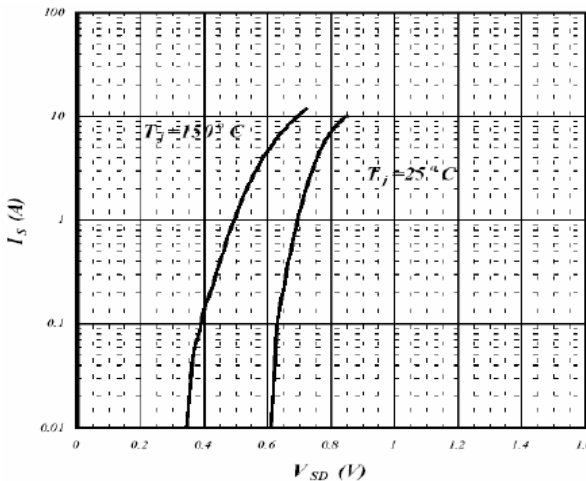
**Fig 2. Typical Output Characteristics**



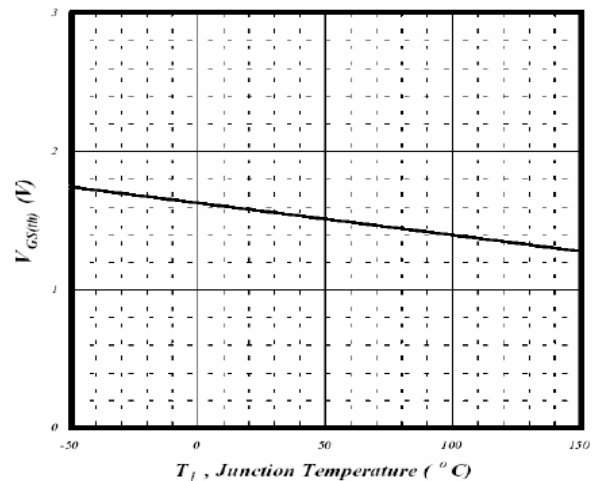
**Fig 3. On-Resistance v.s. Gate Voltage**



