

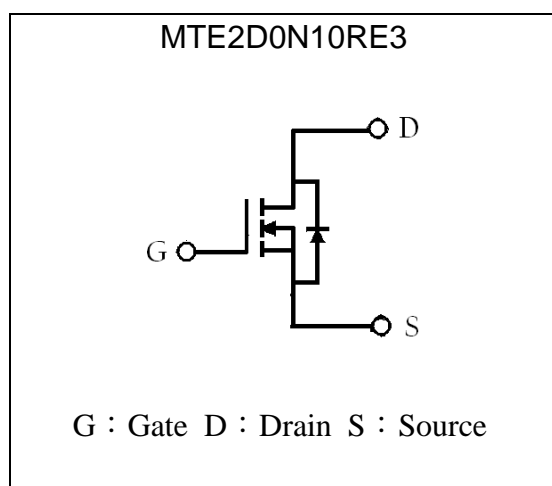
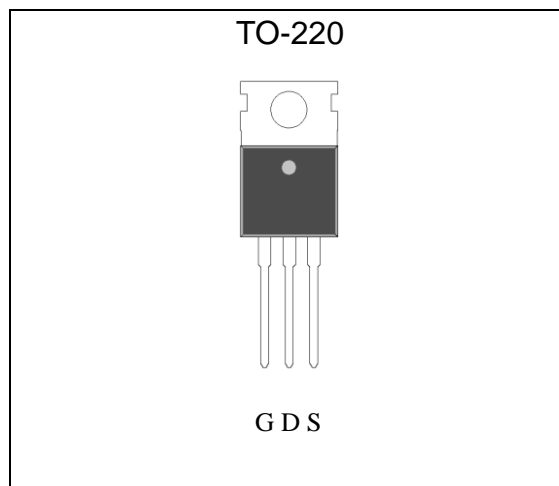
N-Channel Enhancement Mode Power MOSFET

MTE2D0N10RE3

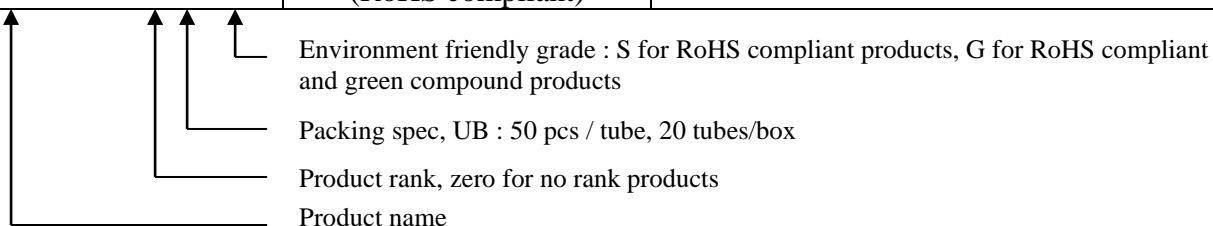
Features

- Low On Resistance
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

BV_{DSS}	100V
$I_D@V_{GS}=10V, T_C=25^\circ C$ (silicon limit)	185A
$I_D@V_{GS}=10V, T_C=25^\circ C$ (package limit)	130A
$I_D@V_{GS}=10V, T_A=25^\circ C$	30A
$R_{DS(on)(typ)}@V_{GS}=10V, I_D=30A$	2.4 m Ω

Symbol

Outline

Ordering Information

Device	Package	Shipping
MTE2D0N10RE3-0-UB-X	TO-220 (RoHS compliant)	50 pcs/tube, 20 tubes/box, 4 boxes / carton



