

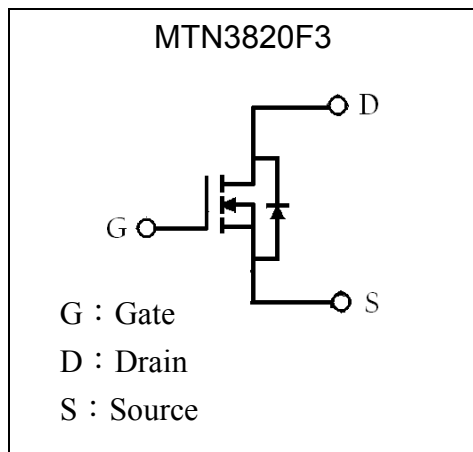
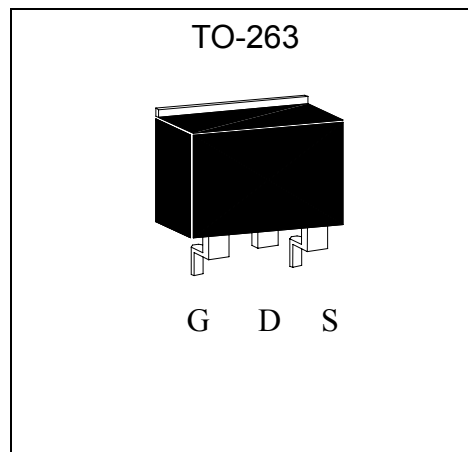
N-Channel Enhancement Mode Power MOSFET

MTN3820F3

Features

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

BV_{DSS}		100V
I_D		26A
$R_{DS(on)(TYP)}$	$V_{GS}=10V, I_D=18A$	64m Ω
	$V_{GS}=4V, I_D=10A$	65m Ω

Symbol

Outline

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Limits	Unit	
Drain-Source Voltage	V_{DS}	100	V	
Gate-Source Voltage	V_{GS}	± 20		
Continuous Drain Current @ $V_{GS}=10V, T_C=25^\circ\text{C}$	I_D	26	A	
Continuous Drain Current @ $V_{GS}=10V, T_C=100^\circ\text{C}$	I_D	15		
Pulsed Drain Current (Note 1)	I_{DM}	104		
Avalanche Current	I_{AS}	20		
Avalanche Energy @ $L=0.14\text{mH}, I_D=20A, R_G=25\Omega$	E_{AS}	35	mJ	
Repetitive Avalanche Energy @ $L=0.1\text{mH}$ (Note 2)	E_{AR}	5.6		
Power Dissipation	P_D	$T_C=25^\circ\text{C}$	56	W
		$T_A=25^\circ\text{C}$	2	
Operating Junction and Storage Temperature	T_j, T_{stg}	-55~+150	$^\circ\text{C}$	

Note : 1. Pulse width limited by maximum junction temperature
 2. Duty cycle $\leq 1\%$



Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	2.2	°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	1.7	2.5	V	$V_{DS} = V_{GS}, I_D=250\mu A$
G_{FS}	-	18	-	S	$V_{DS} = 10V, I_D=18A$
I_{GSS}	-	-	±100	nA	$V_{GS}=\pm 20$
I_{DSS}	-	-	1	μA	$V_{DS} = 100V, V_{GS} = 0V$
	-	-	25	μA	$V_{DS} = 100V, V_{GS} = 0V, T_j=125^\circ C$
* $R_{DS(ON)}$	-	64	80	mΩ	$V_{GS} = 10V, I_D=18A$
	-	65	80		$V_{GS} = 4V, I_D=10A$
Dynamic					
* Q_g	-	23	-	nC	$I_D=13A, V_{DS}=80V, V_{GS}=10V$
* Q_{gs}	-	7	-		
* Q_{gd}	-	7	-		
* $t_{d(ON)}$	-	18	-	ns	$V_{DS}=50V, I_D=13A, V_{GS}=10V, R_G=6\Omega$
* t_r	-	9.5	-		
* $t_{d(OFF)}$	-	75	-		
* t_f	-	30	-		
C_{iss}	-	2964	-	pF	$V_{GS}=0V, V_{DS}=25V, f=1MHz$
C_{oss}	-	62.3	-		
C_{rss}	-	56.7	-		
Source-Drain Diode					
* I_S	-	-	26	A	
* I_{SM}	-	-	104		
* V_{SD}	-	-	1.3	V	$I_F=I_S, V_{GS}=0V$
* t_{rr}	-	120	-	ns	$I_F=26A, V_{GS}=0, dI_F/dt=100A/\mu s$
* Q_{rr}	-	320	-	nC	

