

# 150V N-Channel Enhancement Mode MOSFET

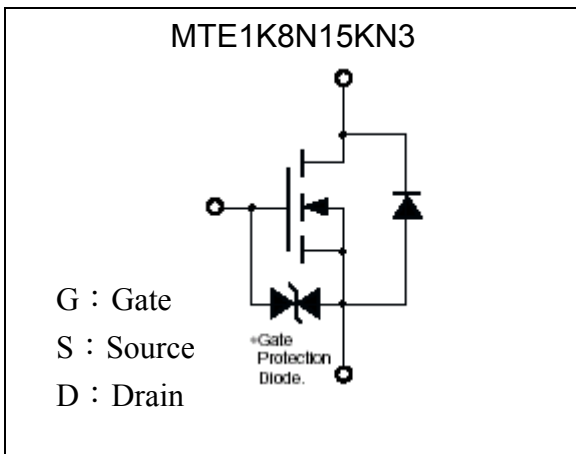
## MTE1K8N15KN3

### Features

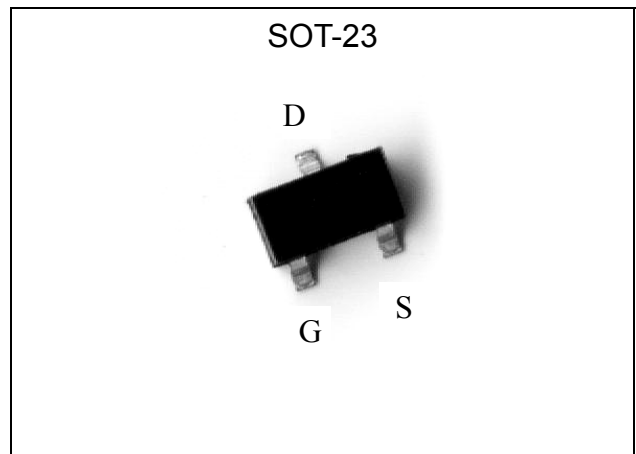
- Low on-resistance
- Excellent thermal and electrical capabilities
- Compact and low profile SOT-23 package
- Pb-free lead plating and halogen-free package
- ESD protected gate

$BV_{DSS}$	150V
$I_D @ V_{GS}=10V, T_A=25^\circ C$	0.7A
$R_{DSON} @ V_{GS}=10V, I_D=0.5A$	1.07 $\Omega$ (typ.)
$R_{DSON} @ V_{GS}=10V, I_D=1A$	1.15 $\Omega$ (typ.)

### Equivalent Circuit

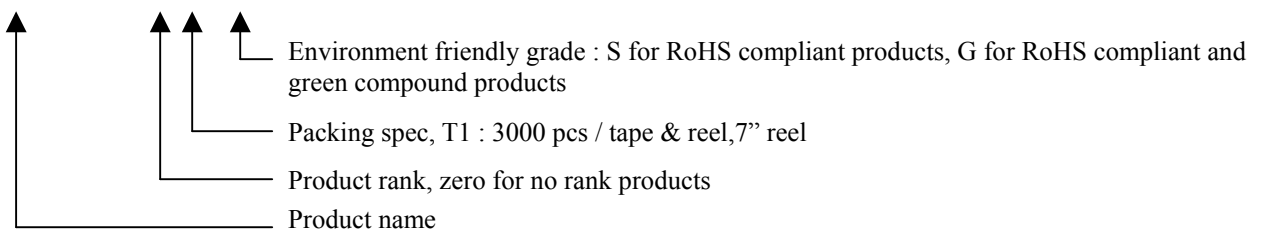


### Outline



### Ordering Information

Device	Package	Shipping
MTE1K8N15KN3-0-T1-G	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel





**Absolute Maximum Ratings (Ta=25°C)**

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V <sub>DS</sub>	150	V
Gate-Source Voltage	V <sub>GS</sub>	±20	
Continuous Drain Current @ TA=25°C, V <sub>GS</sub> =10V (Note 3)	I <sub>D</sub>	0.7	A
Continuous Drain Current @ TA=70°C, V <sub>GS</sub> =10V (Note 3)		0.56	
Pulsed Drain Current (Note 1, 2)	I <sub>DM</sub>	4	
Maximum Power Dissipation @ TA=25°C (Note 3)	P <sub>D</sub>	1.38	W
Linear Derating Factor		0.01	W/°C
Thermal Resistance, Junction-to-Ambient (Note 3)	R <sub>th,ja</sub>	90	°C/W
Operating Junction and Storage Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55~+150	°C

Note : 1. Pulse width limited by maximum junction temperature.  
 2. Pulse width ≤ 300μs, duty cycle ≤ 2%.  
 3. Surface mounted on FR-4 board, t ≤ 10sec.

