

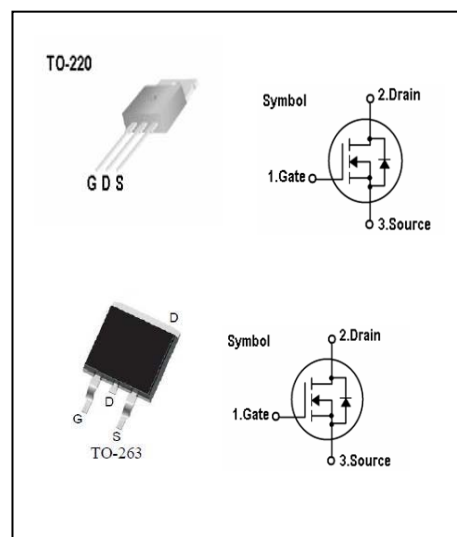
N-Channel MOSFET

Features

- 70V,80A,R_{ds(on)}(typ)=6mΩ @V_{gs}=10V
- High Ruggedness
- Fast Switching
- 100% Avalanche Tested
- Improved dv/dt Capability

General Description

This Power MOSFET is produced using Si-Tech's advanced Trench MOS Technology. This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics. These devices are well suited for low voltage application such as automotive, DC/DC converters, and high efficiency switch for power management in portable and battery products.



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V _{DSS}	Drain-Source Voltage	70	V
I _D	Continuous Drain Current (T _c =25°C)	80	A
	Continuous Drain Current (T _c =100°C)	68	A
I _{DM}	Pulsed Drain Current (Note 1)	300	A
V _{GS}	Gate-Source Voltage	± 25	V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)	622	mJ
P _D	Maximum Power Dissipation (T _c =25°C)	188	W
	Derating Factor above 25°C	1.25	W/°C
T _J	Operating Junction Temperature Range	-55 to +175	°C
T _{STG}	Storage Temperature Range	-55 to +175	°C

Thermal Characteristics

Symbol	Parameter	Max.	Units
R _{th j-c}	Thermal Resistance, Junction to case	0.8	°C/W
R _{th c-s}	Thermal Resistance, Case to Sink	0.5	°C/W
R _{th j-a}	Thermal Resistance, Junction to Ambient	62.5	°C/W

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	70	-	-	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=65V, V_{GS}=0V$	-	-	1	μA
I_{GSS}	Gate Leakage Current, Forward	$V_{GS}=25V, V_{DS}=0V$	-	-	100	nA
	Gate Leakage Current, Reverse	$V_{GS}=-25V, V_{DS}=0V$	-	-	-100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2.5	-	3.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=40A$	-	6	7	m Ω
Q_g	Total Gate Charge	$V_{DD}=56V$ $V_{GS}=10V$ $I_D=80A$ (Note 3)	-	107	-	nC
Q_{gs}	Gate-Source Charge		-	26	-	nC
Q_{gd}	Gate-Drain Charge		-	46	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=37.5V, V_{GS}=10V$ $I_D=45A, R_G=4.7\Omega$ $T_C=25^{\circ}\text{C}$ (Note 3)	-	25	-	ns
t_r	Turn-on Rise Time		-	85	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	70	-	ns
t_f	Turn-off Fall Time		-	25	-	ns
C_{iss}	Input Capacitance -	$V_{DS}=25V$	-	4690	-	pF
C_{oss}	Output Capacitance	$V_{GS}=0V$	-	426	-	pF
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$	-	355	-	pF

Source-Drain Diode Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

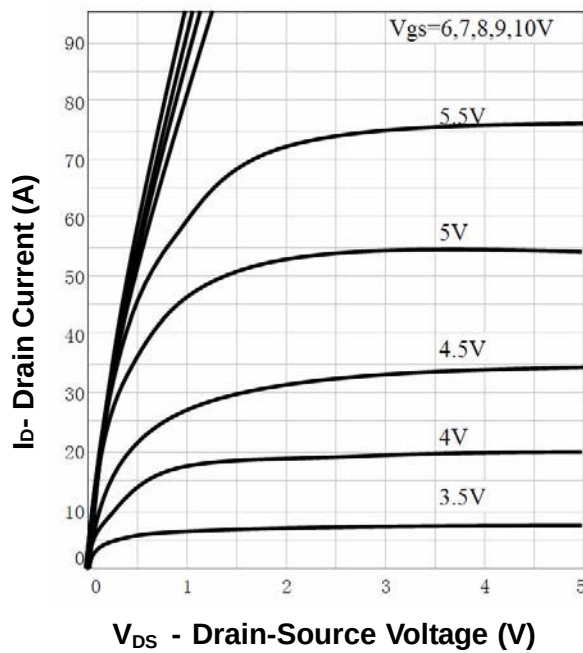
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Diode Forward Current		-	-	80	A
I_{SM}	Pulsed Source Diode Forward Current (Note 1)		-	-	300	A
V_{SD}	Forward On Voltage	$V_{GS}=0V, I_S=45A$	-	-	1.3	V
t_{rr}	Reverse Recovery Time	$V_{GS}=0V, I_S=45A$	-	50	-	ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt = 100A/\mu s$	-	90	-	nC

