P-Channel Logic Level Enhancement Mode Power MOSFET

MTEF1P15L3

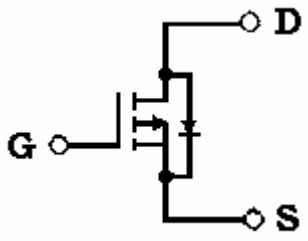
BV_{DSS}	-150V
I_D	-1.4A
R_{DSON}@V_{GS}=-10V, I_D=-1.4A	0.64Ω (typ)
R_{DSON}@V_{GS}=-6V, I_D=-2A	0.7Ω (typ)

Features

- Low Gate Charge
- Simple Drive Requirement
- Pb-free lead plating & halogen-free package

Equivalent Circuit

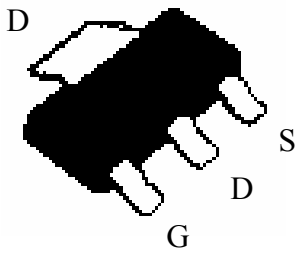
MTEF1P15L3



G：Gate D：Drain
S：Source

Outline

SOT-223



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

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	-150	V
Gate-Source Voltage	V_{GS}	±30	
Continuous Drain Current @ V_{GS}=-10V, T_C=25°C	I_D	-2	A
Continuous Drain Current @ V_{GS}=-10V, T_C=100°C		-1.3	
Continuous Drain Current @ V_{GS}=-10V, T_A=25°C		-1.4	
Continuous Drain Current @ V_{GS}=-10V, T_A=70°C		-1.1	
Pulsed Drain Current *1	I_{DM}	-8	
Avalanche Current	I_{AS}	-1.4	
Avalanche Energy @ L=10mH, I_D=-1.4A, R_G=25Ω	E_{AS}	9.8	mJ
Repetitive Avalanche Energy @ L=0.05mH *2	E_{AR}	2	
Total Power Dissipation @T_A=25℃	Pd	2.5	W
Total Power Dissipation @T_A=100℃		1	
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+150	°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	$R_{th,j\text{-}c}$	25	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j\text{-}a}$	50 (Note)	°C/W

Note : Surface mounted on a 1 in^2 pad of 2 oz. copper, t≤10s; 110°C/W when mounted on minimum copper pad.

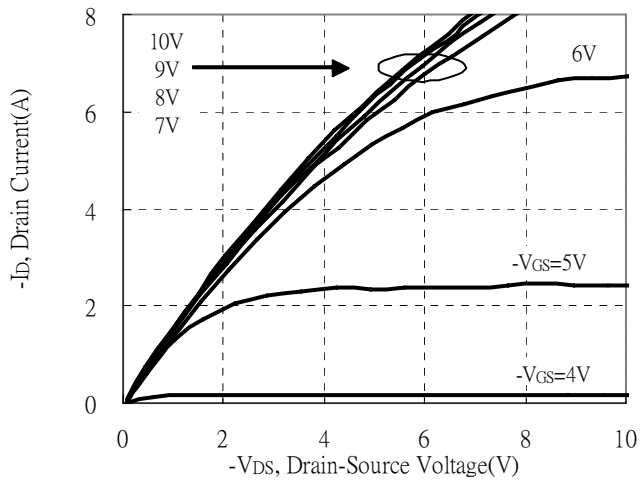
Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-150	-	-	V	V_{GS}=0, I_D=-250μA
$V_{GS(th)}$	-2	-3.2	-4		V_{DS} =V_{GS}, I_D=-250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±30, V_{DS}=0
I_{DSS}	-	-	-1	μA	V_{DS} =-120V, V_{GS} =0
	-	-	-10		V_{DS} =-120V, V_{GS} =0, T_J=125°C
$R_{DS(ON)}$ *1	-	0.64	0.85	Ω	V_{GS} =-10V, I_D=-1.4A
	-	0.7	0.9		V_{GS} =-6V, I_D=-1A
G_{FS} *1	-	2.5	-	S	V_{DS} =-10V, I_D=-1.4A
Dynamic					
Qg *1, 2	-	6	-	nC	I_D=-1.4A, V_{DS}=-75V, V_{GS}=-10V
Qgs *1, 2	-	2	-		
Qgd *1, 2	-	1.4	-		
$t_{d(ON)}$ *1, 2	-	8	-	ns	V_{DS}=-75V, I_D=-1A, V_{GS}=-10V, R_G=6Ω
tr *1, 2	-	6	-		
$t_{d(OFF)}$ *1, 2	-	20	-		
t_f *1, 2	-	4	-		
Ciss	-	475	-	pF	V_{GS}=0V, V_{DS}=-25V, f=1MHz
Coss	-	31	-		
Crss	-	13	-		
Source-Drain Diode					
I_S *1	-	-	-2	A	
I_{SM} *3	-	-	-8		
V_{SD} *1	-	-0.78	-1.2	V	I_S=-1A, V_{GS}=0V
trr	-	60	-	ns	I_F=-1A, dI_F/dt=100A/μs
Qrr	-	120	-	nC	