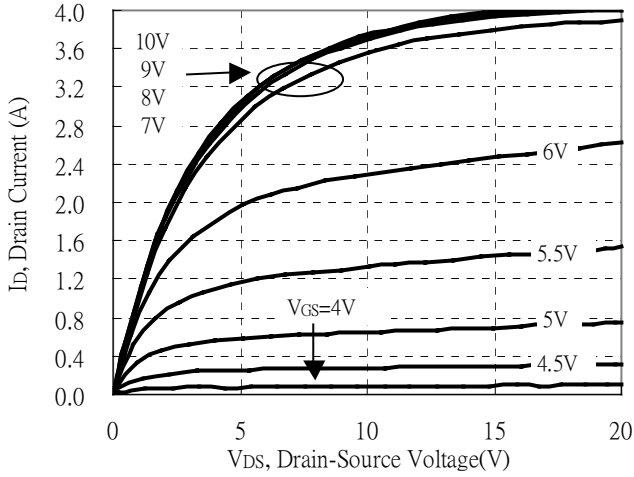
**Electrical Characteristics (Ta=25°C)**

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub>	150	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
V <sub>GS(th)</sub>	2.0	-	4.0		V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA
I <sub>GSS</sub>	-	-	±10	μA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
I <sub>DSS</sub>	-	-	1		V <sub>DS</sub> =120V, V <sub>GS</sub> =0V
	-	-	25		V <sub>DS</sub> =120V, V <sub>GS</sub> =0V, T <sub>j</sub> =70°C
*R <sub>DSON</sub>	-	1.07	1.8	Ω	V <sub>GS</sub> =10V, I <sub>D</sub> =0.5A
	-	1.15	1.8		V <sub>GS</sub> =10V, I <sub>D</sub> =1A
*G <sub>FS</sub>	-	1.13	-	S	V <sub>DS</sub> =15V, I <sub>D</sub> =1A
<b>Dynamic</b>					
C <sub>iss</sub>	-	93	-	pF	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz
C <sub>oss</sub>	-	17	-		
C <sub>rss</sub>	-	11	-		
t <sub>d(ON)</sub>	-	15.6	-	ns	V <sub>DS</sub> =75V, I <sub>D</sub> =1A, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω
t <sub>r</sub>	-	34.8	-		
t <sub>d(OFF)</sub>	-	79.4	-		
t <sub>f</sub>	-	41.8	-		
Q <sub>g</sub>	-	3.8	-	nC	V <sub>DS</sub> =120V, I <sub>D</sub> =1A, V <sub>GS</sub> =10V
Q <sub>gs</sub>	-	0.7	-		
Q <sub>gd</sub>	-	1.0	-		
<b>Source-Drain Diode</b>					
*V <sub>SD</sub>	-	0.83	1.2	V	V <sub>GS</sub> =0V, I <sub>S</sub> =1A
t <sub>rr</sub>	-	26.3	-	ns	I <sub>F</sub> =1A, dI <sub>F</sub> /dt=100A/μs
Q <sub>rr</sub>	-	23.3	-	nC	

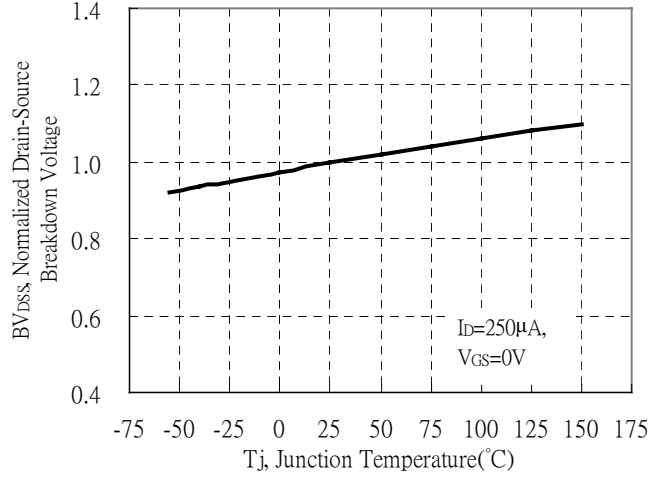
\*Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

