

**N-Channel Enhancement Mode Power MOSFET**

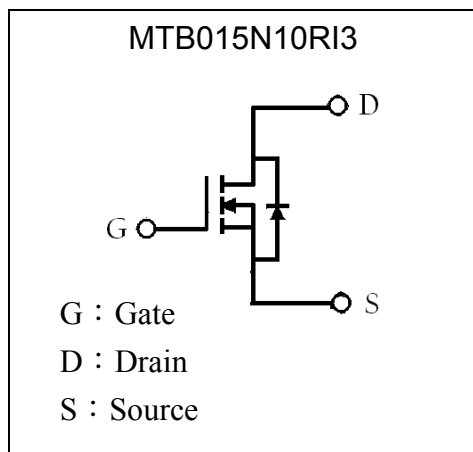
# MTB015N10RI3

<b>BV<sub>DSS</sub></b>	<b>100V</b>
<b>I<sub>D</sub>@ V<sub>GS</sub>=10V, T<sub>C</sub>=25°C</b>	<b>46A</b>
<b>R<sub>DS(ON)</sub>@ V<sub>GS</sub>=10V, I<sub>D</sub>=20A</b>	<b>13.5mΩ (typ)</b>
<b>R<sub>DS(ON)</sub>@ V<sub>GS</sub>=4.5V, I<sub>D</sub>=20A</b>	<b>16.0mΩ (typ)</b>

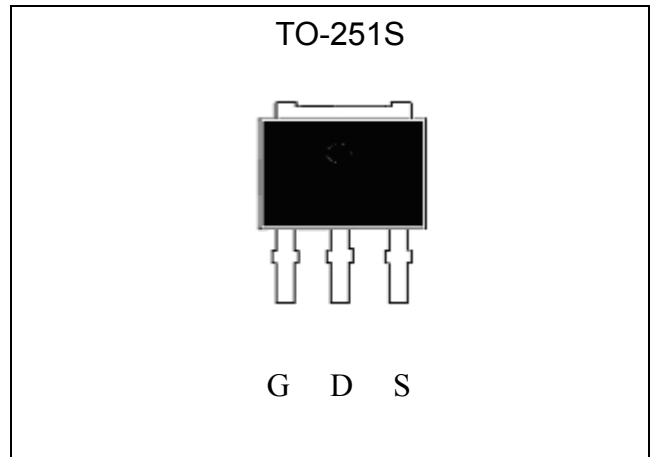
**Features**

- Simple Drive Requirement
- Repetitive Avalanche Rated
- Fast Switching Characteristic
- RoHS compliant package & Halogen-free package

**Symbol**

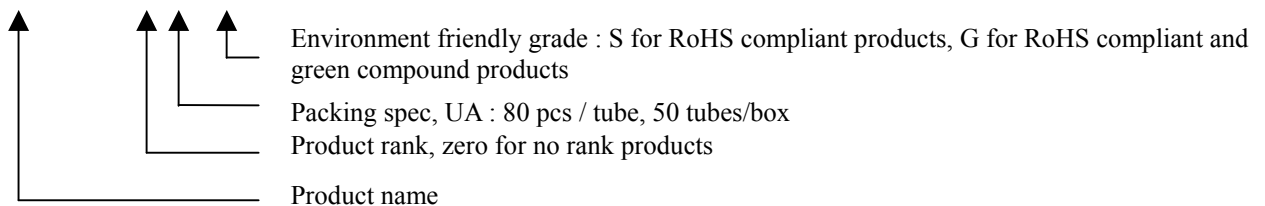


**Outline**



**Ordering Information**

Device	Package	Shipping
MTB015N10RI3-0-UA-G	TO-251S (RoHS compliant and halogen-free package)	80 pcs/tube, 50 tubes/box