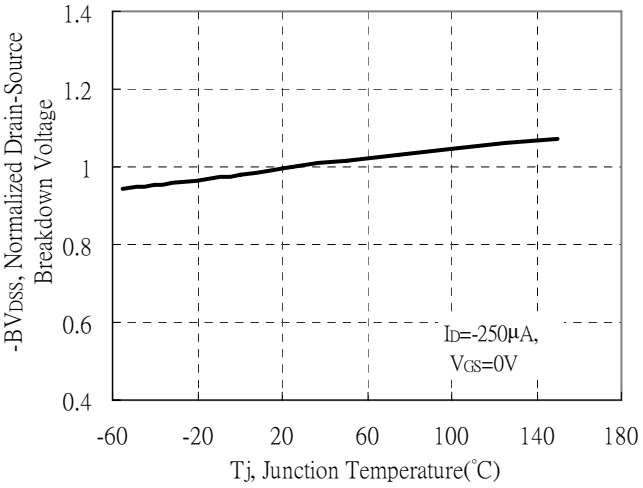
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Typical Characteristics

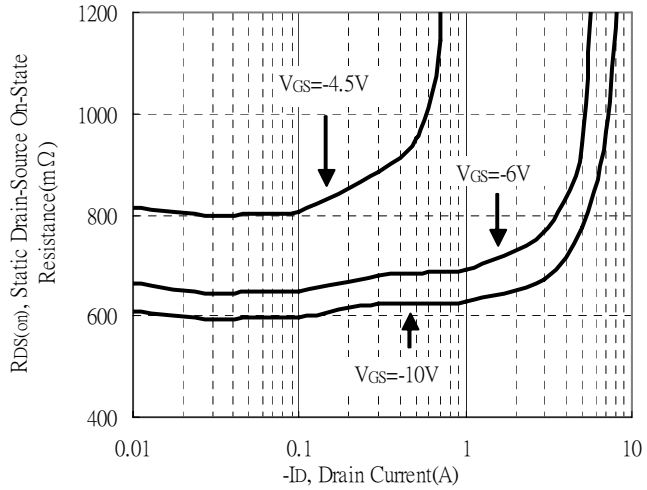
Typical Output Characteristics



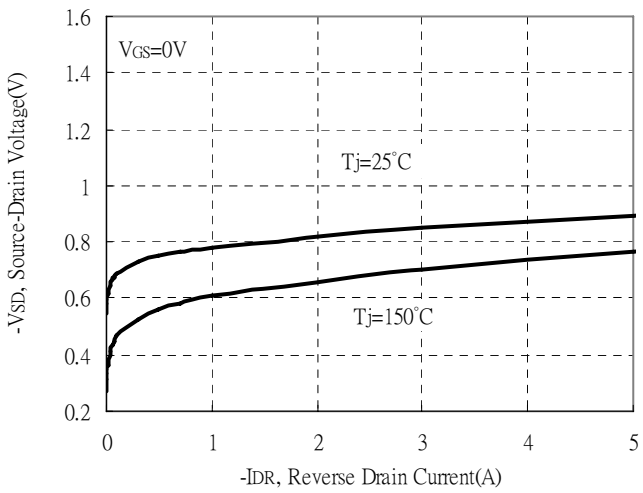
Brekdown Voltage vs Ambient Temperature



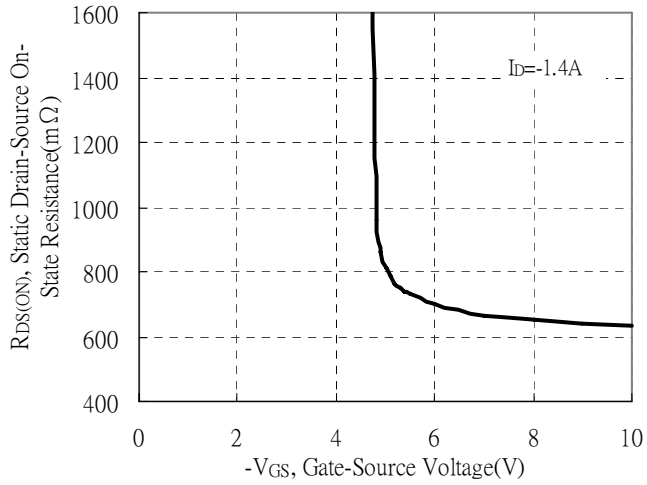
Static Drain-Source On-State resistance vs Drain Current