**Typical Characteristics**

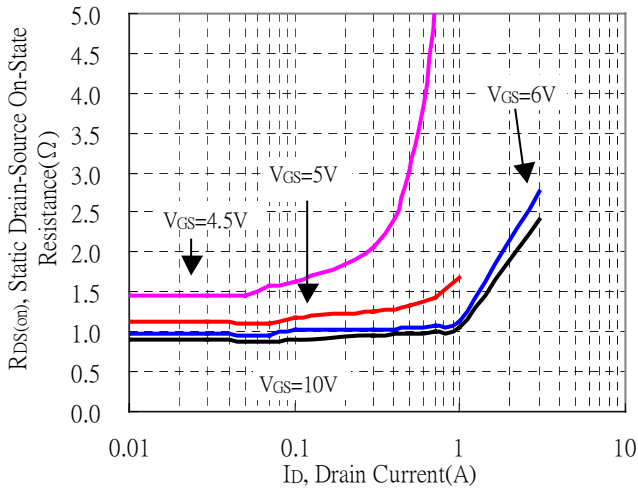
Typical Output Characteristics



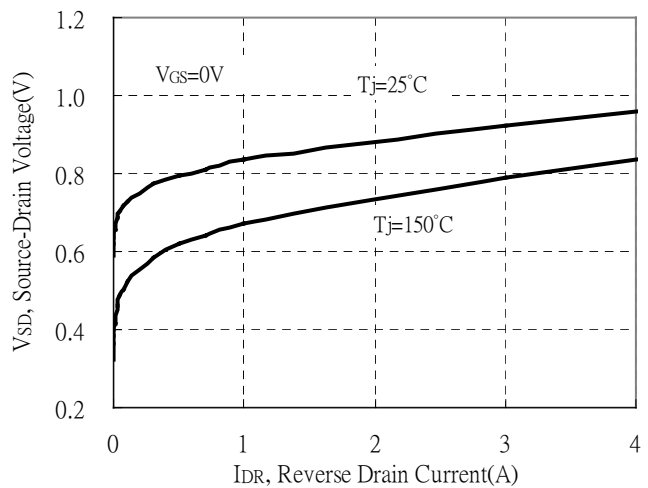
Breakdown Voltage vs Ambient Temperature



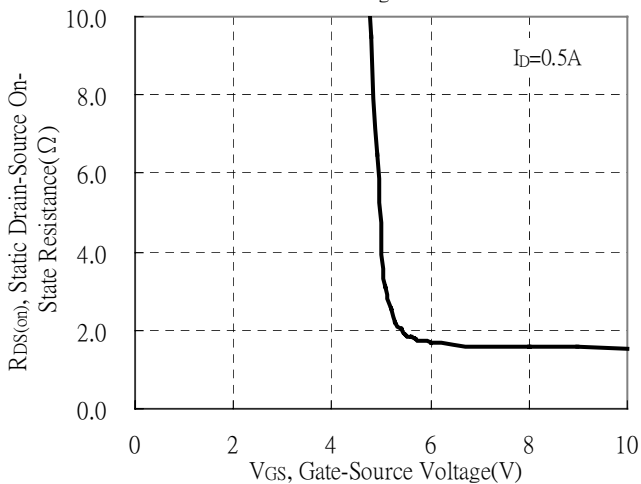
Static Drain-Source On-State resistance vs Drain Current



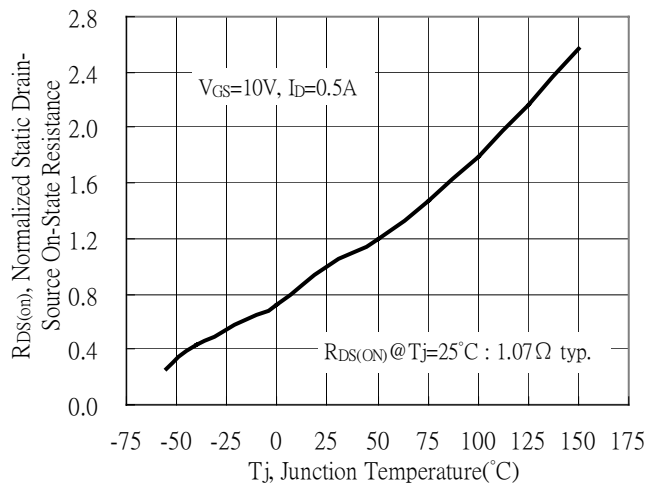
Reverse Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

