

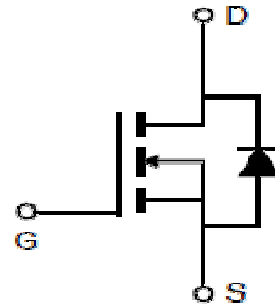
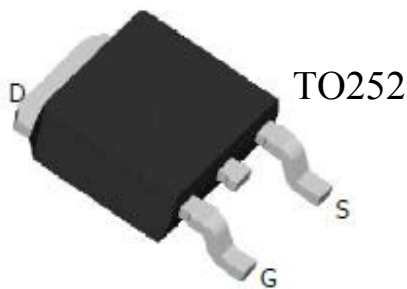
## Features

- Lead free and Green Device Available
- Low Rds-on to Minimize Conductive Loss
- High avalanche Current

## Application

- Power Tool
- Boost Converters for LED Lighting
- SMPS

<b>V<sub>DSS</sub></b>	<b>30V</b>
<b>R<sub>DS(on)</sub> V<sub>GS</sub>=10V typ.</b>	<b>9mΩ</b>
<b>max.</b>	<b>11mΩ</b>
<b>R<sub>DS(on)</sub> V<sub>GS</sub>=4.5V typ.</b>	<b>11mΩ</b>
<b>max.</b>	<b>13mΩ</b>
<b>I<sub>D</sub> @ V<sub>GS</sub>=10V (Silicon limited)</b>	<b>45A</b>
<b>I<sub>D</sub> (Package limited)</b>	<b>20A</b>



## Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise noted)

Symbol	Param	Maximum	Unit	
V <sub>DSS</sub>	Drain-to-Source Voltage	30	V	
V <sub>GSS</sub>	Gate-to-Source Voltage	±20	V	
I <sub>D</sub> V <sub>GS</sub> =10V  I <sub>D</sub> V <sub>GS</sub> =4.5V	Continuous Drain Current	T <sub>C</sub> =25°C (Silicon limited)	45	A
		T <sub>C</sub> =100°C (Silicon limited)	32	
		T <sub>C</sub> =25°C (Package limited)	20	
		T <sub>C</sub> =25°C (Silicon limited)	41	
		T <sub>C</sub> =100°C (Silicon limited)	29	
		T <sub>C</sub> =25°C (Package limited)	20	
I <sub>DP</sub>	Pulsed Drain Current	T <sub>C</sub> =25°C	-	A
I <sub>AS</sub>	Avalanche Current (L=0.3mH)	11	A	
E <sub>AS</sub>	Avalanche Energy (L=0.3mH)	18	mJ	
P <sub>D</sub>	Maximum Power Dissipation	T <sub>C</sub> =25°C	40	W
		T <sub>C</sub> =100°C	20	
T <sub>J</sub> , T <sub>STG</sub>	Junction & Storage Temperature Range	-55~175	°C	

## Thermal Characteristics

Symbol	Parameter	Max.	Unit
R <sub>thJC</sub>	Thermal resistance, junction to case	3.7	°C/W
R <sub>thJA</sub>	Thermal resistance, junction to ambient	86	°C/W

**Electrical Characteristics** (TA=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ	Max.	Unit
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	—	—	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$	—	—	1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.8	—	1.8	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	—	—	$\pm 100$	nA
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS}=10V, I_D=12A$	—	9	11	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$	—	11	13	
$G_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=12A$	—	43	—	S
<b>Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage	$I_{SD}=25A, V_{GS}=0V$	—	0.8	1.3	V
$I_S$	Diode Continuous Forward Current		—	—	20	A
$t_{rr}$	Reverse Recovery Time	$I_S=12A,$ $di/dt=100A/\mu s$	—	13	—	nS
$Q_{rr}$	Reverse Recovery Charge		—	1.6	—	nC
<b>Dynamic Characteristics</b>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V,$ Frequency=1MHz	—	2.5	—	$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=15V,$ F=1MHz	—	1250	—	pF
$C_{oss}$	Output Capacitance		—	168	—	
$C_{rss}$	Reverse Transfer Capacitance		—	127	—	
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=15V,$ $I_D=1A,$ $R_g=3\ \Omega,$ $V_{GS}=4.5V$	—	15	—	nS
$t_r$	Rise Time		—	25	—	
$t_{d(off)}$	Turn-Off Delay Time		—	39	—	
$t_f$	Fall Time		—	22	—	
<b>Gate Charge Characteristics</b>						
$Q_g$	Total Gate Charge	$V_{DS}=25V,$ $V_{GS}=10V,$ $I_D=14A$	—	23	—	nC
$Q_{gs}$	Gate-to-Source Charge		—	2.2	—	
$Q_{gd}$	Gate-to-Drain Charge		—	5.5	—	