**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

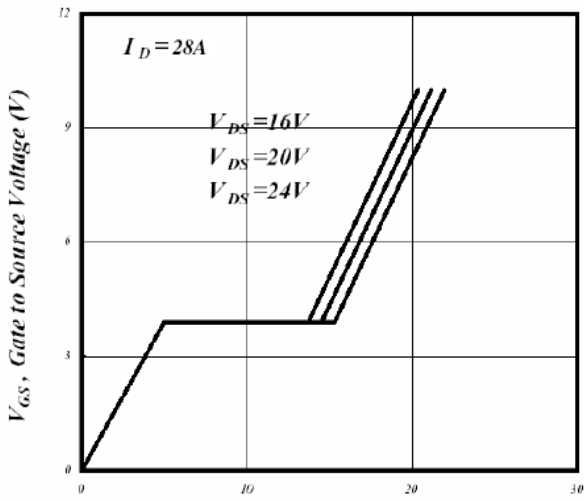


**Fig 5. Forward Characteristics of Reverse Diode**

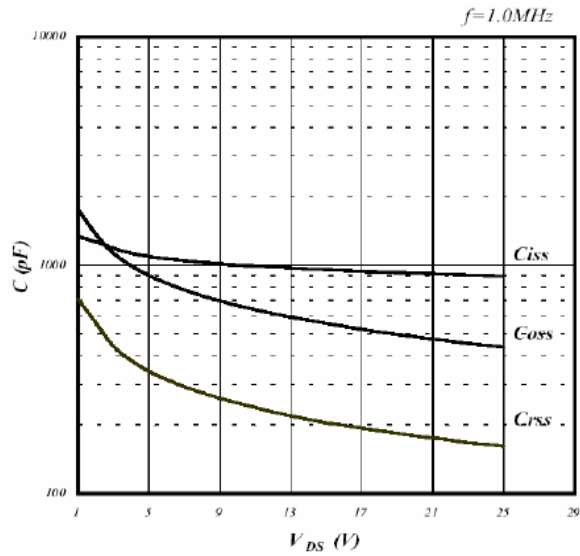


**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

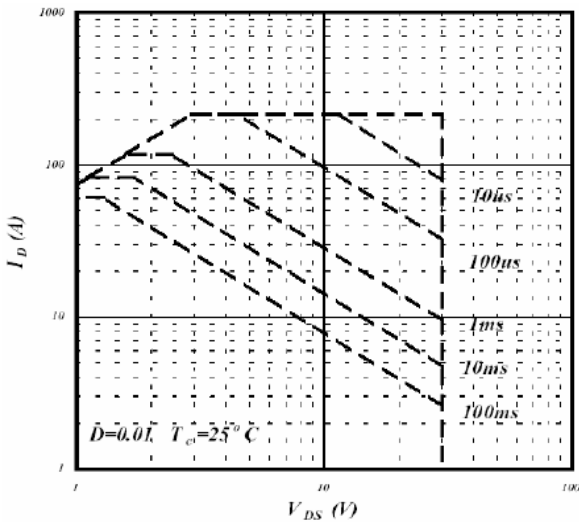
**Characteristic Curves(Cont.)**



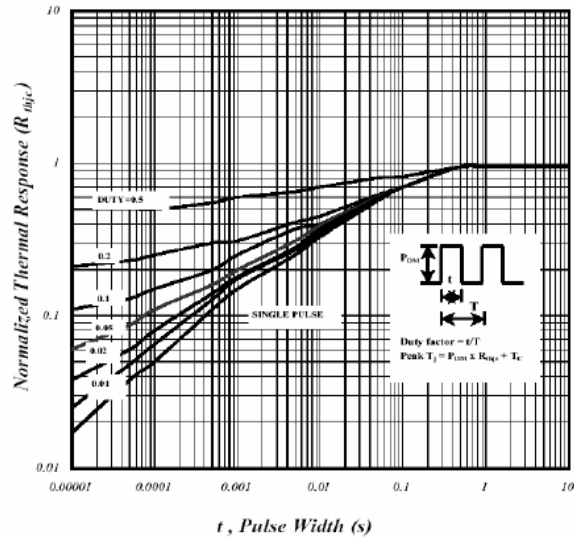
**Fig 7. Gate Charge Characteristics**



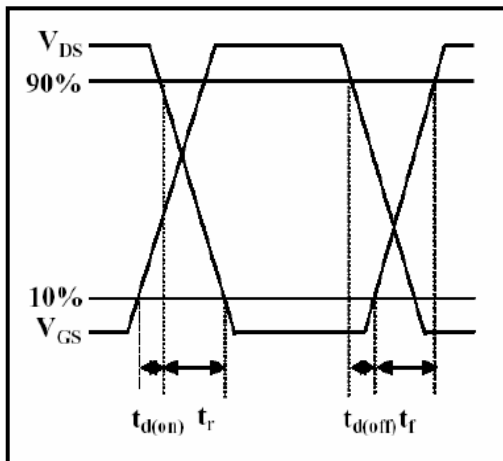
**Fig 8. Typical Capacitance Characteristics**



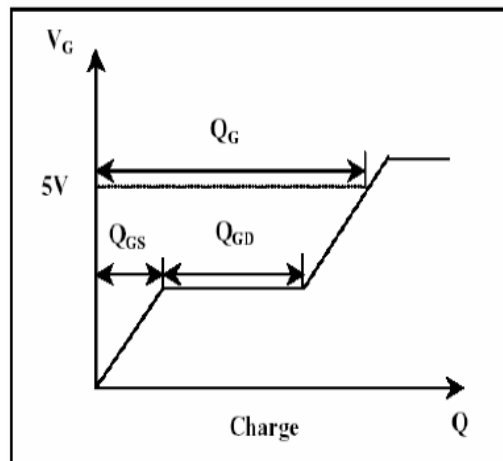
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**