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

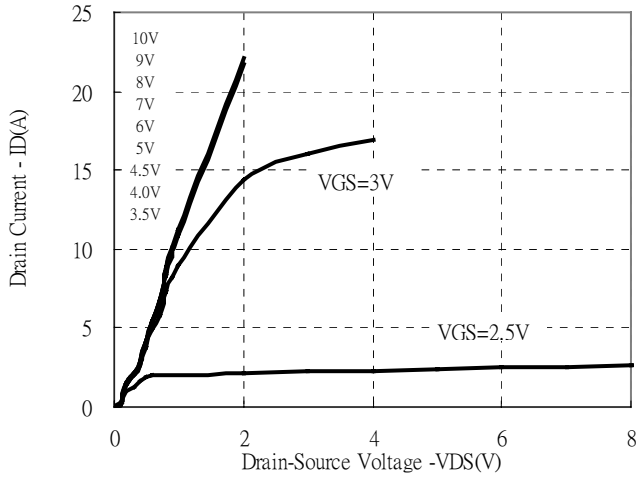
Ordering Information

Device	Package	Shipping
MTN3820F3	TO-263 (RoHS compliant package)	800 pcs / Tape & Reel

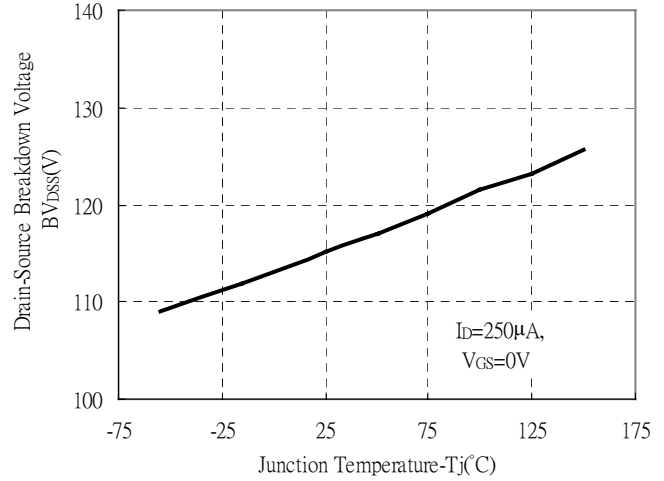


Typical Characteristics

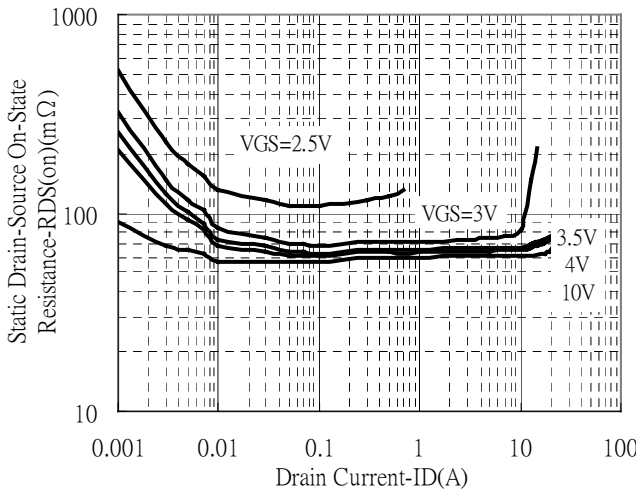
Typical Output Characteristics



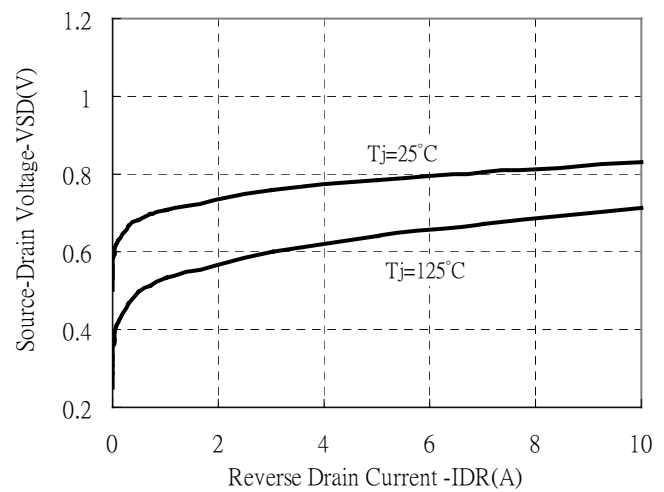
Brekdown Voltage vs Ambient Temperature



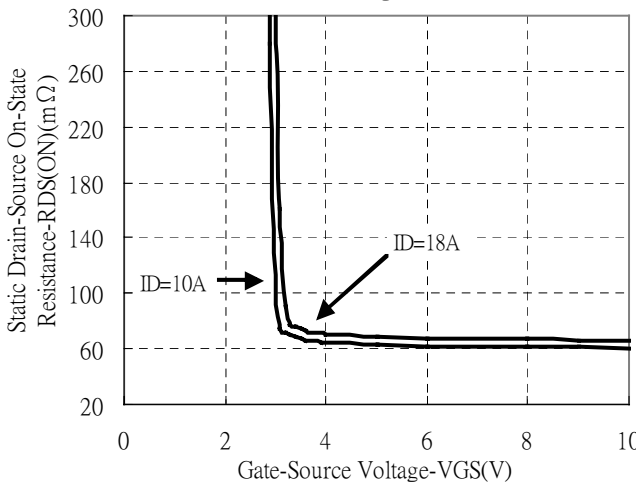
Static Drain-Source On-State resistance vs Drain Current