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

Parameter	Symbol	Limits	Unit	
Drain-Source Voltage	V _{DS}	100	V	
Gate-Source Voltage	V _{GS}	±20		
Continuous Drain Current @ T _C =25°C, V _{GS} =10V(silicon limit)	I _D	185 *1	A	
Continuous Drain Current @ T _C =100°C, V _{GS} =10V(silicon limit)		130 *1		
Continuous Drain Current @ T _C =25°C, V _{GS} =10V(package limit)		130		
Continuous Drain Current @ T _A =25°C, V _{GS} =10V		30 *2		
Continuous Drain Current @ T _A =70°C, V _{GS} =10V		25 *2		
Pulsed Drain Current	I _{DM}	520 *3		
Avalanche Current @ L=0.1mH	I _{AS}	30		
Avalanche Energy @ L=0.5mH	E _{AS}	72	mJ	
Total Power Dissipation	P _D	T _C =25°C	180 *1	W
		T _C =100°C	90 *1	
	P _{DSM}	T _A =25°C	5 *2, 4	
		T _A =70°C	3.5 *2, 4	
Operating Junction and Storage Temperature Range	T _j , T _{stg}	-55~+175	°C	

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	R _{θJC}	0.83	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	R _{θJA}	30 *4	

- Note : 1.The power dissipation P_D is based on T_{J(MAX)}=175 °C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- 2.The value of R_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with T_A=25 °C. The value in any given application depends on the user's specific board design. The power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150 °C.
3. Ratings are based on low frequency and low duty cycles to keep initial T_J=25 °C.
4. When mounted on 1 in² copper pad of FR-4 board ; 125°C/W when mounted on minimum copper pad.



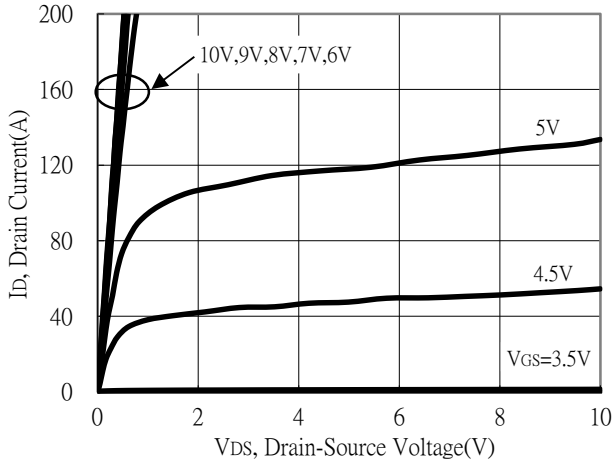
Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	100	-	-	V	V _{GS} =0V, I _D =250μA
V _{GS(th)}	2	-	4		V _{DS} =V _{GS} , I _D =250μA
G _{FS} *1	-	52.3	-	S	V _{DS} =5V, I _D =20A
I _{GSS}	-	-	±100	nA	V _{GS} =±20V, V _{DS} =0V
I _{DSS}	-	-	1	μA	V _{DS} =80V, V _{GS} =0V
	-	-	10		V _{DS} =80V, V _{GS} =0V, T _J =85°C
R _{DS(ON)} *1	-	2.4	3	mΩ	V _{GS} =10V, I _D =30A
Dynamic					
C _{iss}	-	8100	-	pF	V _{DS} =50V, V _{GS} =0V, f=1MHz
C _{oss}	-	1230	-		
C _{rss}	-	45	-		
Q _g *1, 2	-	125	-	nC	V _{DS} =80V, I _D =30A, V _{GS} =10V
Q _{gs} *1, 2	-	35	-		
Q _{gd} *1, 2	-	30	-		
t _{d(ON)} *1, 2	-	45	-	ns	V _{DS} =50V, I _D =30A, V _{GS} =10V, R _{GS} =1Ω
t _r *1, 2	-	30	-		
t _{d(OFF)} *1, 2	-	88	-		
t _f *1, 2	-	27	-		
R _g	-	1.0	-	Ω	f=1MHz
Source-Drain Diode					
I _S *1	-	-	30	A	
I _{SM} *3	-	-	120		
V _{SD} *1	-	0.8	1.2	V	I _S =30A, V _{GS} =0V
t _{rr}	-	75	-	ns	I _F =30A, dI _F /dt=100A/μs
Q _{rr}	-	150	-	nC	