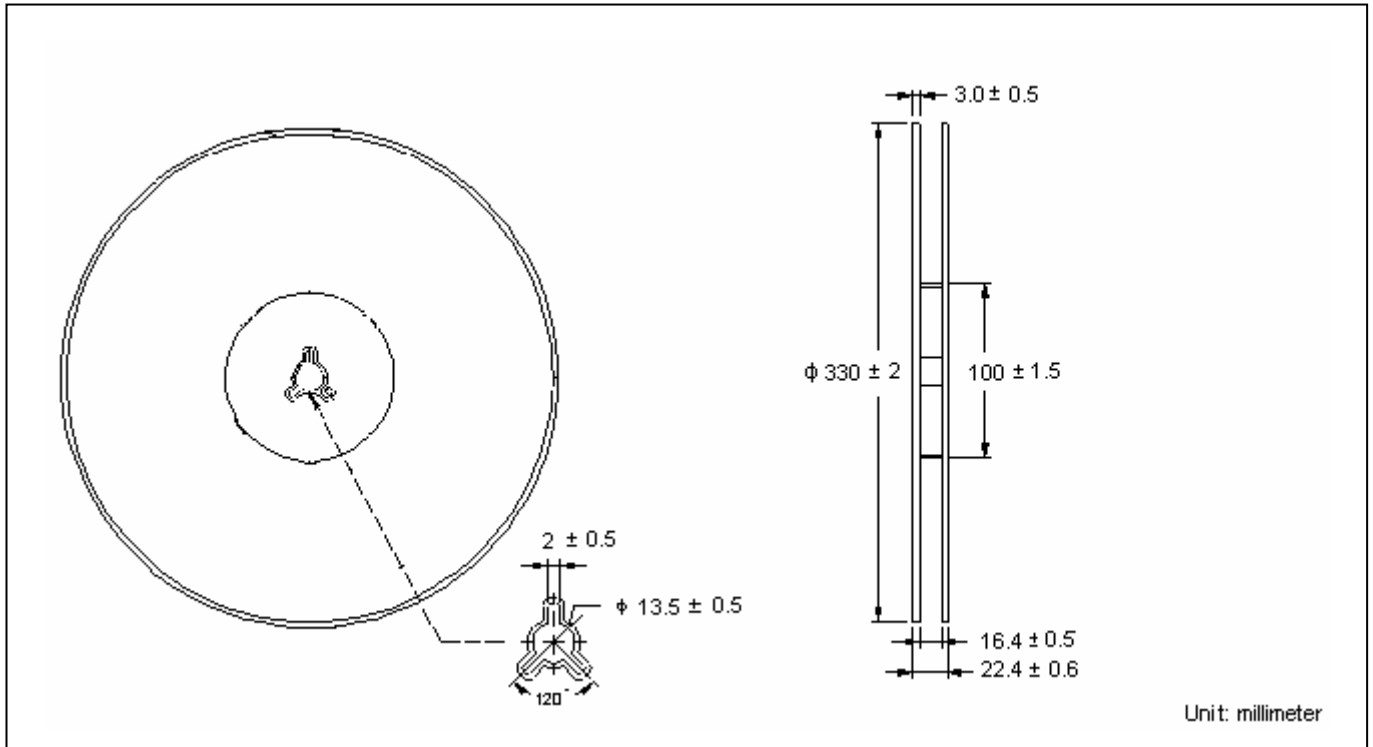


**Fig 11. Switching Time Waveform**

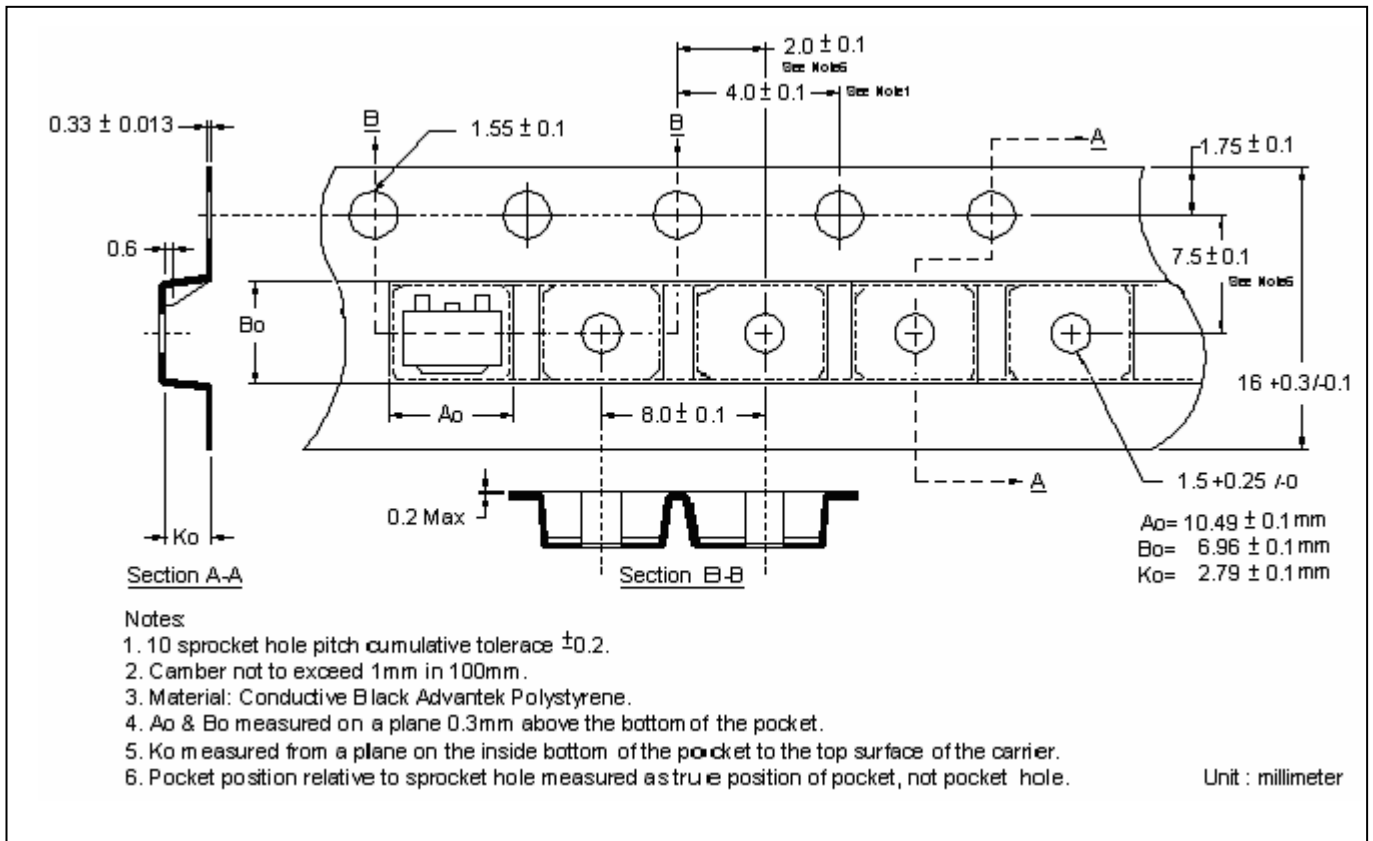


**Fig 12. Gate Charge Waveform**

**Reel Dimension**



**Carrier Tape Dimension**



**Notes:**

1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.2$ .
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Advantek Polystyrene.
4.  $A_o$  &  $B_o$  measured on a plane 0.3mm above the bottom of the pocket.
5.  $K_o$  measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

