

N-Channel Enhancement Mode Power MOSFET

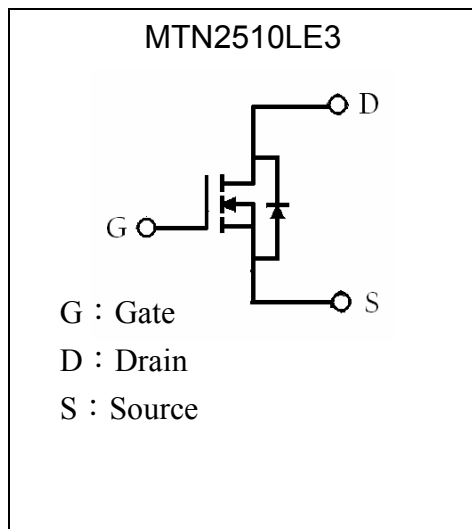
MTN2510LE3

BV_{DSS}	100V
I_D	50A
$R_{DS(ON)}$	30m Ω

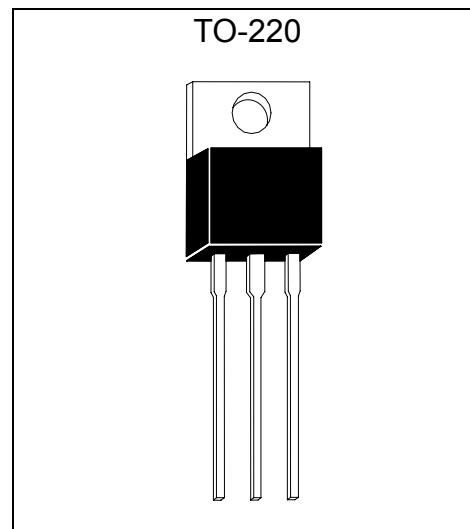
Features

- 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}	±20		
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	P_D	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	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	62.5	°C/W

Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	$V_{GS}=0V, I_D=250\mu A$
$V_{GS(th)}$	1.0	1.7	3.0	V	$V_{DS} = V_{GS}, I_D=250\mu A$
G_{FS}	-	38	-	S	$V_{DS} = 5V, I_D=30A$
I_{GSS}	-	-	±100	nA	$V_{GS}=\pm 20$
I_{DSS}	-	-	1	μA	$V_{DS} = 80V, V_{GS} = 0V$
	-	-	25	μA	$V_{DS} = 70V, V_{GS} = 0V, T_j=125^\circ C$
* $R_{DS(ON)}$	-	22	30	mΩ	$V_{GS} = 10V, I_D=30A$
	-	28	35		$V_{GS} = 5V, I_D=20A$
* $I_{D(ON)}$	50	-	-	A	$V_{DS} = 10V, V_{GS} = 10V$
Dynamic					
* Q_g	-	45	-	nC	$I_D=30A, V_{DS}=80V, V_{GS}=10V$
* Q_{gs}	-	15	-		
* Q_{gd}	-	25	-		
* $t_{d(ON)}$	-	25	-	ns	$V_{DS}=50V, I_D=1A, V_{GS}=10V, R_G=6\Omega$
* t_r	-	200	-		
* $t_{d(OFF)}$	-	100	-		
* t_f	-	120	-		
C_{iss}	-	6087	-	pF	$V_{GS}=0V, V_{DS}=50V, f=1MHz$
C_{oss}	-	224	-		
C_{rss}	-	68	-		
R_g	-	2	-	Ω	$V_{GS}=15mV, V_{DS}=0V, f=1MHz$
Source-Drain Diode					
* I_S	-	-	50	A	
* I_{SM}	-	-	150		
* V_{SD}	-	-	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	

