N-Channel Enhancement Mode Power MOSFET

MTN3607E3

BV_{DSS} : 75V
$R_{DS(ON)}$: 7.8 mΩ(typ.)
I_D :75A

Description

The MTN3607E3 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-220 package is universally preferred for all commercial-industrial applications

Features

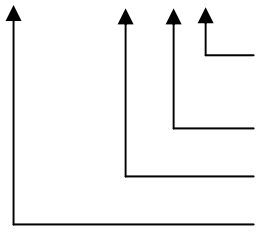
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

Applications

- Switching Mode Power Supply
- Uninterruptible Power Supply
- High Speed Power Switching
- Hard Switched and High Frequency Circuits

Ordering Information

Device	Package	Shipping
MTN3607E3-0-UB-S	TO-220 (RoHS compliant package)	50 pcs/tube, 20 tubes/box, 4 boxes / carton



Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

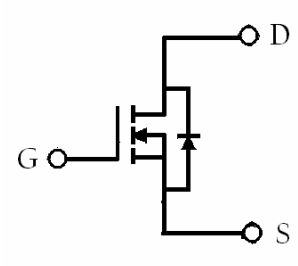
Packing spec, UB : 50 pcs / tube, 20 tubes/box

Product rank, zero for no rank products

Product name

Symbol

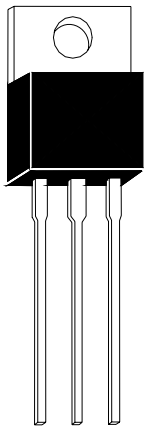
MTN3607E3



G：Gate
D：Drain
S：Source

Outline

TO-220



G D S

Absolute Maximum Ratings (Tc=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage (Note 1)	V_{DS}	75	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	75*	A
Continuous Drain Current @T_C=100°C	I_D	52*	A
Pulsed Drain Current @ V_{GS}=10V (Note 2)	I_{DM}	300*	A
Single Pulse Avalanche Energy (Note 3)	E_{AS}	400	mJ
Avalanche Current (Note 2)	I_{AR}	40	A
Repetitive Avalanche Energy (Note 2)	E_{AR}	23	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	4.5	V/ns
ESD susceptibility (Note 5)		2000	V
Maximum Temperature for Soldering @ Lead at 0.125in(3.175mm) from case for 10 seconds	T_L	300	°C
Total Power Dissipation (T_C=25℃)	P_D	230	W
Linear Derating Factor above 25℃		1.53	W/°C
Operating Junction and Storage Temperature	Tj, Tstg	-55~+175	°C

*Drain current limited by maximum junction temperature

Note : 1. T_J=+25℃ to +150℃.
2. Repetitive rating; pulse width limited by maximum junction temperature.
3. I_{AS}=70A, V_{DD}=25V, L=0.1mH, R_G=25Ω, starting TJ=+25℃.
4. I_{SD}=40A, dI/dt<100A/μs, V_{DD}<BV_{DSS}, TJ=+150℃.
5. Human body model, 1.5kΩ in series with 100pF.

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	0.65	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	62	°C/W

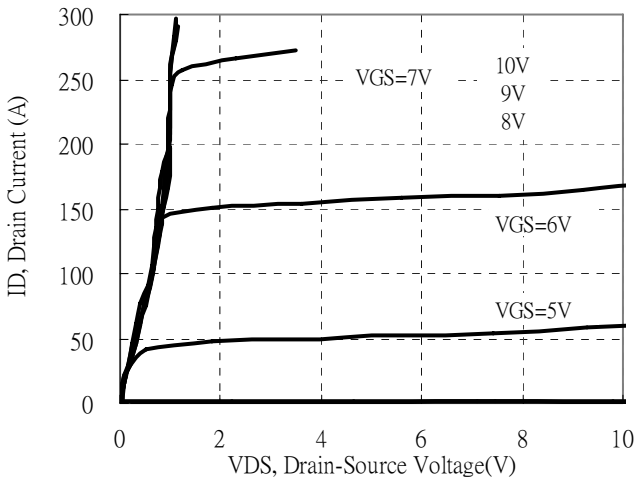
Characteristics (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	75	-	-	V	V_{GS}=0, I_D=250μA
$V_{GS(th)}$	2.0	-	4.0	V	V_{DS} = V_{GS}, I_D=250μA
*G_{FS}	-	25.5	-	S	V_{DS} =15V, I_D=37.5A
I_{GSS}	-	-	±100	nA	V_{GS}=±20
I_{DSS}	-	-	1	μA	V_{DS} =60V, V_{GS} =0
	-	-	10		V_{DS} =50V, V_{GS} =0, Tj=125°C
*$R_{DS(ON)}$	-	7.8	9.5	mΩ	V_{GS} =10V, I_D=37.5A
Dynamic					
*Qg	-	90	-	nC	I_D=37.5A, V_{DD}=38V, V_{GS}=10V
*Qgs	-	24	-		
*Qgd	-	36	-		
*$t_{d(ON)}$	-	20	-	ns	V_{DD}=38V, I_D=75A, V_{GS}=10V, R_G=3.3Ω
*tr	-	25	-		
*$t_{d(OFF)}$	-	27	-		
*t_f	-	18	-		
Ciss	-	5376	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	401	-		
Crss	-	337	-		
Source-Drain Diode					
*I_S	-	-	75	A	
*I_{SM}	-	-	300		
*V_{SD}	-	-	1.5	V	I_S=37.5A, V_{GS}=0V
*trr	-	32	-	ns	V_{GS}=0, I_F=75A, dI/dt=100A/μs
*Qrr	-	40	-	nC	