## Typical Operating Characteristics

Figure 1. Typ. Output Characteristics

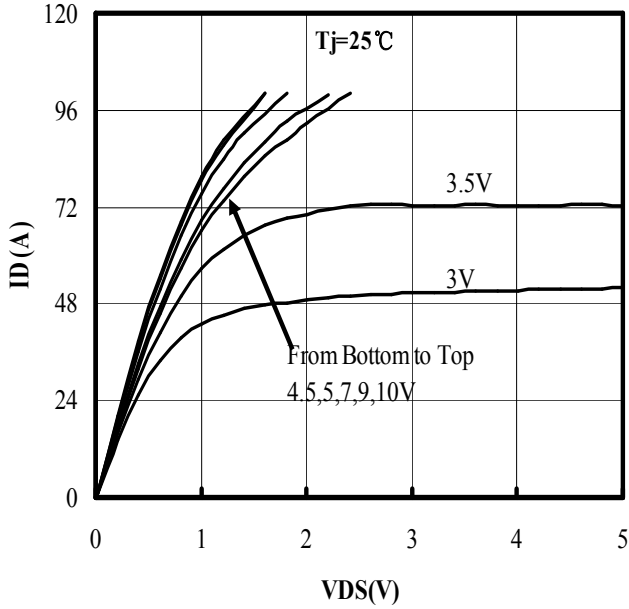


Figure 2. Typ. Output Characteristics

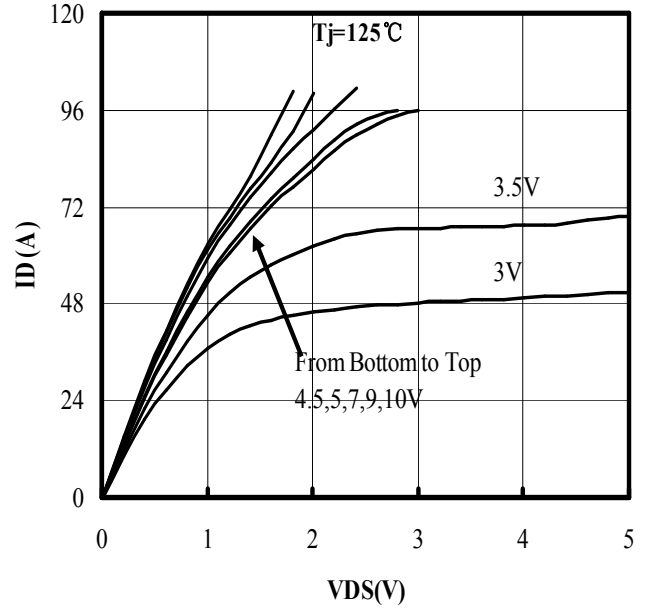


Figure 3. Transfer Characteristics

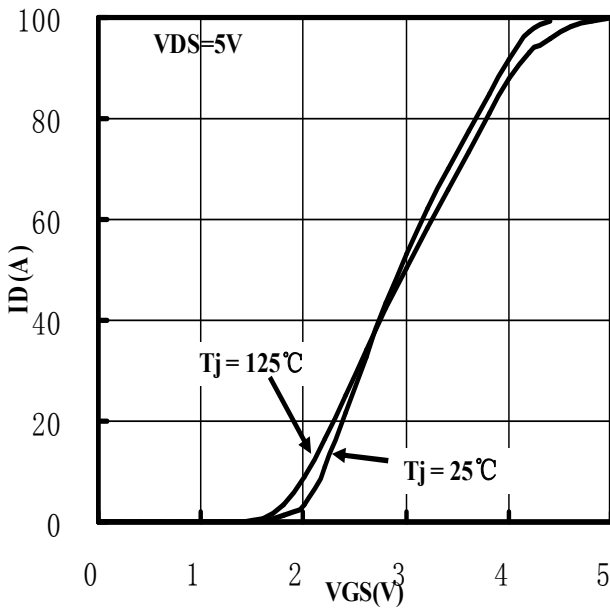
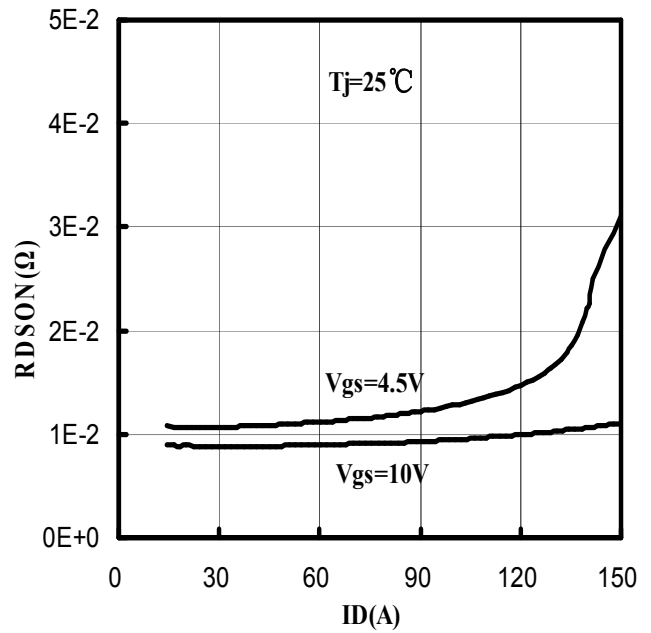