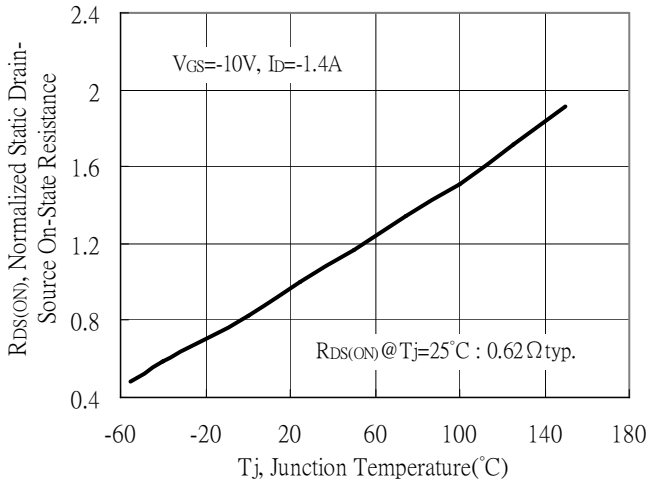
Reverse Drain Current vs Source-Drain Voltage



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

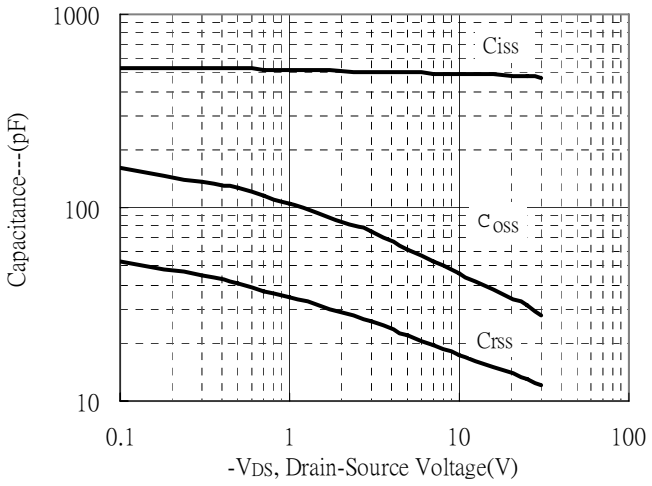


Drain-Source On-State Resistance vs Junction Tempearture

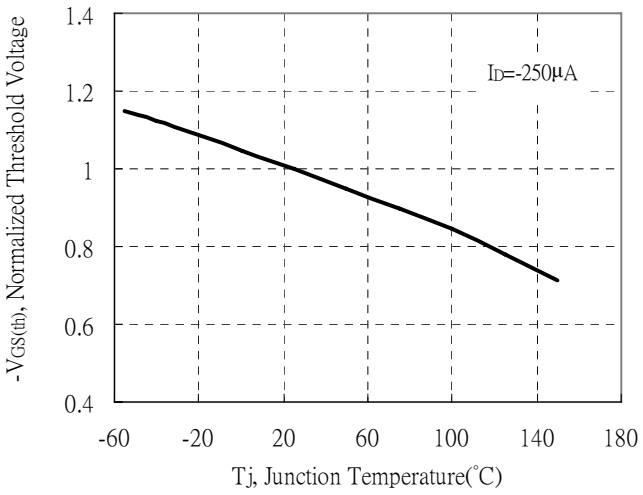


Typical Characteristics(Cont.)