**Absolute Maximum Ratings** (T<sub>C</sub>=25°C, unless otherwise noted)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V <sub>DS</sub>	100	V
Gate-Source Voltage	V <sub>GS</sub>	±20	
Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>C</sub> =25°C	I <sub>D</sub>	46	A
Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>C</sub> =100°C		29	
Pulsed Drain Current (Note 1)	I <sub>DM</sub>	184	
Avalanche Current @ L=0.1mH	I <sub>AS</sub>	46	mJ
Avalanche Energy @ L=0.1mH, I <sub>D</sub> =46A, R <sub>G</sub> =25Ω (Note 3)	E <sub>AS</sub>	106	
Repetitive Avalanche Energy @ L=0.05mH (Note 2)	E <sub>AR</sub>	6	
Total Power Dissipation @ T <sub>C</sub> =25°C	P <sub>D</sub>	62.5	W
Total Power Dissipation @ T <sub>C</sub> =100°C		25	
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. Duty cycle ≤ 1%.  
 3. 100% tested by conditions of L=0.1mH, V<sub>GS</sub>=10V, I<sub>AS</sub>=24A, V<sub>DD</sub>=25V

**Thermal Data**

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	R <sub>th,j-c</sub>	2	°C/W
Thermal Resistance, Junction-to-ambient, max	R <sub>th,j-a</sub>	110	

**Characteristics (T<sub>C</sub>=25°C, unless otherwise specified)**

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub>	100	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
V <sub>GS(th)</sub>	1	-	3		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA
I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
I <sub>DSS</sub>	-	-	1	μA	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V
	-	-	25		V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>j</sub> =125°C
*R <sub>DS(ON)</sub>	-	13.5	16.6	mΩ	V <sub>GS</sub> =10V, I <sub>D</sub> =20A
	-	16.0	22.5		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A
*G <sub>FS</sub>	-	32.2	-	S	V <sub>DS</sub> =10V, I <sub>D</sub> =20A
<b>Dynamic</b>					
*Q <sub>g</sub>	-	54.4	-	nC	V <sub>DS</sub> =80V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V
*Q <sub>gs</sub>	-	7.7	-		
*Q <sub>gd</sub>	-	10.7	-		
*t <sub>d(ON)</sub>	-	16.6	-	ns	V <sub>DS</sub> =50V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V, R <sub>GS</sub> =1Ω
*t <sub>r</sub>	-	18	-		
*t <sub>d(OFF)</sub>	-	59.6	-		
*t <sub>f</sub>	-	6.6	-		



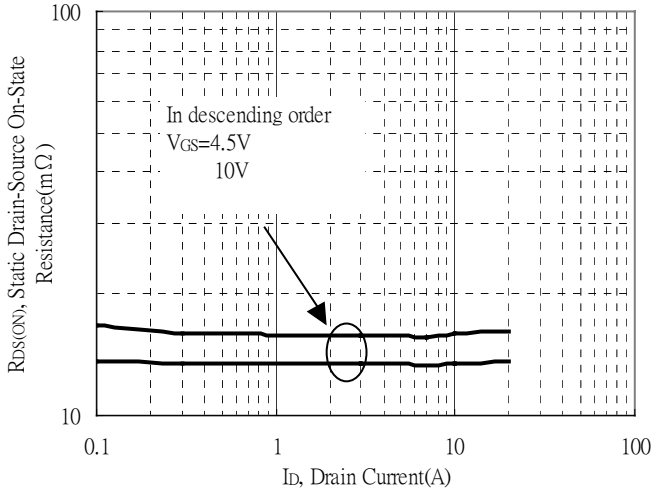
Ciss	-	2652	-	pF	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f=1MHz
Coss	-	179	-		
Crss	-	18	-		
Rg	-	1	-	Ω	f=1MHz
<b>Source-Drain Diode</b>					
*I <sub>S</sub>	-	-	46	A	
*I <sub>SM</sub>	-	-	184		
*V <sub>SD</sub>	-	0.85	1.2	V	I <sub>S</sub> =20A, V <sub>GS</sub> =0V
*trr	-	30	-	ns	I <sub>F</sub> =20A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/μs
*Qrr	-	39	-	nC	