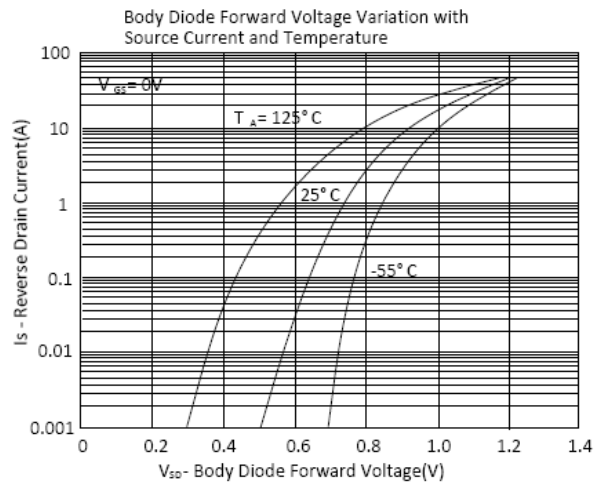
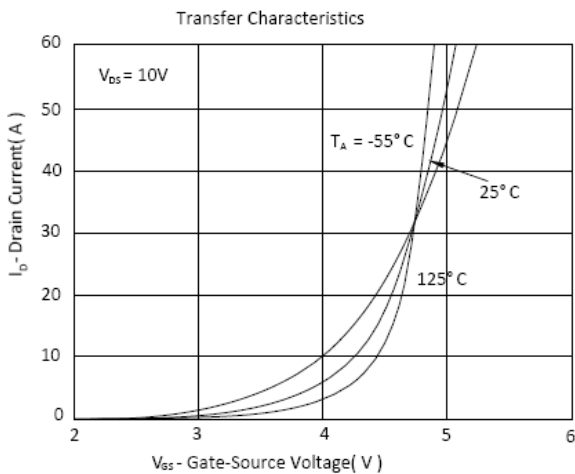
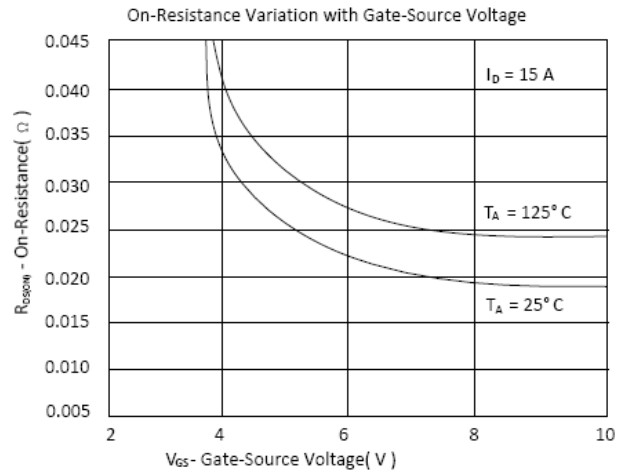
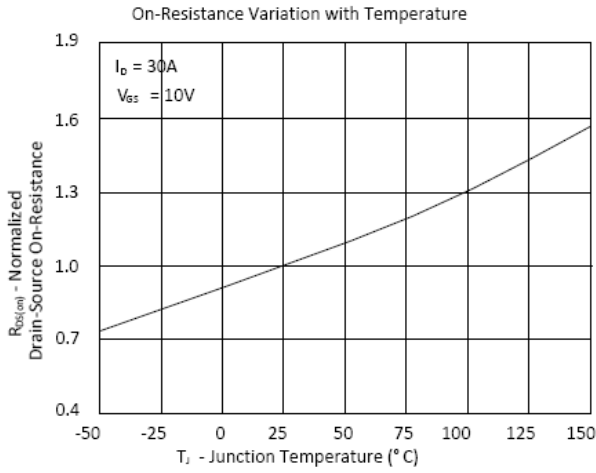