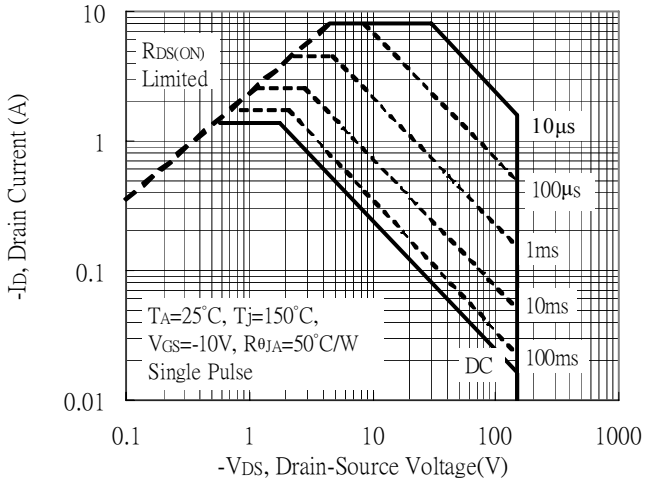
Capacitance vs Drain-to-Source Voltage



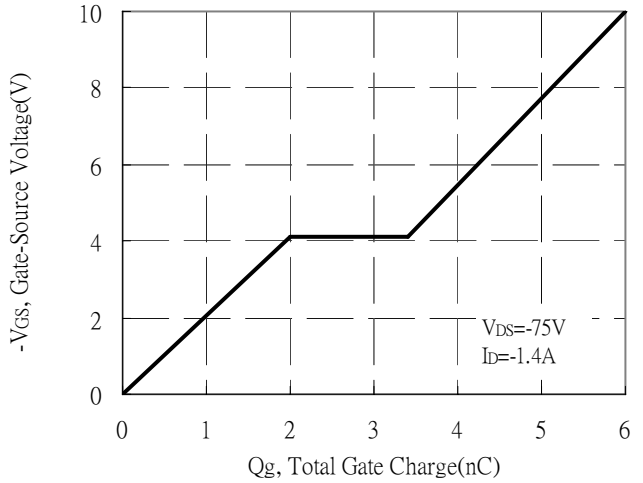
Threshold Voltage vs Junction Tempearture