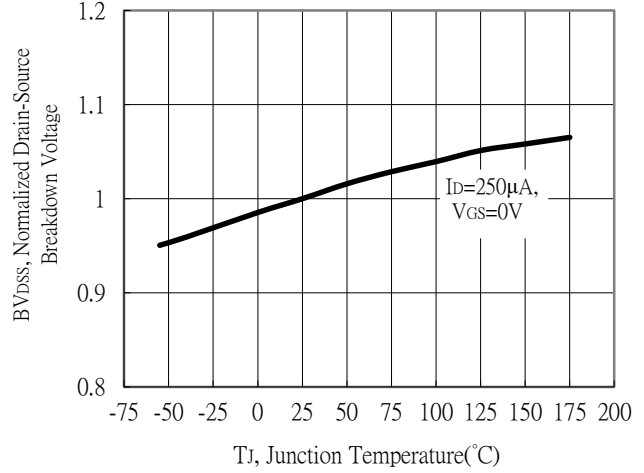
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
 *2.Independent of operating temperature
 *3.Pulse width limited by maximum junction temperature.

Typical Characteristics

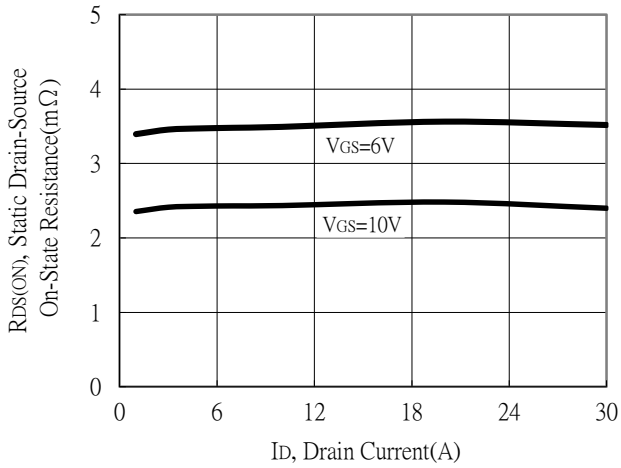
Typical Output Characteristics



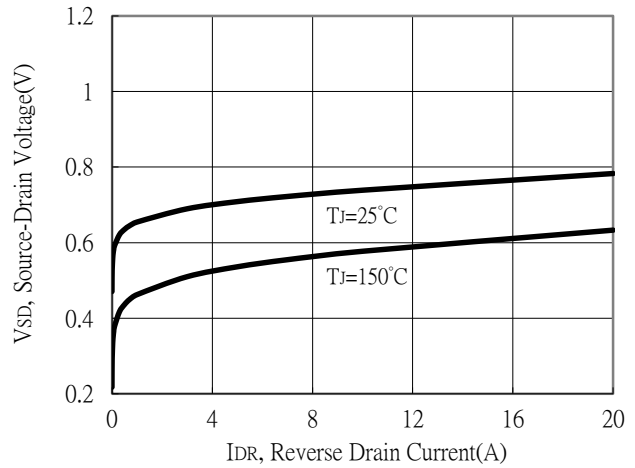
Brekdown Voltage vs Ambient Temperature



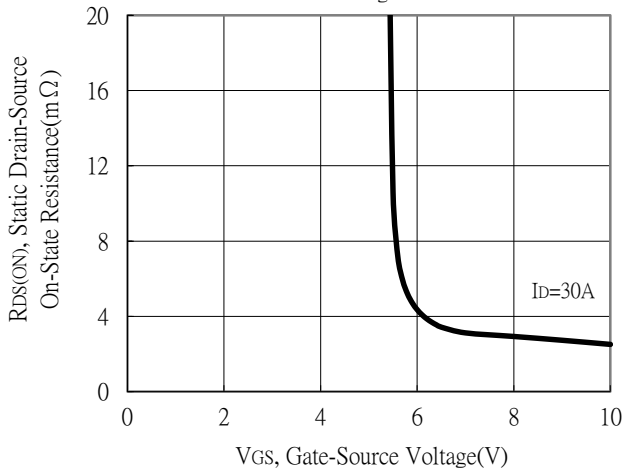
Static Drain-Source On-State resistance vs Drain Current