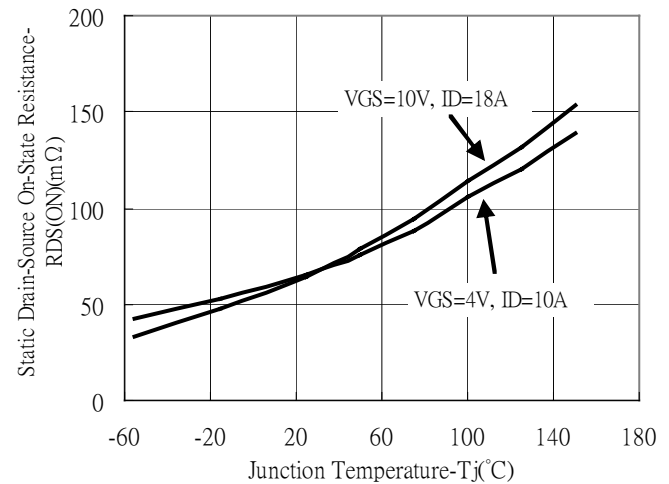
Reverse Drain Current vs Source-Drain Voltage



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

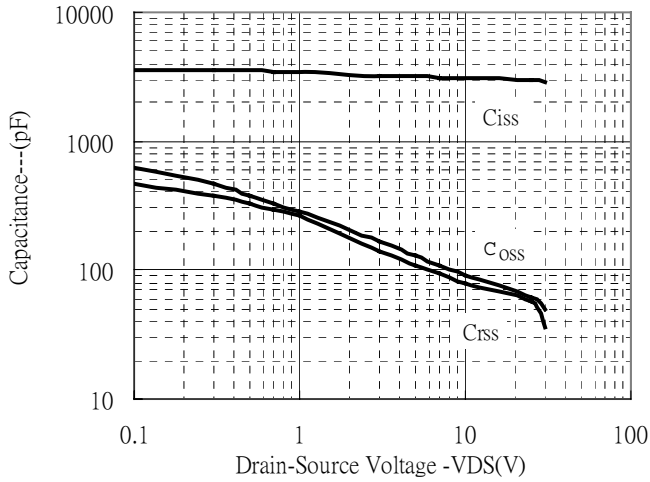


Drain-Source On-State Resistance vs Junction Temperature

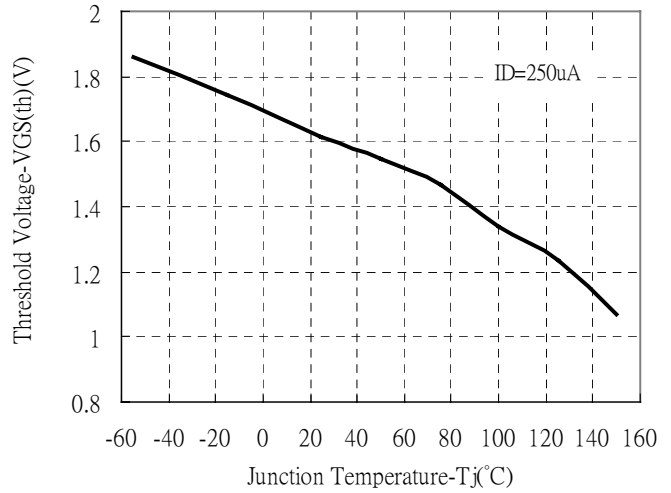


Typical Characteristics(Cont.)