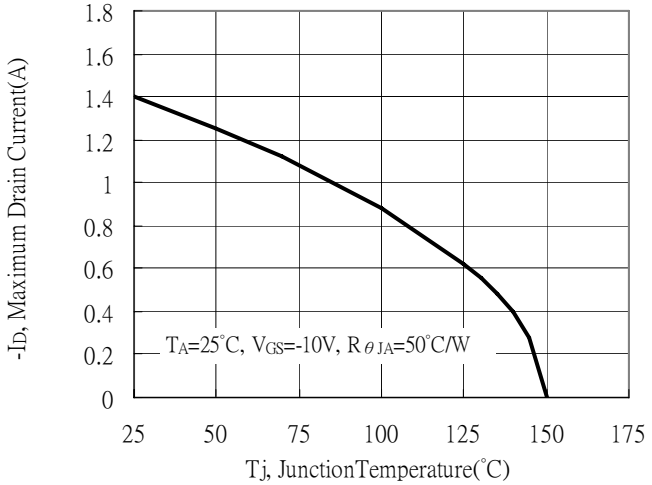
Maximum Safe Operating Area



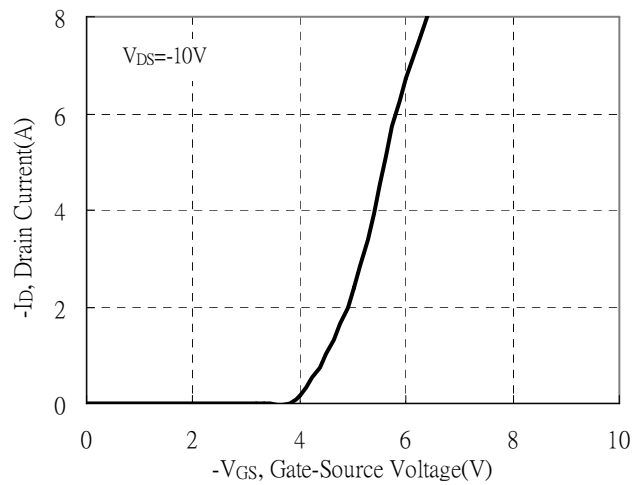
Gate Charge Characteristics



Maximum Drain Current vs Junction Temperature

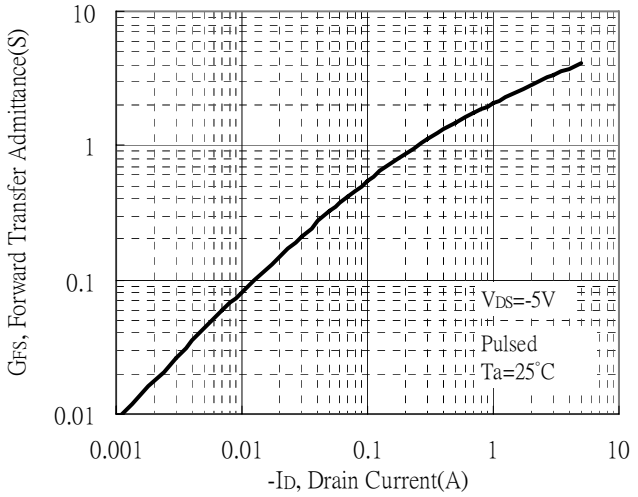


Typical Transfer Characteristics

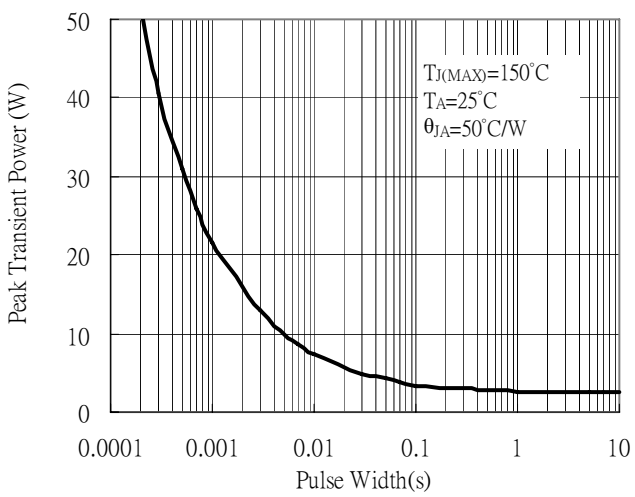


Typical Characteristics(Cont.)

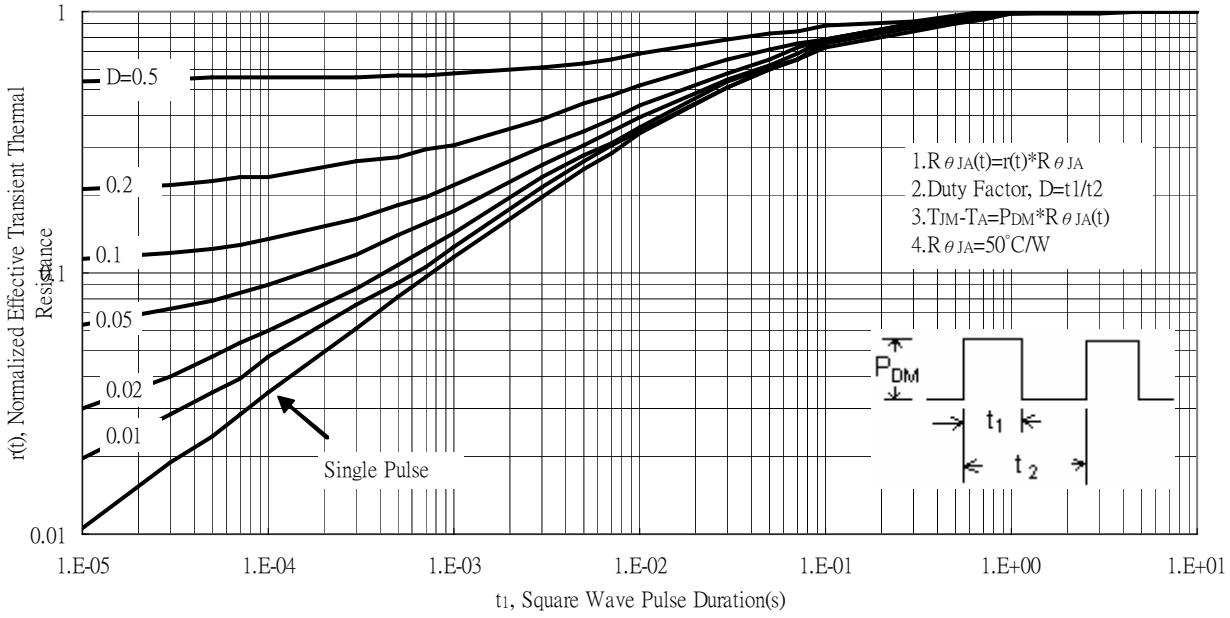
Forward Transfer Admittance vs Drain Current



