

N-Channel Enhancement Mode Power MOSFET

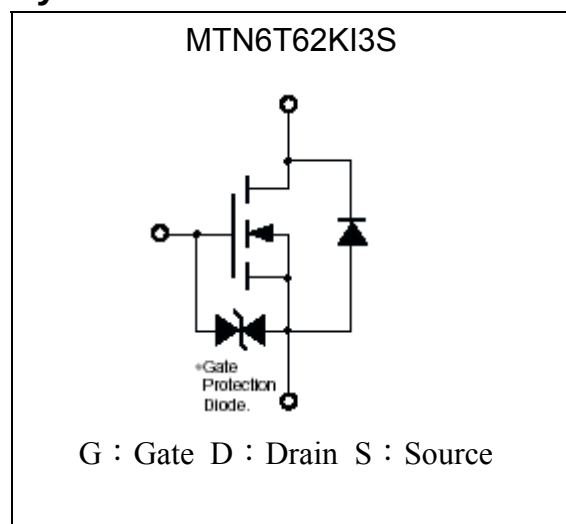
MTN6T62KI3S

BV_{DSS}	620V
I_D@V_{GS}=10V, T_C=25°C	5.5A
R_{DS(ON)}@V_{GS}=10V, I_D=2.8A	1Ω (typ)

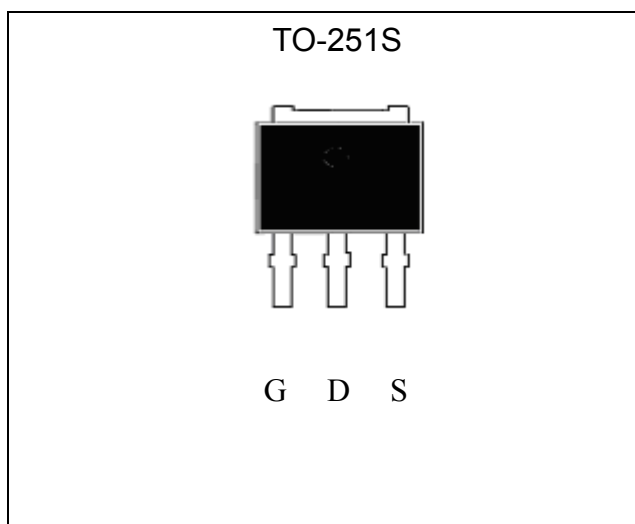
Features

- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- ESD Protected Gate
- RoHS compliant package

Symbol

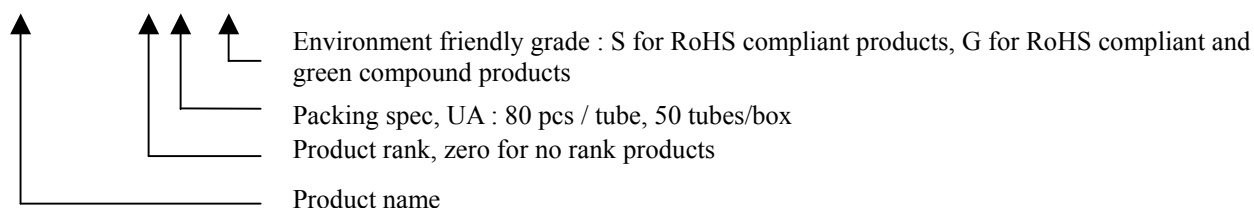


Outline



Ordering Information

Device	Package	Shipping
MTN6T62KI3S-0-UA-G	TO-251S (RoHS compliant and halogen-free package)	80 pcs/tube, 50 tubes/box



**Absolute Maximum Ratings** ($T_C=25^{\circ}\text{C}$)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	620	V
Gate-Source Voltage	V_{GS}	± 25	
Continuous Drain Current @ $T_C=25^{\circ}\text{C}$, $V_{GS}=10\text{V}$	I_D	5.5	A
Continuous Drain Current @ $T_C=100^{\circ}\text{C}$, $V_{GS}=10\text{V}$		3.5	
Pulsed Drain Current (Note 1)	I_{DM}	22	
Single Pulse Avalanche Energy (Note 2)	E_{AS}	151	mJ
Avalanche Current (Note 1)	I_{AS}	5.5	A
Repetitive Avalanche Energy (Note 1)	E_{AR}	9	mJ
Maximum Temperature for Soldering @ Lead at 0.125 in(0.318mm) from case for 10 seconds	T_L	300	$^{\circ}\text{C}$
Total Power Dissipation ($T_A=25^{\circ}\text{C}$)	P_D	1.25	W
Total Power Dissipation ($T_C=25^{\circ}\text{C}$)		90	W
Linear Derating Factor		0.72	W/ $^{\circ}\text{C}$
Gate Source ESD susceptibility ($R=1.5\text{k}\Omega$, $C=100\text{pF}$)	$V_{ESD(G-S)}$	2000	V
Operating Junction and Storage Temperature	T_j, T_{stg}	$-55\sim+150$	$^{\circ}\text{C}$

Note : 1.Repetitive rating; pulse width limited by maximum junction temperature.

