HAOLIN ELECTRONICS

Nov 2019

HD30N06 / HU30N06

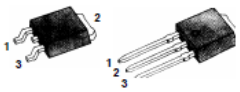
60V N-Channel MOSFET

BV_{DSS} = 60 V

$R_{DS(on)}$ = 32 mΩ

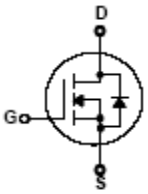
I_D = 30 A

TO-252 **TO-251**



HD30N06 **HU30N06**

1.Gate 2. Drain 3. Source



FEATURES

- Originative New Design
- Superior Avalanche Rugged Technology
- Robust Gate Oxide Technology
- Very Low Intrinsic Capacitances
- Excellent Switching Characteristics
- Unrivalled Gate Charge : 40 nC (Typ.)
- Extended Safe Operating Area
- Lower $R_{DS(ON)}$: 0.032 Ω (Typ.) @V_{GS}=10V
- 100% Avalanche Tested

Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter		Value	Units
V_{DSS}	Drain-Source Voltage		60	V
I_D	Drain Current – Continuous (T_C = 25℃)		30	A
	Drain Current – Continuous (T_C = 100℃)		20	A
I_{DM}	Drain Current – Pulsed	(Note 1)	30	A
V_{GS}	Gate-Source Voltage		±20	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	25	mJ
I_{AR}	Avalanche Current	(Note 1)	50	A
E_{AR}	Repetitive Avalanche Energy	(Note 1)	25	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	7.0	V/ns
P_D	Power Dissipation (T_A = 25℃)*		3.75	W
	Power Dissipation (T_C = 25℃)		23	W
	- Derate above 25℃		0.8	W/℃
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	℃
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		300	℃

Thermal Resistance Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	1.0	℃/W
$R_{\theta JA}$	Junction-to-Ambient*	--	40	
$R_{\theta JA}$	Junction-to-Ambient	--	62.5	

* When mounted on the minimum pad size recommended (PCB Mount)

Electrical Characteristics T_C=25 °C unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
On Characteristics						
V_{GS}	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 μA	1.0	2.3	3.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 12 A	--	0.032	0.040	Ω
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	60	--	70	V
ΔBV_{DSS} /ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to25℃	--	0.06	--	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 60 V, V_{GS} = 0 V	--	--	1	μA
		V_{DS} = 48 V, T_C = 150℃	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 20 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -20 V, V_{DS} = 0 V	--	--	-100	nA
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 30 V, V_{GS} = 0 V, f = 1.0 MHz	--	778		pF
C_{oss}	Output Capacitance		--	60		pF
C_{rss}	Reverse Transfer Capacitance		--	41		pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Time	V_{DS} = 30 V, I_D = 30 A, R_G = 25 Ω (Note 4,5)	--	4.2		ns
t_r	Turn-On Rise Time		--	3.4	220	ns
$t_{d(off)}$	Turn-Off Delay Time		--	16	130	ns
t_f	Turn-Off Fall Time		--	2	140	ns
Q_g	Total Gate Charge	V_{DS} = 30 V, I_D = 30 A, V_{GS} = 10 V (Note 4,5)	--	13.5		nC
Q_{gs}	Gate-Source Charge		--	3.2	--	nC
Q_{gd}	Gate-Drain Charge		--	6.2	--	nC
Source-Drain Diode Maximum Ratings and Characteristics						
I_S	Continuous Source-Drain Diode Forward Current		--	--	30	A
I_{SM}	Pulsed Source-Drain Diode Forward Current		--	--	60	
V_{SD}	Source-Drain Diode Forward Voltage	I_S = 30 A, V_{GS} = 0 V	--	--	0.99	V
trr	Reverse Recovery Time	I_S = 30 A, V_{GS} = 0 V di_F/dt = 100 A/μs (Note 4)	--	27	--	ns
Qrr	Reverse Recovery Charge		--	30	--	μC

Notes ;

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L=230μH, I_{AS}=15A, V_{DD}=25V, R_G=25Ω, Starting T_J=25°C
3. I_{SD}≤50A, di/dt≤300A/μs, V_{DD}≤BV_{DSS} , Starting T_J=25 °C
4. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. On-Region Characteristics