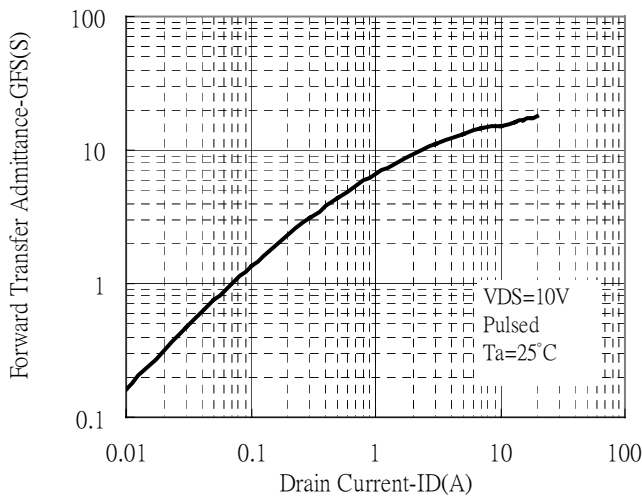
Capacitance vs Drain-to-Source Voltage



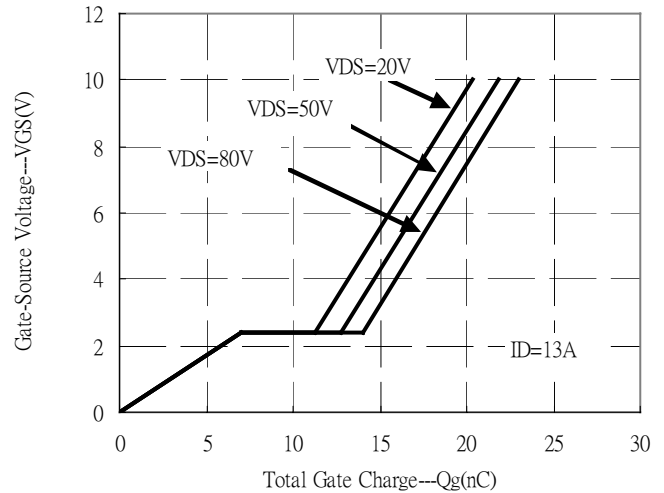
Threshold Voltage vs Junction Temperature



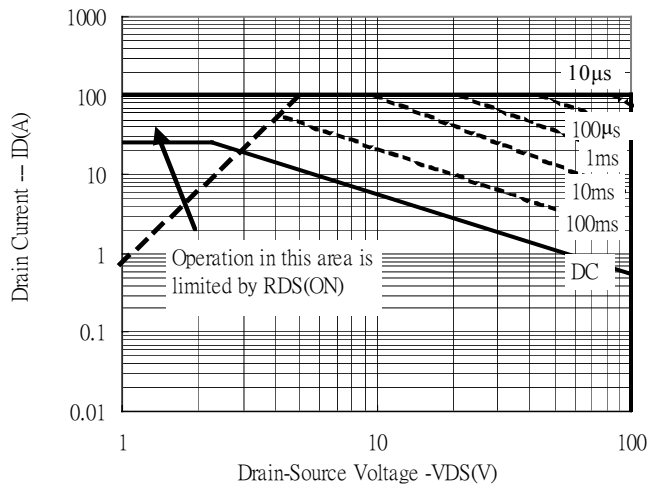
Forward Transfer Admittance vs Drain Current