2. $I_{AS}=5.5\text{A}$, $V_{DD}=50\text{V}$, $L=10\text{mH}$, $V_{GS}=10\text{V}$, starting $T_j=+25^{\circ}\text{C}$. 100% tested by conditions of $L=10\text{mH}$, $I_{AS}=2\text{A}$, $V_{GS}=10\text{V}$, $V_{DD}=50\text{V}$.

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	1.4	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	100	

Characteristics ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	620	-	-	V	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$, $T_j=25^{\circ}\text{C}$
$\Delta BV_{DSS}/\Delta T_j$	-	0.6	-	V/ $^{\circ}\text{C}$	Reference to 25°C , $I_D=250\mu\text{A}$
$V_{GS(th)}$	3.0	-	4.5	V	$V_{DS} = V_{GS}$, $I_D=250\mu\text{A}$
$*G_{FS}$	-	7.2	-	S	$V_{DS} = 10\text{V}$, $I_D=3\text{A}$
I_{GSS}	-	-	± 9	μA	$V_{GS}=\pm 20\text{V}$
I_{DSS}	-	-	1		$V_{DS} = 620\text{V}$, $V_{GS} = 0\text{V}$
	-	-	50		$V_{DS} = 620\text{V}$, $V_{GS} = 0\text{V}$, $T_C=125^{\circ}\text{C}$
$*R_{DS(ON)}$	-	1.0	1.2	Ω	$V_{GS} = 10\text{V}$, $I_D=2.8\text{A}$
Dynamic					
$*Q_g$	-	32.4	-	nC	$I_D=5.5\text{A}$, $V_{DD}=496\text{V}$, $V_{GS}=10\text{V}$
$*Q_{gs}$	-	7.6	-		
$*Q_{gd}$	-	14.4	-		
$*t_{d(ON)}$	-	18.4	-	ns	$V_{DS}=310\text{V}$, $I_D=2.75\text{A}$, $V_{GS}=10\text{V}$, $R_G=4.7\Omega$
$*t_r$	-	14.6	-		
$*t_{d(OFF)}$	-	45.2	-		
$*t_f$	-	25.8	-		

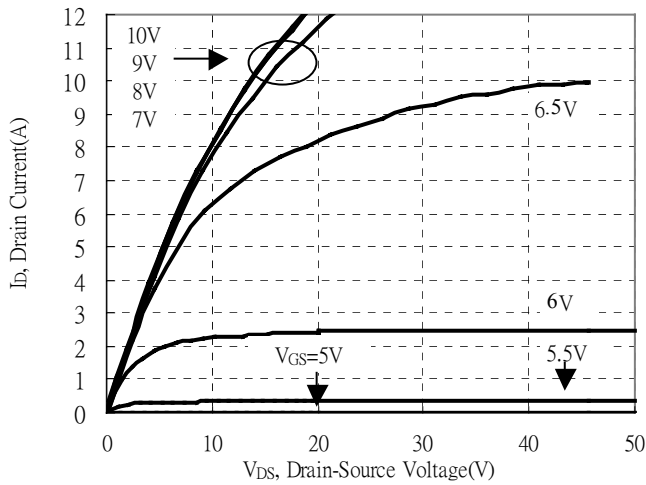


Ciss	-	1214	-	pF	V _{GS} =0V, V _{DS} =30V, f=1MHz
Coss	-	73	-		
Crss	-	31	-		
Rg	-	5.1	-	Ω	f=1MHz
Source-Drain Diode					
*I _S	-	-	5.5	A	
*I _{SM}	-	-	22		
*V _{SD}	-	0.82	1.5	V	I _S =5.5A, V _{GS} =0V
*trr	-	320	-	ns	V _{GS} =0V, I _F =5.5A, dI _F /dt=100A/μs
*Qrr	-	1.6	-	μC	
Gate-Source Zener Diode					
BV _{GSO}	25	-	-	V	I _{GS} =±1mA

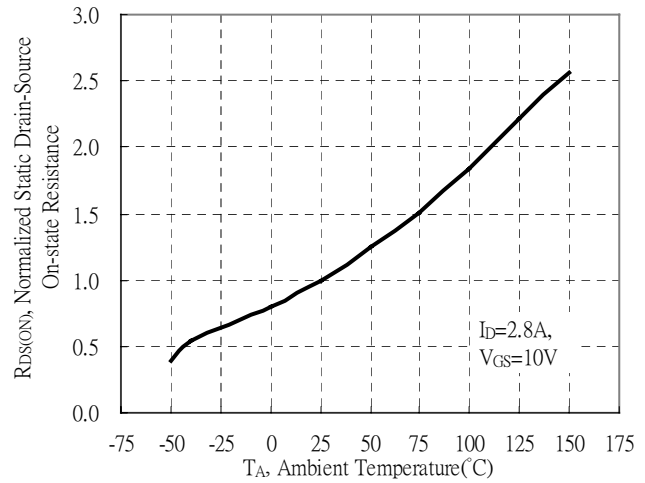
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

