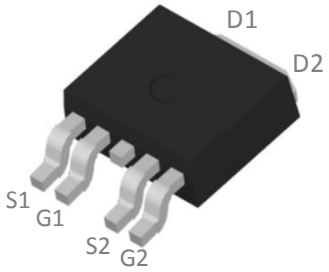
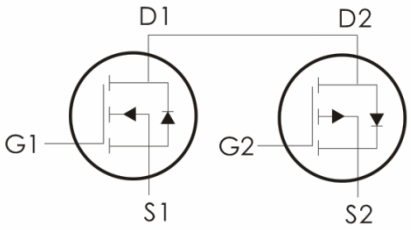
Description：

This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.





Features：

N-Channel:V_{DS}=60V,I_D=40A,$R_{DS(ON)}$<15mΩ @V_{GS}=10V（Typ：12mΩ）

P-Channel: V_{DS}=-60V,I_D=-40A,$R_{DS(ON)}$<25mΩ @V_{GS}=-10V（Typ：21mΩ）

1) Low gate charge.
2) Green device available.
3) Advanced high cell denity trench technology for ultra low $R_{DS(ON)}$.
4) Excellent package for good heat dissipation.
5) MSL3

Package Marking and Ordering Information：

Part NO.	Marking	Package	Packing
DOD633	D633	TO- 252-4	2500 pcs/Reel

Absolute Maximum Ratings：（T_C=25℃ unless otherwise noted）

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	60	-60	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Continuous Drain Current- T_C=25℃[1]	40	-40	A
	Continuous Drain Current-T_C=100℃[1]	28	-28	
I_{DM}	Pulsed Drain Current [2]	160	-160	A
E_{AS}	Single pulse avalanche energy[3]	72	150	mJ
P_D	Power Dissipation - T_C=25℃	56	71.4	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		℃

Thermal Characteristics：

Symbol	Parameter	N-CH	P-CH	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Cast	2.25	1.75	℃/W

N-Channel Electrical Characteristics: (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=60V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1	2	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[4]	V_{GS}=10V,I_D=30A	---	12	15	mΩ
		V_{GS}=4.5V,I_D=20A	---	18	23	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	---	2030	---	pF
C_{oss}	Output Capacitance		---	139	---	
C_{rss}	Reverse Transfer Capacitance		---	128	---	
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=30V, I_D=30A, R_{REN} =1.8Ω ,V_{GS}=10V	---	11	---	ns
t_r	Rise Time		---	82	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	34	---	ns
t_f	Fall Time		---	112	---	ns
Switching Characteristics[4]						
Q_g	Total Gate Charge[4,5]	V_{DS}=30V, I_D=30A, V_{GS}=10V	---	45	---	nC
Q_{gs}	Gate-Source Charge[4,5]		---	8	---	nC
Q_{gd}	Gate-Drain “Miller” Charge[4,5]		---	11	---	nC
Drain-Source Diode Characteristics						
I_S	Continuous Drain to Source Diode	VD=VG=0V	---	----	40	A
I_{SM}	Pulsed Drain to Source Diode	VD=VG=0V	---	---	160	A
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS}=0V,I_S=30A	---	---	1.2	V

Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition : TJ=25℃,VDD=30V,V_G=10V,L=0.5mH
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

N-Typical Characteristics： (T_C=25℃ unless otherwise noted)