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

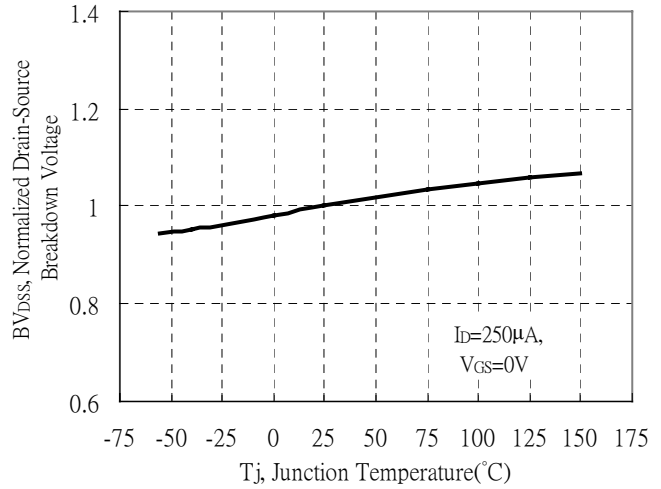


**Typical Characteristics**

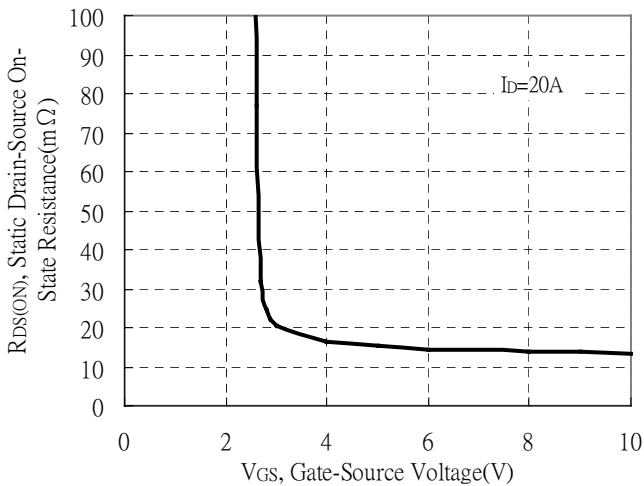
Static Drain-Source On-State resistance vs Drain Current