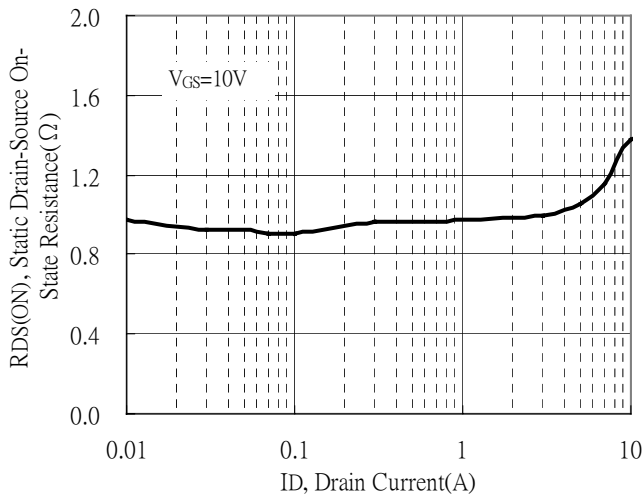
Typical Output Characteristics



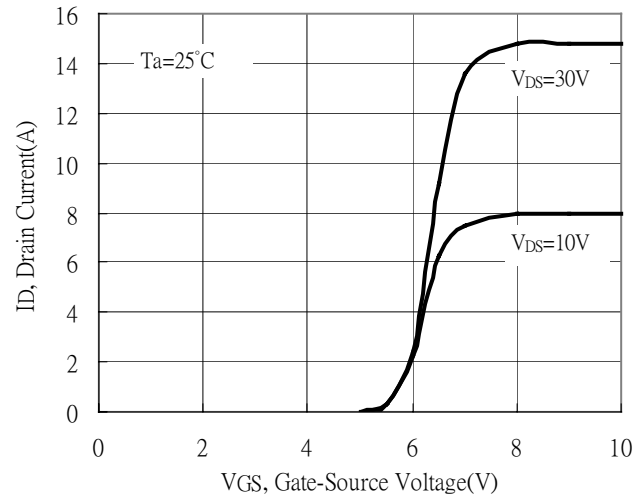
Static Drain-Source On-resistance vs Ambient Temperature



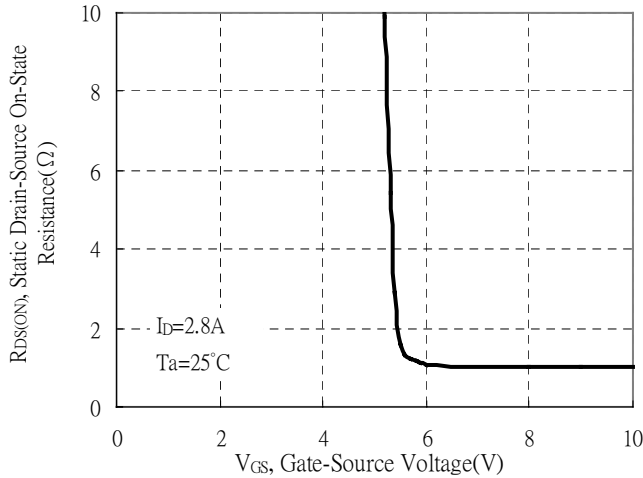
Static Drain-Source On-State resistance vs Drain Current