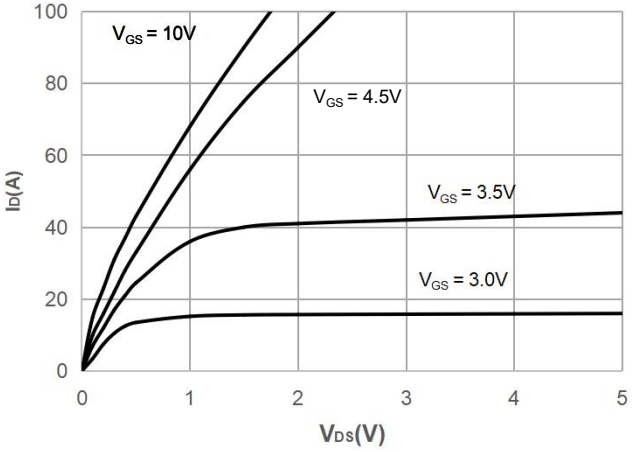


Figure 1: Output Characteristics

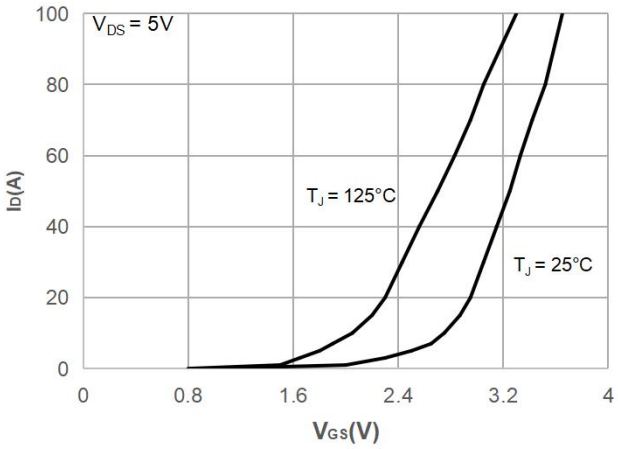


Figure 2: Typical Transfer Characteristics

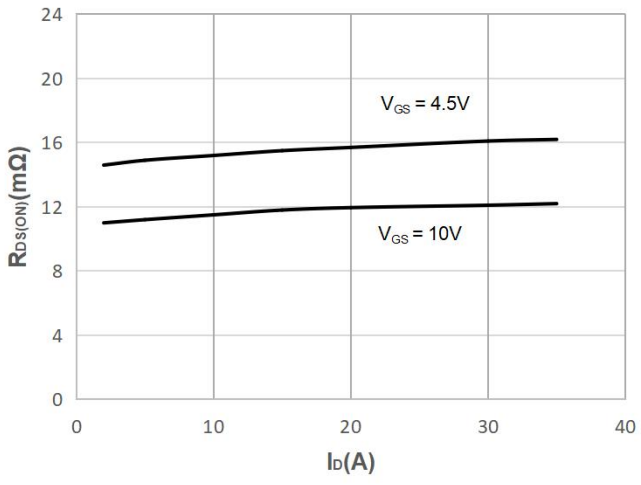


Figure 3: On-resistance vs. Drain Current

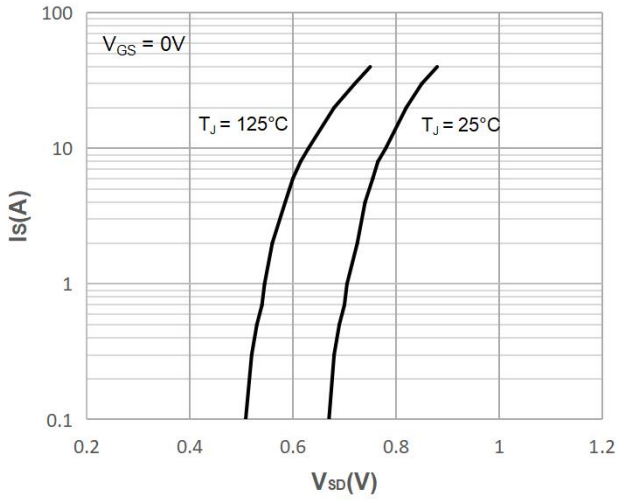


Figure 4: Body Diode Characteristics

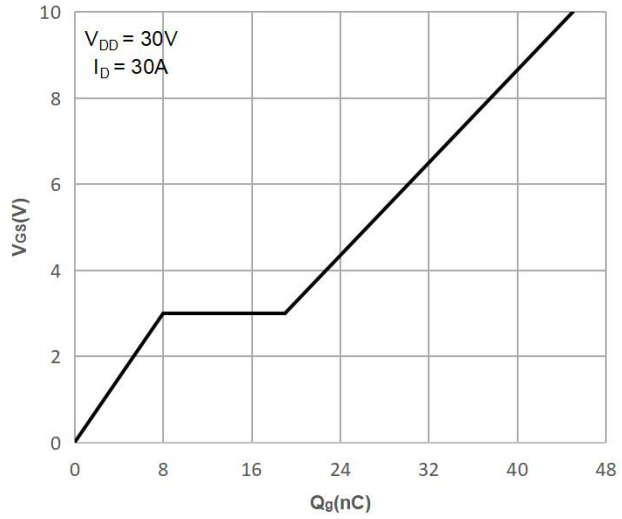


Figure 5: Gate Charge Characteristics

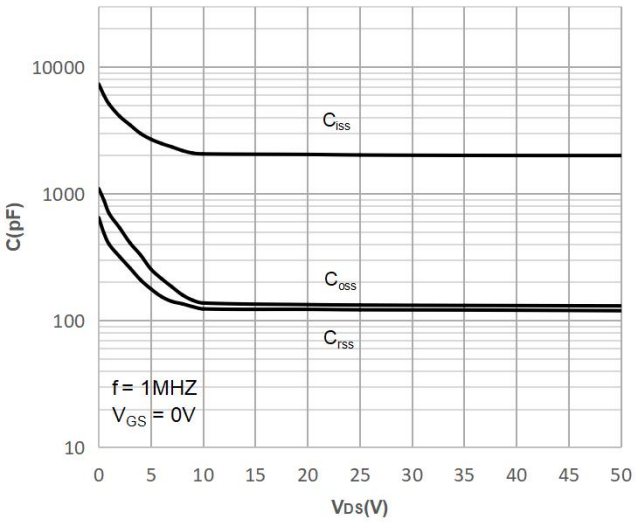


Figure 6: Capacitance Characteristics

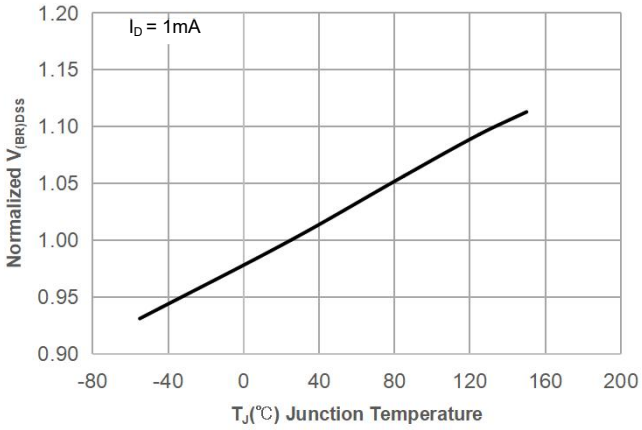


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

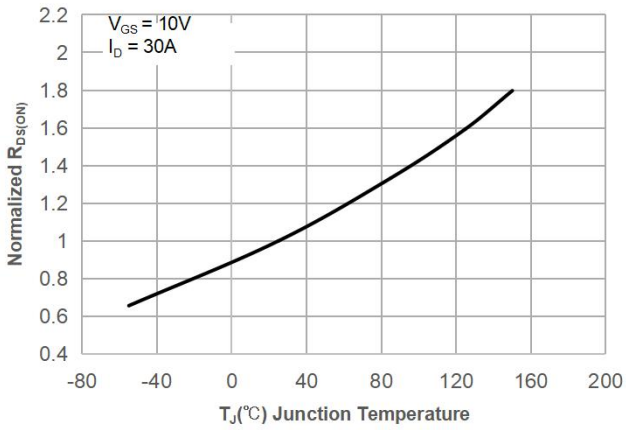


Figure 8: Normalized on Resistance vs. Junction Temperature

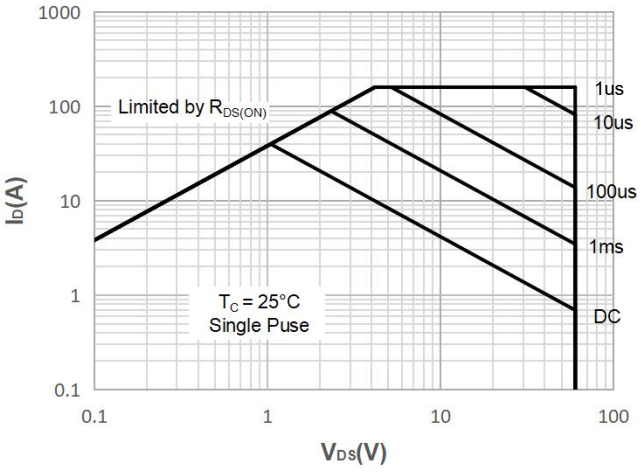


Figure 9: Maximum Safe Operating Area

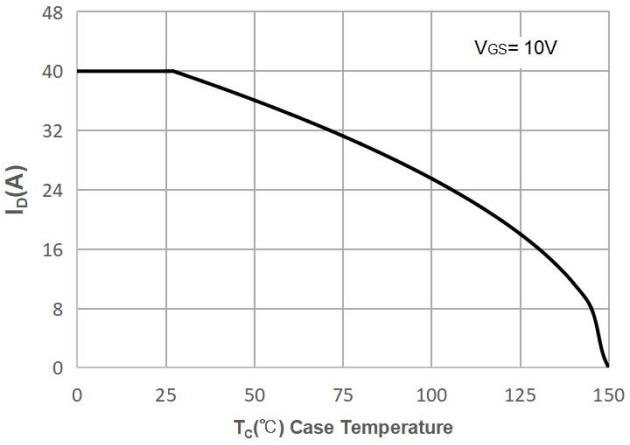