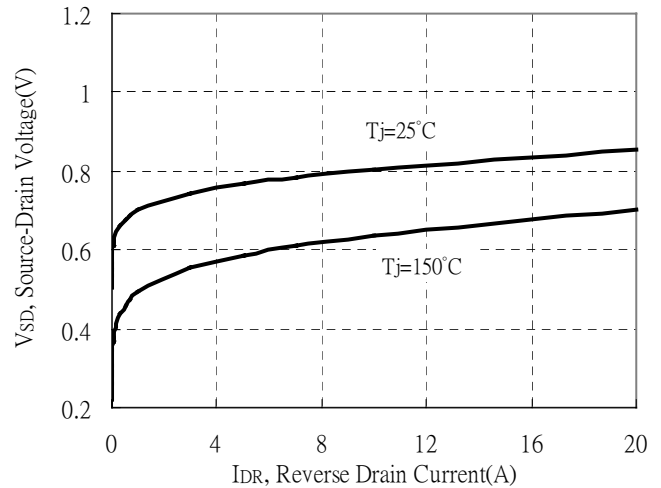
Brekdown Voltage vs Ambient Temperature



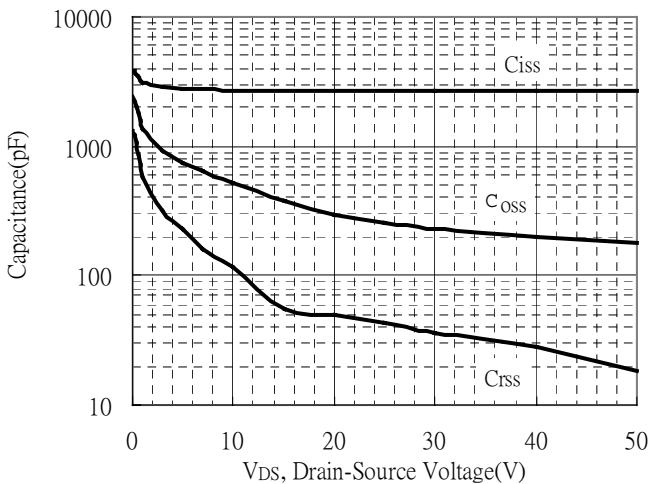
Static Drain-Source On-State Resistance vs Gate-Source Voltage



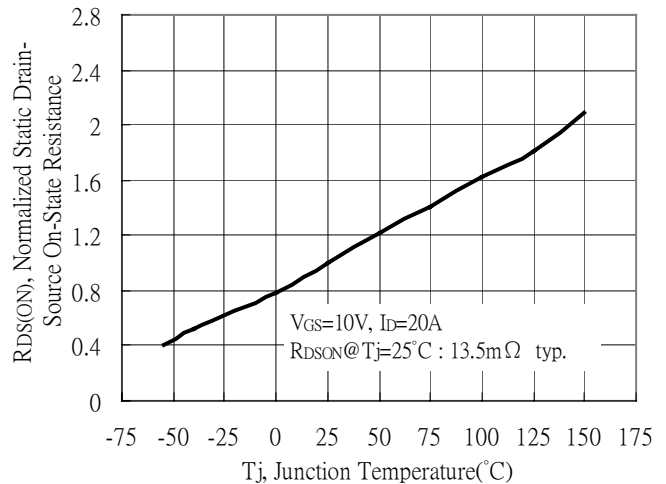
Reverse Drain Current vs Source-Drain Voltage



Capacitance vs Drain-to-Source Voltage



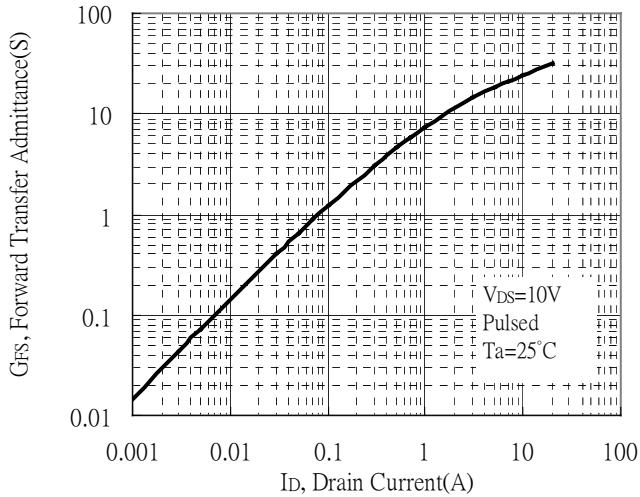
Drain-Source On-State Resistance vs Junction Teperature