Figure 4. R<sub>ds(on)</sub> vs. Drain Current Characteristics



## Typical Operating Characteristics

Figure 5. Gate Threshold Voltage Characteristics

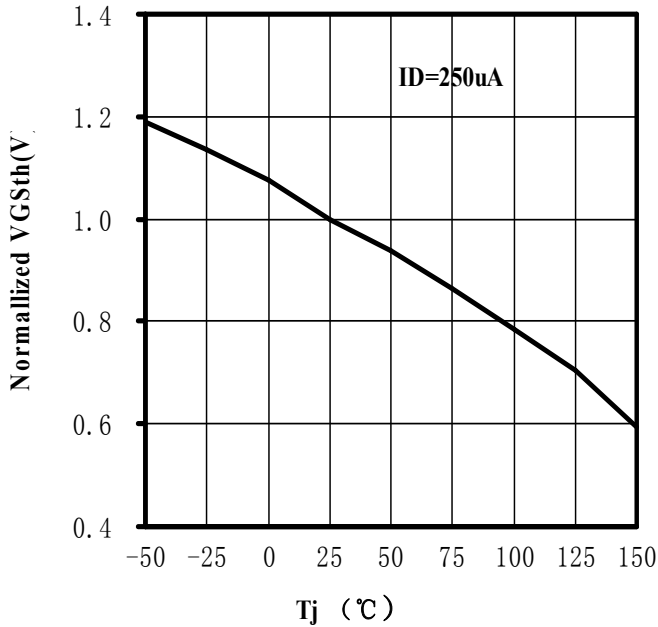


Figure 7. Rdson vs. VGS Characteristics

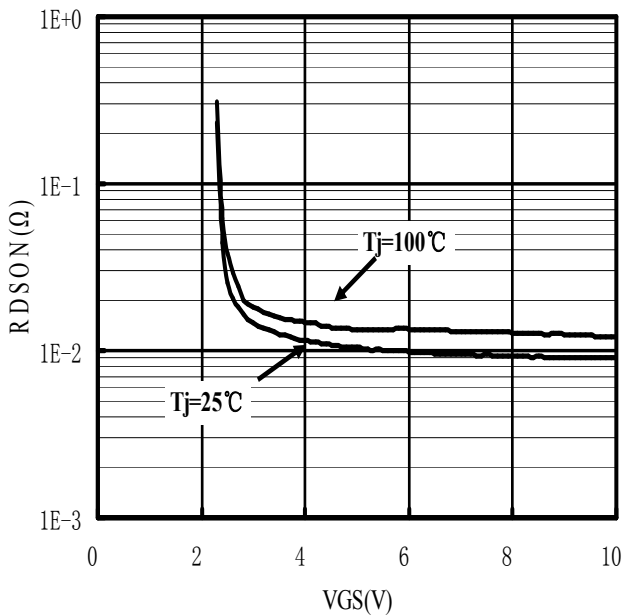


Figure 6. Rdson vs. Junction Tem Characteristics

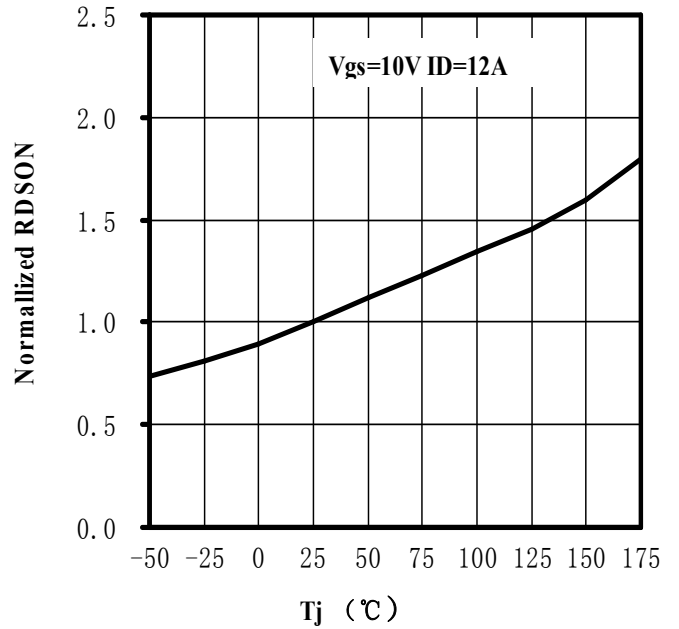
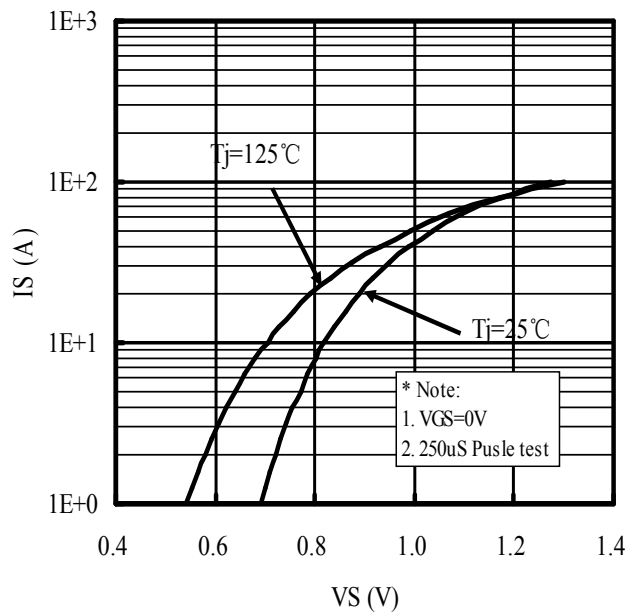


