N-Channel 60V(D-S) MOSFET

Product summary		
V_{DS}	60	V
$R_{DS(ON)}$(at V_{GS}=10V) Typ.	7.5	mΩ
I_D(Tc=25℃)	55	A

Features

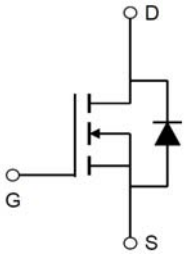
- Advanced Trench Technology
- Low Gate Charge

Applications

- PWM Application
- Load switching

Pin Configuration

TO-252



Packing Information

Device	Package	Reel Size	Quantity(Min. Package)
ECFA55N06	TO-252	13″	2500pcs

Absolute Maximum Ratings (at T_A=25℃ Unless Otherwise Noted)

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		60	V
V_{GS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C=25℃	55	A
		T_C=100℃	34.8	A
I_{DM}	Pulse Drain Current Tested [A]		230	A
E_{AS}	Single Pulse Avalanche Energy [B]		121	mJ
P_D	Power Dissipation	T_C=25℃	58	W
T_J,T_{STG}	Junciton and Storage Temperature Range		-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Typical	Units
$R_{\theta JC}$	Thermal Resistance-Junction to case	2.16	℃/W

Electrical Characteristics (at T_J =25℃ Unless Otherwise Noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250uA	60	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V,V_{GS}=0V	--	--	1	uA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V,V_{GS}=±20V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250uA	2.0	3.0	4.0	V
$R_{DS(ON)}$	Drain-Source On-State Resistance [C]	V_{GS}=10V,I_D=20A	--	7.5	9.8	mΩ
Dynamic Parameters [D]						
C_{iss}	Input Capacitance	V_{GS}=0V,V_{DS}=25V f=1MHZ	--	2800	--	pF
C_{oss}	Output Capacitance		--	196	--	pF
C_{rss}	Reverse Transfer Capacitance		--	172	--	pF
Q_g	Total Gate Charge	V_{DS}=30V,I_D=30A V_{GS}=0 to 10V	--	85	--	nC
Q_{gs}	Gate-Source Charge		--	17	--	nC
Q_{gd}	Gate-Drain Charge		--	9	--	nC
$t_{D(on)}$	Turn-on Delay Time	V_{DD}=30V，I_D=30A, R_{GEN}=1.8Ω, V_{GS}=10V	--	15	--	ns
t_r	Turn-on Rise Time		--	80	--	ns
$t_{D(off)}$	Turn-off Delay Time		--	55	--	ns
t_f	Turn-off Fall Time		--	110	--	ns
Drain-Source Diode Characteristics						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	55	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	230	A
V_{SD}	Diode Forward Voltage	I_S=30A,V_{GS}=0V	--	--	1.2	V
t_{rr}	Reverse recovery time	I_F=30A, di/dt=100 A/us	--	28	--	ns
Q_{rr}	Reverse recovery charge		--	33	--	nC

A. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

B. EAS condition: T_J=25℃, V_{DD}=30V, V_G=10V，R_G=25ohm，L=0.5mH，I_{AS}=22A.

C. Pulse Test: Pulse Width≤300us,Duty cycle ≤0.5%.

D. Guaranteed by design, not subject to production testing.

Typical Characteristics

Figure 1: Power De-rating

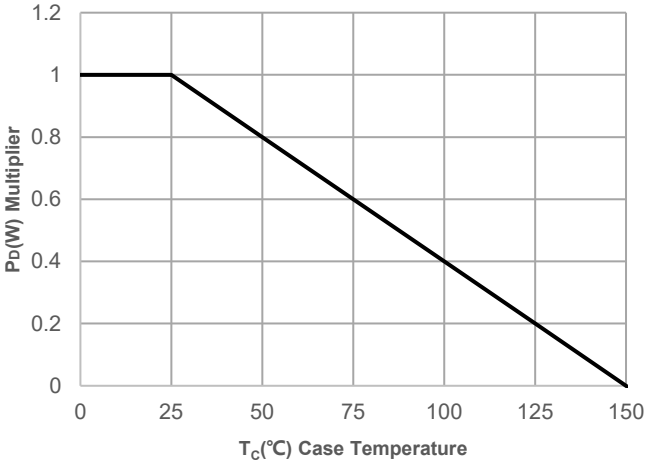


Figure 2: Current De-rating

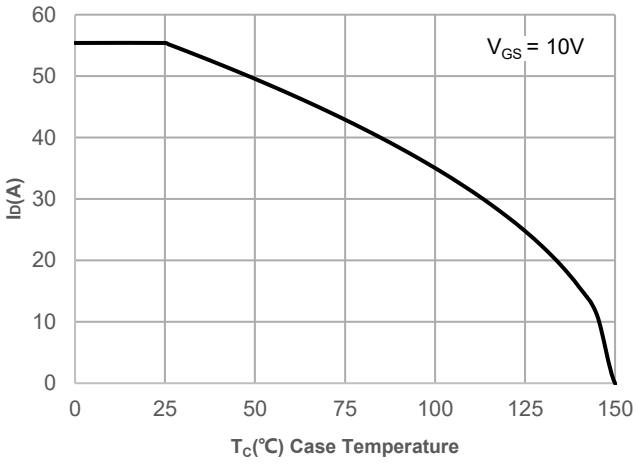


Figure 3: Normalized Maximum Transient Thermal Impedance

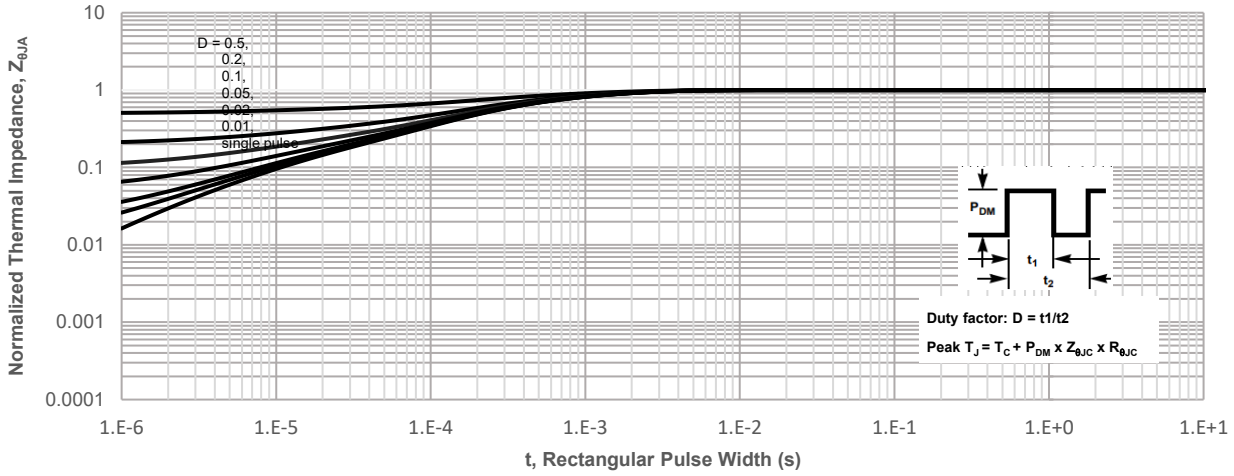
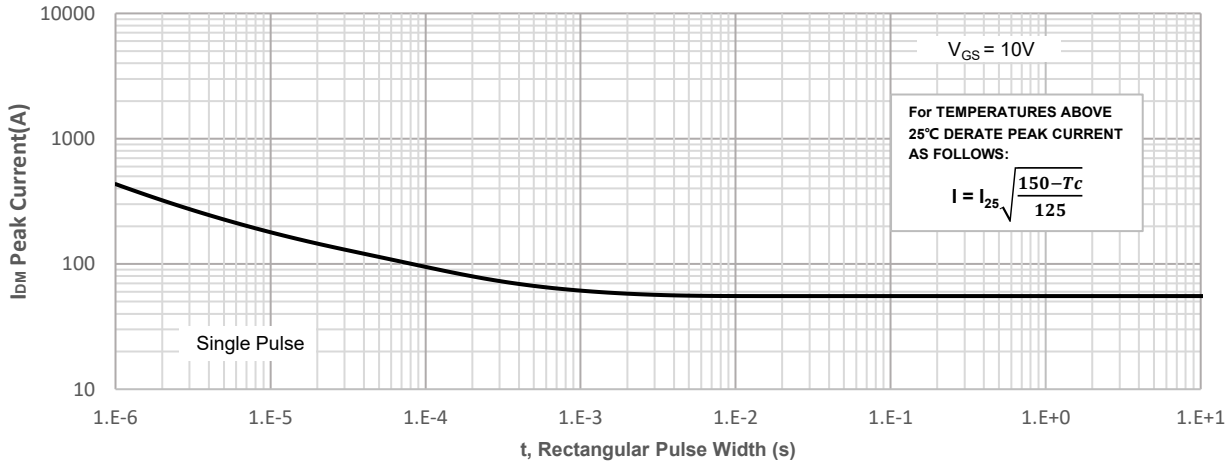