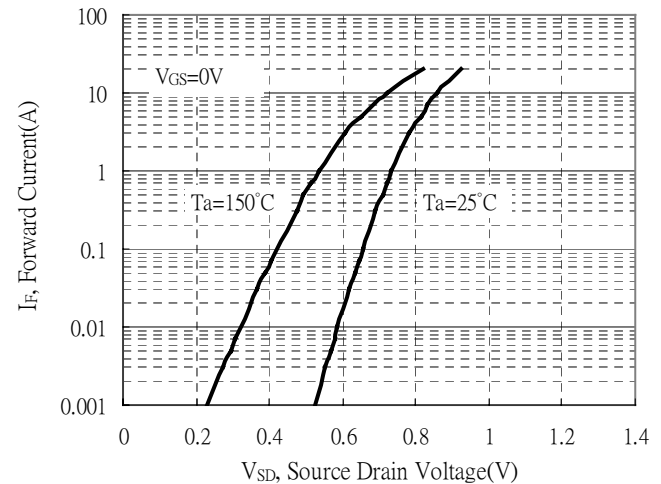
Drain Current vs Gate-Source Voltage



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

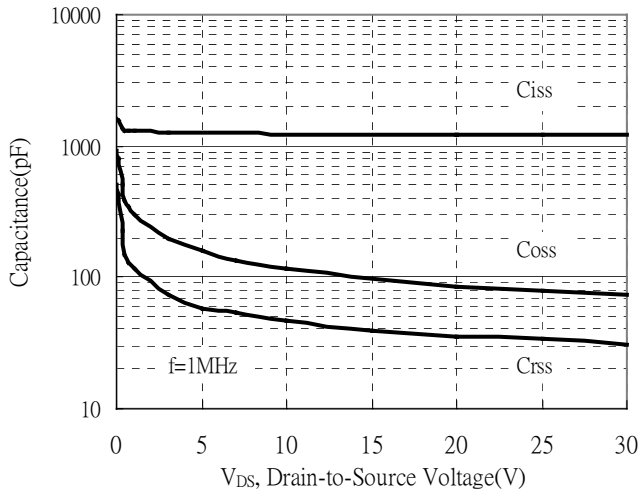


Forward Drain Current vs Source-Drain Voltage

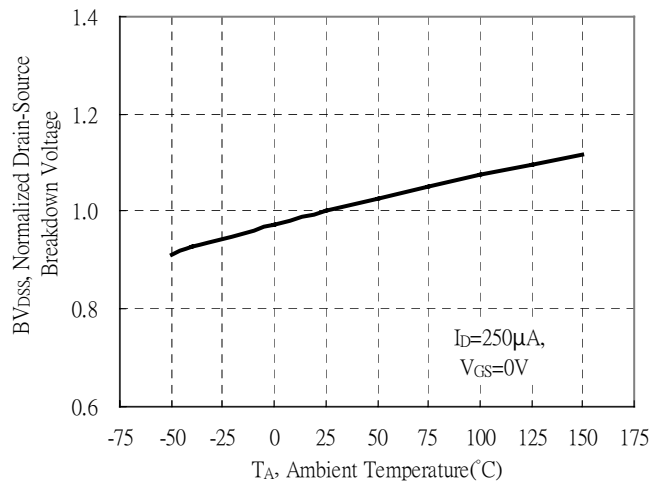


Typical Characteristics(Cont.)