Notes:

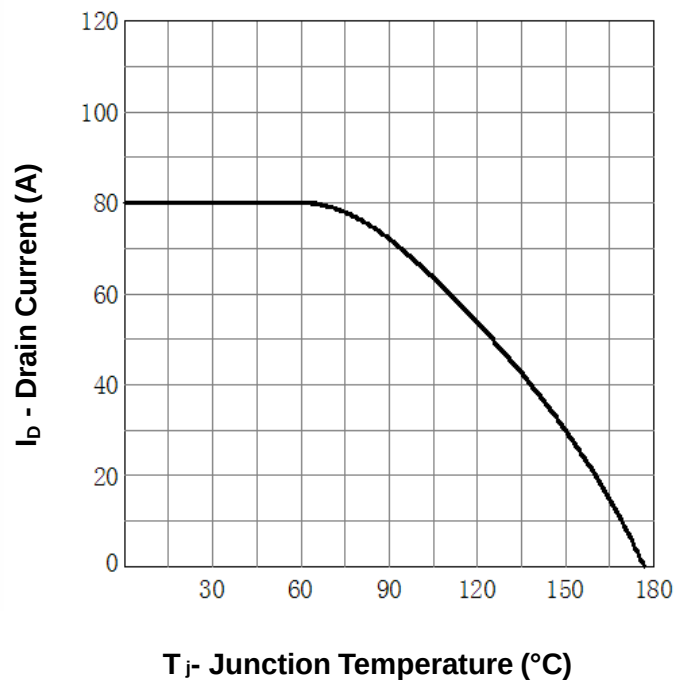
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $L=0.5\text{mH}$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
3. Pulse Width $\leq 300\mu s$; Duty Cycle $\leq 2\%$