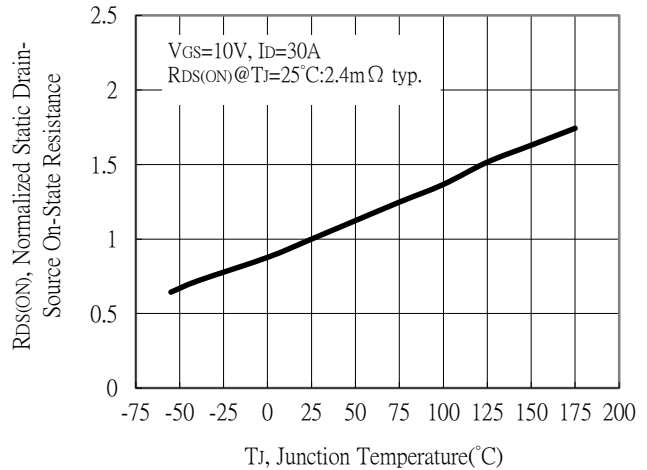
Reverse Drain Current vs Source-Drain Voltage



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

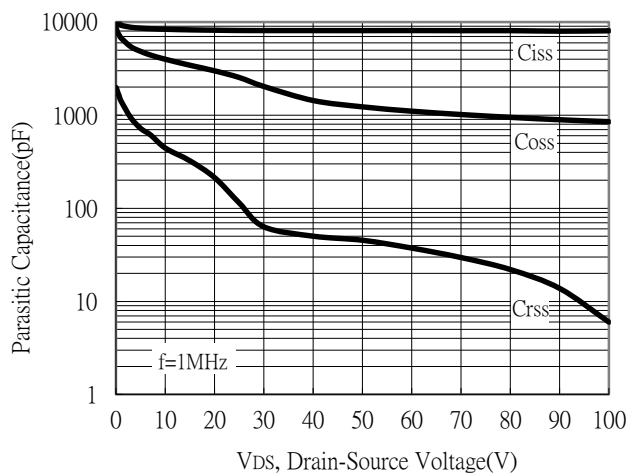


Drain-Source On-State Resistance vs Junction Temperature

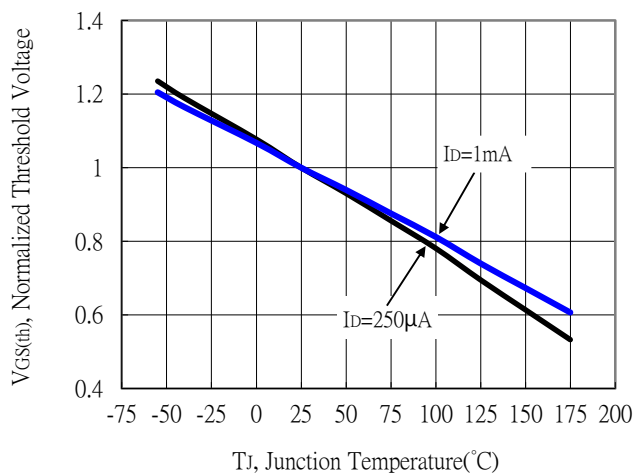


Typical Characteristics(Cont.)