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

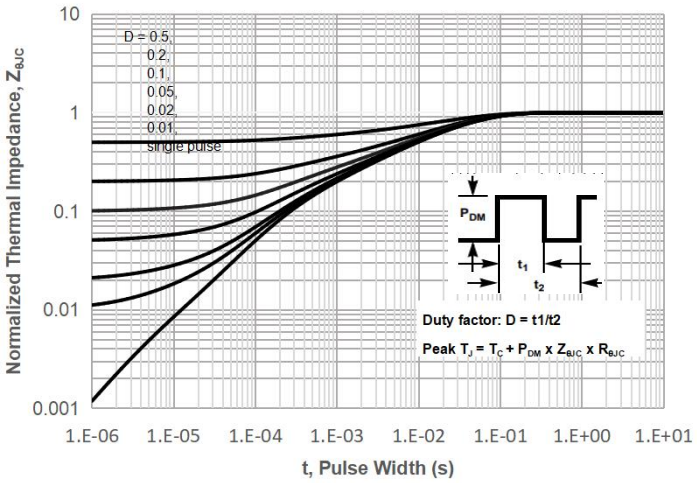


Figure 11: Normalized Maximum Transient Thermal Impedance

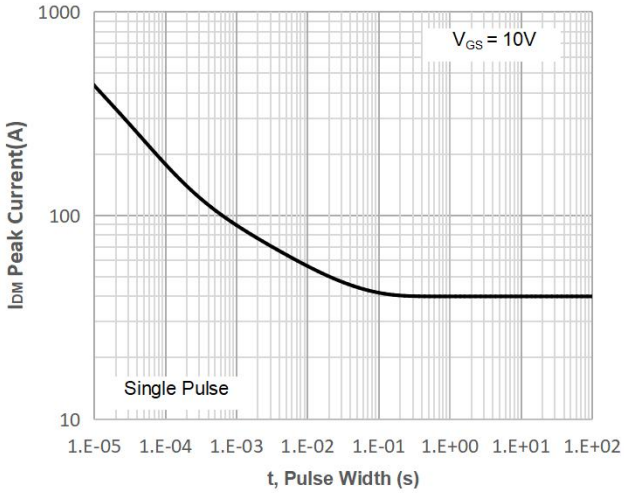


Figure 12: Peak Current Capacity

P-Channel Electrical Characteristics: (T_A=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	-60	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-60V	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	-1	---	-2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[4]	V_{GS}=-10V,I_D=-19A	---	21	25	mΩ
		V_{GS}=-4.5V,I_D=-19A	---	26	32	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=-30V, V_{GS}=0V, f=1MHz	---	3650	---	pF
C_{oss}	Output Capacitance		---	158	---	
C_{rss}	Reverse Transfer Capacitance		---	122	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD}= -30V， I_D=-19A V_{GS}= -10V, R_{GEN}=3Ω	---	15	---	ns
t_r	Rise Time		---	6.6	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	123	---	ns
t_f	Fall Time		---	73	---	ns
Q_g	Total Gate Charge	V_{GS}=-10V,V_{DS}=-30V, I_D=-19A	---	60	---	nC
Q_{gs}	Gate-Source Charge		---	8.2	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	10.2	---	nC
Drain-Source Diode Characteristics						
I_S	Continuous Drain to Source Diode	V_D=V_G=0V	---	---	-40	A
I_{SM}	Pulsed Drain to Source Diode		---	---	-160	---
Trr	Reverse Recovery Time	I_F=-19A,T_J=25℃ dI/dt=100A/us	---	29.38	---	ns
Qrr	Reverse Recovery Charge		---	30.19	---	nC
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS}=0V,I_S=-19A	---	---	-1.2	V

Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition : TJ=25℃,VDD=-30V,V_G=-10V,L=0.5mH
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Test Circuit & Waveform