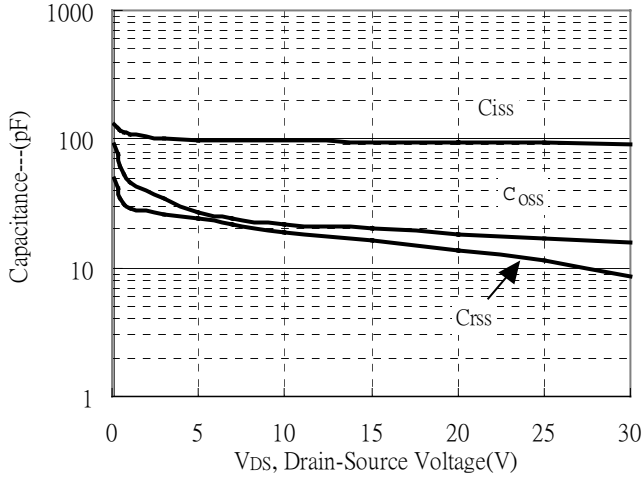


Drain-Source On-State Resistance vs Junction Temperature

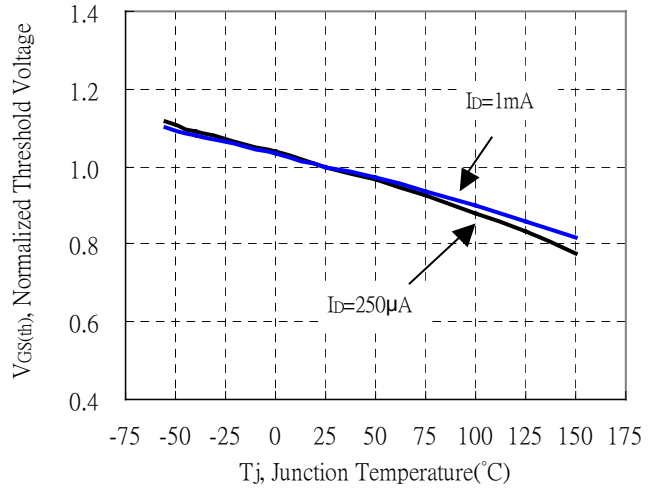


## Typical Characteristics(Cont.)

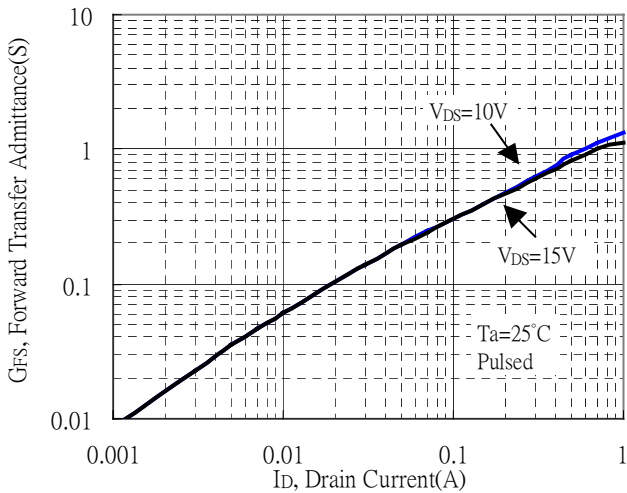
Capacitance vs Drain-to-Source Voltage



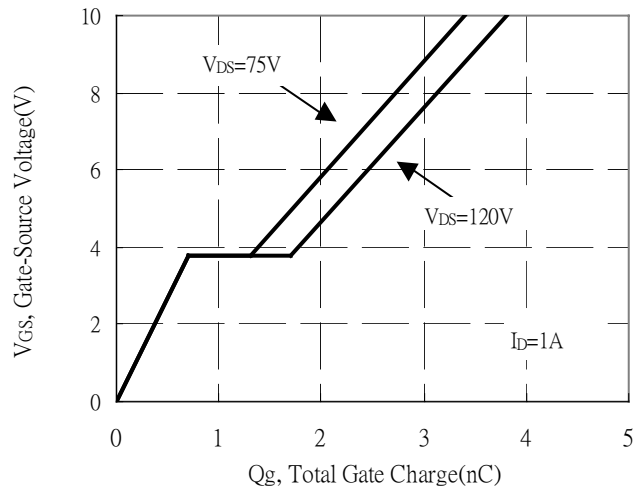
Threshold Voltage vs Junction Temperature



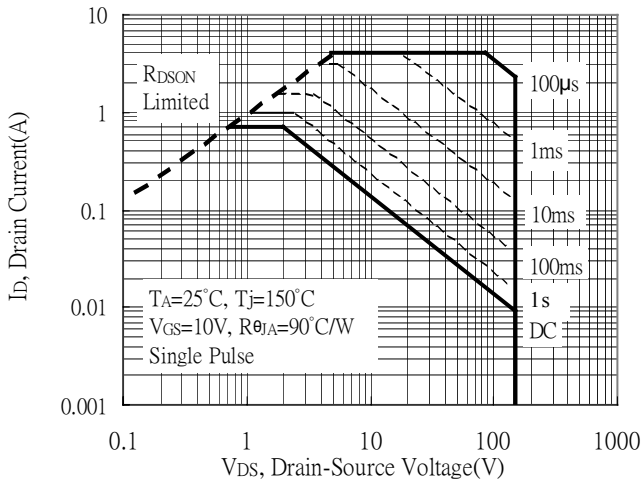
Forward Transfer Admittance vs Drain Current