Single Pulse Maximum Power Dissipation



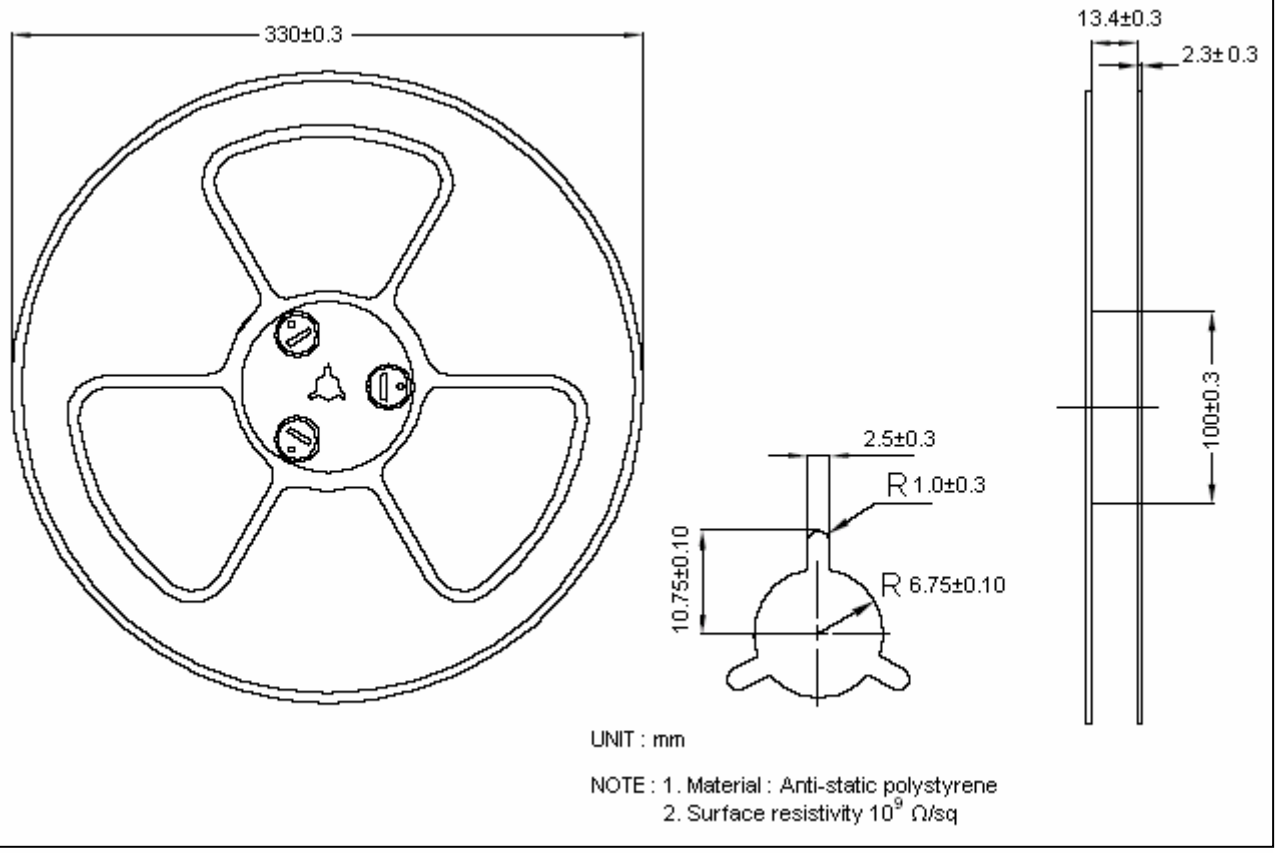
Transient Thermal Response Curves



Ordering Information

Device	Package	Shipping
MTEF1P15L3-0-T3-G	SOT-223 (Pb-free lead plating and halogen-free package)	2500 pcs / Tape & Reel