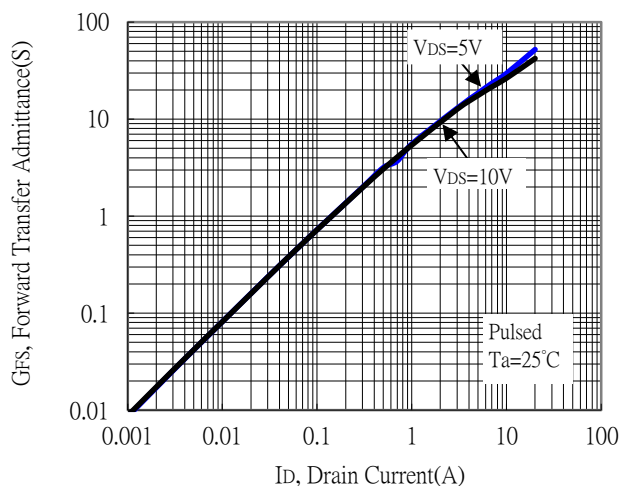
Capacitance vs Drain-to-Source Voltage



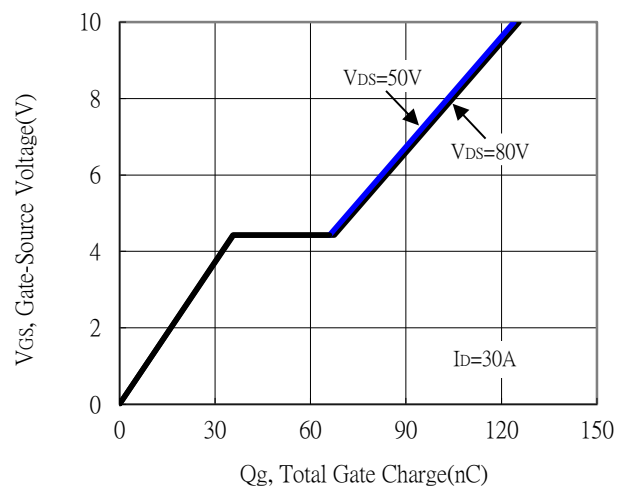
Threshold Voltage vs Junction Temperature



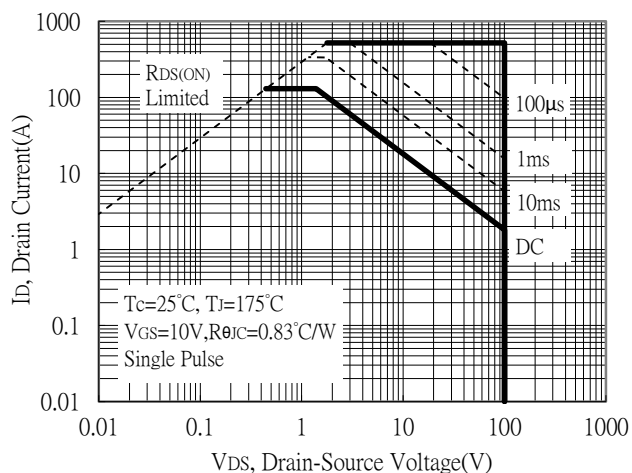
Forward Transfer Admittance vs Drain Current