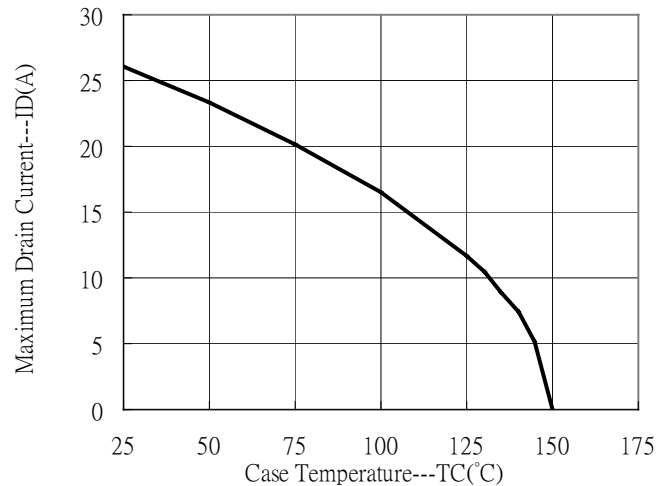
Gate Charge Characteristics



Maximum Safe Operating Area

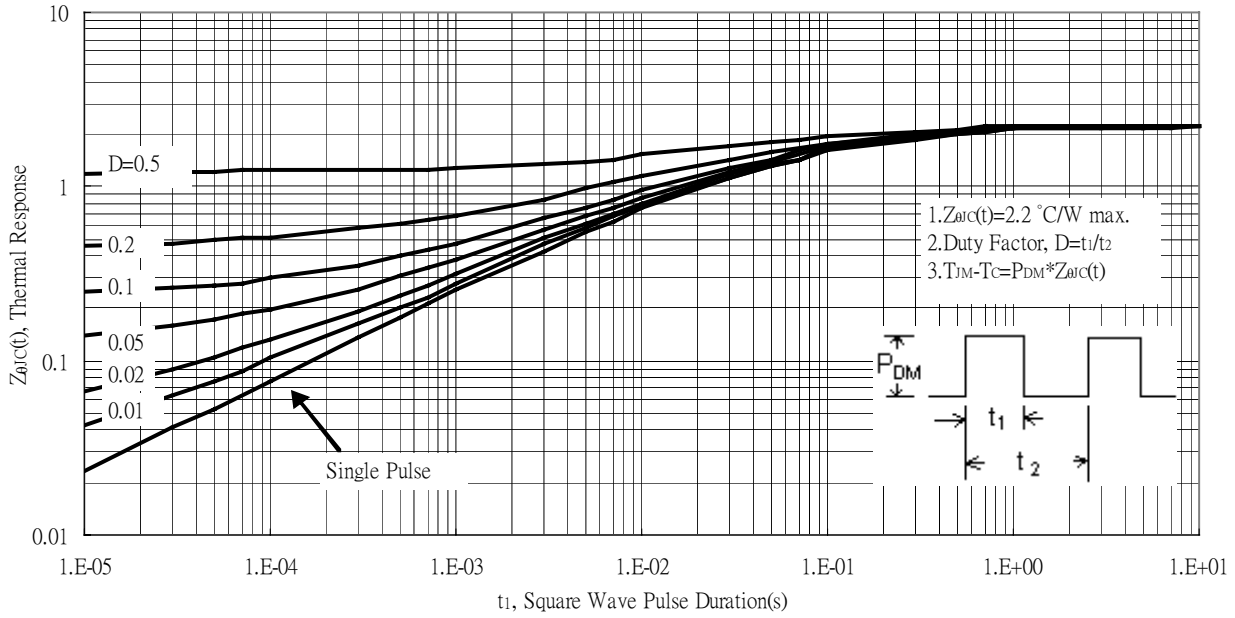


Maximum Drain Current vs Case Temperature

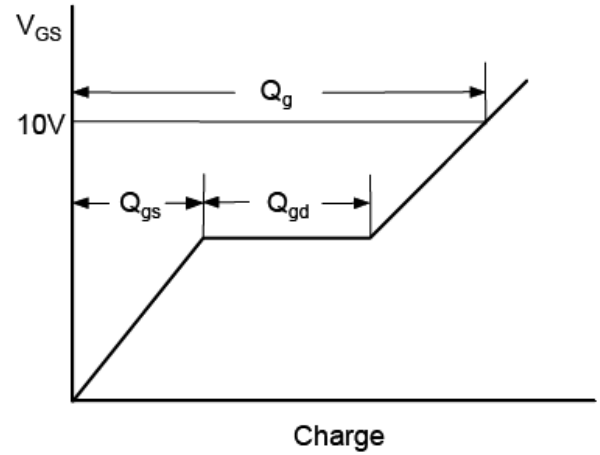
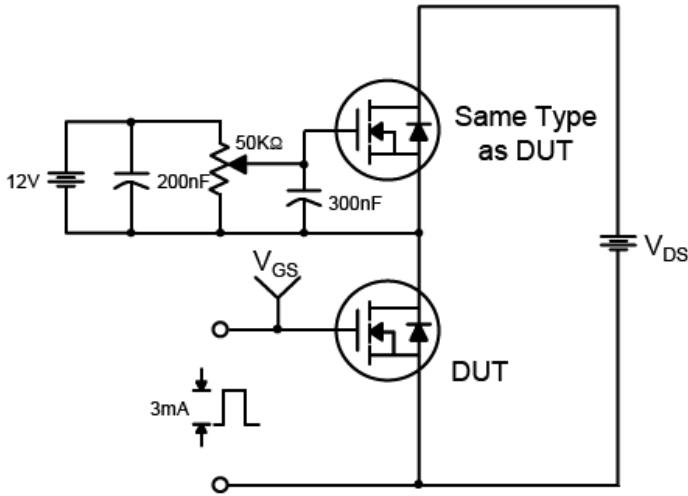


Typical Characteristics(Cont.)

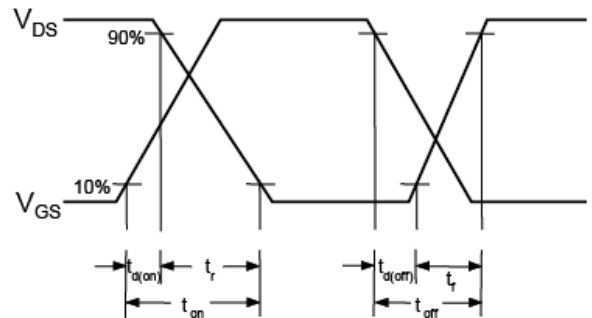
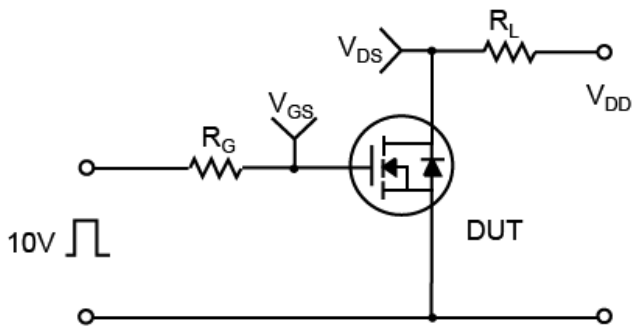
Transient Thermal Response Curves