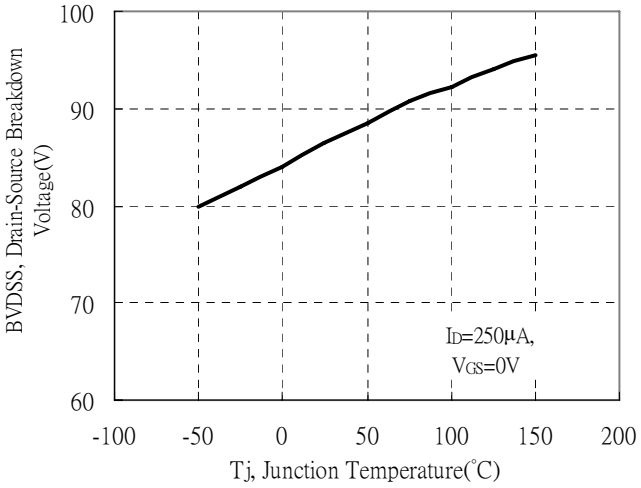
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

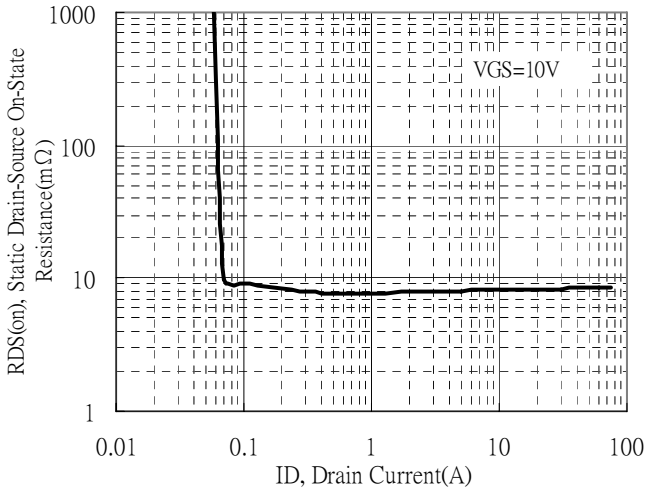
Typical Output Characteristics



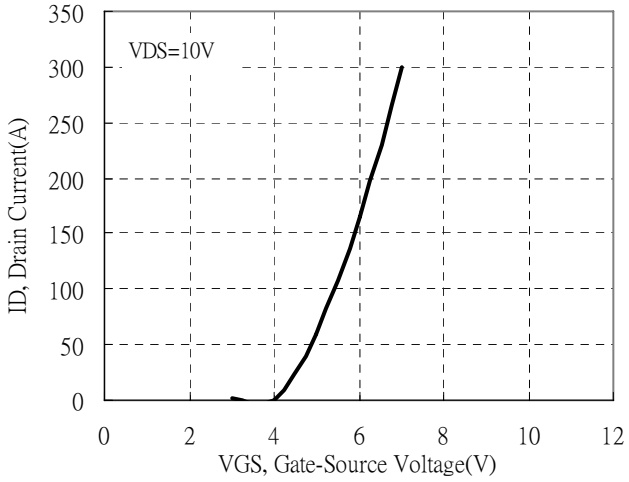
Brekdown Voltage vs Ambient Temperature



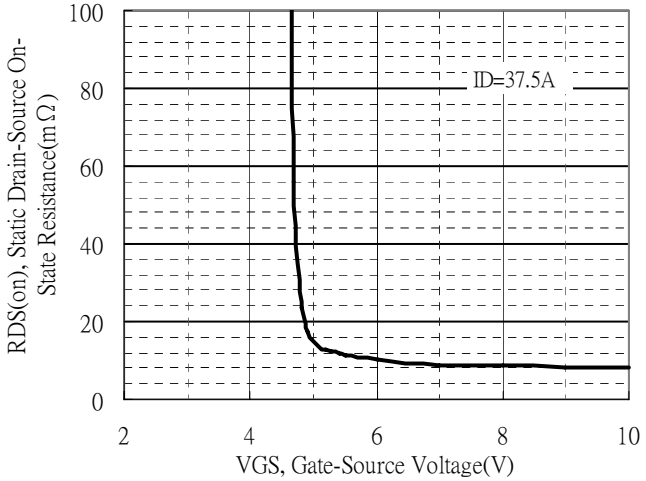
Static Drain-Source On-State resistance vs Drain Current



