

N-Channel Enhancement Mode Power MOSFET

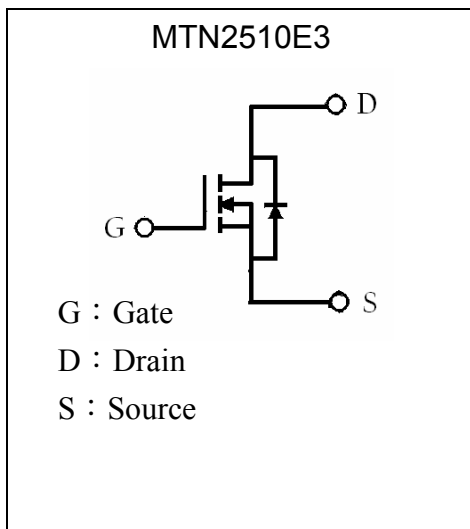
MTN2510E3

BV_{DSS}	100V
I_D	50A
$R_{DS(on)(TYP)} @ V_{GS}=10V, I_D=30A$	17m Ω

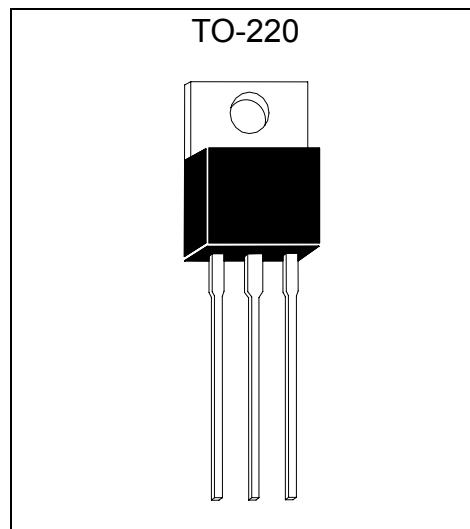
Features

- Low Gate Charge
- Simple Drive Requirement
- Repetitive Avalanche Rated
- Fast Switching Characteristic
- RoHS compliant package

Symbol



Outline



Absolute Maximum Ratings (T_c=25°C, unless otherwise noted)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±30	
Continuous Drain Current @ T _c =25°C	I_D	50	A
Continuous Drain Current @ T _c =100°C	I_D	35	
Pulsed Drain Current (Note 1)	I_{DM}	150	
Avalanche Current	I_{AS}	30	
Avalanche Energy @ L=0.1mH, I _D =30A, R _G =25 Ω	E_{AS}	45	mJ
Repetitive Avalanche Energy @ L=0.05mH (Note 2)	E_{AR}	22.5	
Power Dissipation	T _c =25°C	155	W
	T _c =100°C	61	
Operating Junction and Storage Temperature	T _j , T _{stg}	-55~+175	°C

Note : 1. Pulse width limited by maximum junction temperature
2. Duty cycle ≤ 1%

**Thermal Data**

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	0.97	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	62.5	$^{\circ}\text{C/W}$