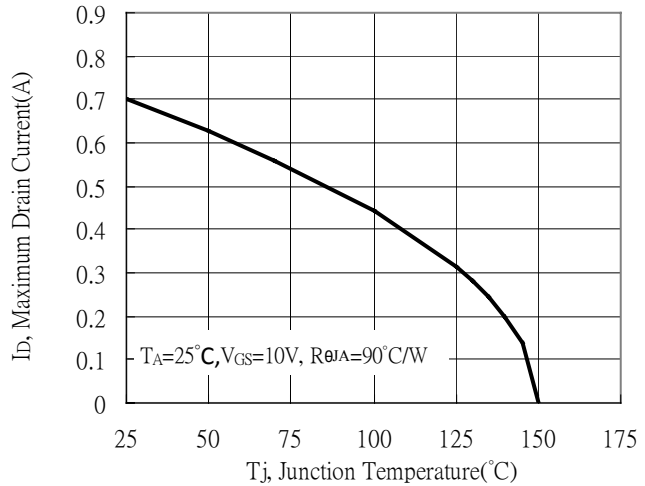
Gate Charge Characteristics



Maximum Safe Operating Area



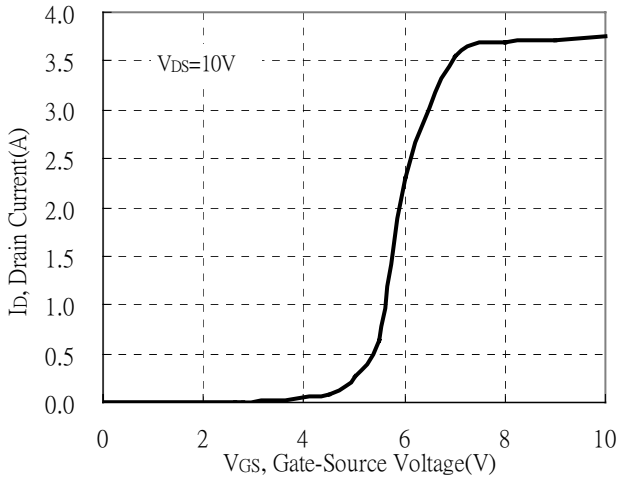
Maximum Drain Current vs Junction Temperature