Figure 4: Peak Current Capacity



Typical Characteristics

Figure 5: Output Characteristics

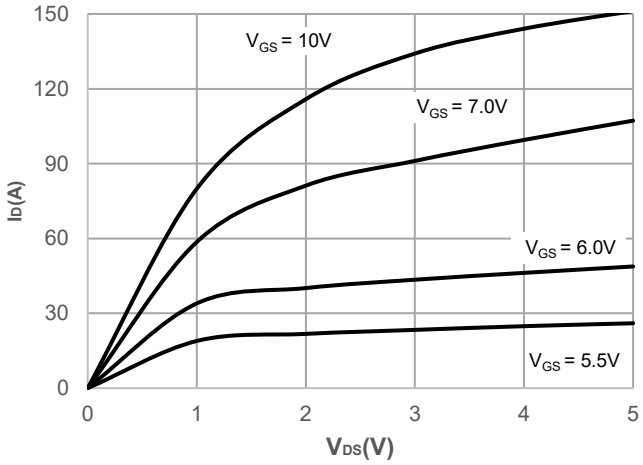


Figure 6: Typical Transfer Characteristics

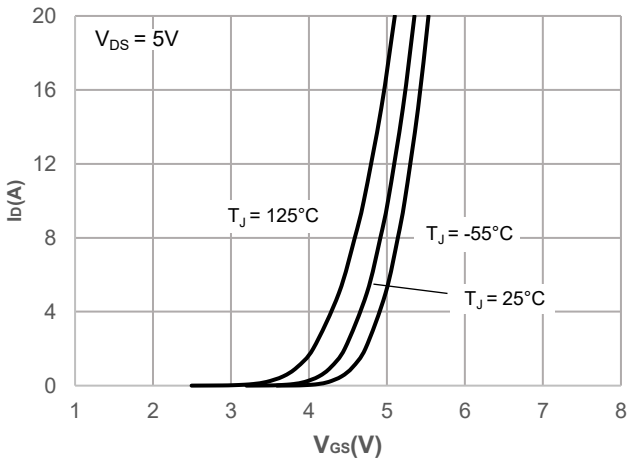


Figure 7: On-resistance vs. Drain Current