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

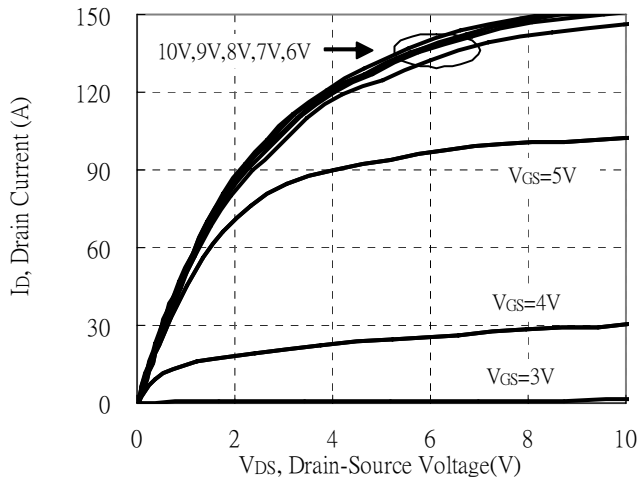
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	$V_{GS}=0V, I_D=250\mu A$
$V_{GS(th)}$	1.5	2.4	4.0	V	$V_{DS} = V_{GS}, I_D=250\mu A$
G_{FS}	-	38	-	S	$V_{DS} = 5V, I_D=30A$
I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 30$
I_{DSS}	-	-	1	μA	$V_{DS} = 80V, V_{GS} = 0V$
	-	-	25	μA	$V_{DS} = 70V, V_{GS} = 0V, T_j=125^{\circ}\text{C}$
$*R_{DS(ON)}$	-	17	30	$m\Omega$	$V_{GS} = 10V, I_D=30A$
$*I_{D(ON)}$	50	-	-	A	$V_{DS} = 10V, V_{GS} = 10V$
Dynamic					
$*Q_g$	-	25	-	nC	$I_D=30A, V_{DS}=50V, V_{GS}=10V$
$*Q_{gs}$	-	6.1	-		
$*Q_{gd}$	-	9.2	-		
$*t_{d(ON)}$	-	19	-	ns	$V_{DS}=50V, I_D=1A, V_{GS}=10V,$ $R_G=6\Omega$
$*t_r$	-	67	-		
$*t_{d(OFF)}$	-	75	-		
$*t_f$	-	34	-		
C_{iss}	-	1888	-	pF	$V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$
C_{oss}	-	236	-		
C_{rss}	-	124	-		
R_g	-	2	-	Ω	$V_{GS}=15mV, V_{DS}=0V, f=1\text{MHz}$
Source-Drain Diode					
$*I_S$	-	-	50	A	
$*I_{SM}$	-	-	150		
$*V_{SD}$	-	0.88	1.3	V	$I_F=I_S, V_{GS}=0V$
$*t_{rr}$	-	120	-	ns	$I_F=25A, V_{GS}=0, dI/dt=100A/\mu s$
$*Q_{rr}$	-	380	-	nC	

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

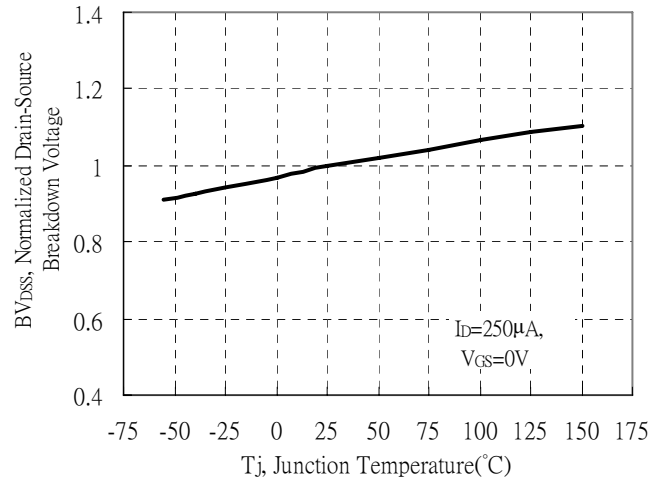
Device	Package	Shipping
MTN2510E3-0-UB-S	TO-220 (Pb-free lead plating package)	50 pcs/tube, 20 tubes/box, 4 boxes / carton