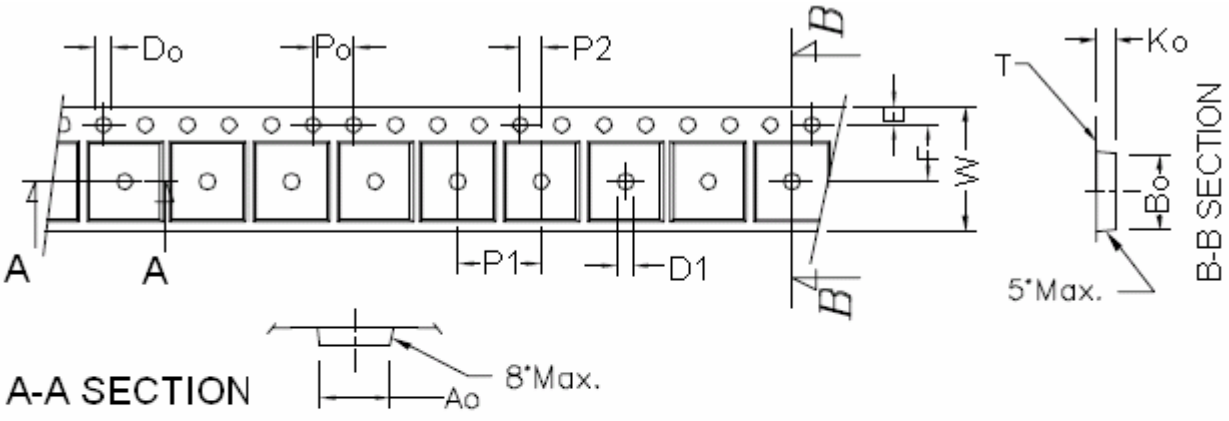
Reel Dimension



UNIT : mm

NOTE : 1. Material : Anti-static polystyrene
2. Surface resistivity 10^9 Ω/sq

Carrier Tape Dimension



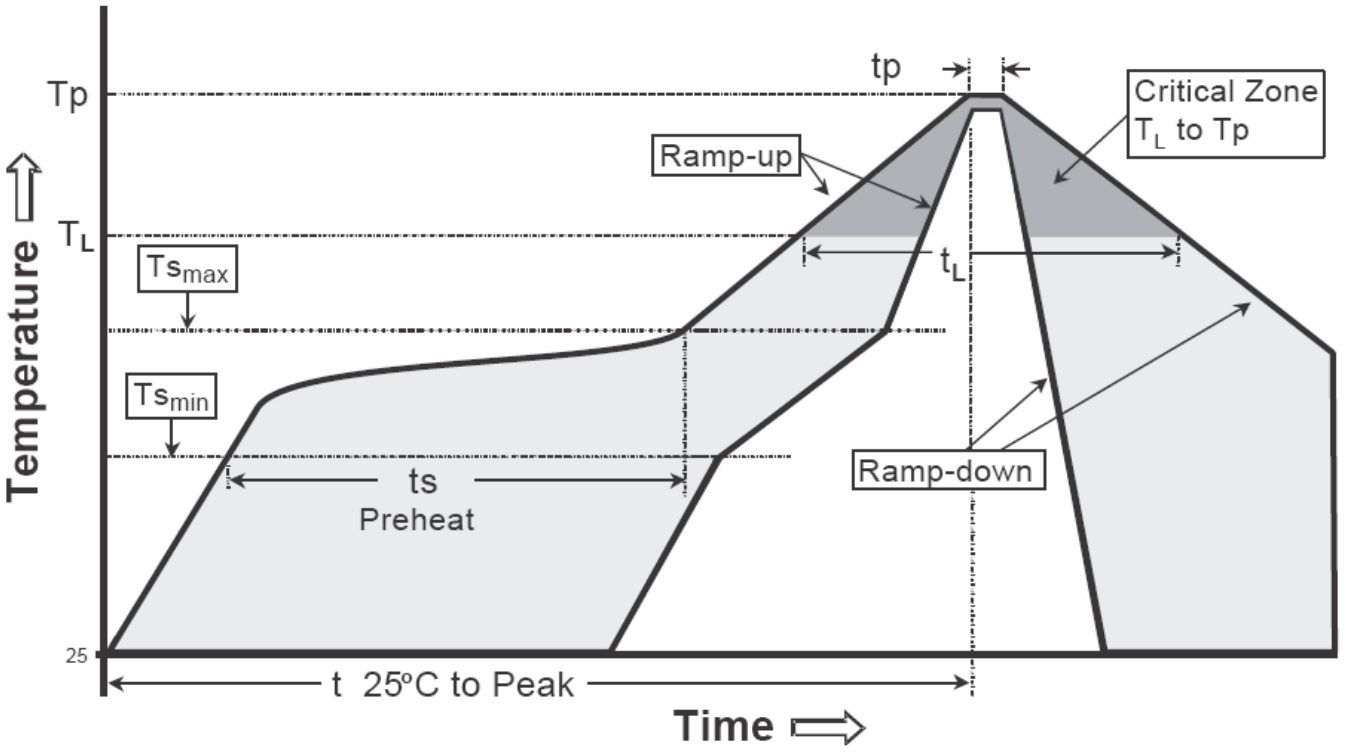
Symbol	Ao	Bo	Ko	Po	P1	P2	T
Spec	6.83±0.1	7.42±0.1	1.88±0.1	4.0±0.1	8.0±0.10	2.0±0.05	0.292±0.02
Symbol	E	F	Do	D1	W	10Po	
Spec	1.75±0.1	5.5±0.05	1.60±0.1	1.5±0.25	$12^{+0.3}_{-0.1}$	40.0±0.2	