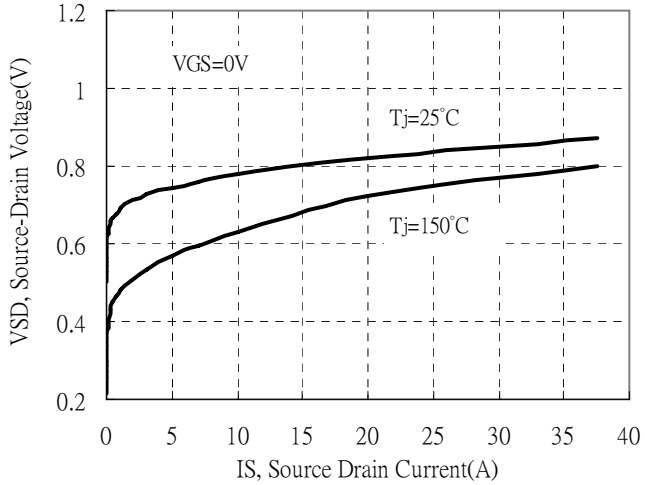
Typical Transfer Characteristics



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

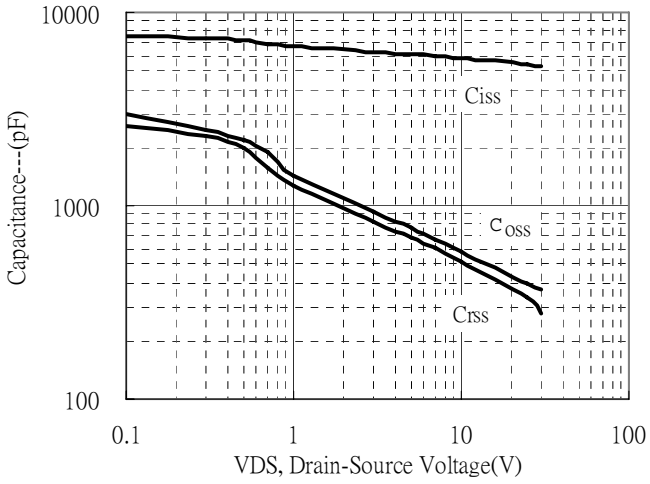


Source Drain Current vs Source-Drain Voltage

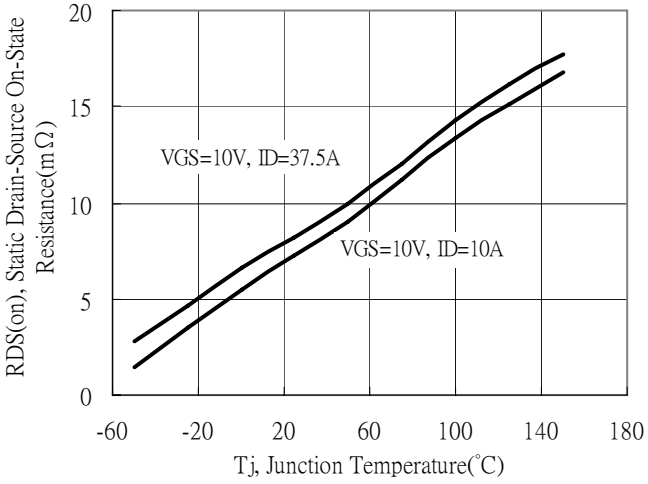


Typical Characteristics(Cont.)