Typical Characteristics

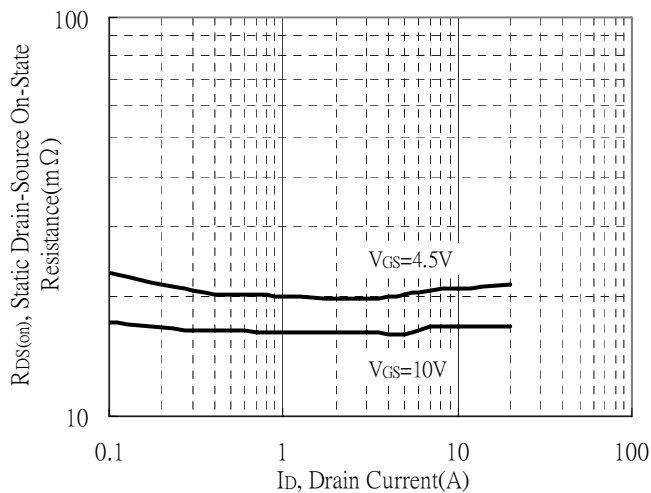
Typical Output Characteristics



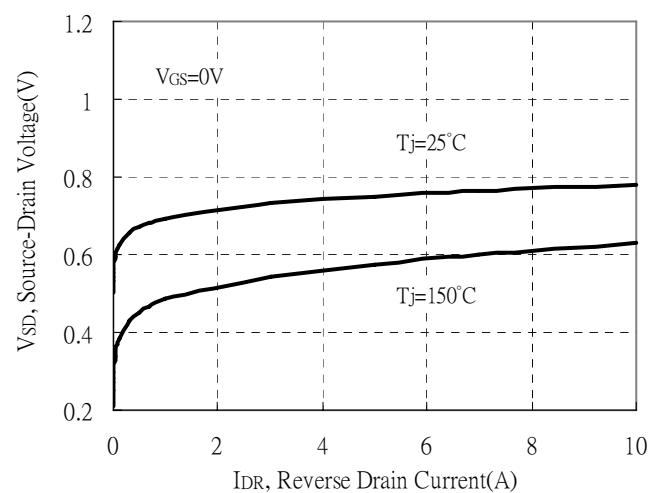
Brekdown Voltage vs Ambient Temperature



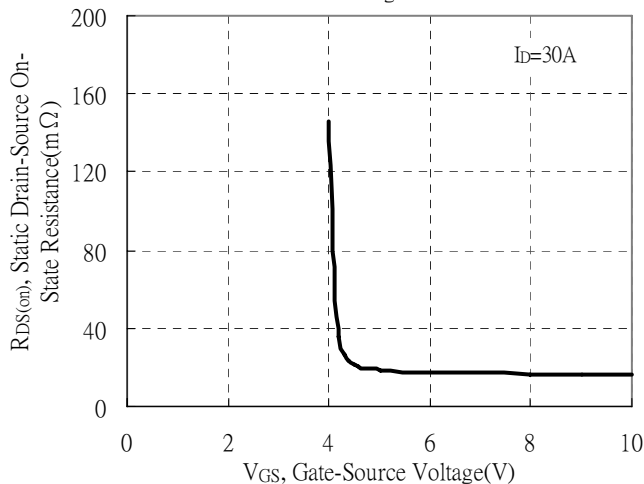
Static Drain-Source On-State resistance vs Drain Current



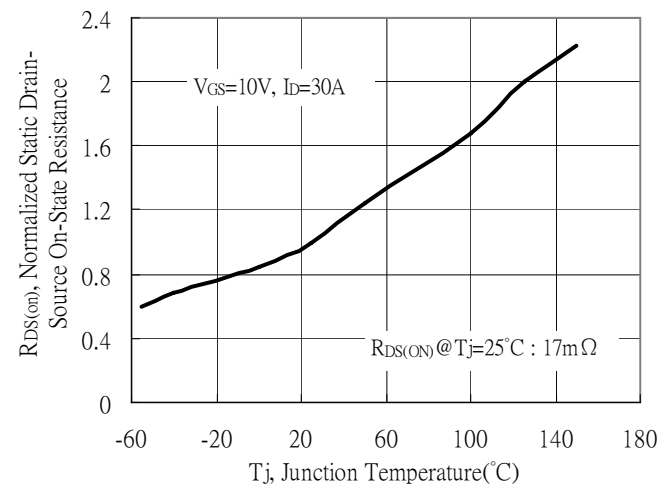
Reverse Drain Current vs Source-Drain Voltage