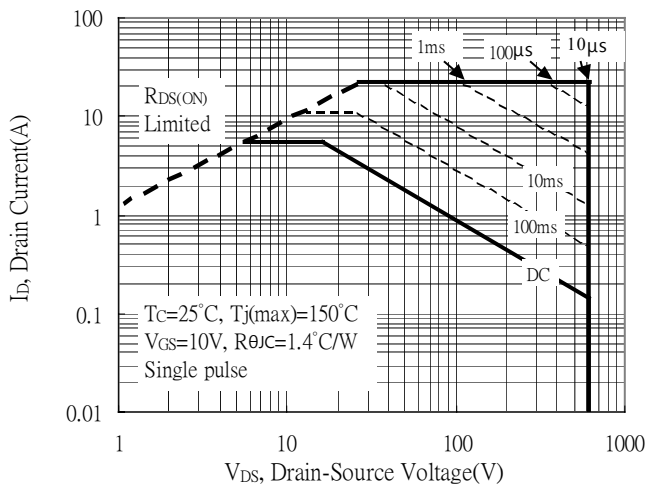
Capacitance vs Reverse Voltage



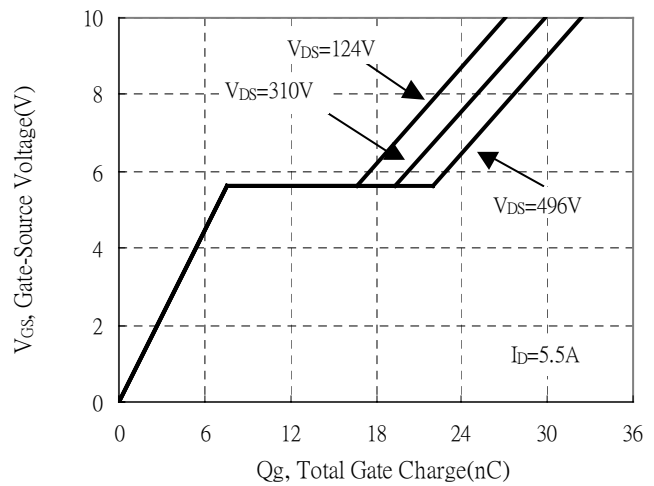
Brekdown Voltage vs Ambient Temperature



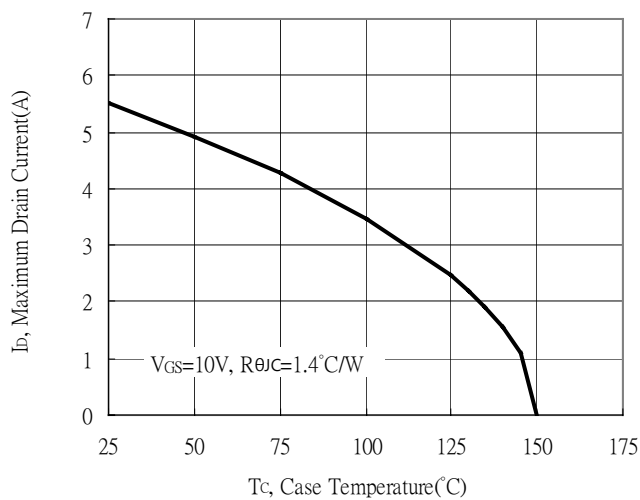
Maximum Safe Operating Area



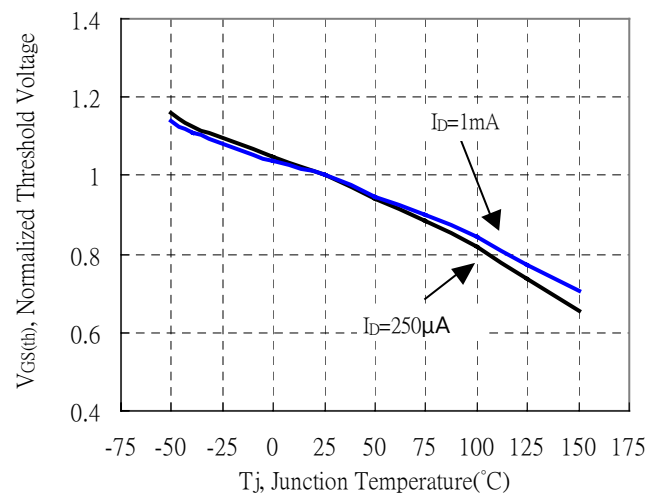
Gate Charge Characteristics



Maximum Drain Current vs Case Temperature

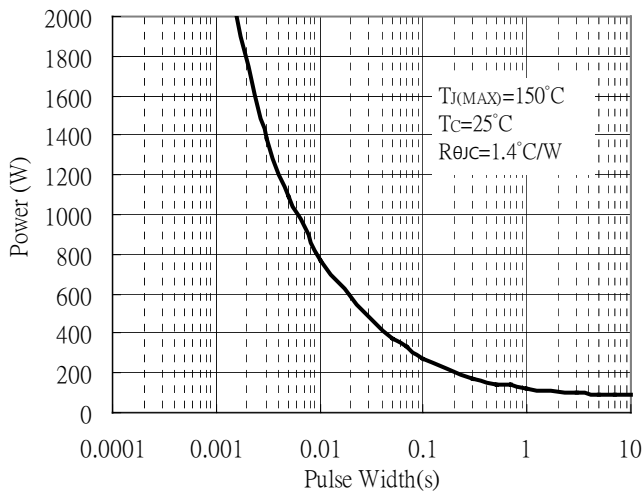


Threshold Voltage vs Junction Temperature

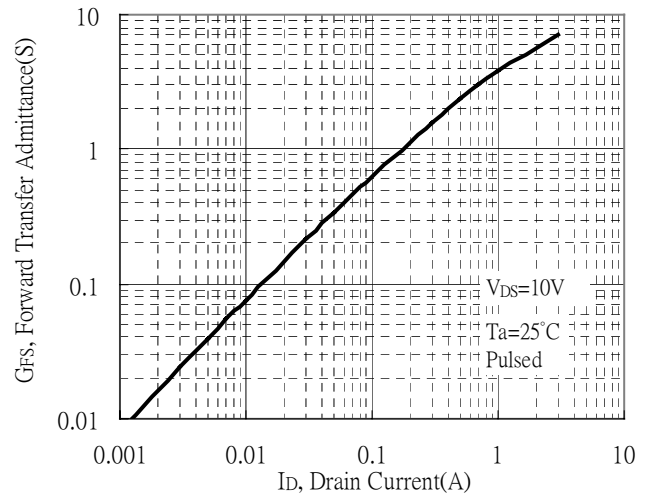


Typical Characteristics(Cont.)

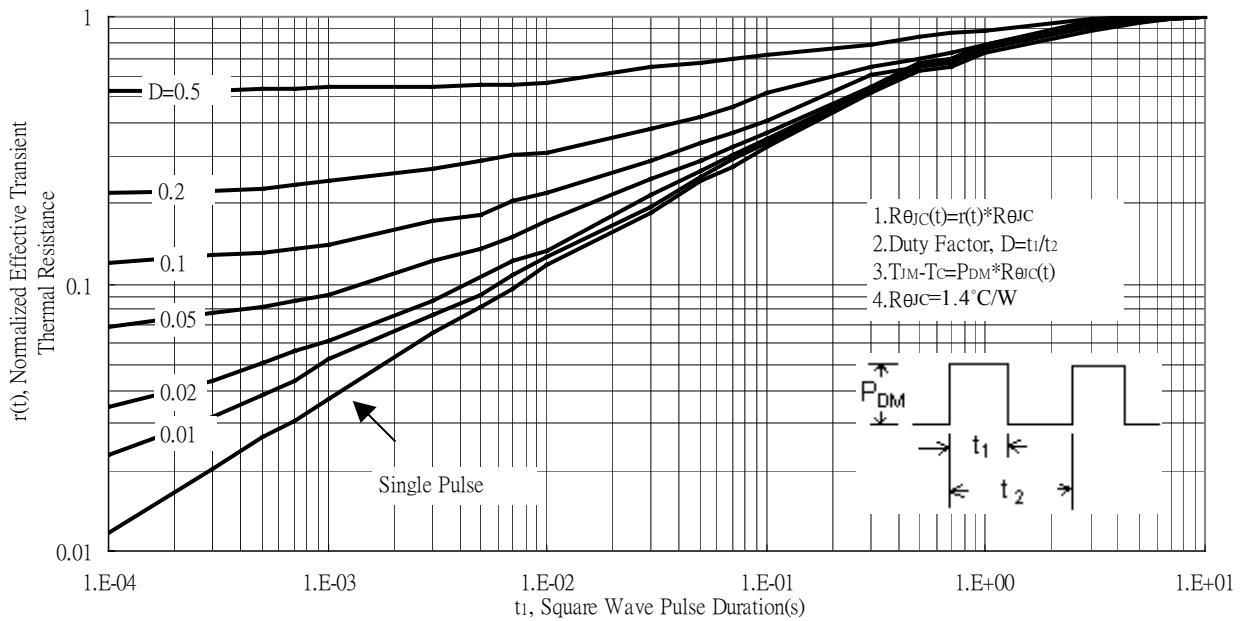
Single Pulse Power Rating, Junction to Case