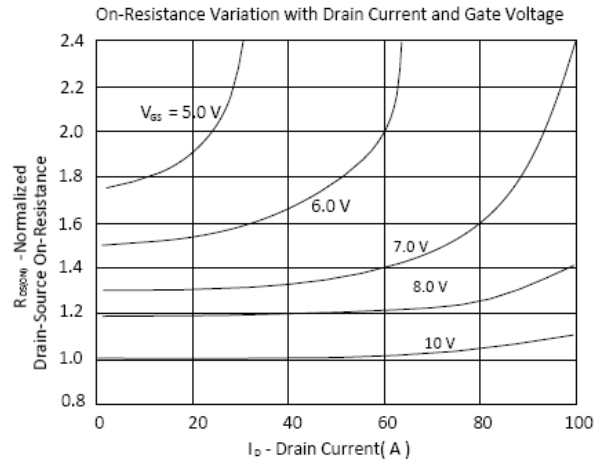
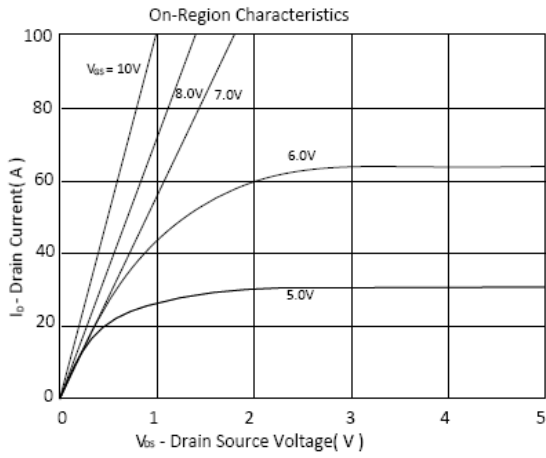
*Pulse Test : Pulse Width ≤300μs, Duty Cycle ≤2%