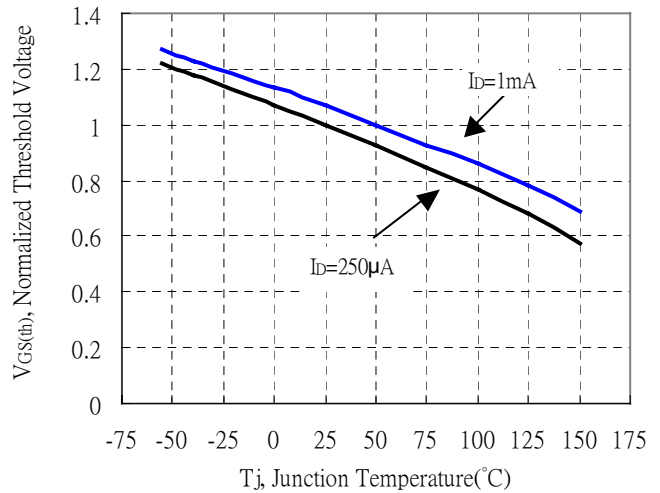


**Typical Characteristics(Cont.)**

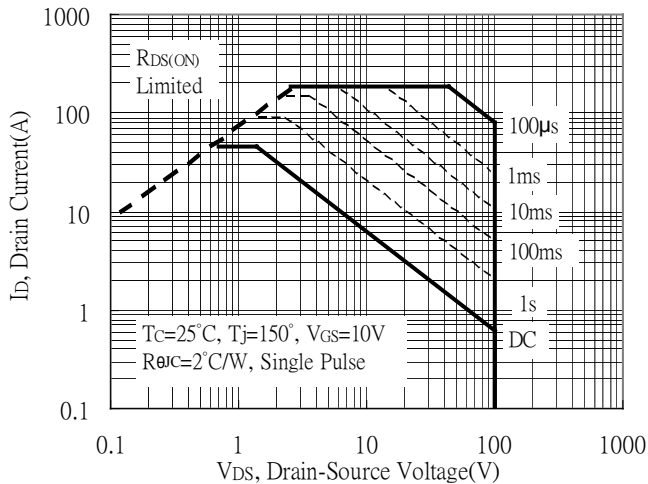
Forward Transfer Admittance vs Drain Current



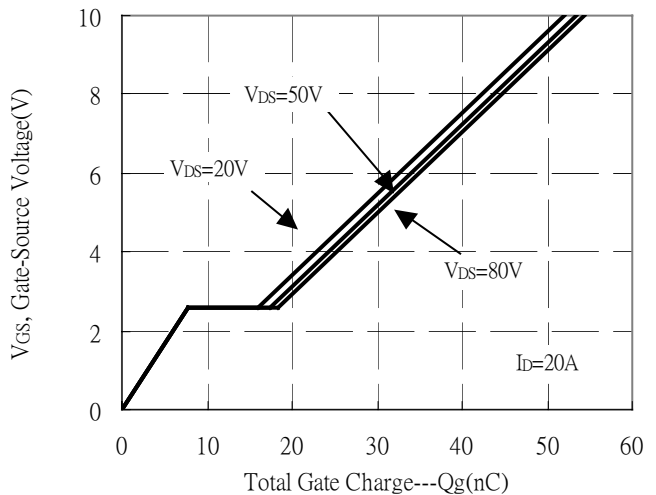
Normalized Threshold Voltage vs Junction Temperature