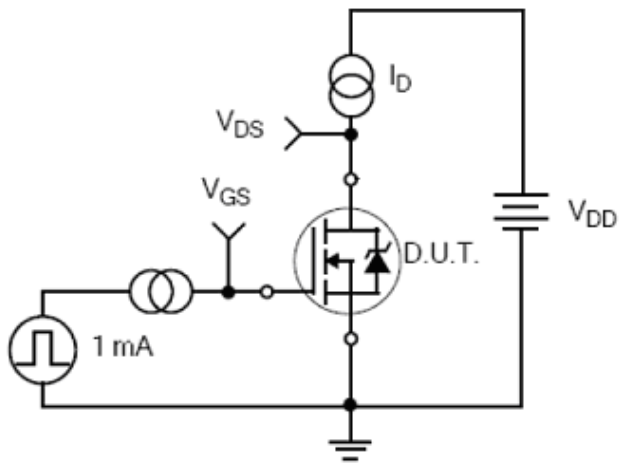
Forward Transfer Admittance vs Drain Current



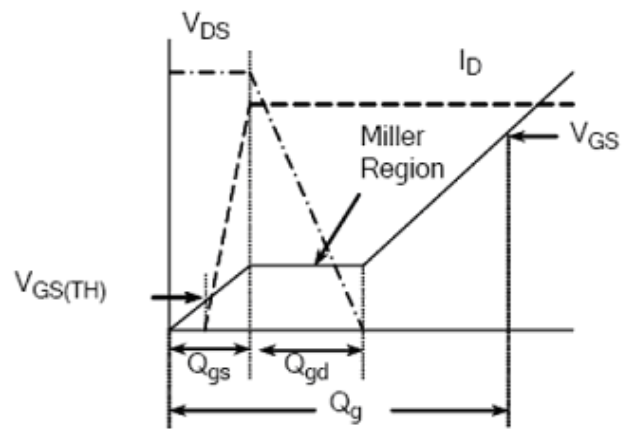
Transient Thermal Response Curves



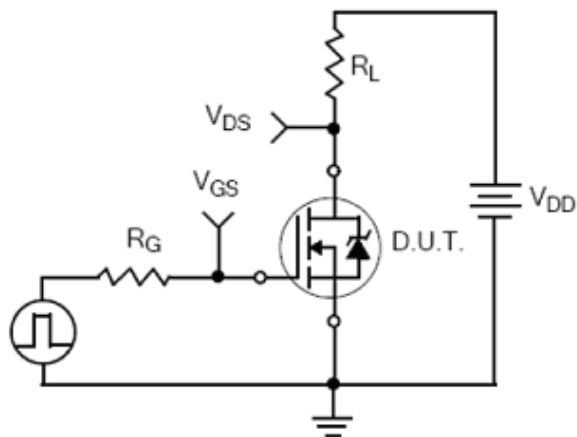
Test Circuit and Waveforms



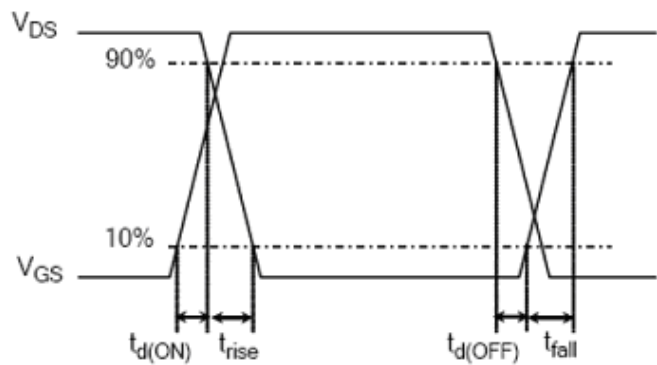
Gate Charge Test Circuit