**Recommended wave soldering condition**

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

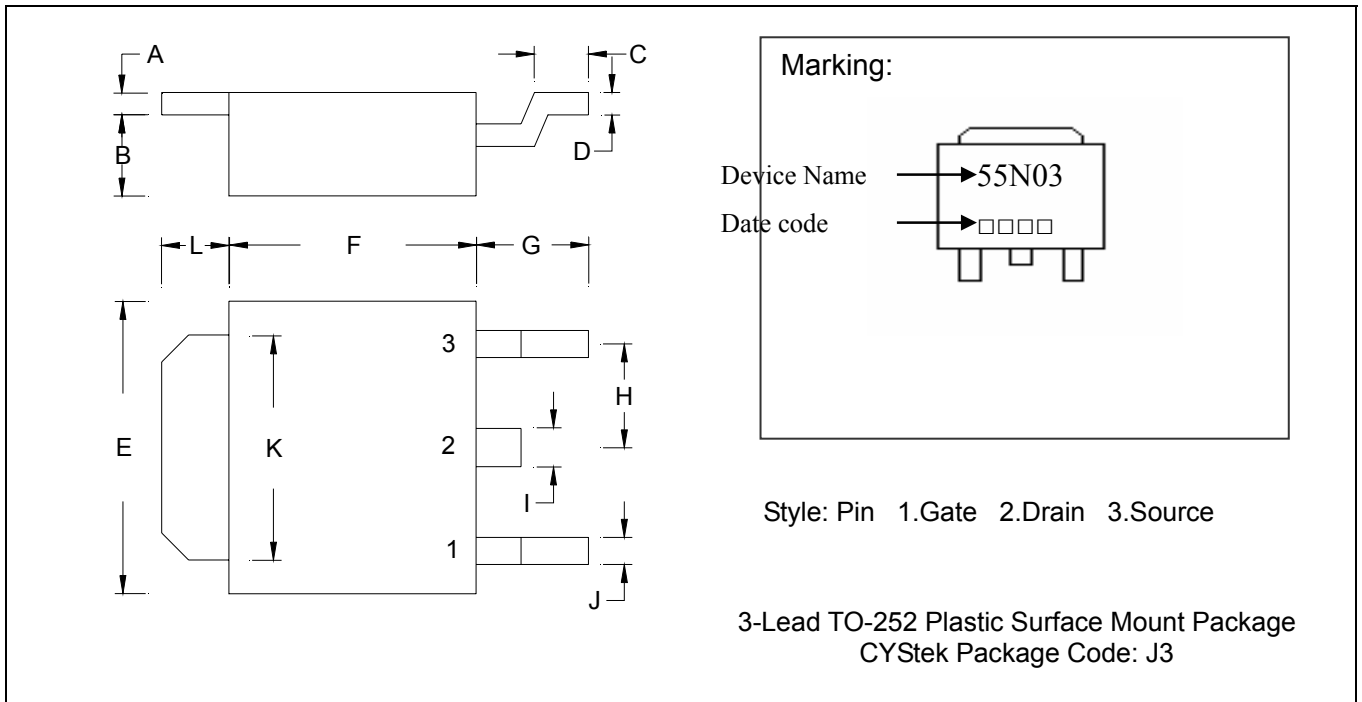
**Recommended temperature profile for IR reflow**



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s min</sub> )	100°C	150°C
-Temperature Max(T <sub>s max</sub> )	150°C	200°C
-Time(t <sub>s min</sub> to t <sub>s max</sub> )	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Temperature(T <sub>P</sub> )	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-252 Dimension**



\*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.0177	0.0217	0.45	0.55	G	0.0866	0.1102	2.20	2.80
B	0.0650	0.0768	1.65	1.95	H	-	*0.0906	-	*2.30
C	0.0354	0.0591	0.90	1.50	I	-	0.0449	-	1.14
D	0.0177	0.0236	0.45	0.60	J	-	0.0346	-	0.88
E	0.2441	0.2677	6.20	6.80	K	0.2047	0.2165	5.20	5.50
F	0.2125	0.2283	5.40	5.80	L	0.0551	0.0630	1.40	1.60

**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: KFC; pure tin plated
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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