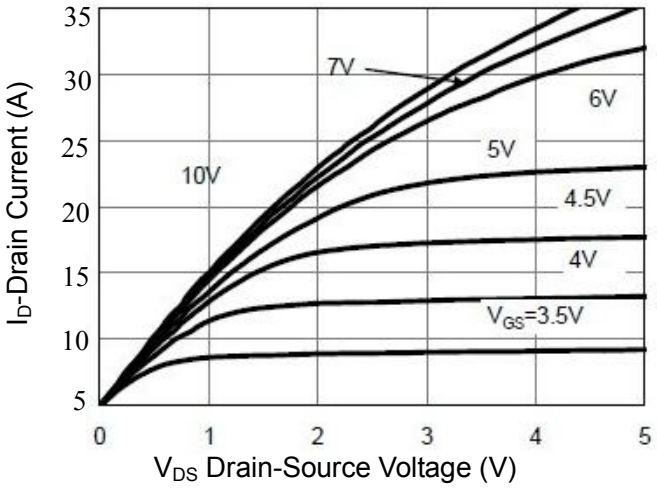


Figure 2: Transfer Characteristics

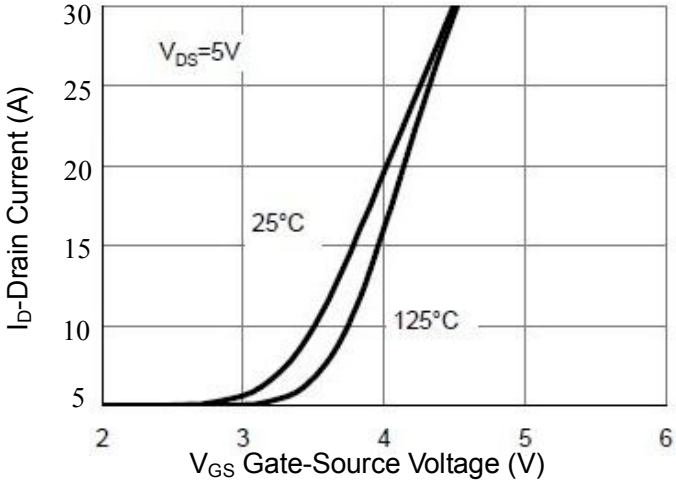


Figure3. ID vs Junction Temperature

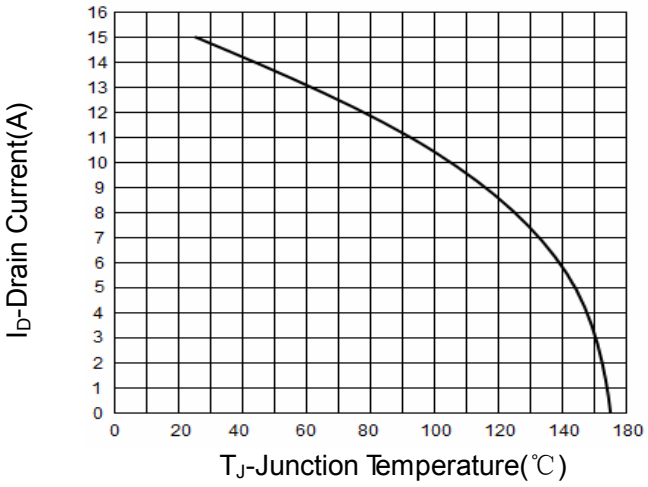


Figure4. On-Resistance vs. Junction Temperature

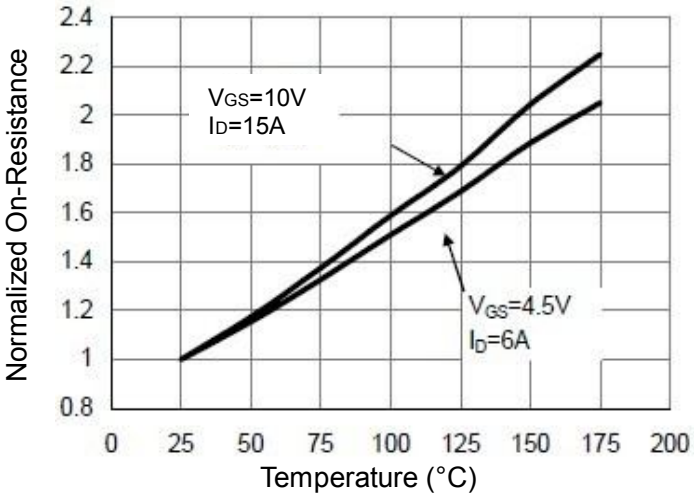


Figure5. On-Resistance vs. Gate-Source Voltage