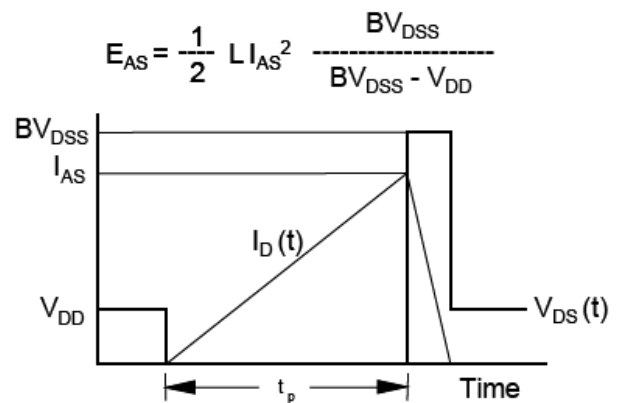
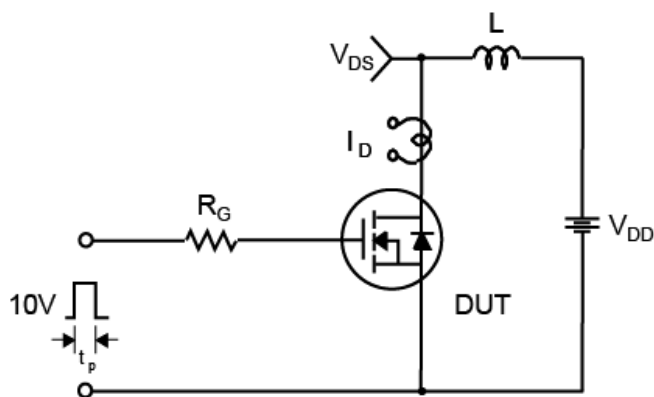
Test Circuit and Waveforms



Resistive Switching Test Circuit & Waveforms

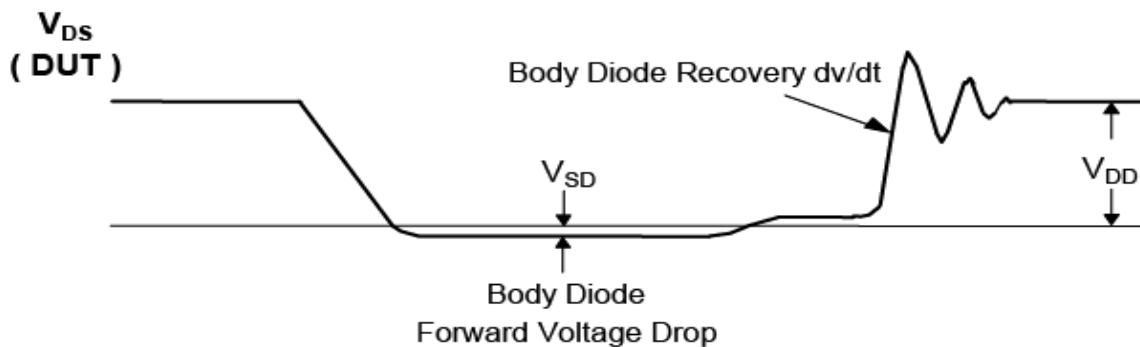
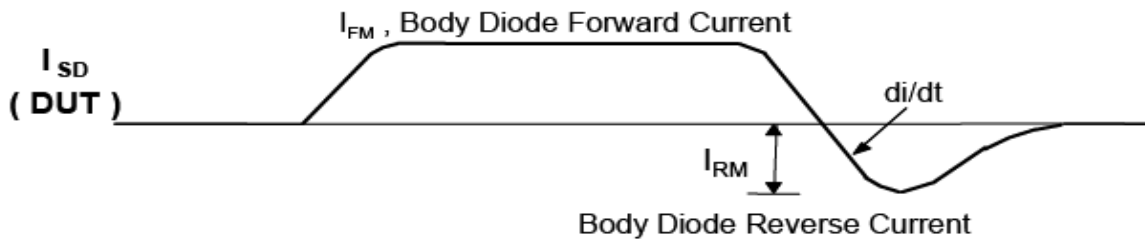
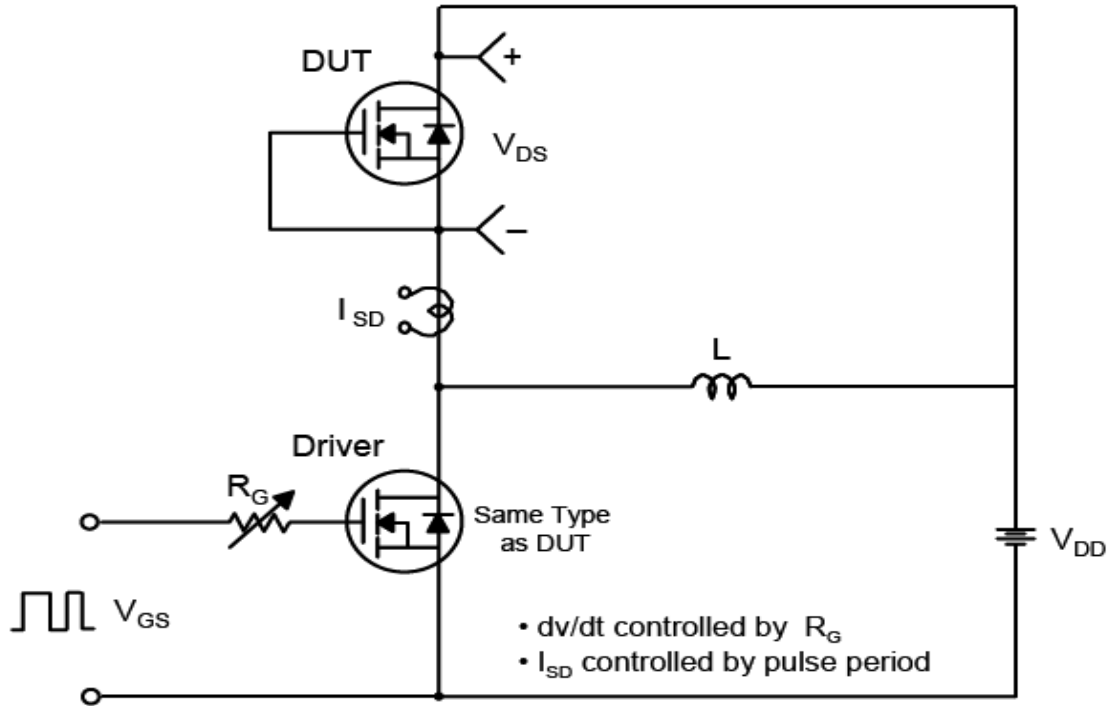