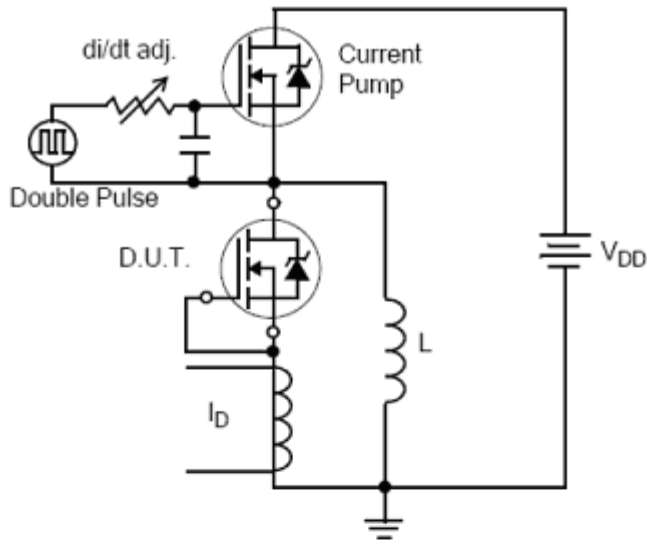
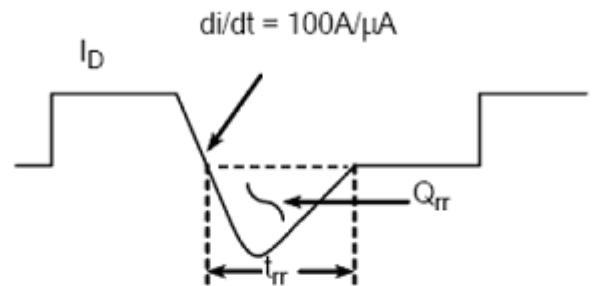
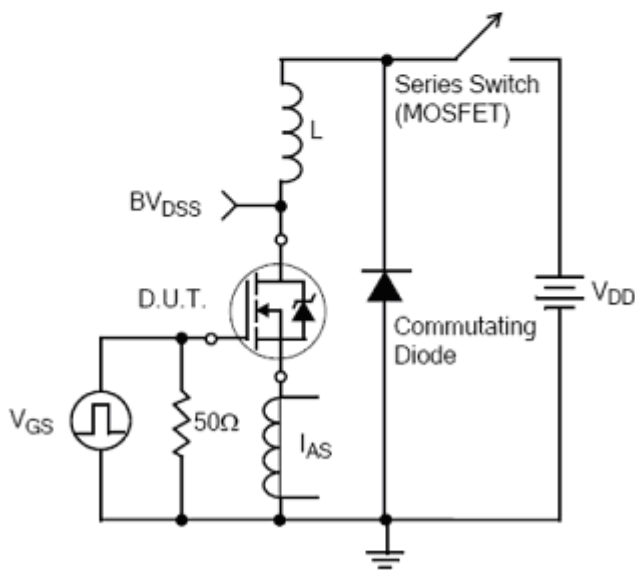
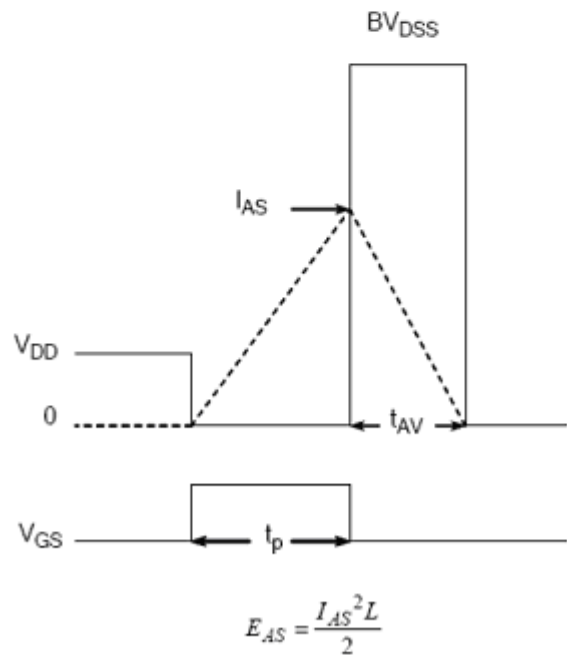
Gate Charge Waveform



Resistive Switching Test Circuit



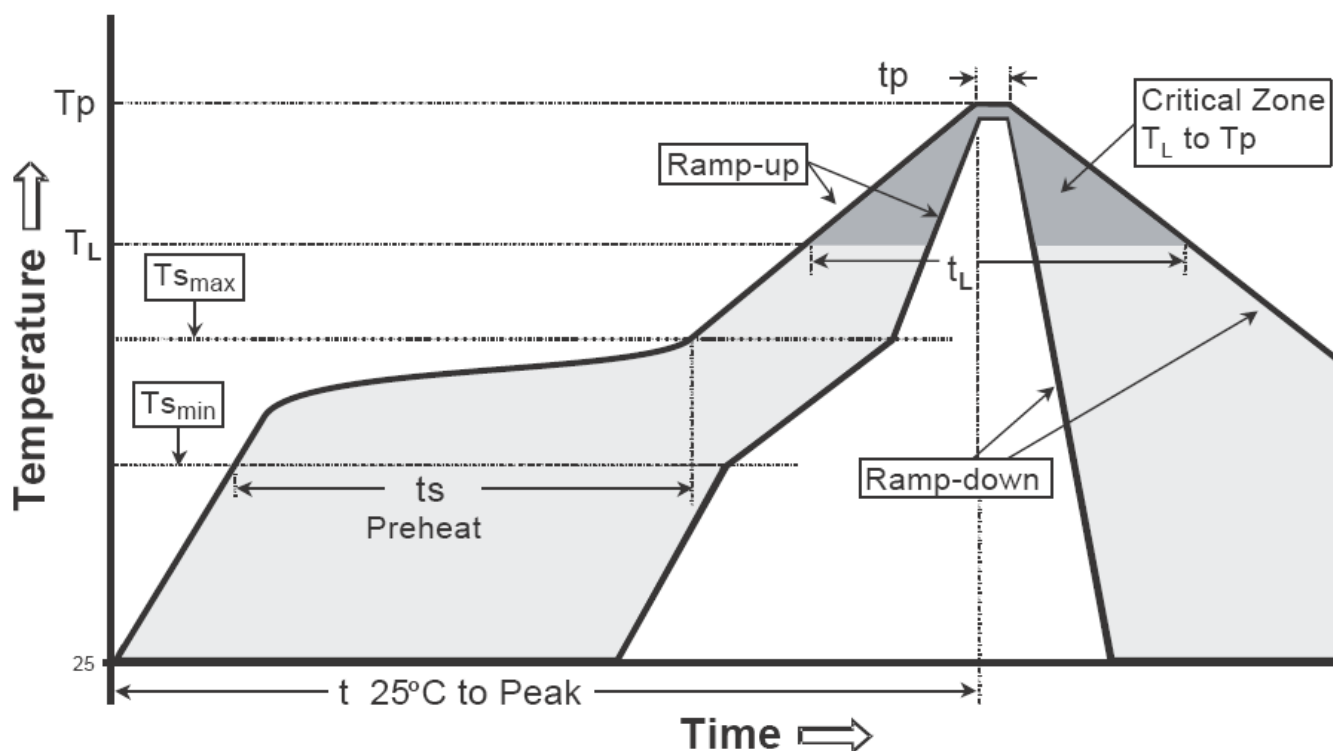
Resistive Switching Waveforms

Test Circuit and Waveforms(Cont.)