Typical Characteristics

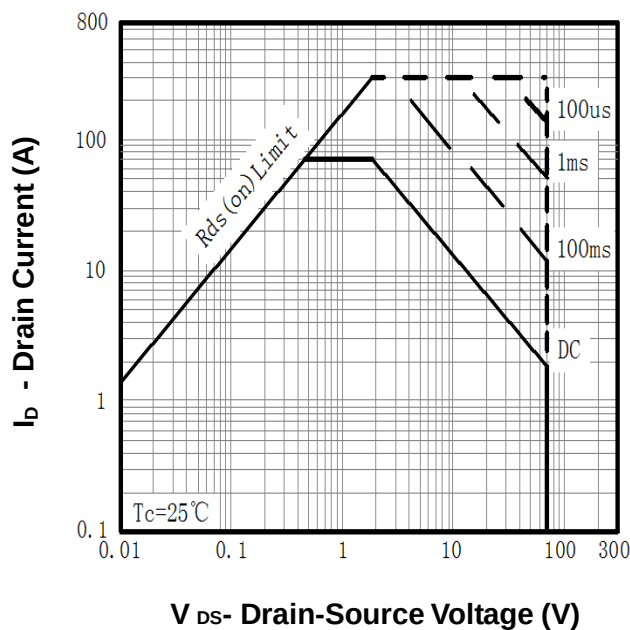
Output Characteristics



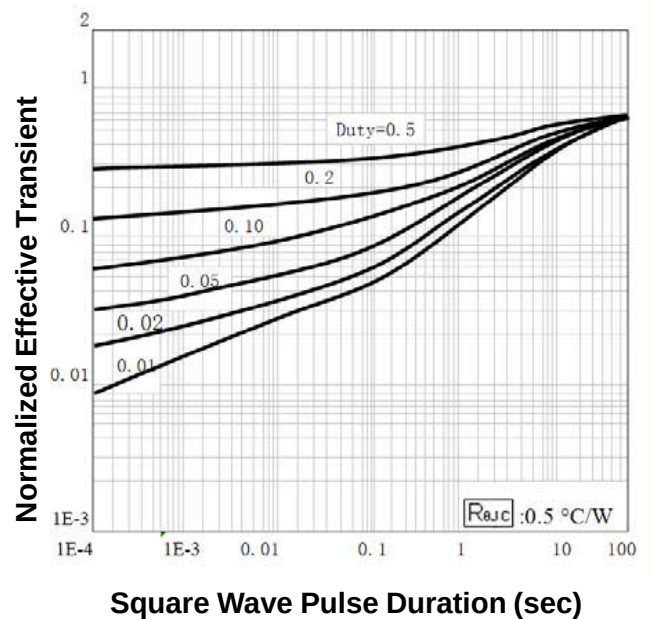
Drain Current



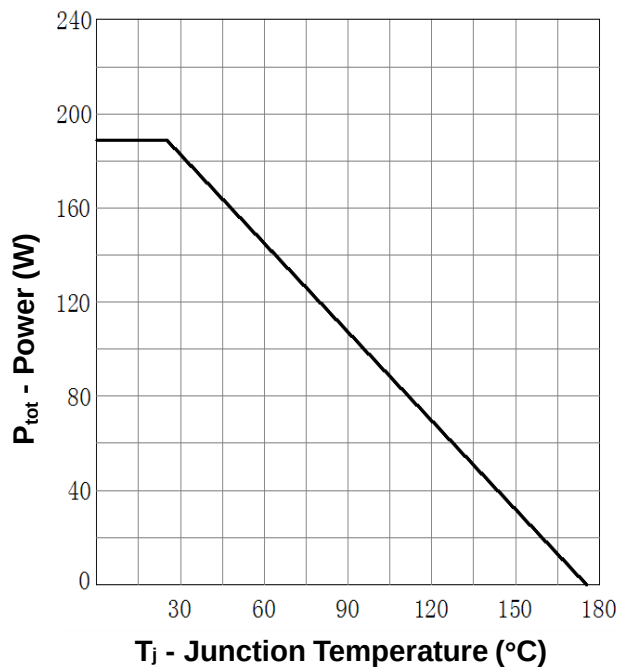
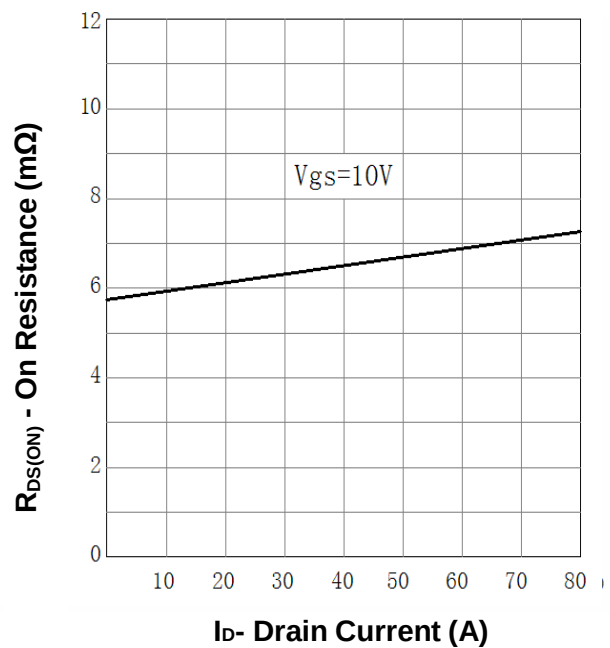
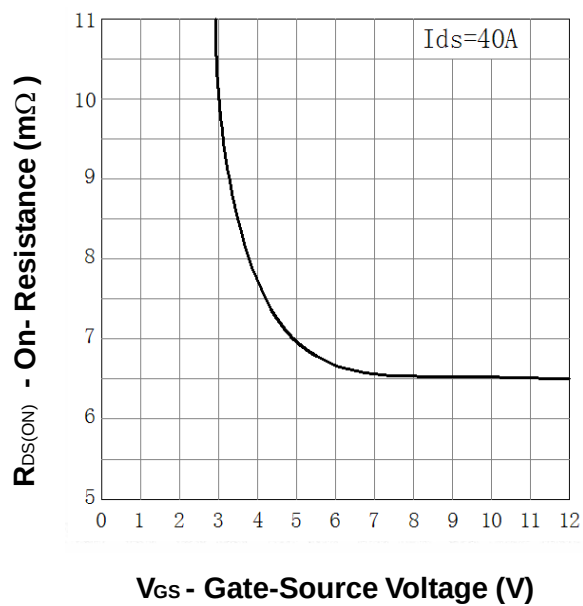
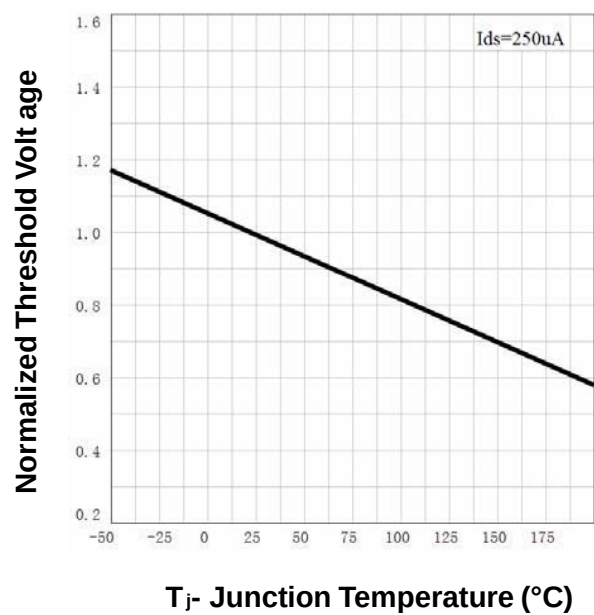
Safe Operation Area