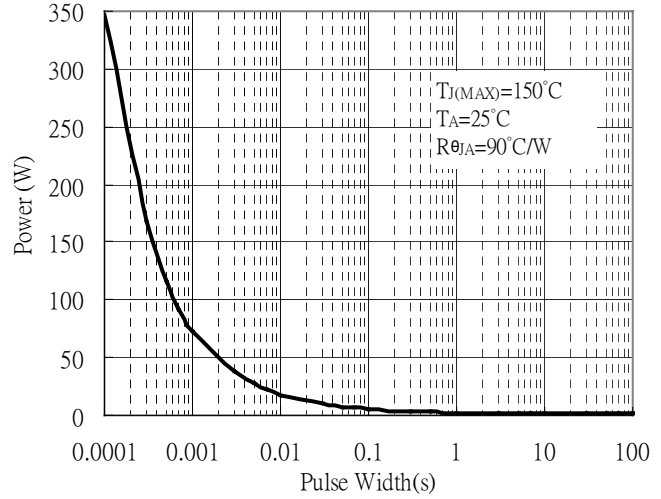


**Typical Characteristics(Cont.)**

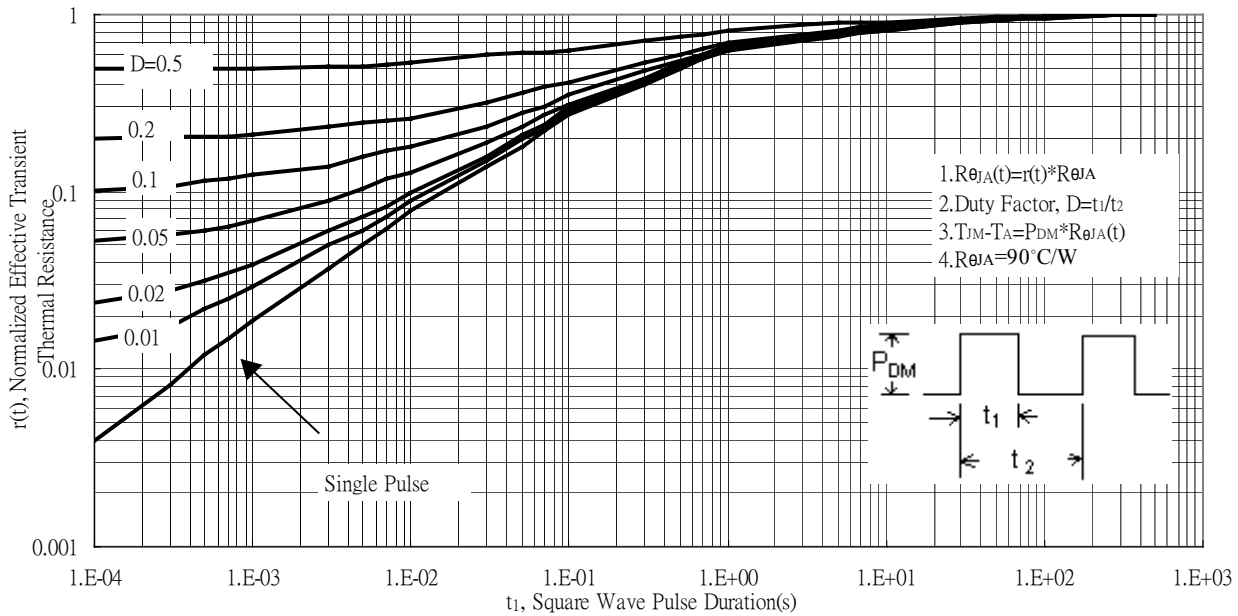
Typical Transfer Characteristics



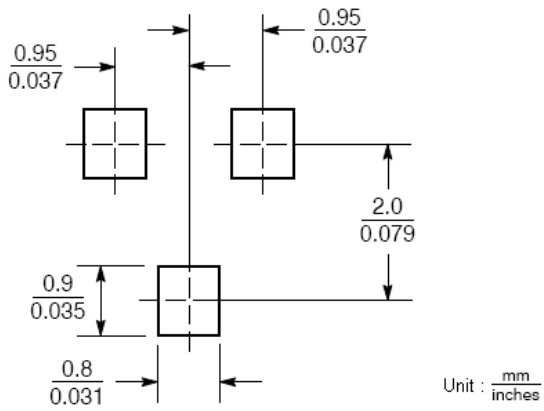
Single Pulse Power Rating, Junction to Ambient