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

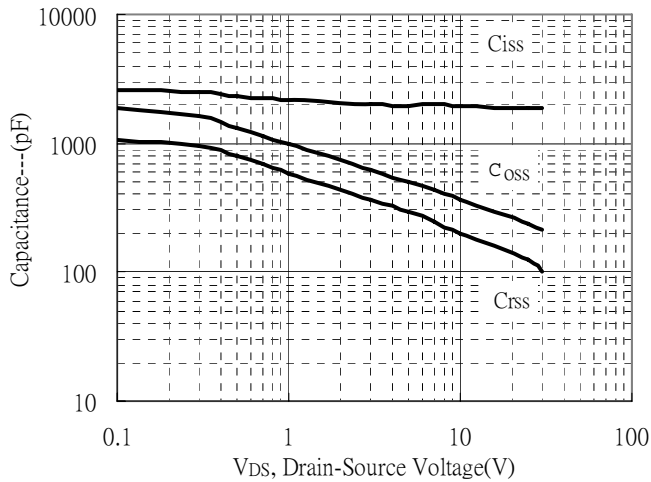


Drain-Source On-State Resistance vs Junction Temperature

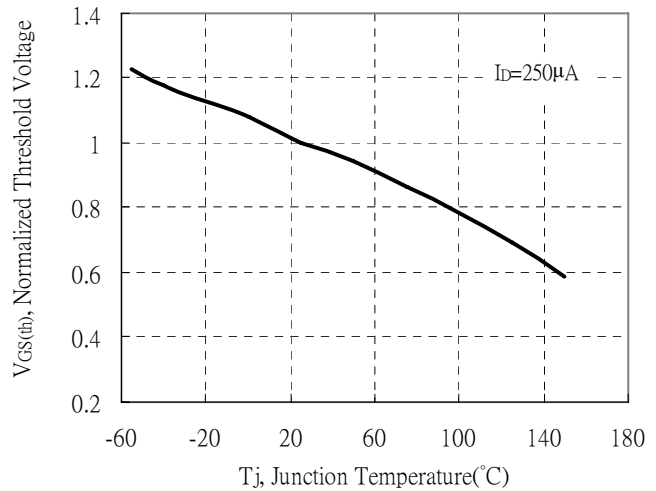


Typical Characteristics(Cont.)

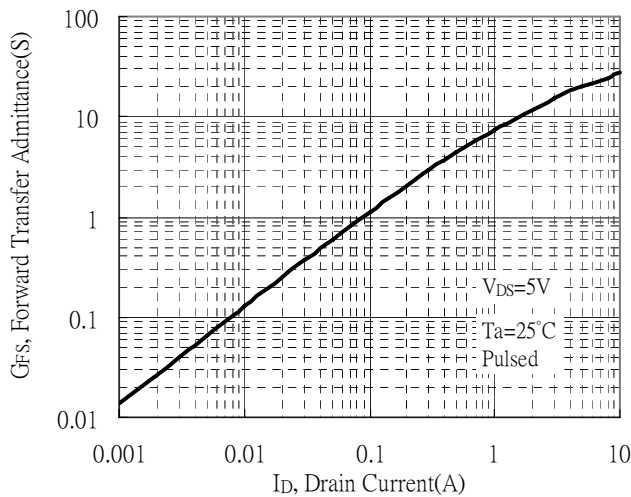
Capacitance vs Drain-to-Source Voltage



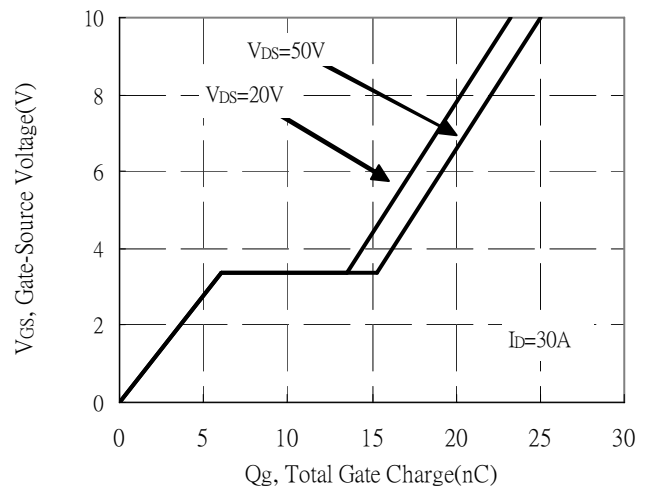
Threshold Voltage vs Junction Temperature