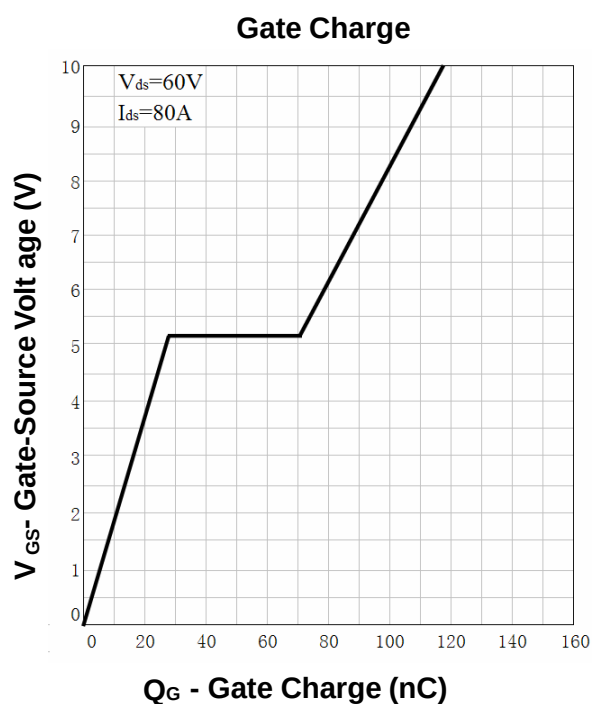
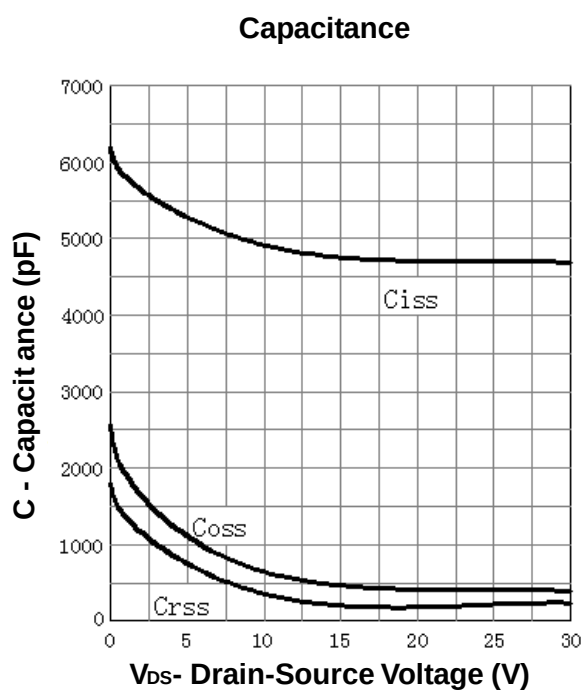
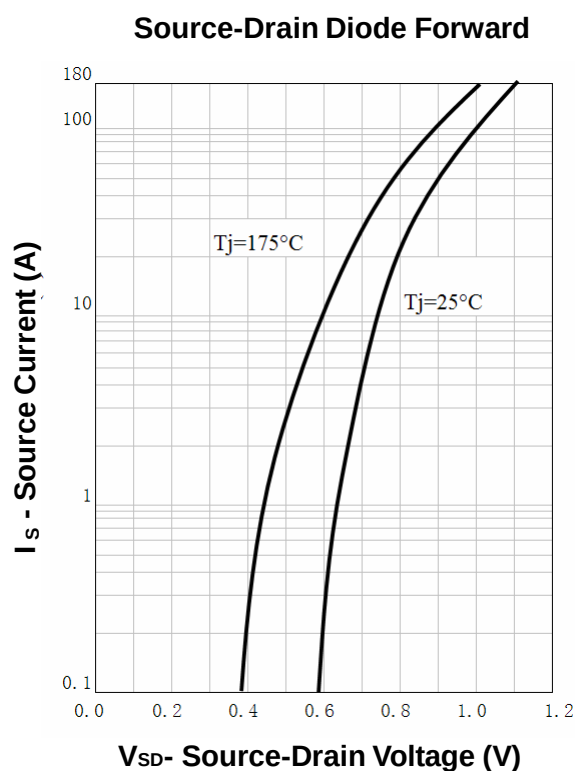
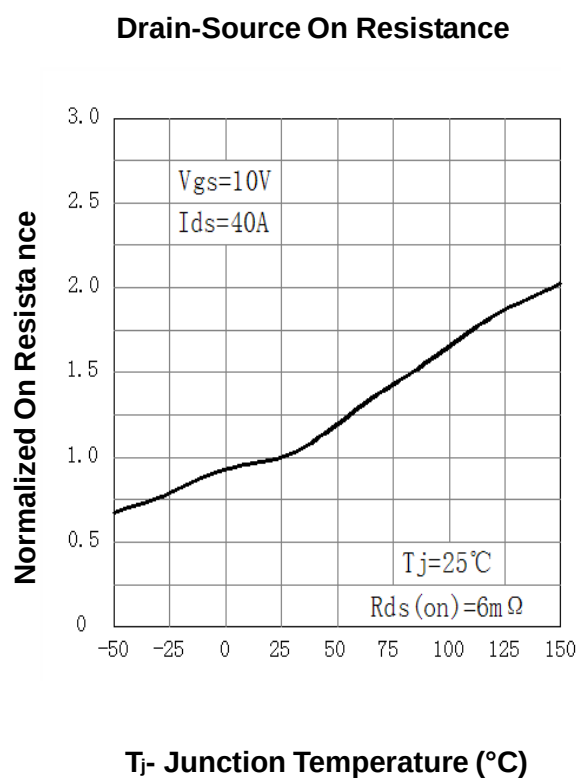
Thermal Transient Impedance