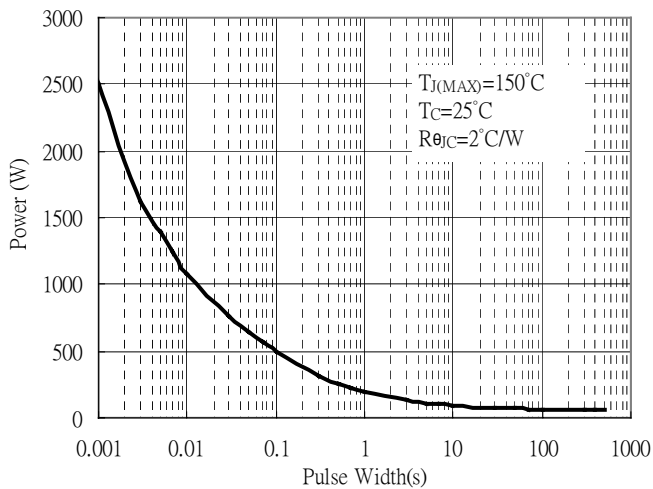
Maximum Safe Operating Area



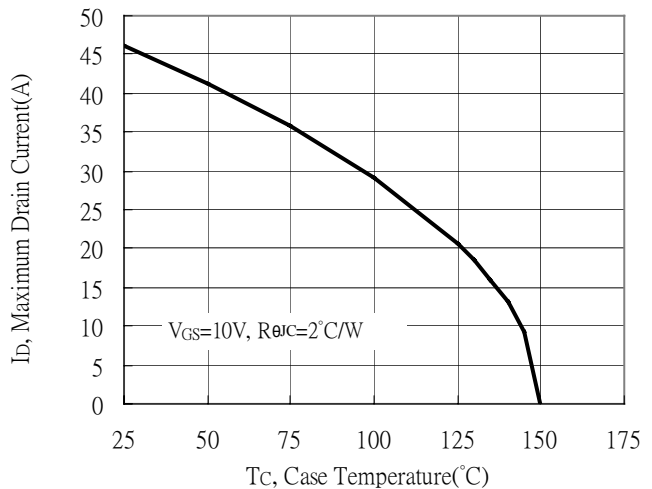
Gate Charge Characteristics



Single Pulse Maximum Power Dissipation

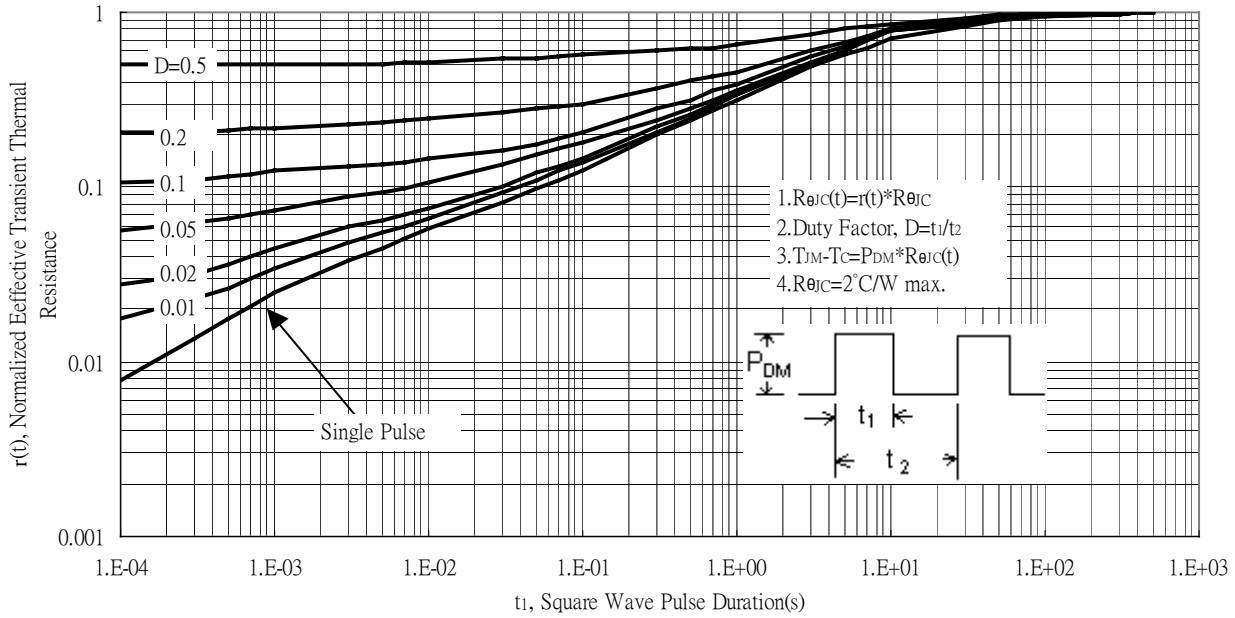


Maximum Drain Current vs Case Temperature



**Typical Characteristics(Cont.)**

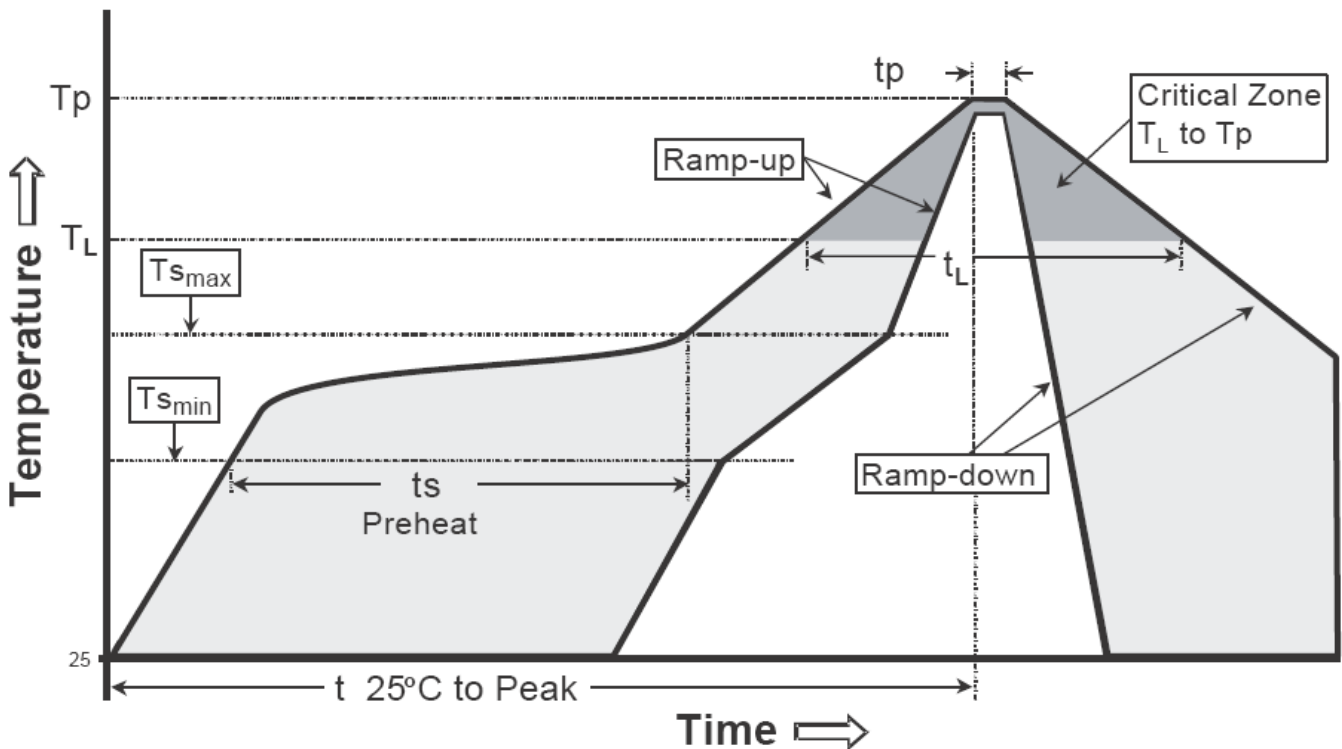
Transient Thermal Response Curves



**Recommended wave soldering condition**

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