Ordering Information

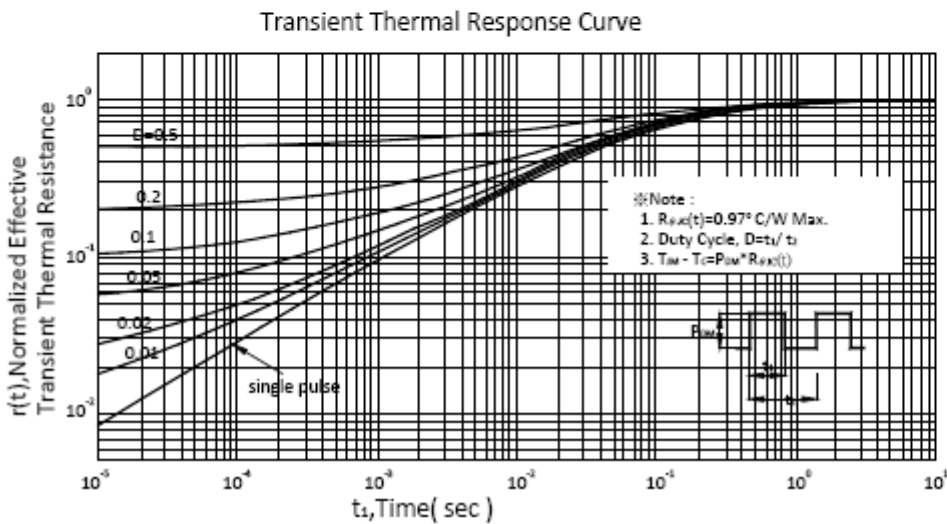
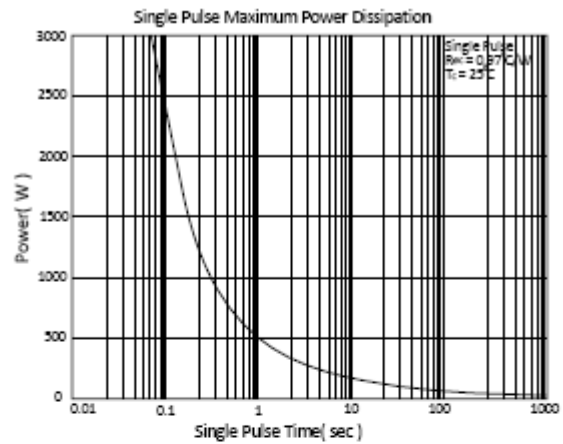
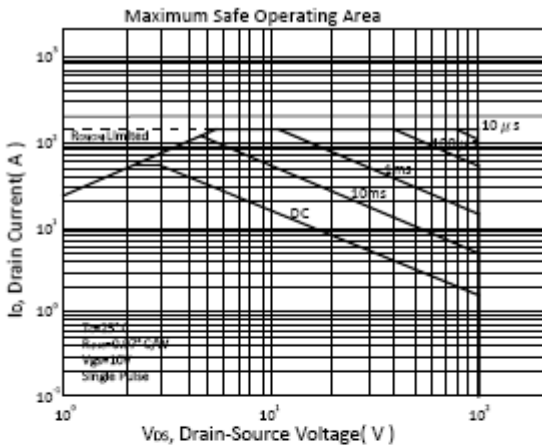
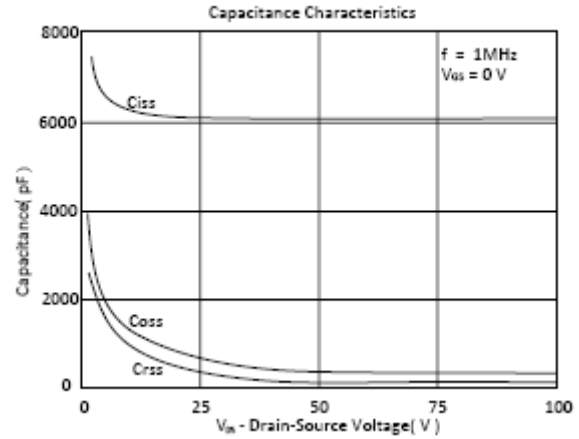
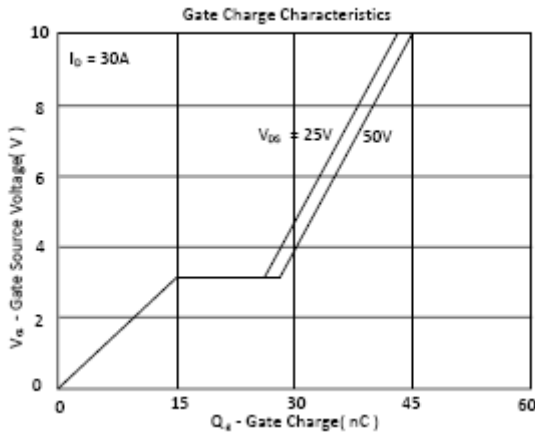
Device	Package	Shipping
MTN2510E3	TO-220 (RoHS compliant)	50 pcs/tube, 20 tubes/box, 4 boxes / carton