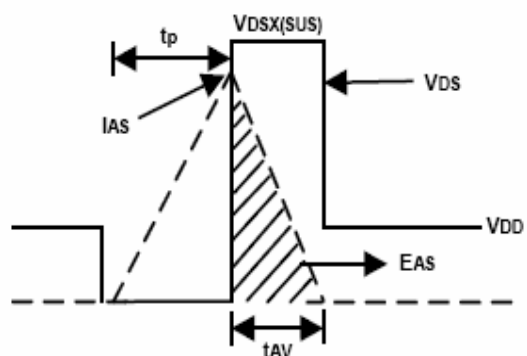
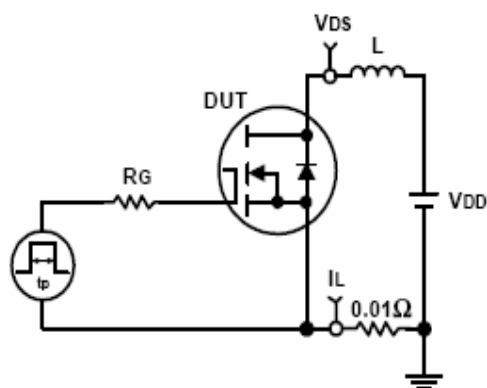
Typical Characteristics