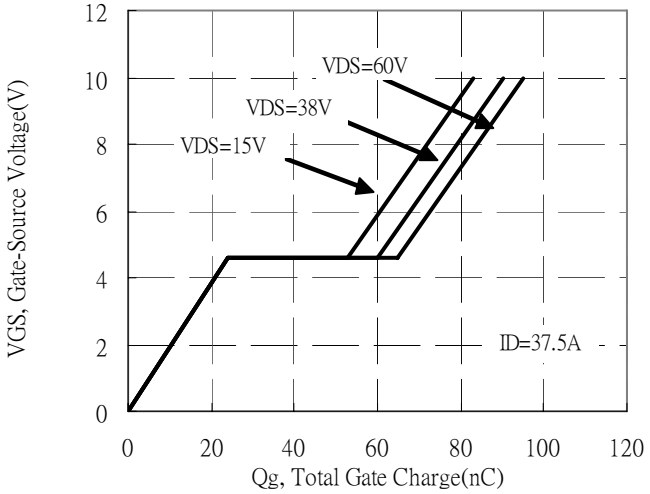
Capacitance vs Drain-to-Source Voltage



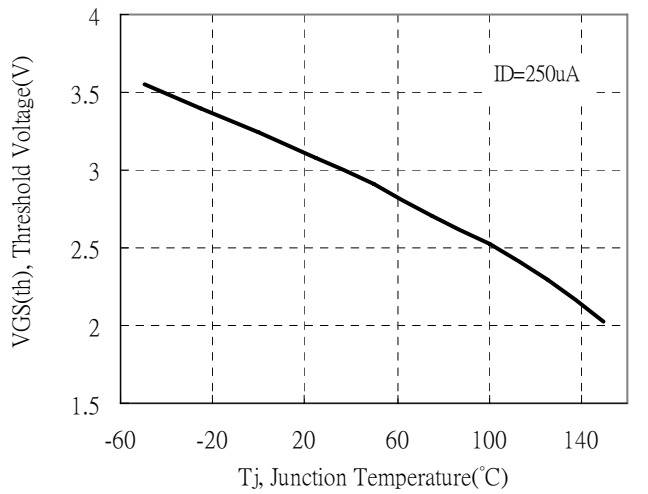
Drain-Source On-State Resistance vs Junction Tempearture



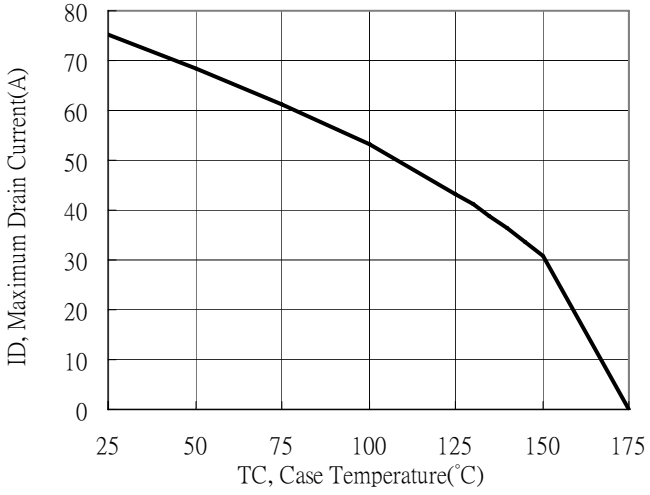
Gate Charge Characteristics



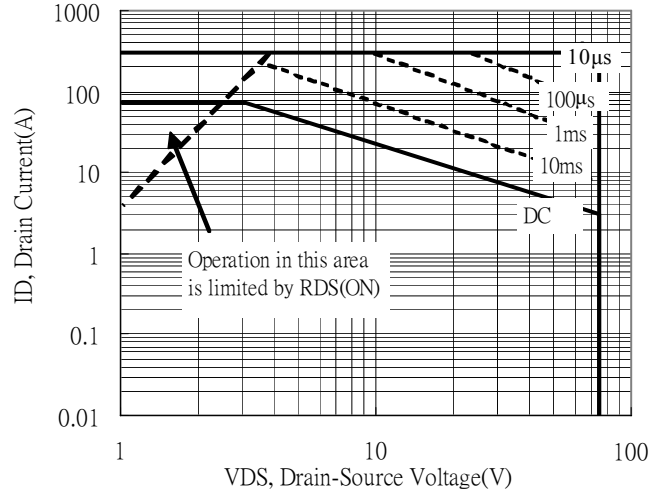
Threshold Voltage vs Junction Tempearture