Figure 8. IS vs. VSD Characteristics



## Typical Operating Characteristics

Figure 9. Gate Charge Characteristics

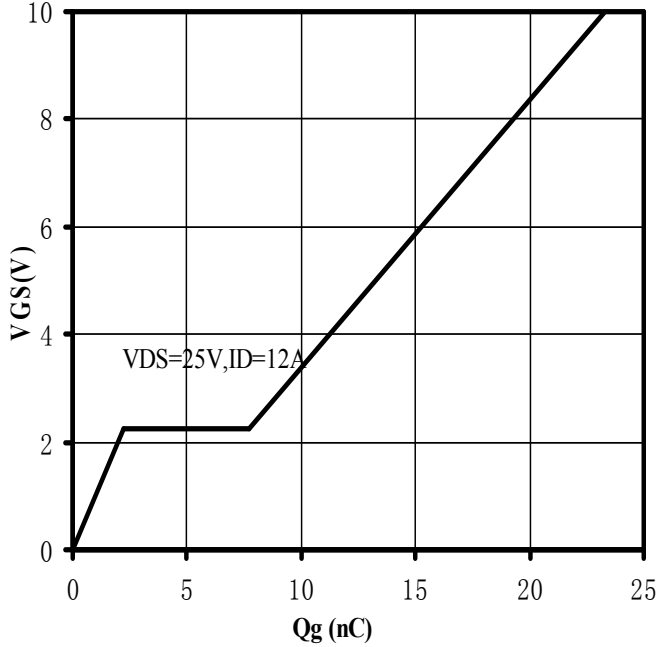


Figure 10. Capacitance Characteristics