Power Dissipation**Drain-Source On Resistance****Drain-Source On Resistance****Gate Threshold Voltage**

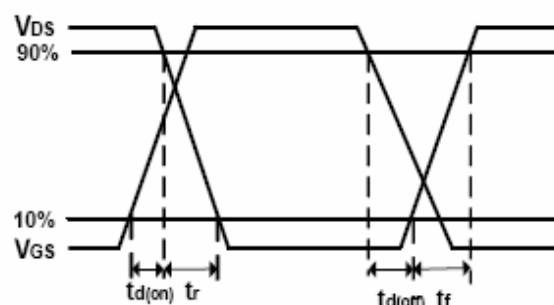
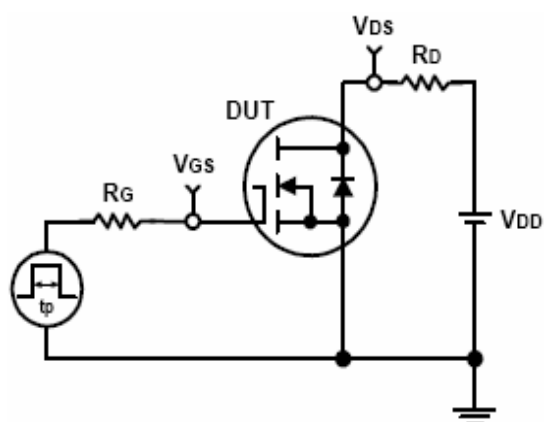
Typical Characteristics



Avalanche Test Circuit and Waveforms



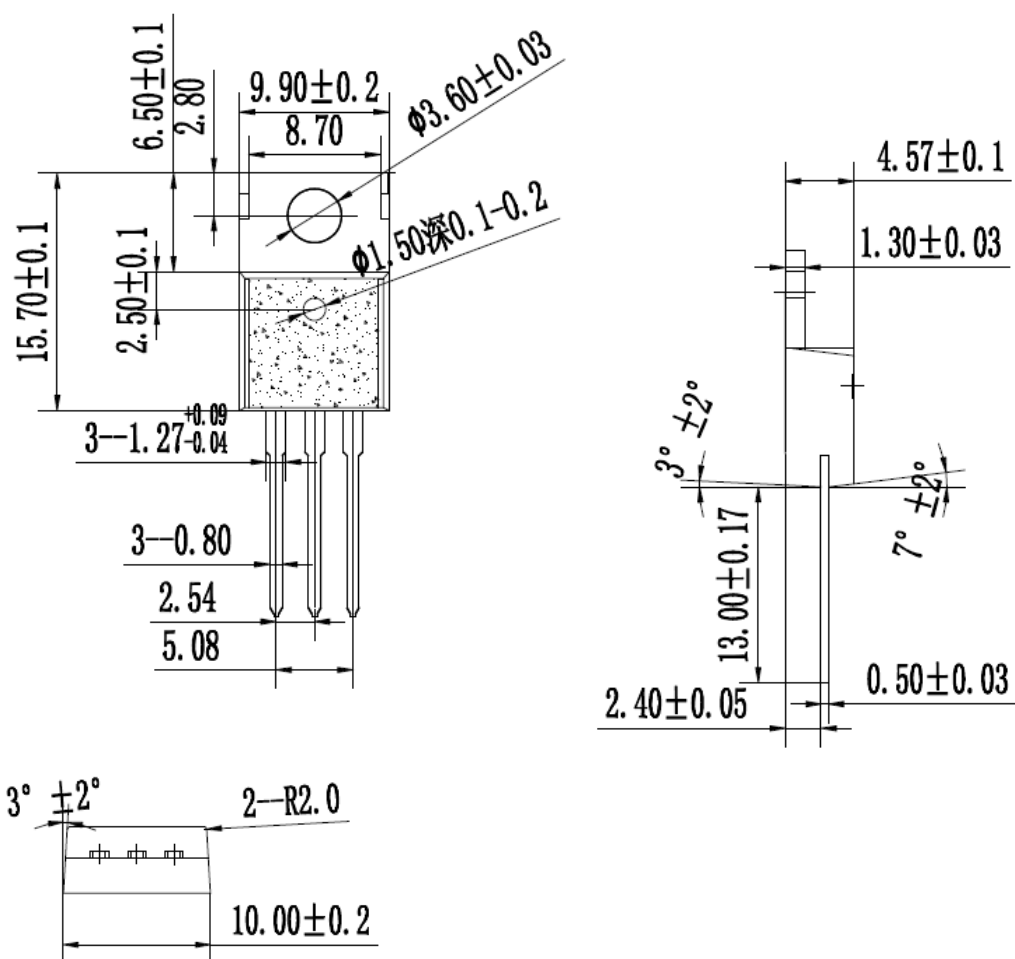
Switching Time Test Circuit and Waveforms