Unclamped Inductive Switching Test Circuit & Waveforms



Test Circuit and Waveforms(Cont.)

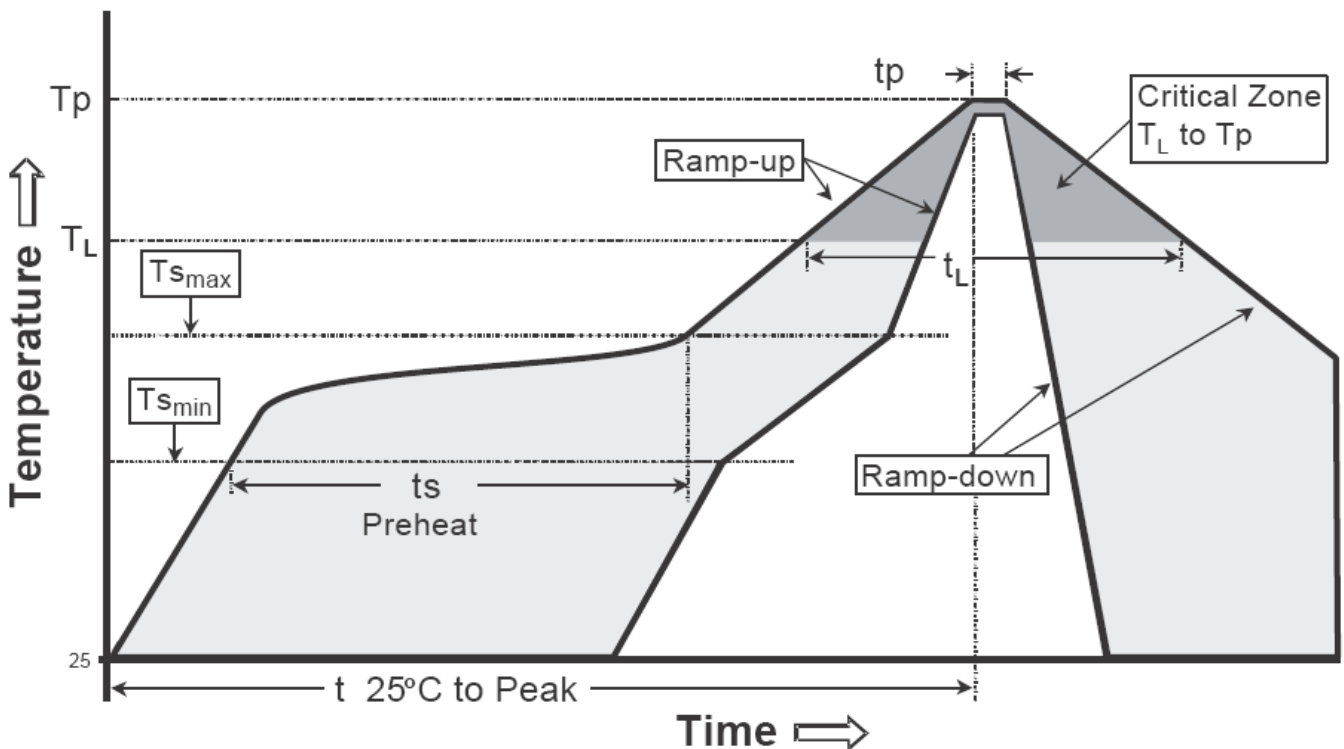
Peak Diode Recovery dv/dt Test Circuit & Waveforms