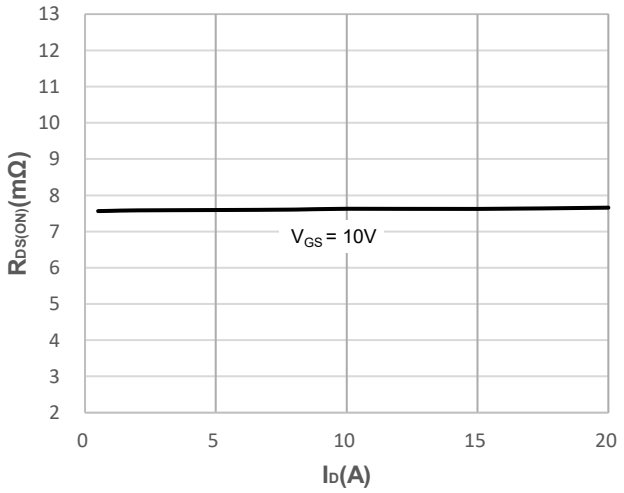


Figure 8: Body Diode Characteristics

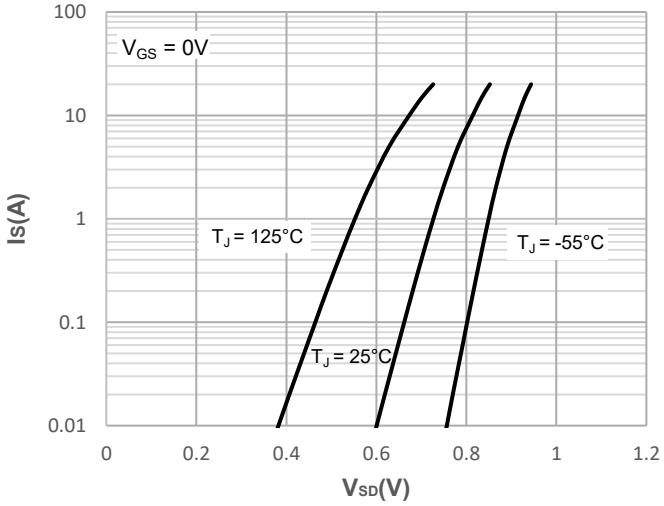


Figure 9: Gate Charge Characteristics

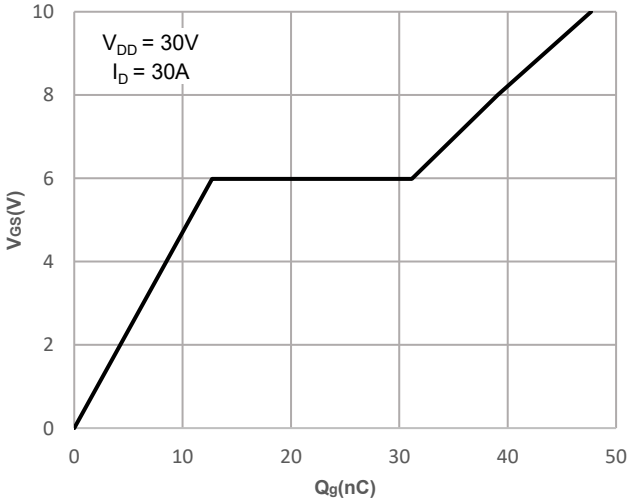
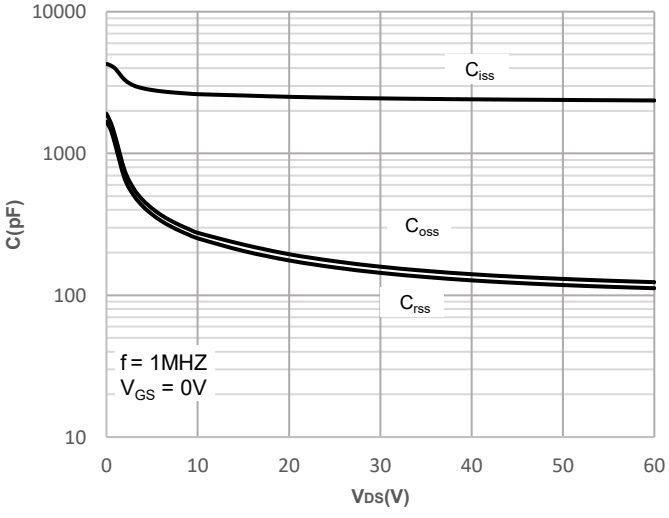