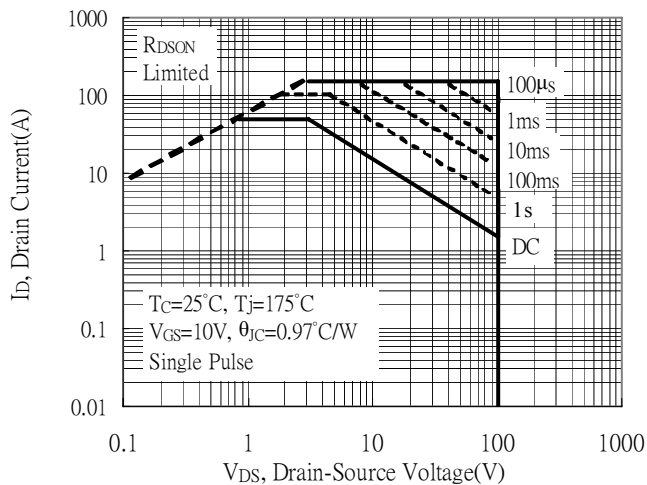
Forward Transfer Admittance vs Drain Current



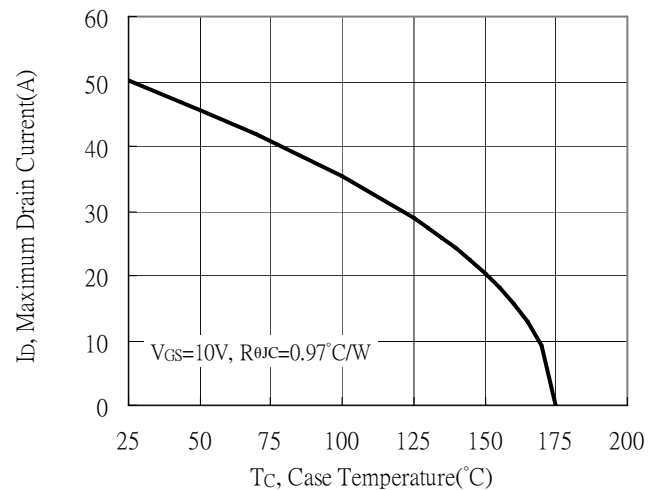
Gate Charge Characteristics



Maximum Safe Operating Area



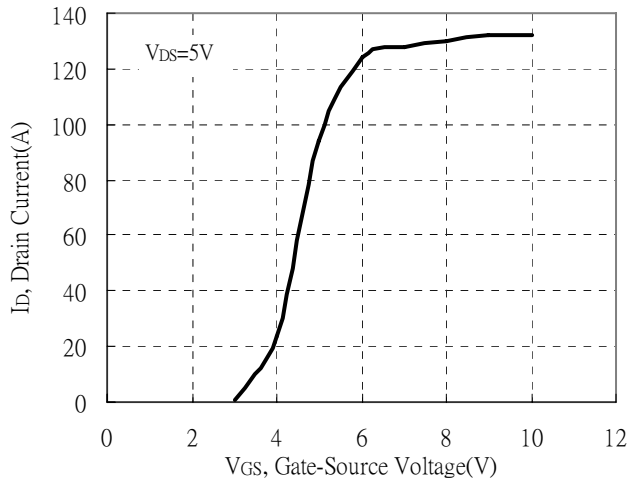
Maximum Drain Current vs Case Temperature