Typical Characteristics



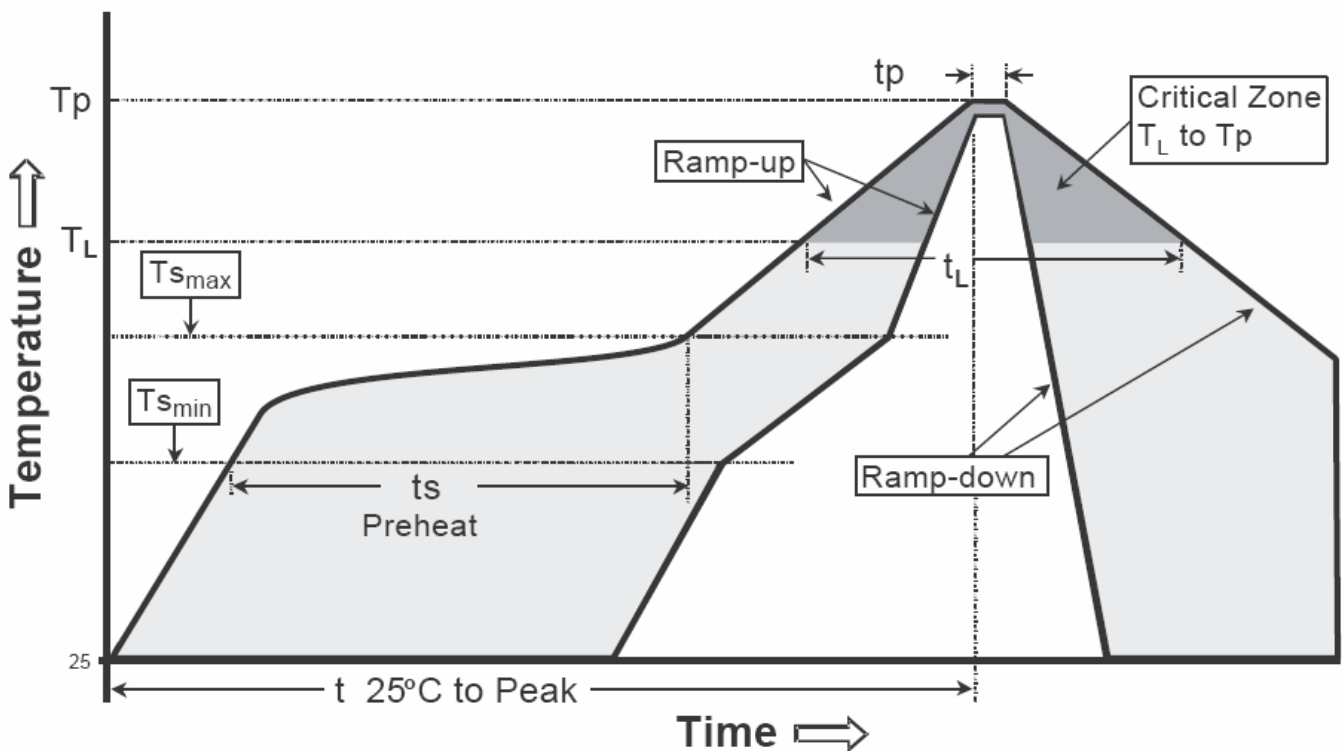
Typical Characteristics(Cont.)



Recommended wave soldering condition

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

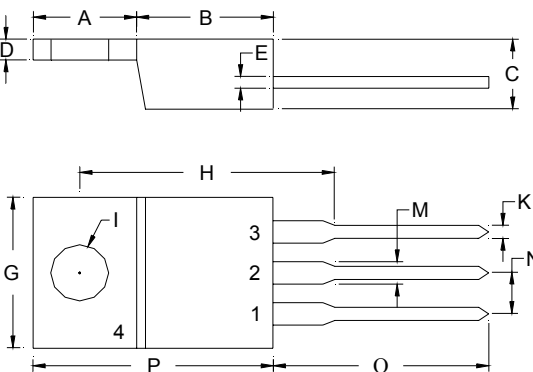
Recommended temperature profile for IR reflow



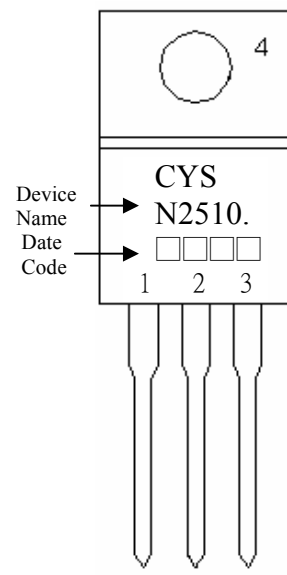
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T _{s min})	100°C	150°C
-Temperature Max(T _{s max})	150°C	200°C
-Time(t _{s min} to t _{s max})	60-120 seconds	60-180 seconds
Time maintained above:		
-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(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



Marking:



3-Lead TO-220 Plastic Package
CYStek Package Code: E3

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

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.2441	0.2598	6.20	6.60	I	-	*0.1508	-	*3.83
B	0.3386	0.3543	8.60	9.00	K	0.0299	0.0394	0.76	1.00
C	0.1732	0.1890	4.40	4.80	M	0.0461	0.0579	1.17	1.47
D	0.0492	0.0571	1.25	1.45	N	-	*0.1000	-	*2.54
E	0.0142	0.0197	0.36	0.50	O	0.5217	0.5610	13.25	14.25
G	0.3858	0.4094	9.80	10.40	P	0.5787	0.6024	14.70	15.30
H	-	*0.6398	-	*16.25					

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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