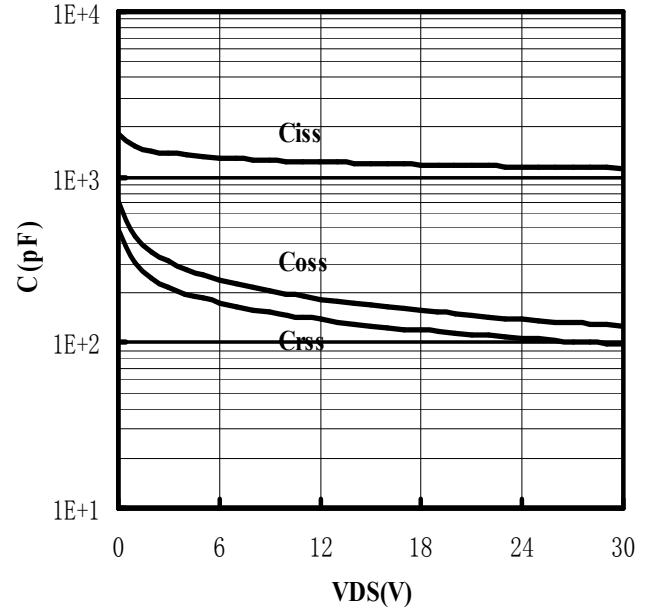


Figure 11. Thermal Resistance Characteristics

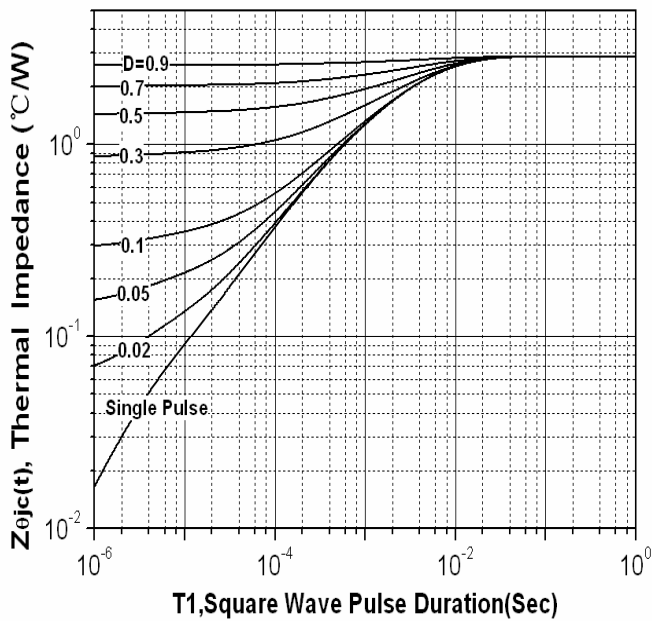
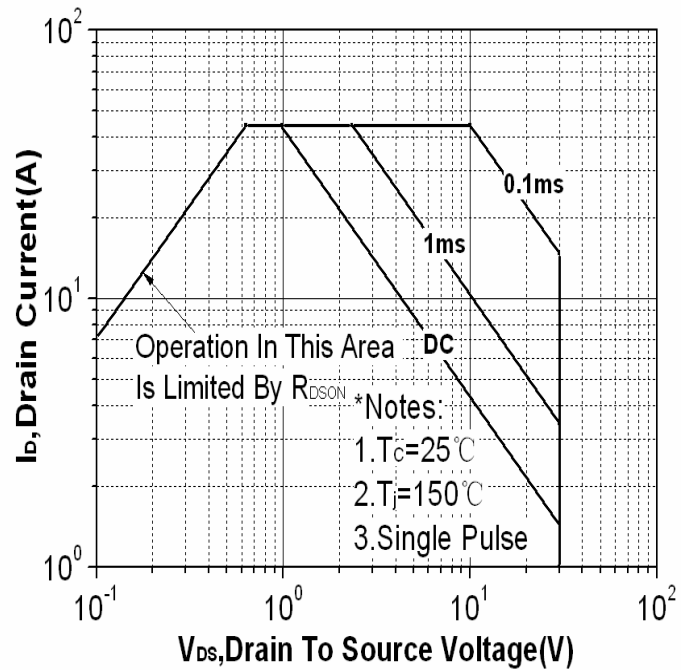