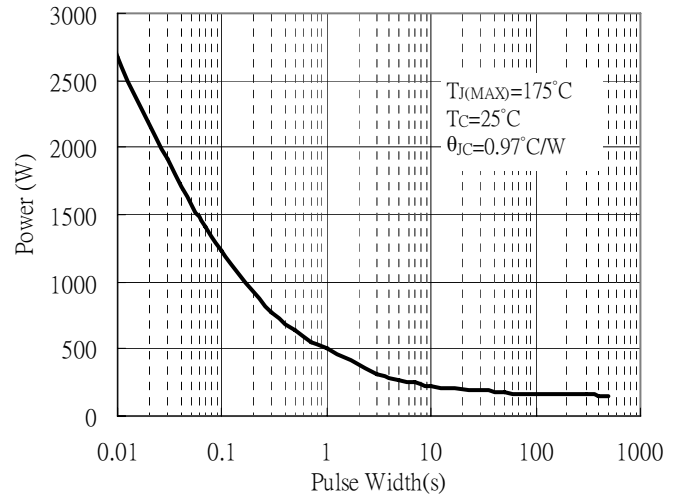


Typical Characteristics(Cont.)

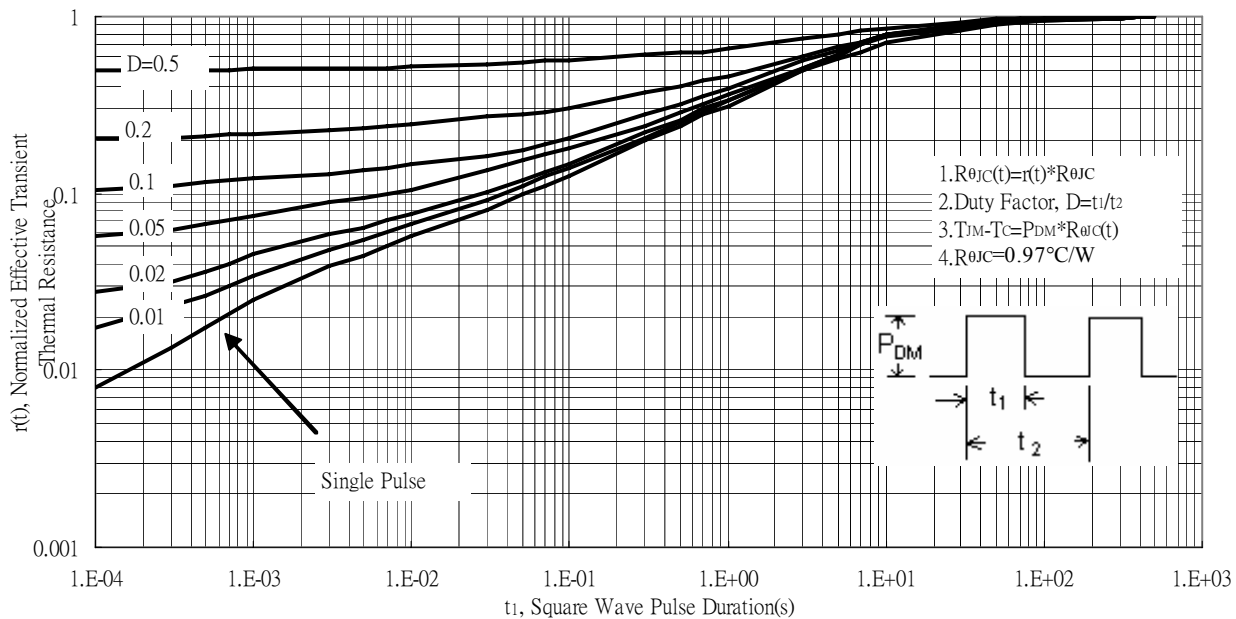
Typical Transfer Characteristics



Single Pulse Maximum Power Dissipation



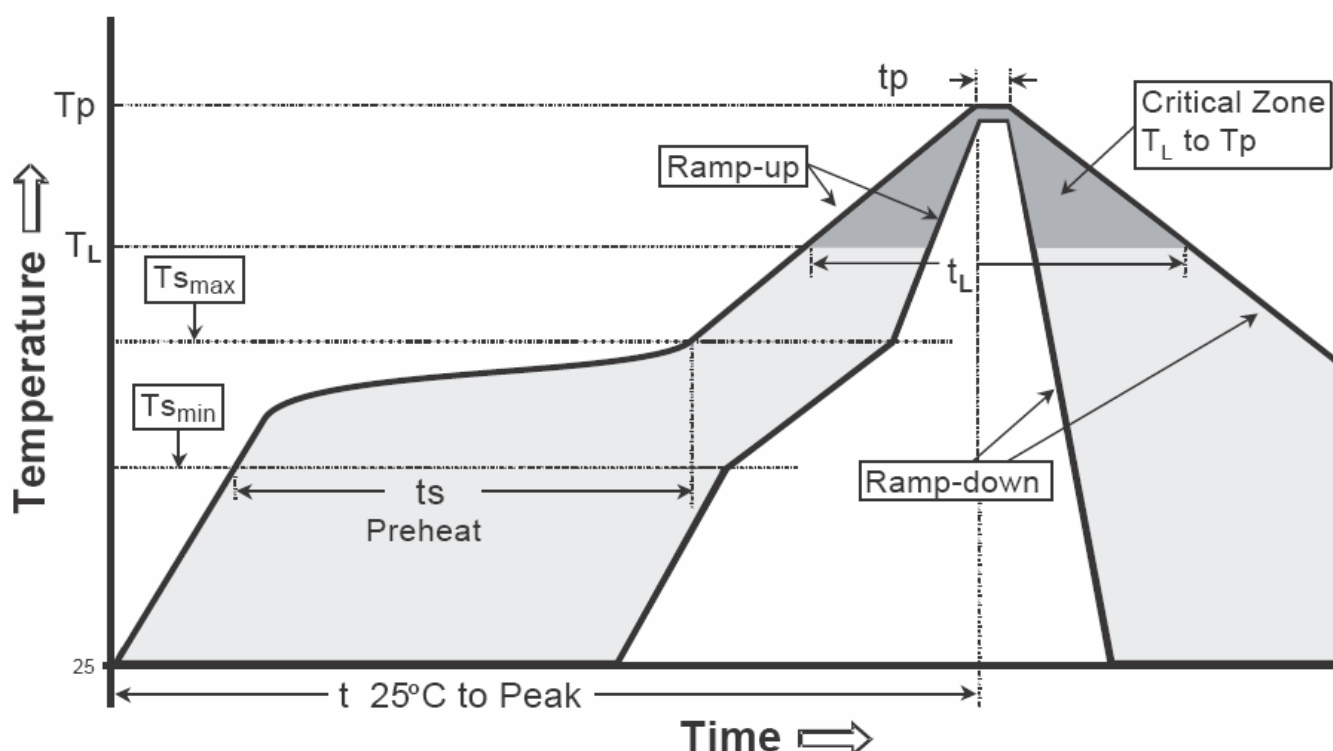
Transient Thermal Response Curves



Recommended wave soldering condition

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