Figure 10: Capacitance Characteristics



Typical Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

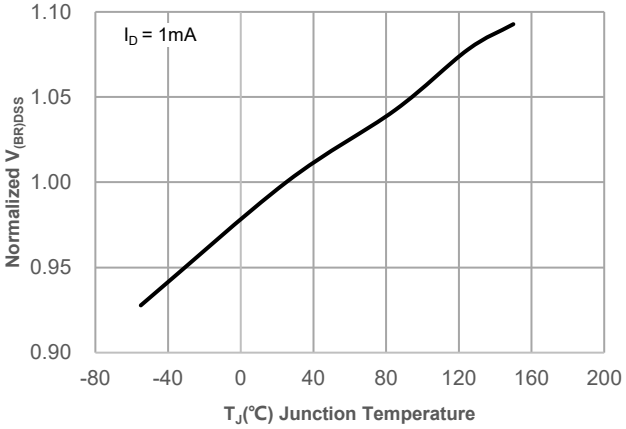


Figure 12: Normalized on Resistance vs. Junction Temperature

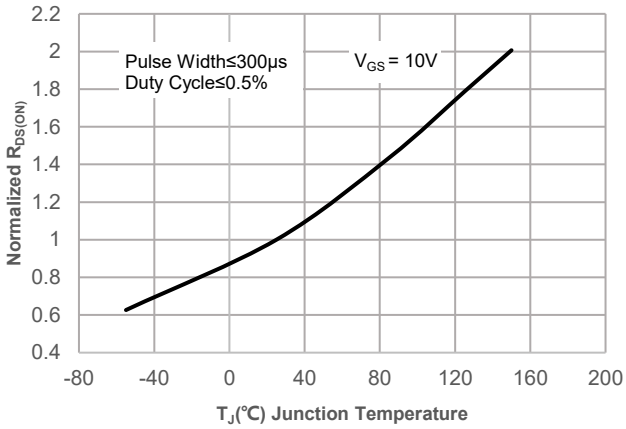


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

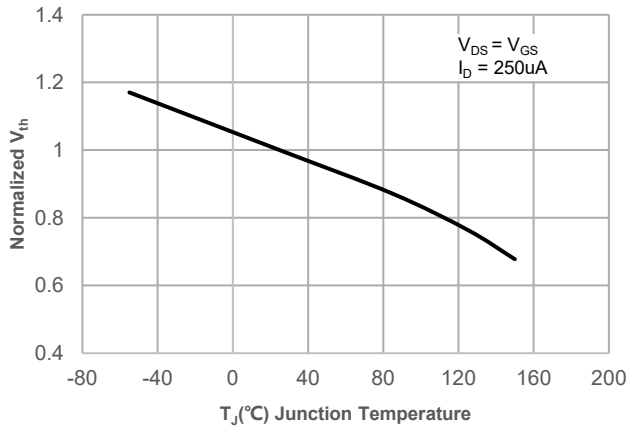


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

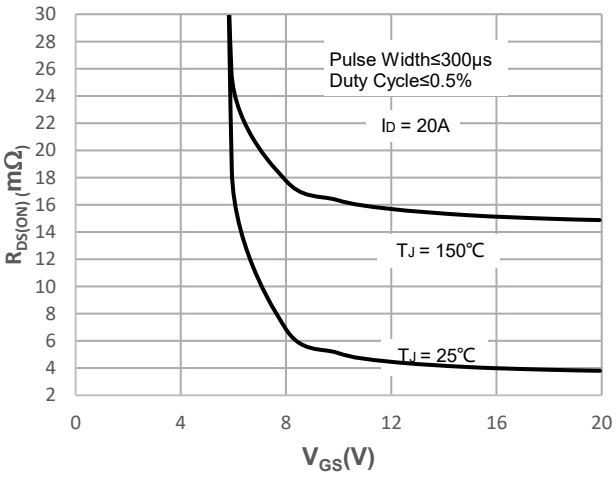
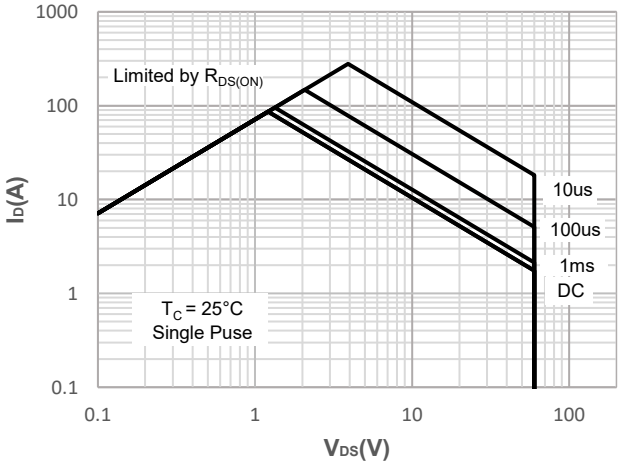