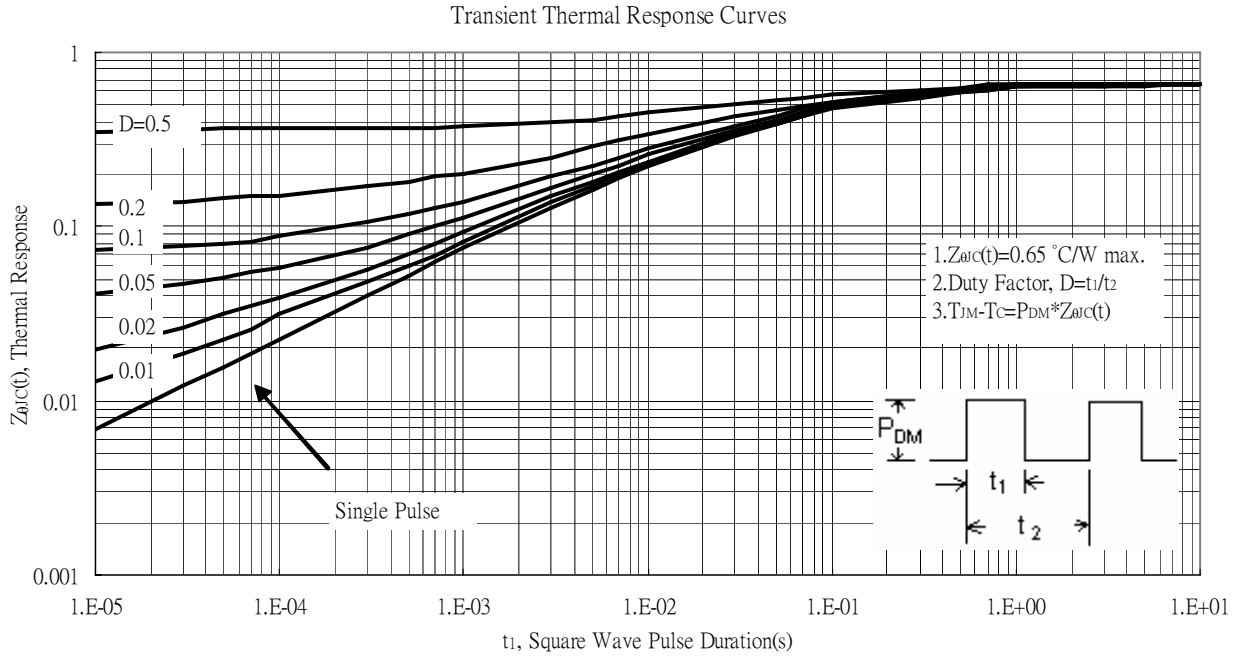
Maximum Drain Current vs Case Temperature



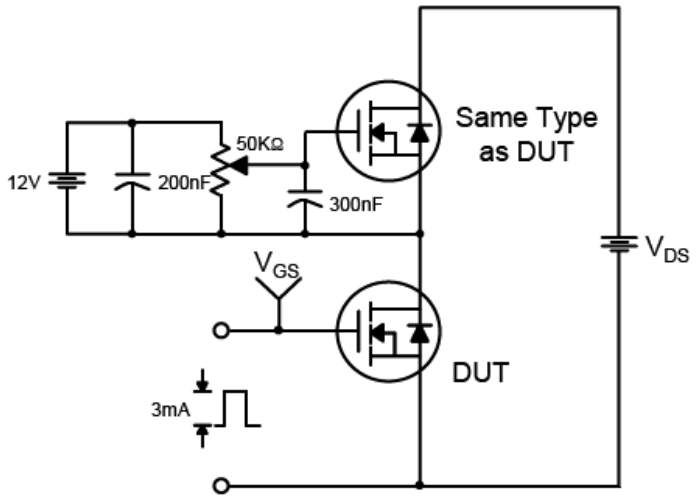
Maximum Safe Operating Area

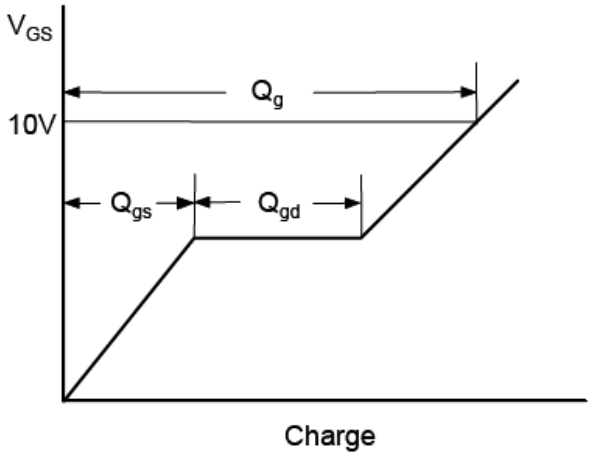


Typical Characteristics(Cont.)