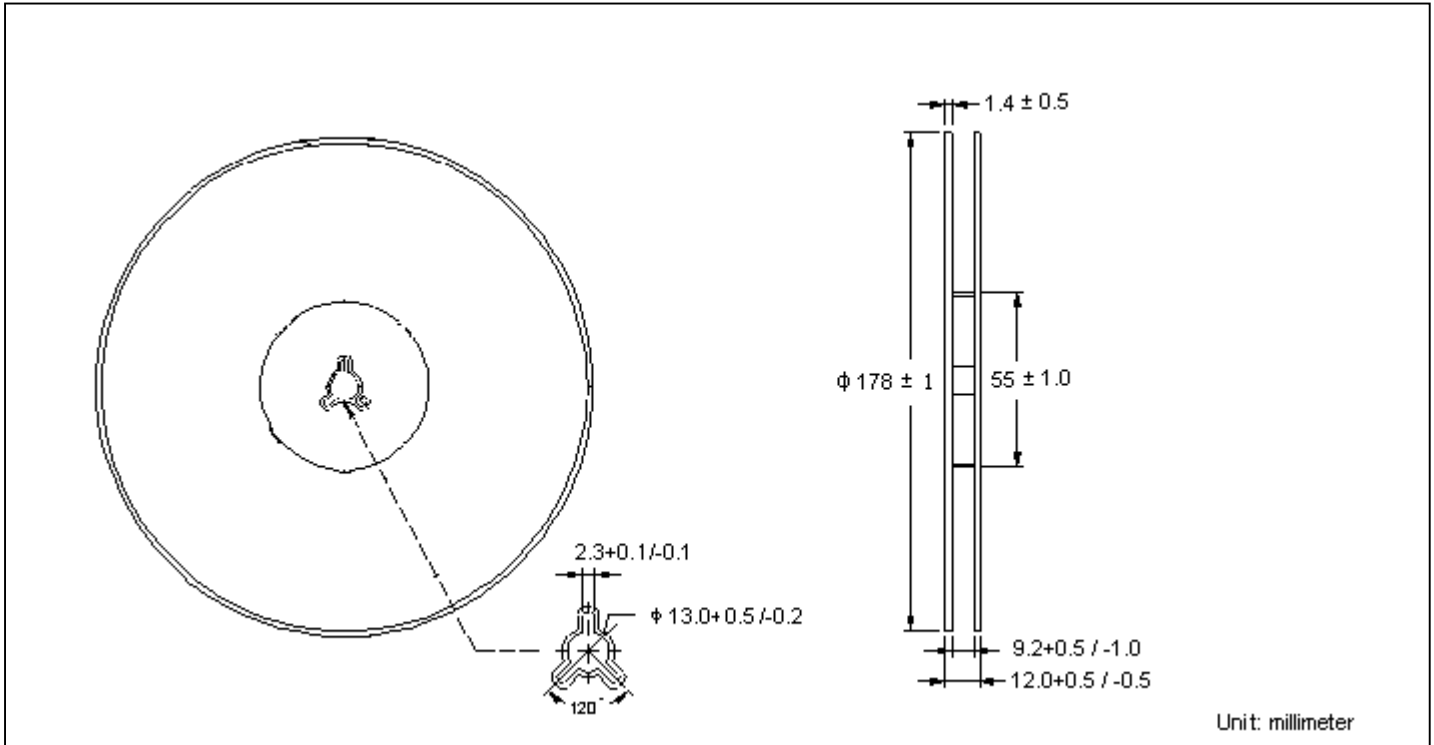
Transient Thermal Response Curves



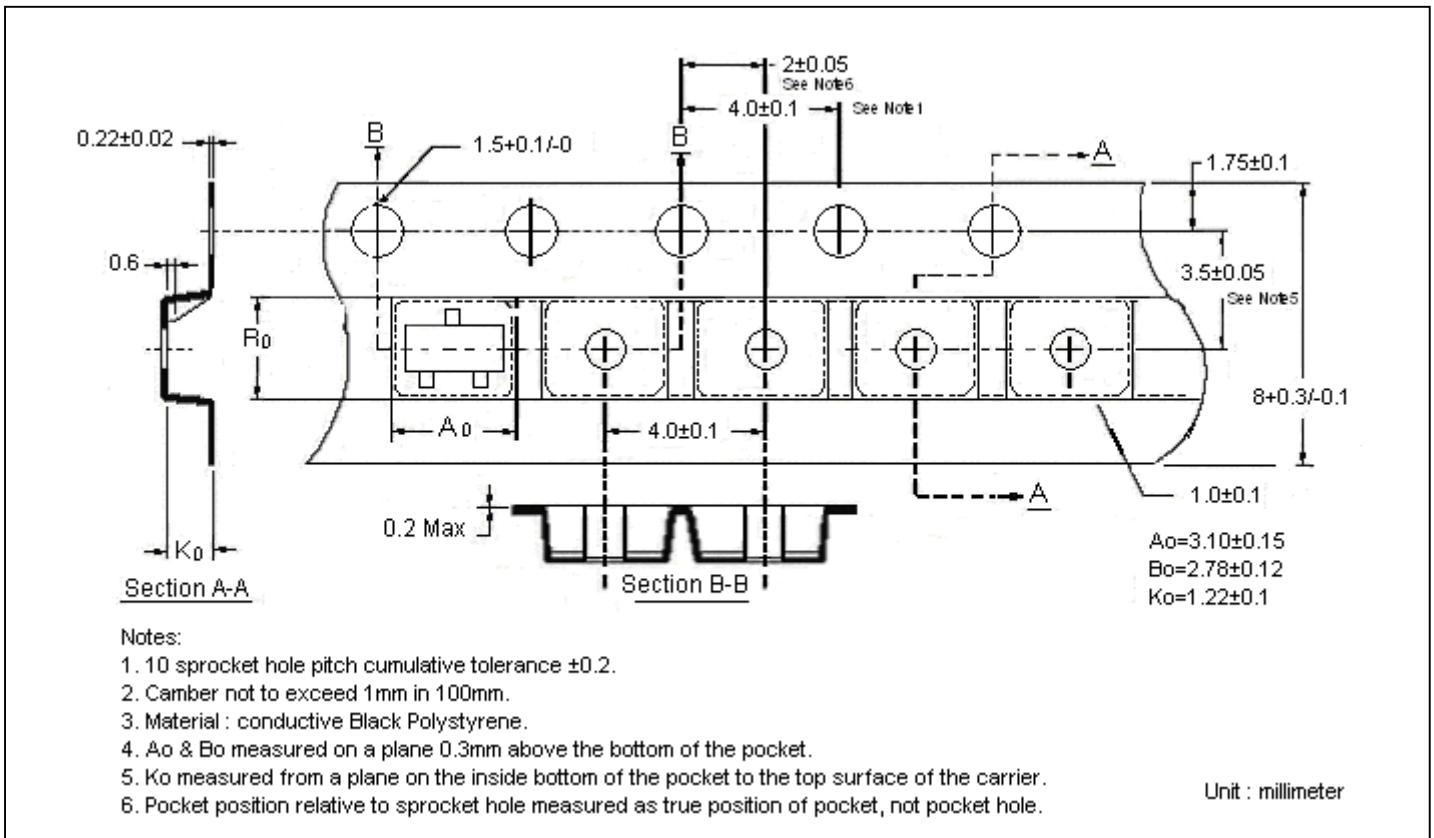
### Recommended Soldering Footprint



**Reel Dimension**



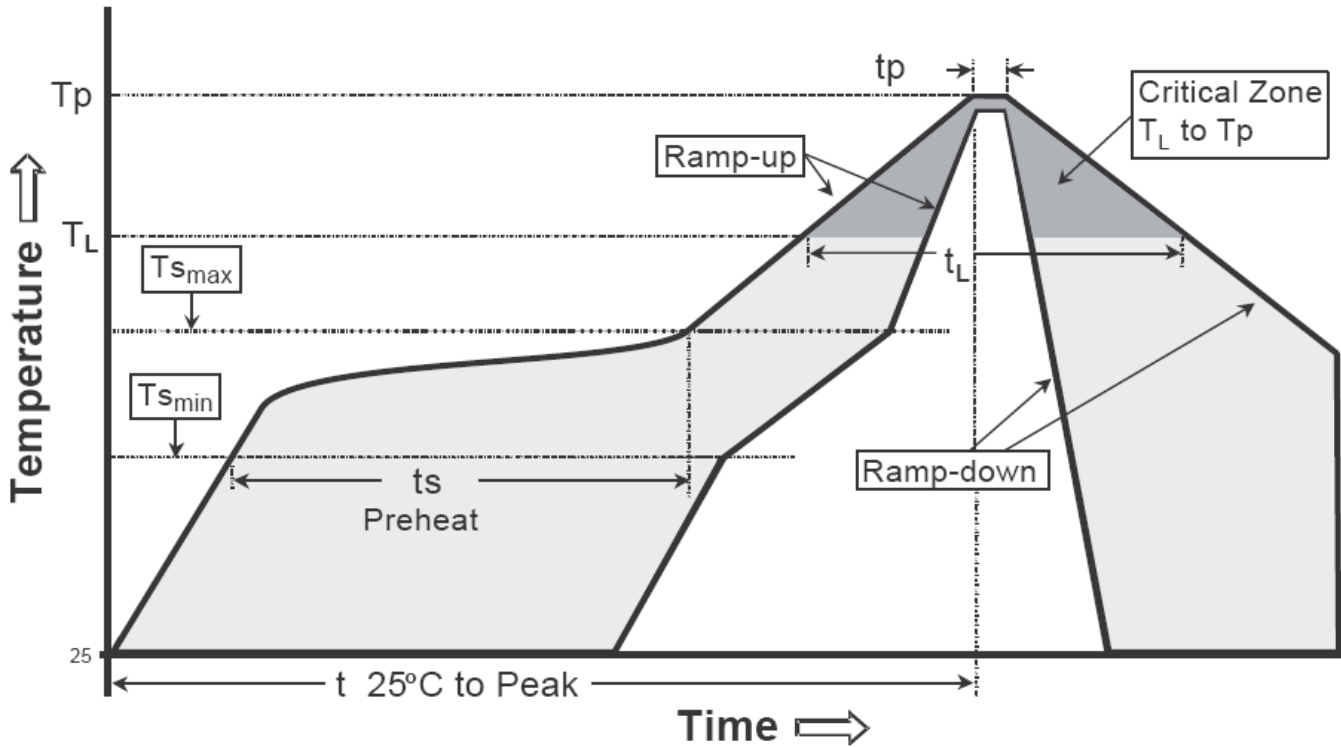
**Carrier Tape Dimension**



**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**

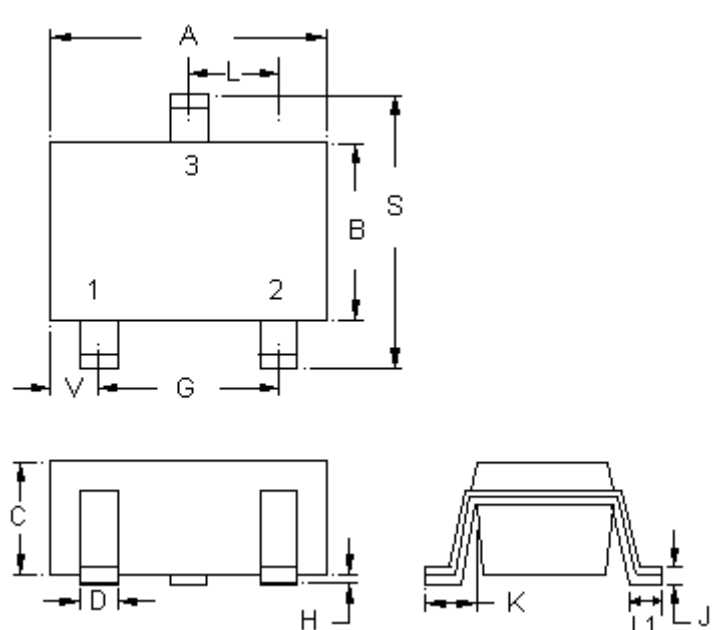


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(Ts min)	100°C	150°C
-Temperature Max(Ts max)	150°C	200°C
-Time(ts min to ts max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (TL)	183°C	217°C
- Time (tL)	60-150 seconds	60-150 seconds
Peak Temperature(TP)	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.

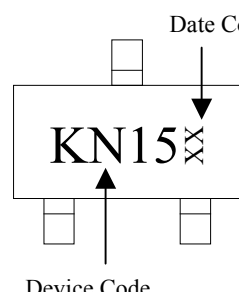
Note : All temperatures refer to topside of the package, measured on the package body surface.



**SOT-23 Dimension**



**Marking:**



Style: Pin 1.Gate 2.Source 3.Drain

3-Lead SOT-23 Plastic  
 Surface Mounted Package  
 CYStek Package Code: N3

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0032	0.0079	0.08	0.20
B	0.0472	0.0669	1.20	1.70	K	0.0118	0.0266	0.30	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1161	2.10	2.95
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10	L1	0.0118	0.0197	0.30	0.50

- Notes:**
- Controlling dimension: millimeters.
  - Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
  - 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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