Diode Reverse Recovery Test Circuit

Diode Reverse Recovery Waveform

Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms

Recommended wave soldering condition

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

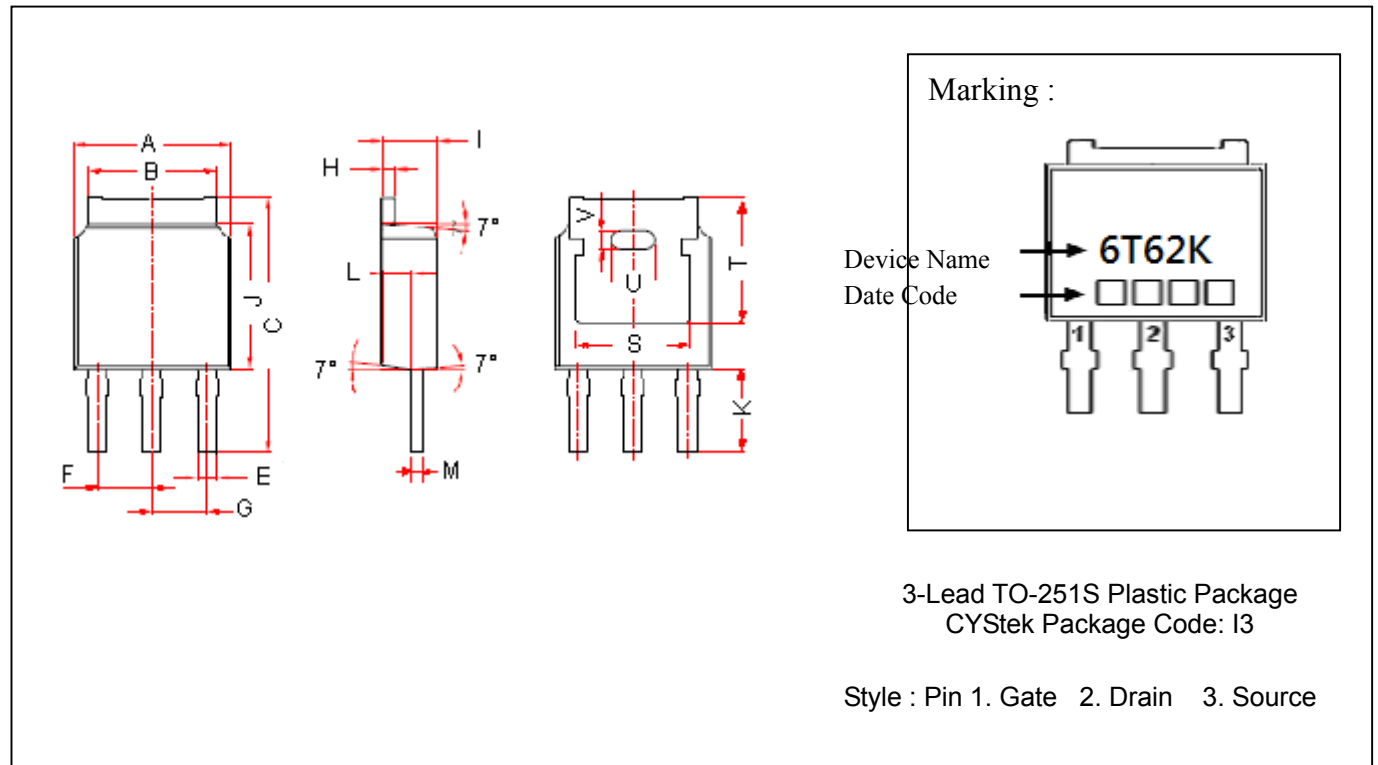
Recommended temperature profile for IR reflow



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(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-251S Dimension



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.2559	0.2638	6.50	6.70	J	0.2362	0.2441	6.00	6.20
B	0.2020	0.2126	5.13	5.46	K	0.1299	0.1457	3.30	3.70
C	0.4094	0.4331	10.40	11.00	L	0.0358	0.0437	0.91	1.11
E	0.0280	0.0319	0.71	0.81	M	0.0181	0.0220	0.46	0.56
F	0.0858	0.0941	2.18	2.39	S	0.1902	REF	4.83	REF
G	0.0858	0.0941	2.18	2.39	T	0.2106	REF	5.35	REF
H	0.0181	0.0220	0.46	0.56	U	0.0701	REF	1.78	REF
I	0.0902	0.0937	2.29	2.38	V	0.0299	REF	0.76	REF

Notes: 1. Controlling dimension: inch.

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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