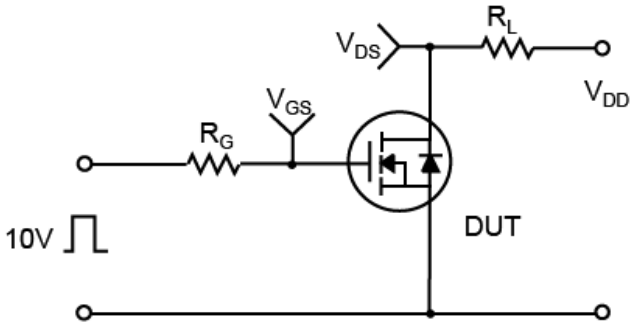


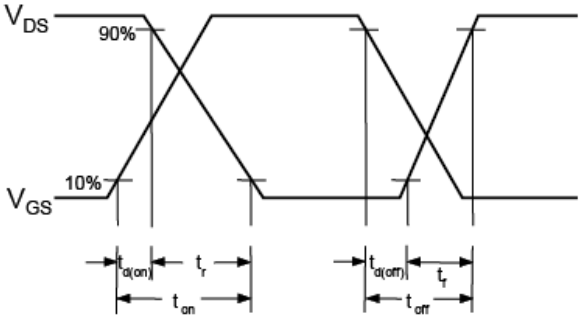
Test Circuit and Waveforms



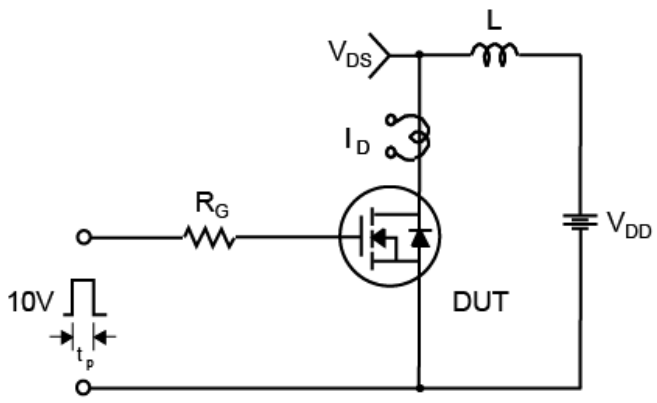


Resistive Switching Test Circuit & Waveforms

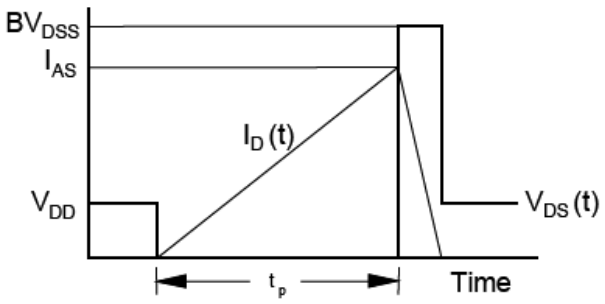




Unclamped Inductive Switching Test Circuit & Waveforms