Figure 15: Maximum Safe Operating Area



Test Circuit

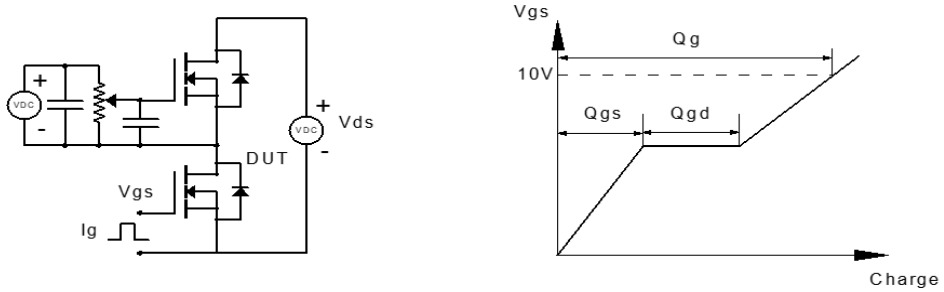


Figure 1: Gate Charge Test Circuit & Waveform

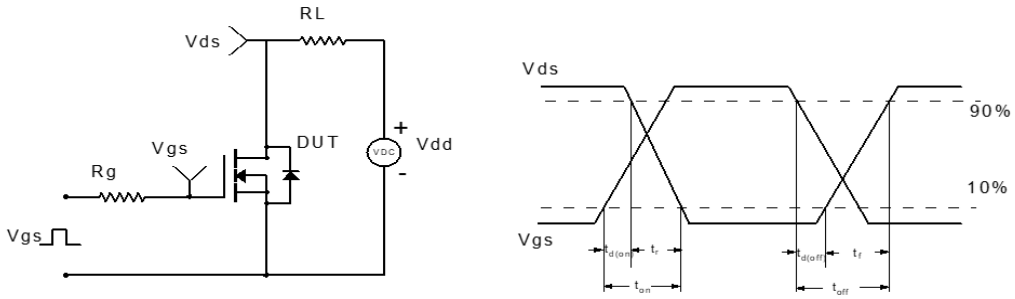


Figure 2: Resistive Switching Test Circuit & Waveform

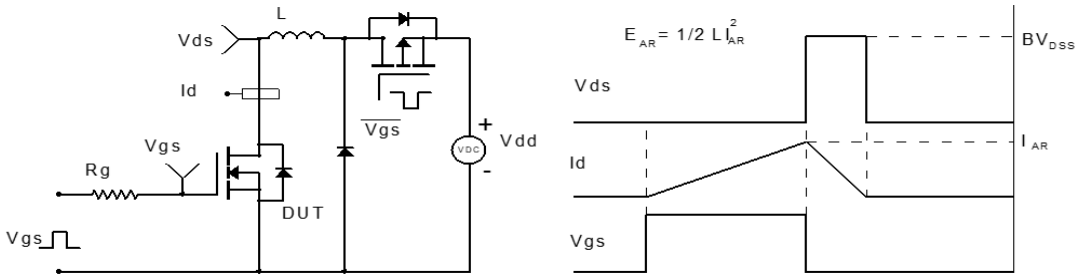


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

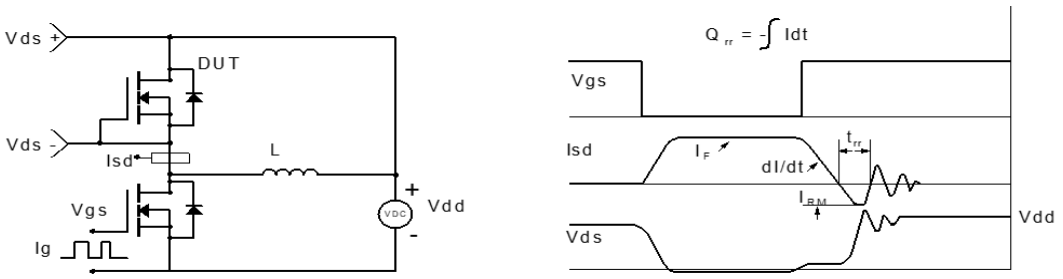
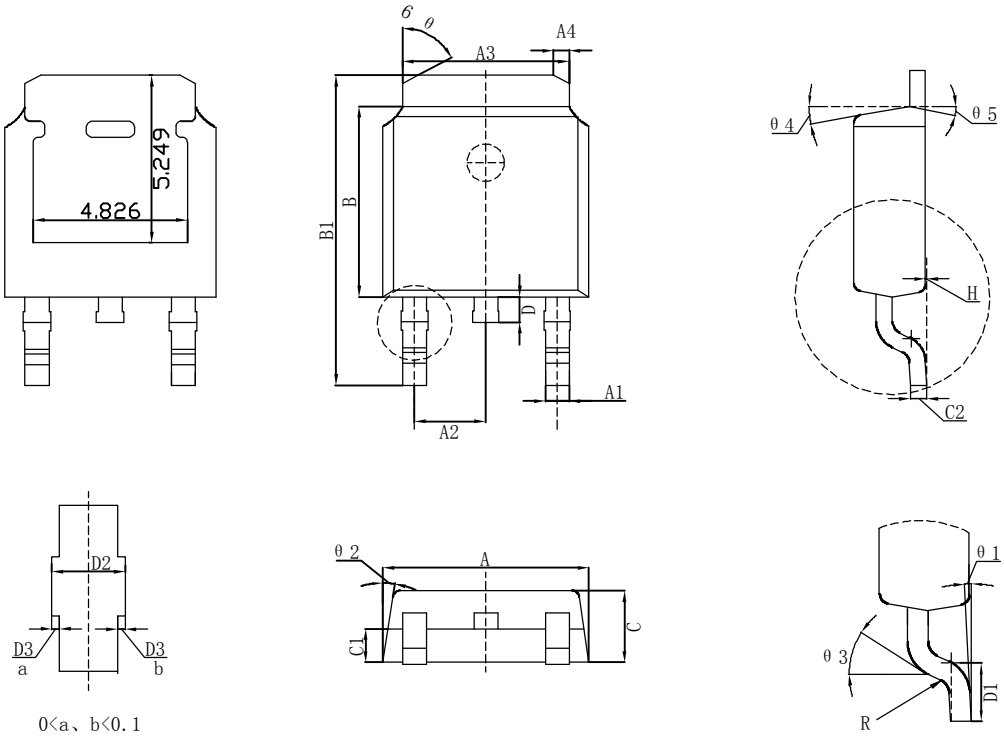


Figure 4: Diode Recovery Test Circuit & Waveform

TO-252 Package Information



尺寸 / 标注	最小(mm)	最大(mm)	尺寸 / 标注	最小(mm)	最大(mm)
A	6.50	6.70	D1	1.40	1.60
A1	0.71	0.81	D2	0.81	0.91
A2	2.236	2.336	D3	0.05TYP	
A3	5.284	5.384	H	0.00	0.10
A4	0.75	0.85	R	0.40TYP	
B	6.00	6.20	θ1	0° ━ 8°	
B1	9.80	10.10	θ2	8.5° TYP4	
C	2.20	2.40	θ3	25° TYP	
C1	0.967	1.087	θ4	10° TYP2	
C2	0.498	0.518	θ5	10° TYP	
D	0.70	0.90	θ6	70° TYP	