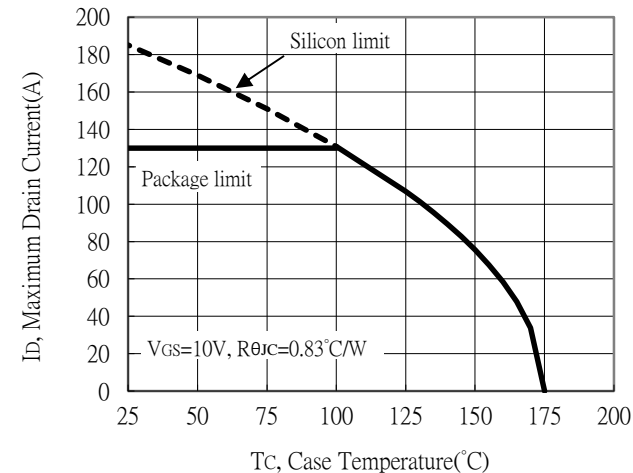
Gate Charge Characteristics



Maximum Safe Operating Area

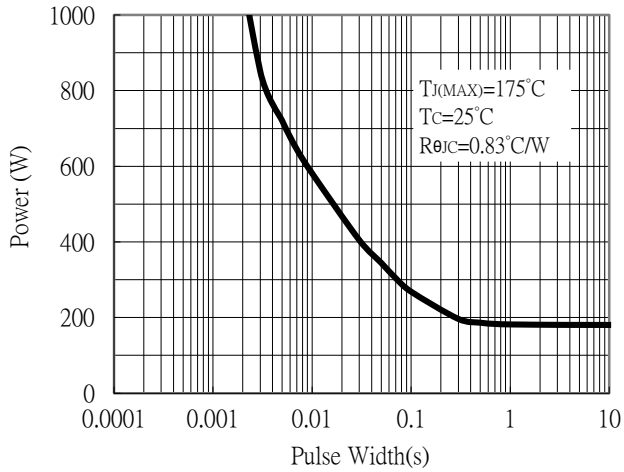


Maximum Drain Current vs Case Temperature

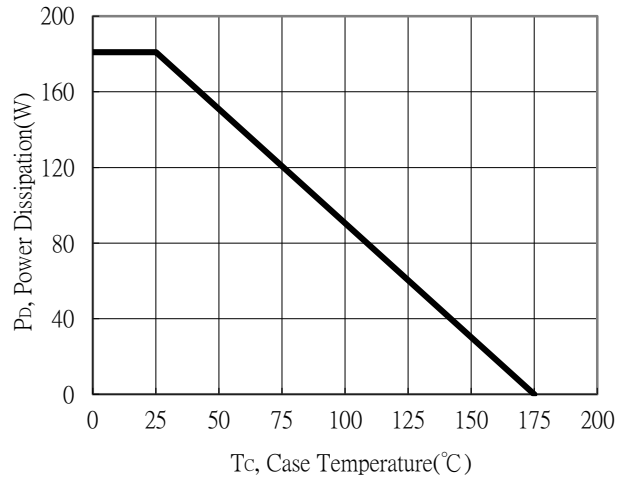


Typical Characteristics(Cont.)