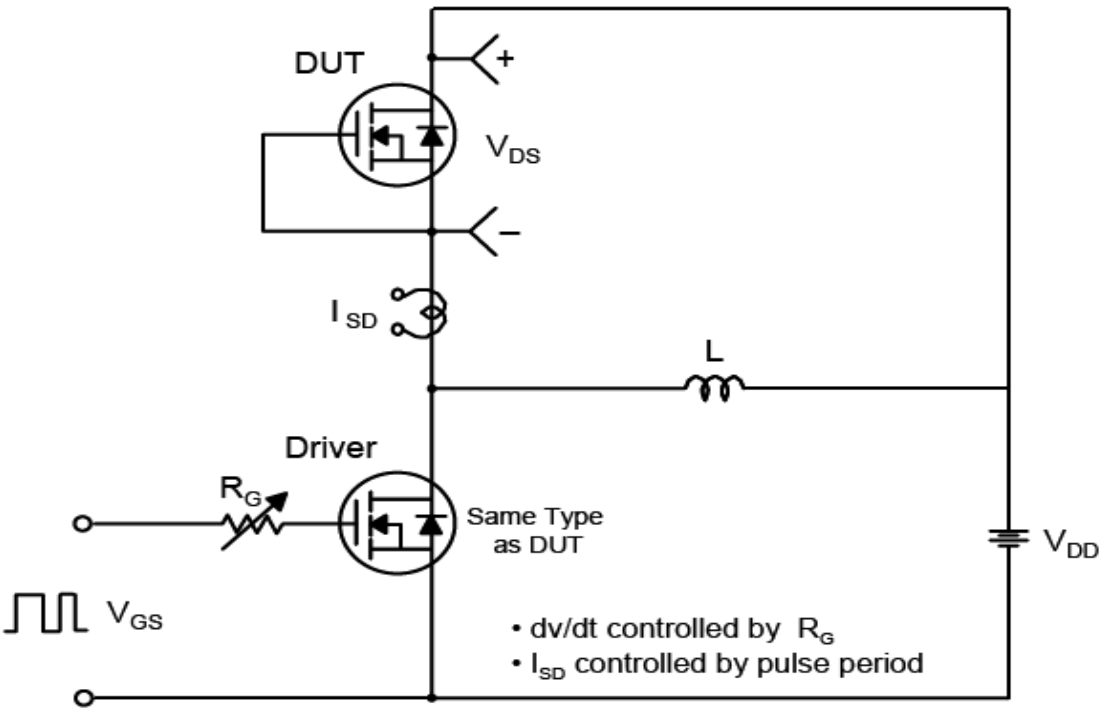


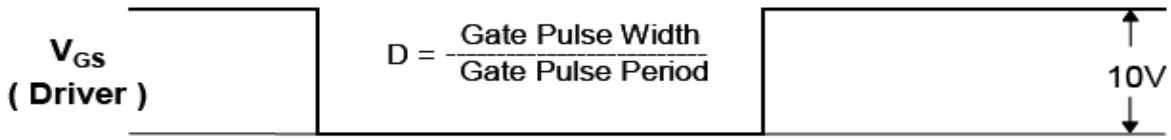
$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

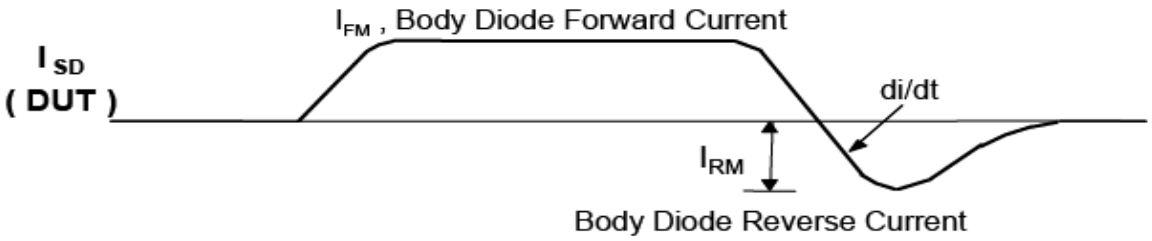


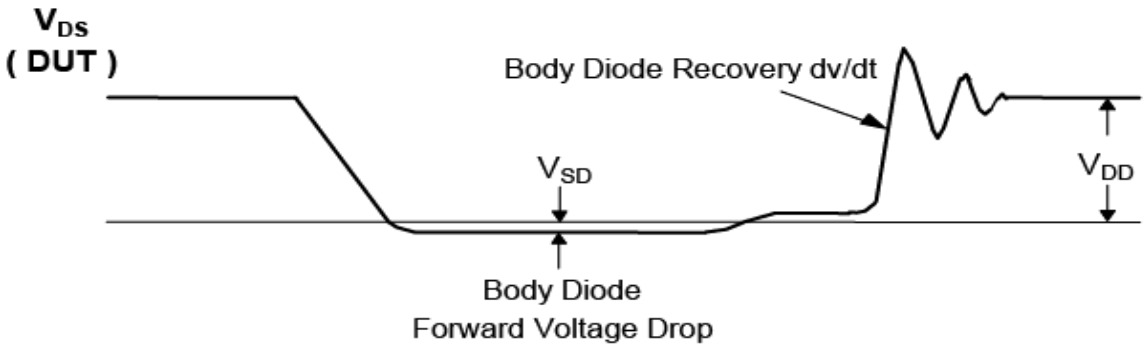
Test Circuit and Waveforms(Cont.)