Unit : mm

Recommended wave soldering condition

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

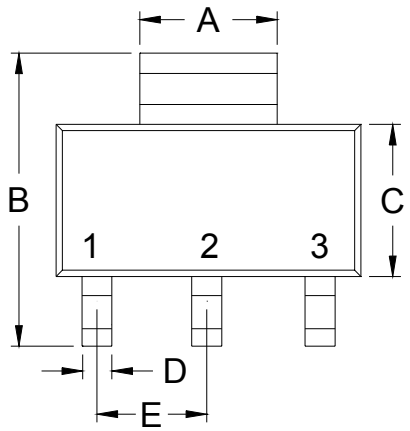
Recommended temperature profile for IR reflow

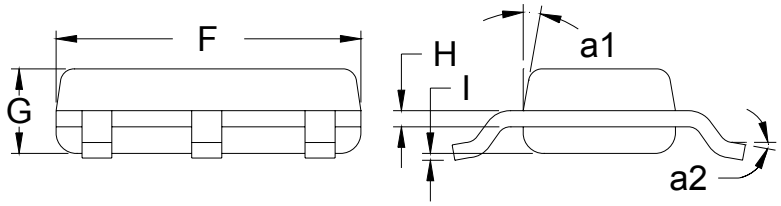


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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

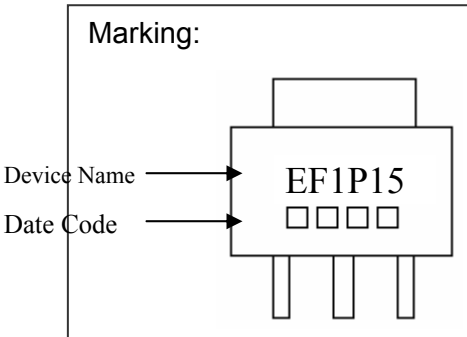
Note : All temperatures refer to topside of the package, measured on the package body surface.

SOT-223 Dimension





Marking:



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

3-Lead SOT-223 Plastic
Surface Mounted Package
CYStek Package Code: L3

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1142	0.1220	2.90	3.10	G	0.0551	0.0709	1.40	1.80
B	0.2638	0.2874	6.70	7.30	H	0.0098	0.0138	0.25	0.35
C	0.1299	0.1457	3.30	3.70	I	0.0008	0.0039	0.02	0.10
D	0.0236	0.0315	0.60	0.80	a1	*13°	-	*13°	-
E	*0.0906	-	*2.30	-	a2	0°	10°	0°	10°
F	0.2480	0.2638	6.30	6.70					

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.