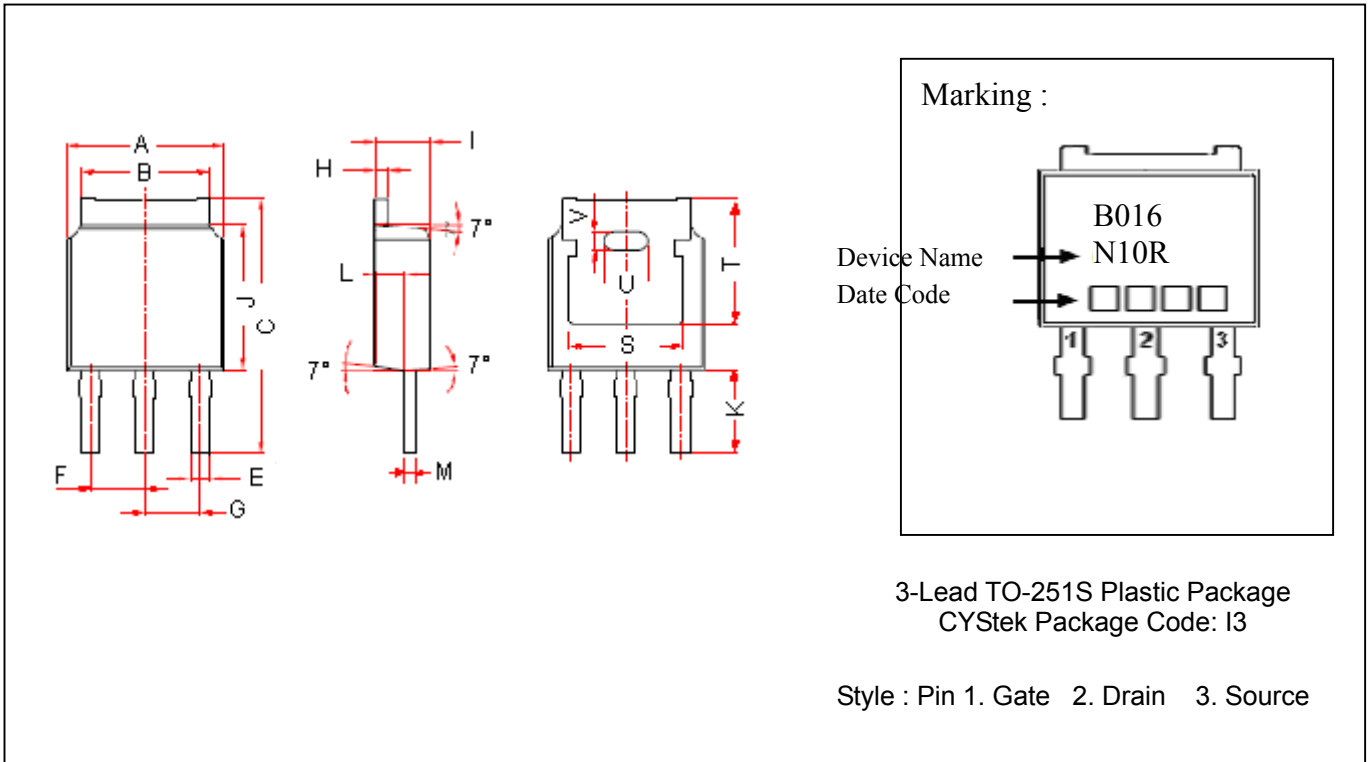
**Recommended temperature profile for IR reflow**



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(t <sub>p</sub> )	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-251S Dimension**



Marking :

Device Name → B016  
 N10R  
 Date Code → □ □ □ □

3-Lead TO-251S Plastic Package  
 CYStek Package Code: I3

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

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.2559	0.2638	6.50	6.70	J	0.2362	0.2441	6.00	6.20
B	0.2020	0.2126	5.13	5.46	K	0.1299	0.1457	3.30	3.70
C	0.4094	0.4331	10.40	11.00	L	0.0358	0.0437	0.91	1.11
E	0.0280	0.0319	0.71	0.81	M	0.0181	0.0220	0.46	0.56
F	0.0858	0.0941	2.18	2.39	S	0.1902	REF	4.83	REF
G	0.0858	0.0941	2.18	2.39	T	0.2106	REF	5.35	REF
H	0.0181	0.0220	0.46	0.56	U	0.0701	REF	1.78	REF
I	0.0902	0.0937	2.29	2.38	V	0.0299	REF	0.76	REF

Notes: 1. Controlling dimension: inch.  
 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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