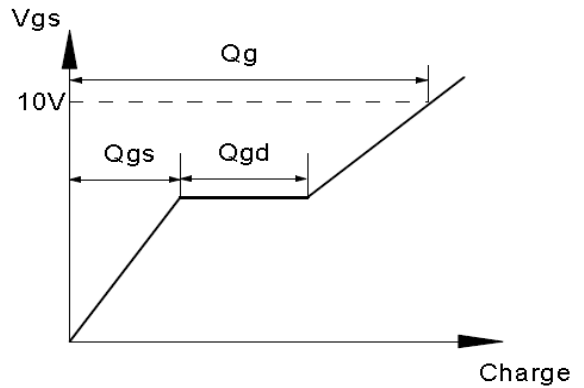
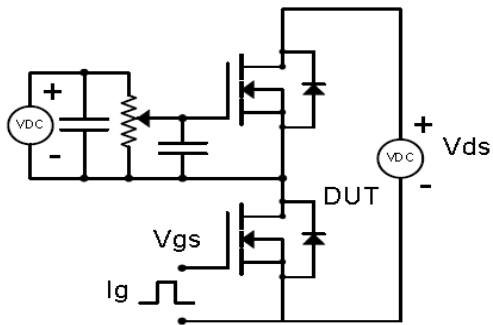
Figure 12. SOA



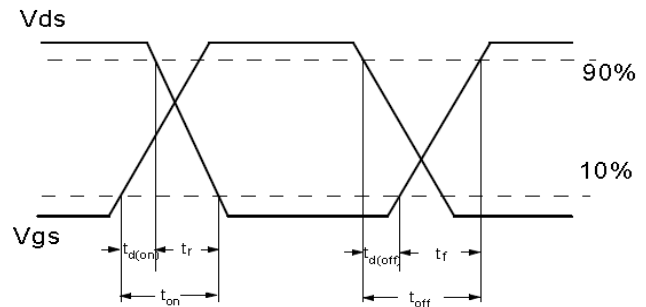
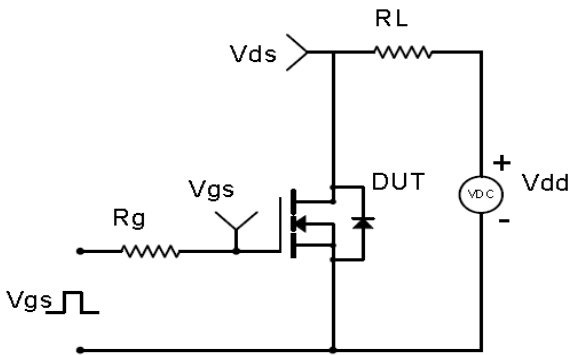
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## Test Circuit & Waveform

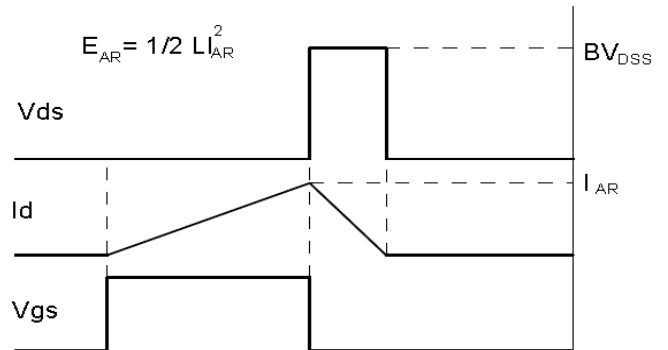
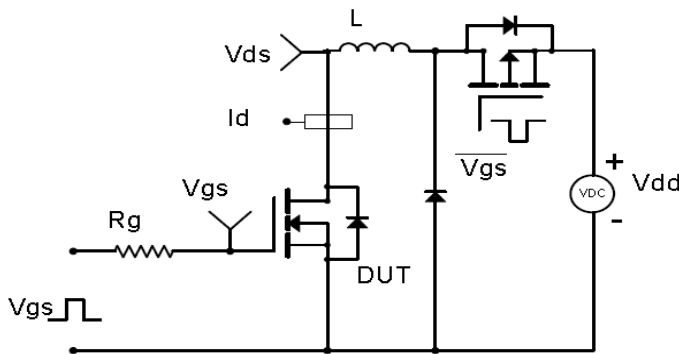
### Gate Charge Test Circuit & Waveform