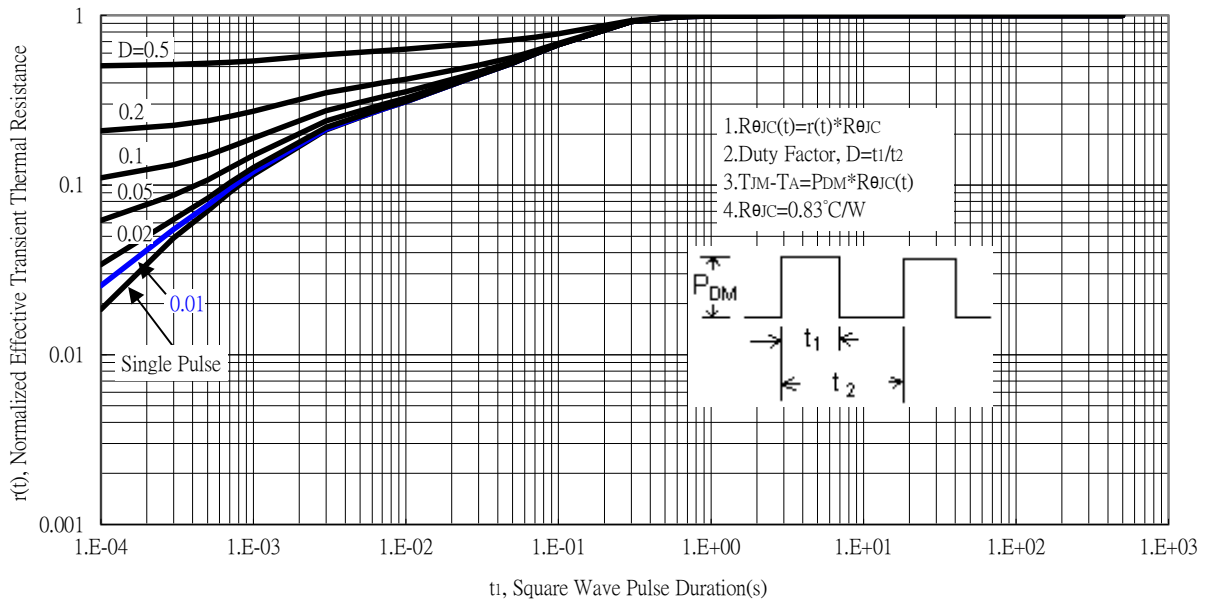
Single Pulse Maximum Power Dissipation



Power Derating Curve

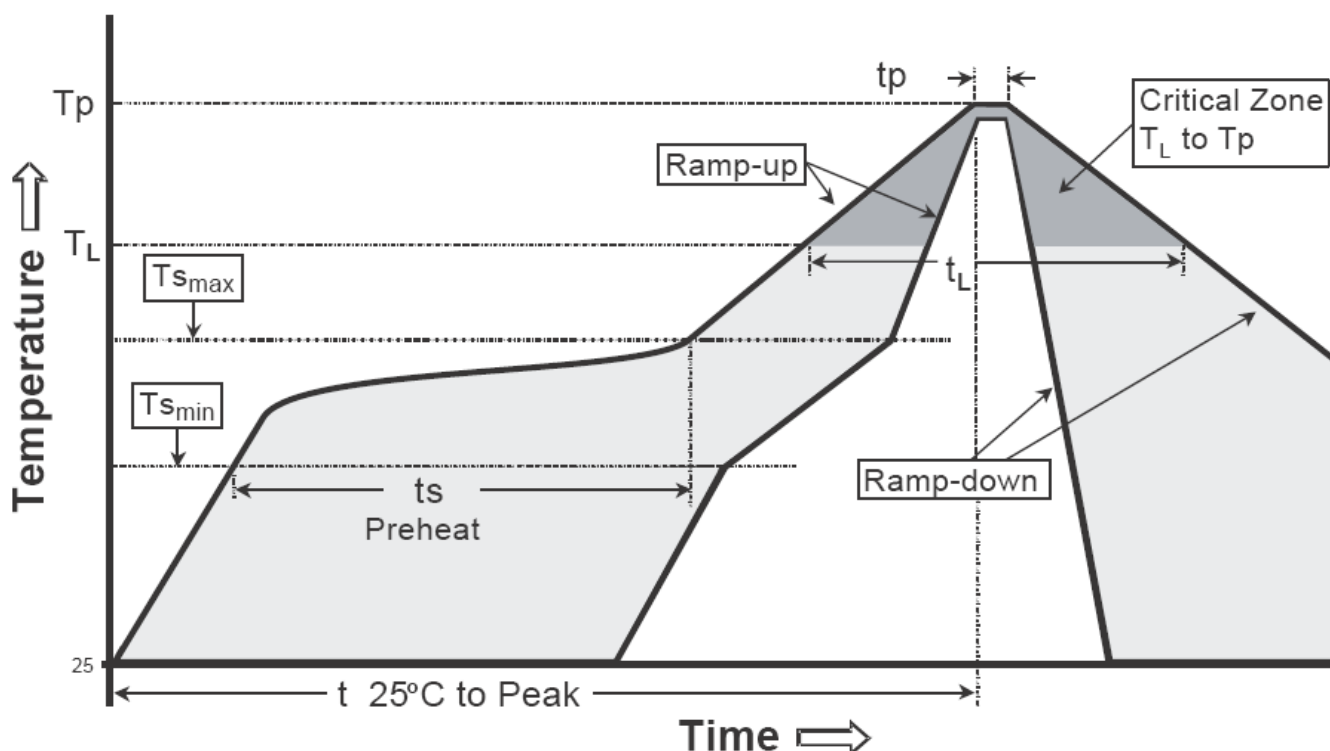


Transient Thermal Response Curves



Recommended wave soldering condition

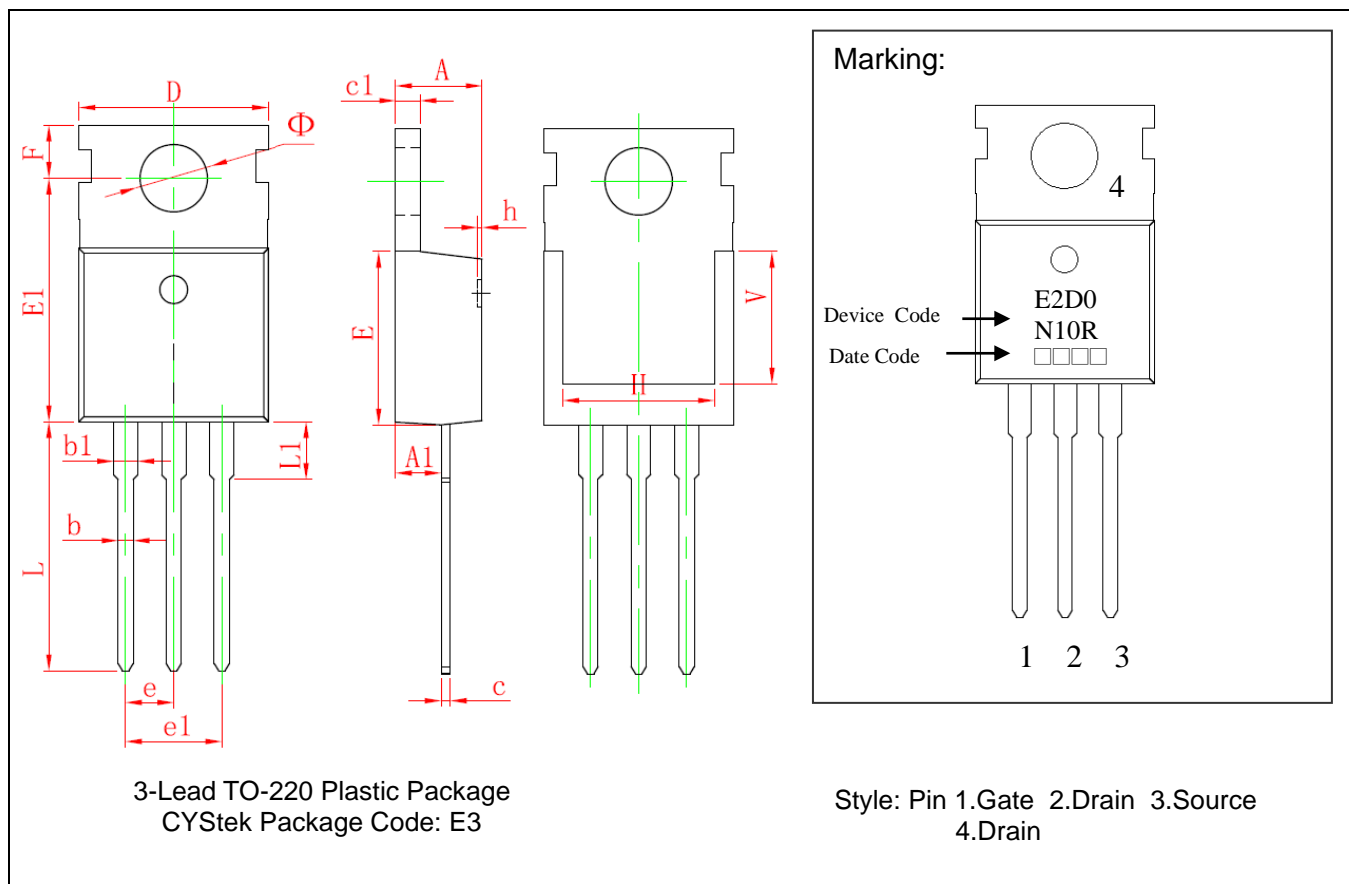
Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

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	4.400	4.600	0.173	0.181	e	2.540*		0.100*	
A1	2.250	2.550	0.089	0.100	e1	4.980	5.180	0.196	0.204
b	0.710	0.910	0.028	0.036	F	2.650	2.950	0.104	0.116
b1	1.170	1.370	0.046	0.054	H	7.900	8.100	0.311	0.319
c	0.330	0.650	0.013	0.026	h	0.000	0.300	0.000	0.012
c1	1.200	1.400	0.047	0.055	L	12.900	13.400	0.508	0.528
D	9.910	10.250	0.390	0.404	L1	2.850	3.250	0.112	0.128
E	8.950	9.750	0.352	0.384	V	7.500	REF	0.295	REF
E1	12.650	12.950	0.498	0.510	Φ	3.400	3.800	0.134	0.150

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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