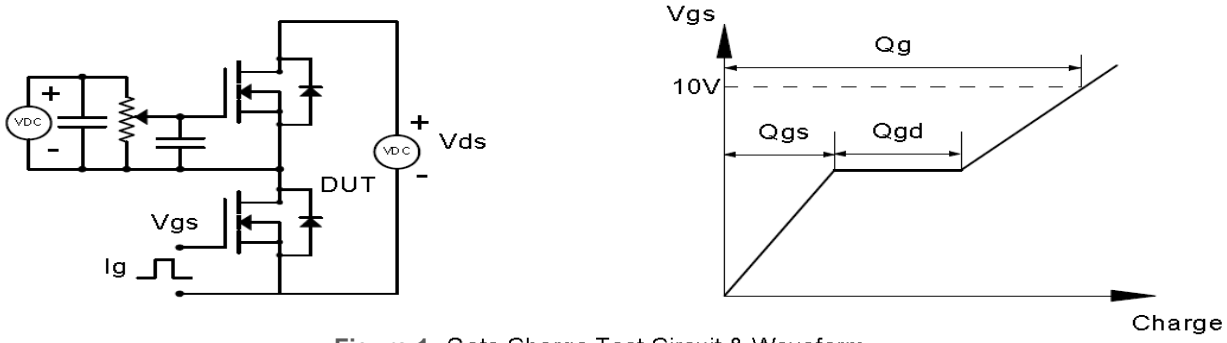


Figure 1 Gate Charge Test Circuit & Waveform

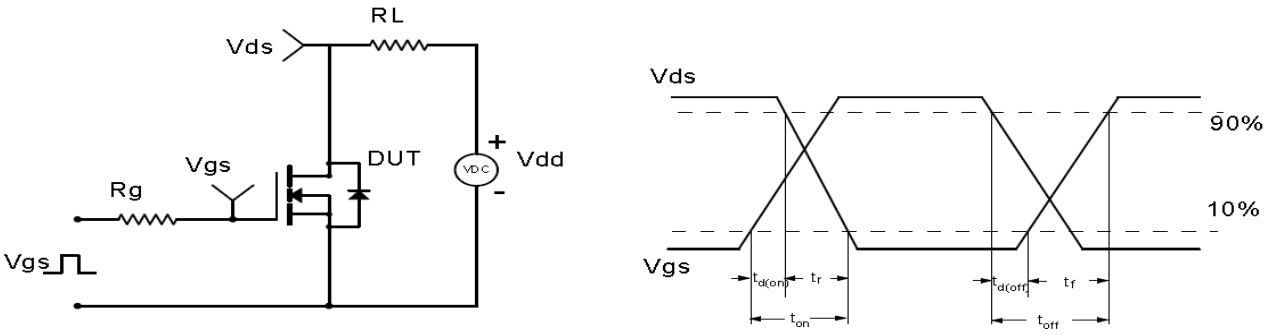


Figure 2 Resistive Switching Test Circuit & Waveforms

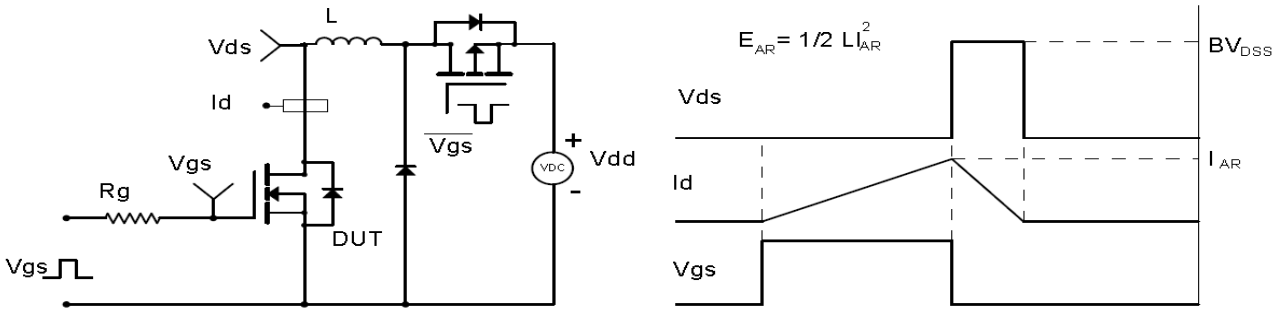


Figure 3 Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

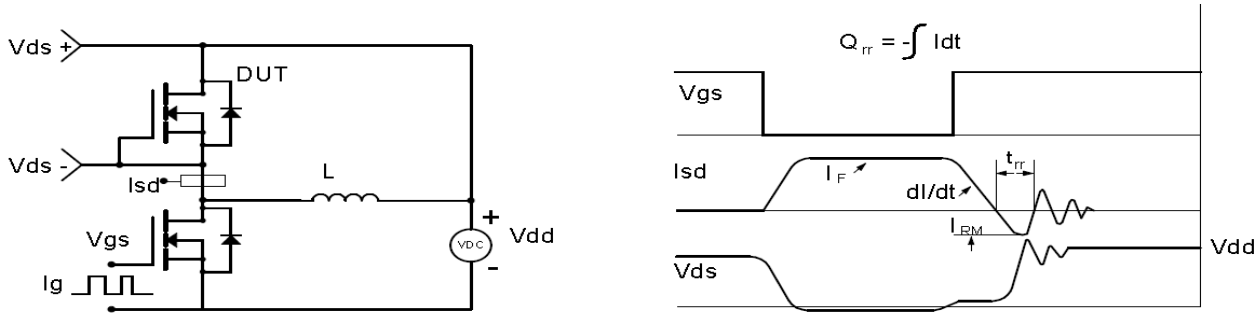
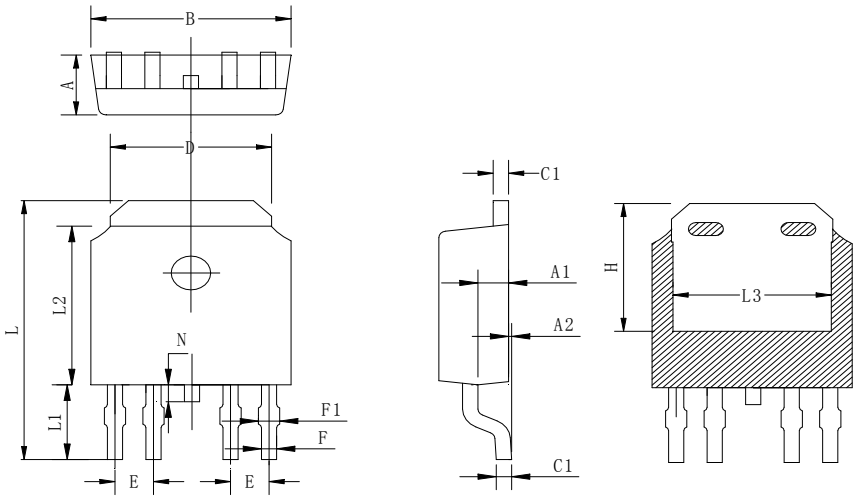


Figure 4 Diode Recovery Test Circuit & Waveforms

TO-252-4Package Outline Data

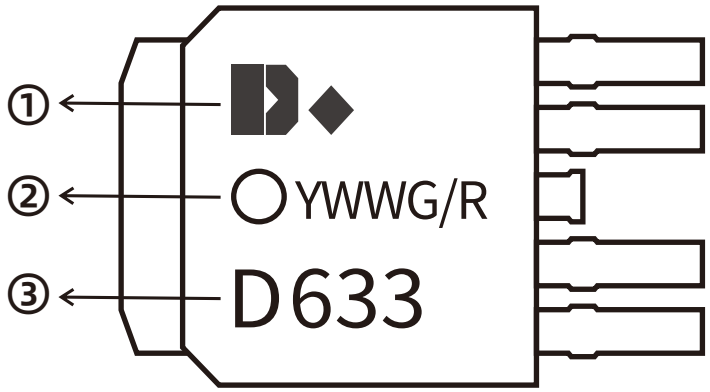
UNIT: mm



Symbol	Min	Typ	Max
A	2.20	2.30	2.40
A1	0.91	1.01	1.11
A2	0.05	0.15	0.25
B	6.45	6.60	6.75
C	0.45	0.50	0.58
C1	0.45	0.50	0.58
D	5.12	5.32	5.52
E		1.27 TYP	
F1	0.45	0.60	0.75
F	0.40	0.50	0.60
H	4.70	4.90	5.10
L	9.70	10.00	10.20
L1	2.6	2.8	3.0
L2	5.95	6.10	6.25
L3	5.00	5.20	5.40`
N	0.45	0.65	0.85

Marking Information：

①: Doingter LOGO
②: Date Code（YWWG / R）
Y: Year Code , last digit of the year
WW : Week Code（01-53）
G/R: G(Green) /R(Lead Free)
③: Part NO.



Previous Version

Version	Date	Subjects (major changes since last revision)
1.0	2024-12-16	Release of final version

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