Peak Diode Recovery dv/dt Test Circuit & Waveforms





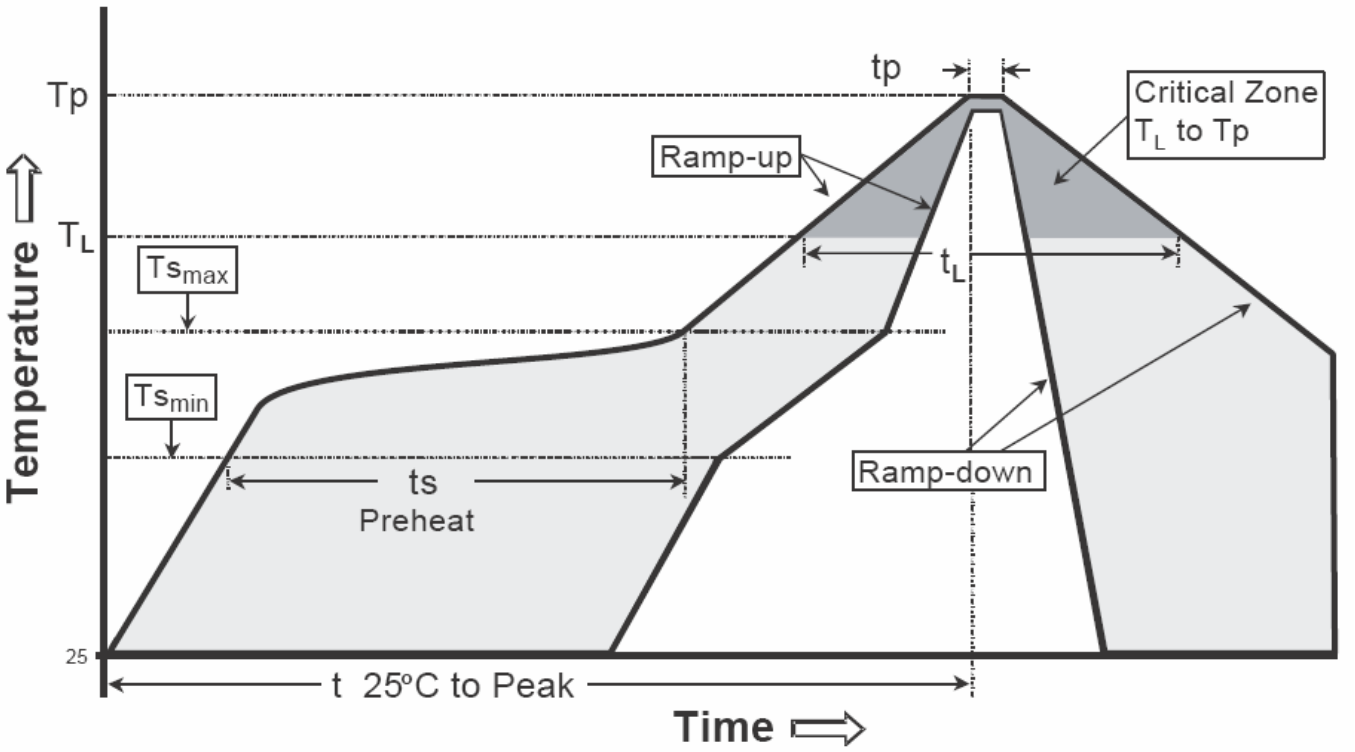




Recommended wave soldering condition

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

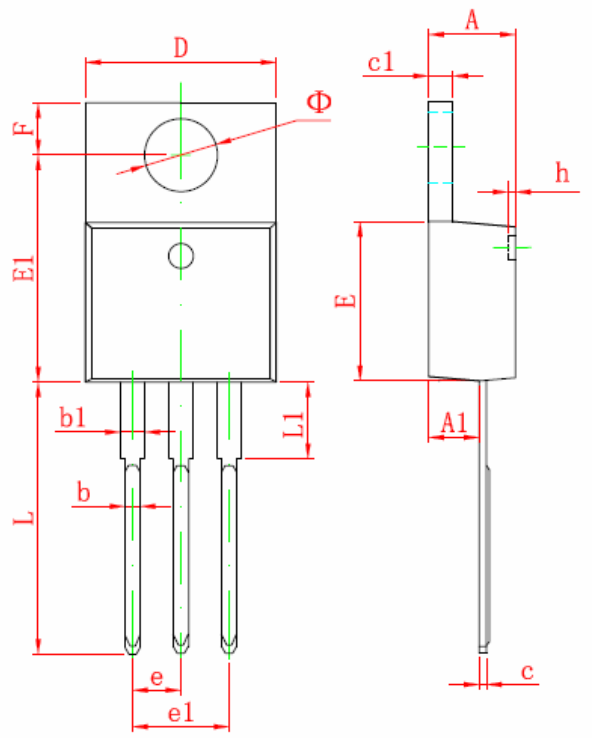
Recommended temperature profile for IR reflow



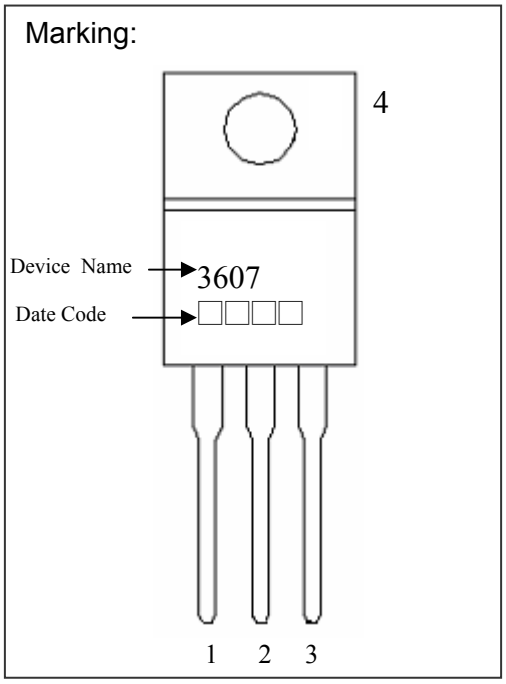
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	 183°C 60-150 seconds	 217°C 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



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



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

*: 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.