Recommended wave soldering condition

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

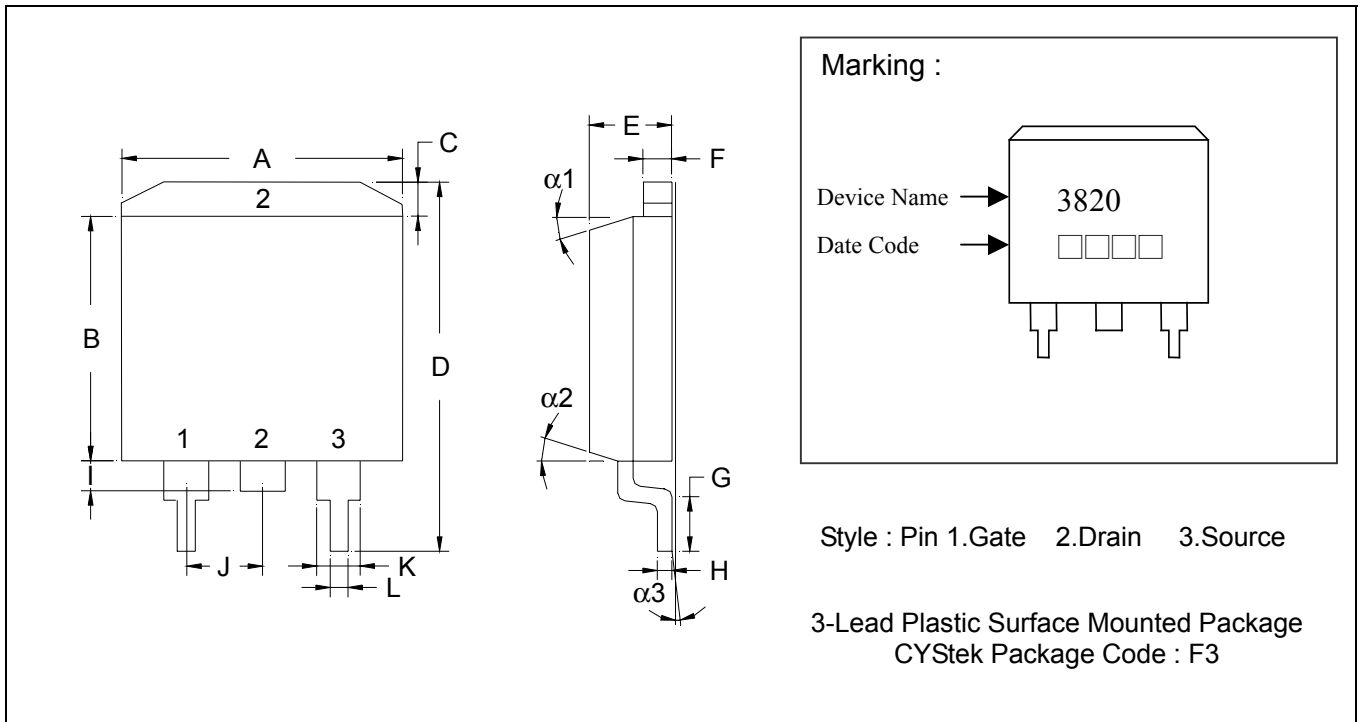
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (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-263 Dimension



*:Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.3800	0.4050	9.65	10.29	I	0.0500	0.0700	1.27	1.78
B	0.3300	0.3700	8.38	9.40	J	-	*0.1000	-	*2.54
C	-	0.0550	-	1.40	K	0.0450	0.0550	1.14	1.40
D	0.5750	0.6250	14.61	15.88	L	0.0200	0.0390	0.51	0.99
E	0.1600	0.1900	4.06	4.83	$\alpha 1$	-	-	6°	8°
F	0.0450	0.0550	1.14	1.40	$\alpha 2$	-	-	6°	8°
G	0.0900	0.1100	2.29	2.79	$\alpha 3$	-	-	0°	5°
H	0.0180	0.0290	0.46	0.74					

- Notes :**
- Controlling dimension : millimeters.
 - Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
 - 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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