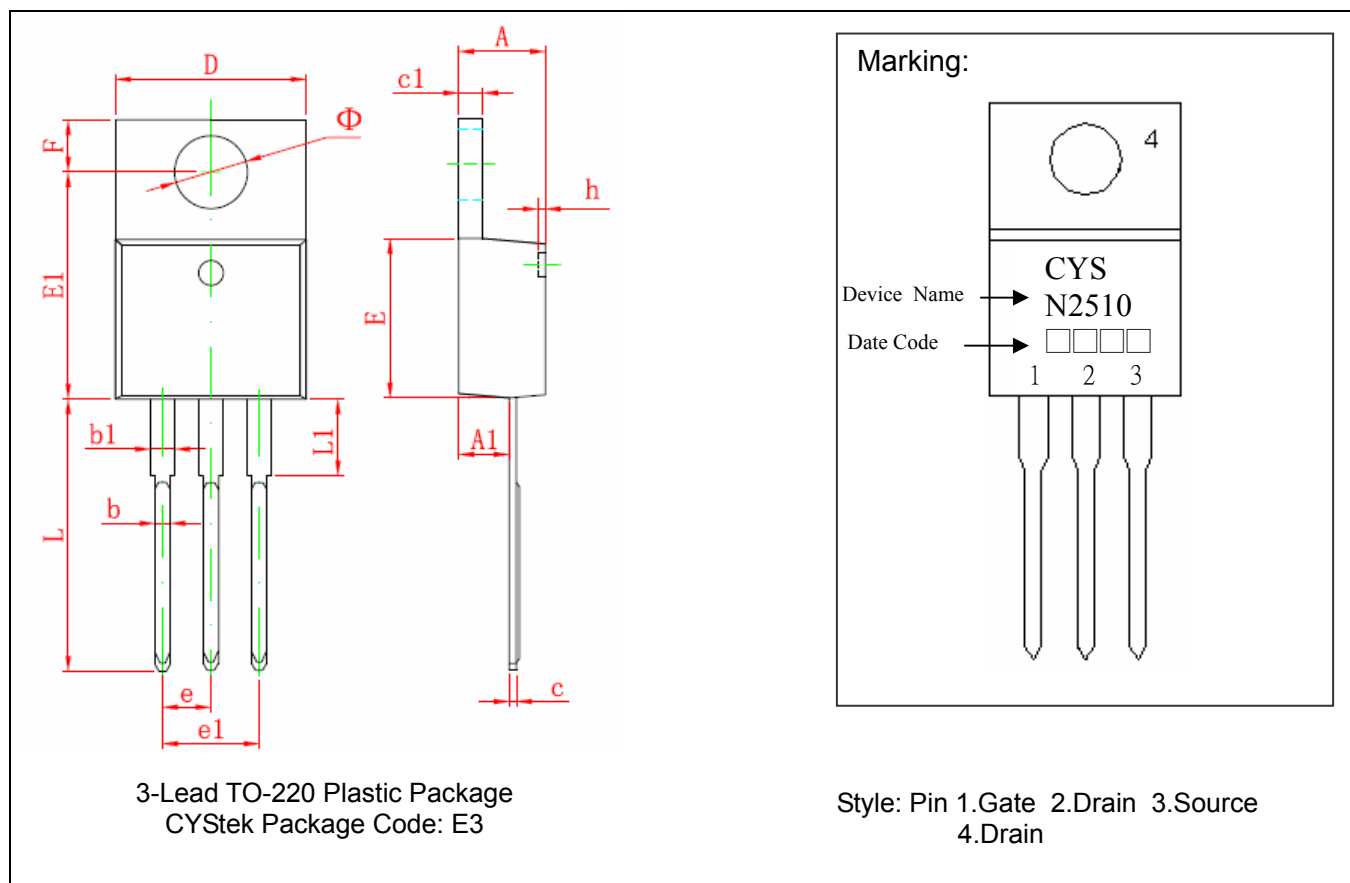
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (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.

TO-220 Dimension



*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184	E1	12.060	12.460	0.475	0.491
A1	2.520	2.820	0.099	0.111	e	2.540*		0.100*	
b	0.710	0.910	0.028	0.036	e1	4.980	5.180	0.196	0.204
b1	1.170	1.370	0.046	0.054	F	2.590	2.890	0.102	0.114
c	0.310	0.530	0.012	0.021	h	0.000	0.300	0.000	0.012
c1	1.170	1.370	0.046	0.054	L	13.400	13.800	0.528	0.543
D	10.010	10.310	0.394	0.406	L1	3.560	3.960	0.140	0.156
E	8.500	8.900	0.335	0.350	Φ	3.735	3.935	0.147	0.155

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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