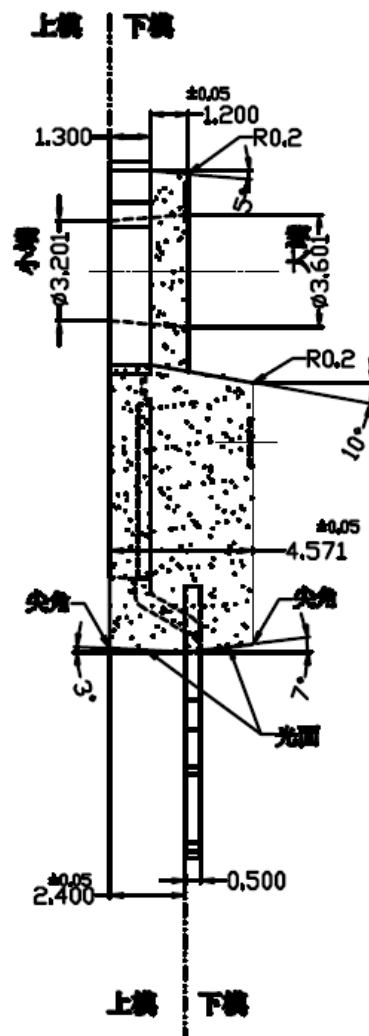
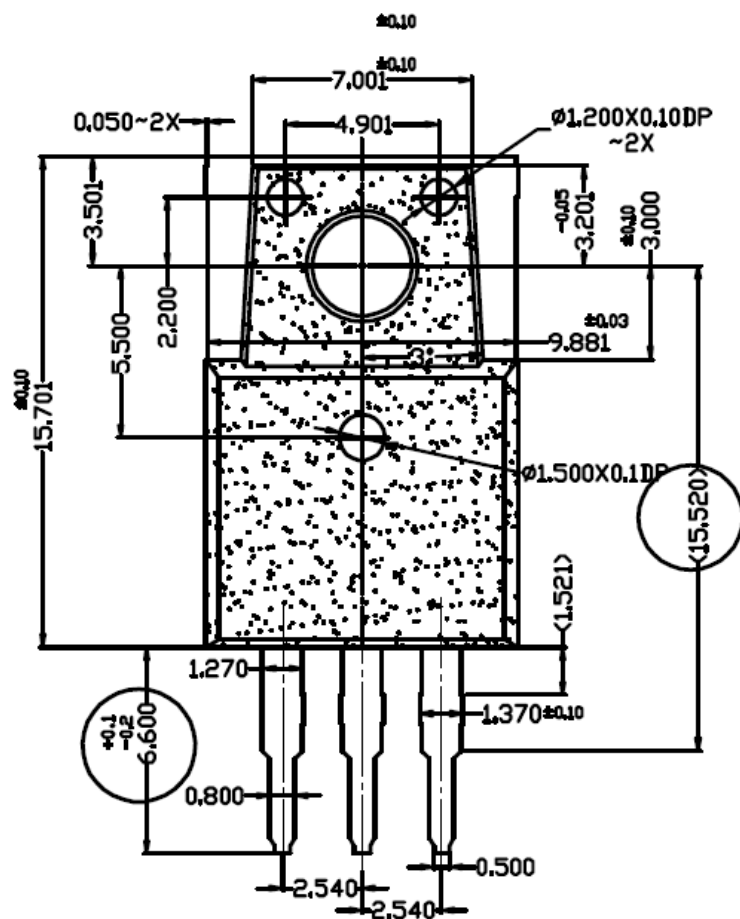
Package Outline

Dimensions are shown in millimeters

R: TO220



RN:TO220-SHORT



S: TO263 (D²PAK)