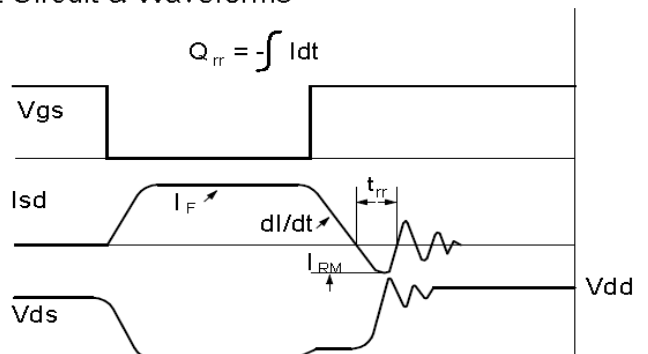
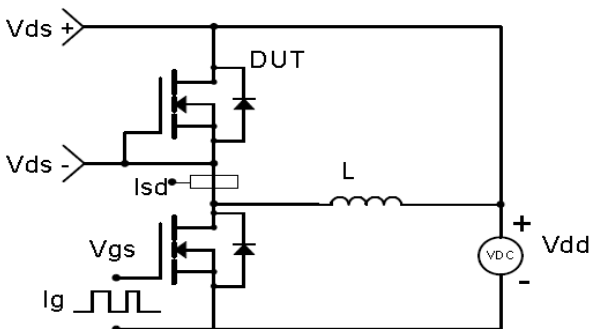
### Resistive Switching Test Circuit & Waveforms



### Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

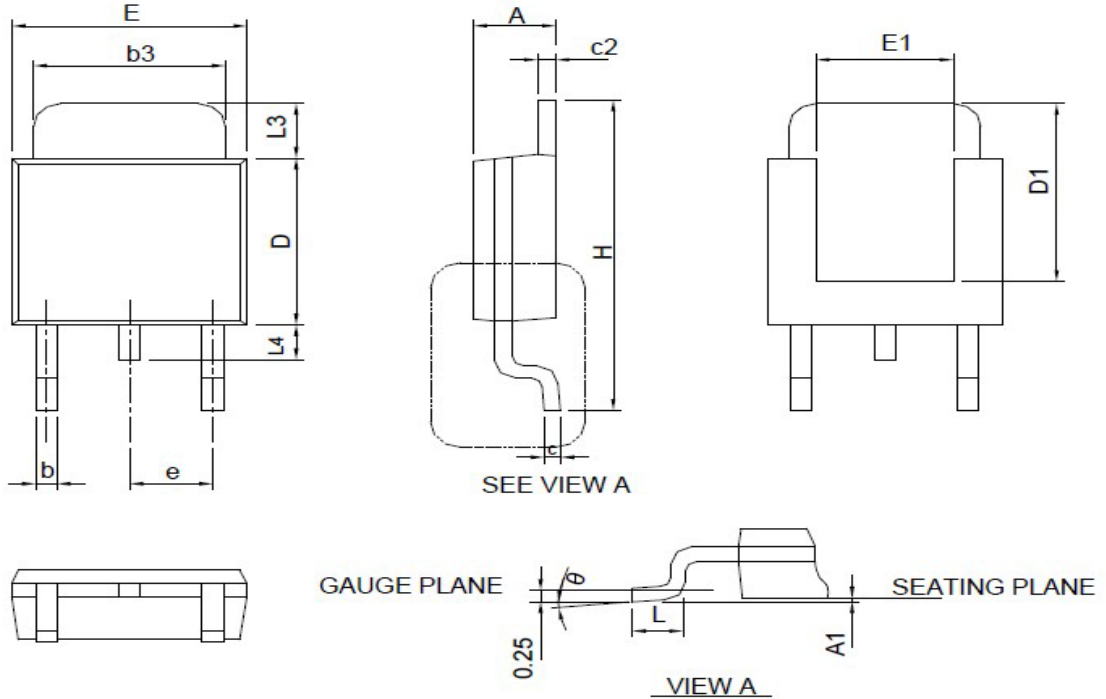


### Diode Recovery Test Circuit & Waveforms



## Package Information

TO-252-3



DIMENSIONS	TO-252-3			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1		0.13		0.005
b	0.50	0.89	0.020	0.035
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	0.90	1.78	0.035	0.070
L3	0.89	2.03	0.035	0.080
L4		1.02		0.040
θ	0°	8°	0°	8°

Note : Follow JEDEC TO-252 .

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