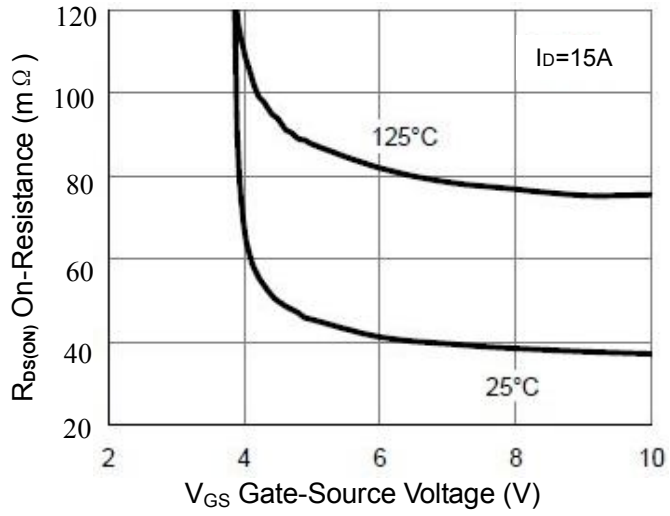


Figure6. Body-Diode Characteristics

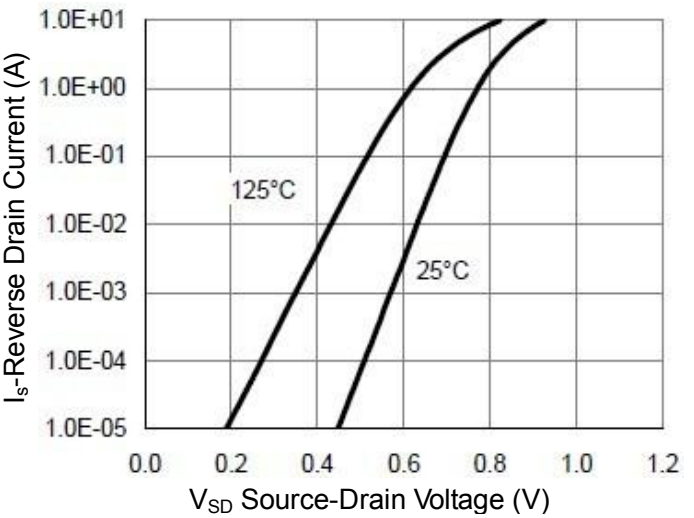


Figure7. Gate-Charge Characteristics

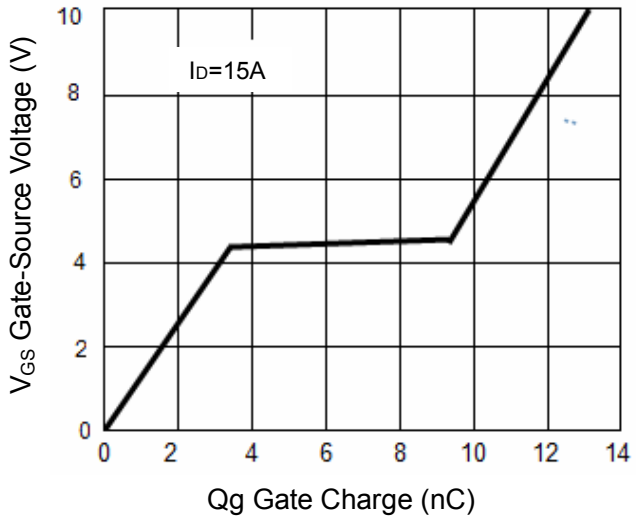


Figure 8. Capacitance Characteristics

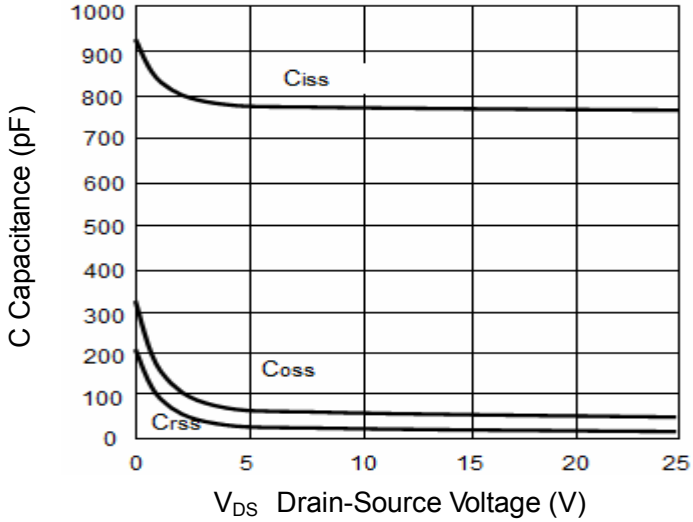


Figure 9. Maximum Forward Biased Safe Operating Area

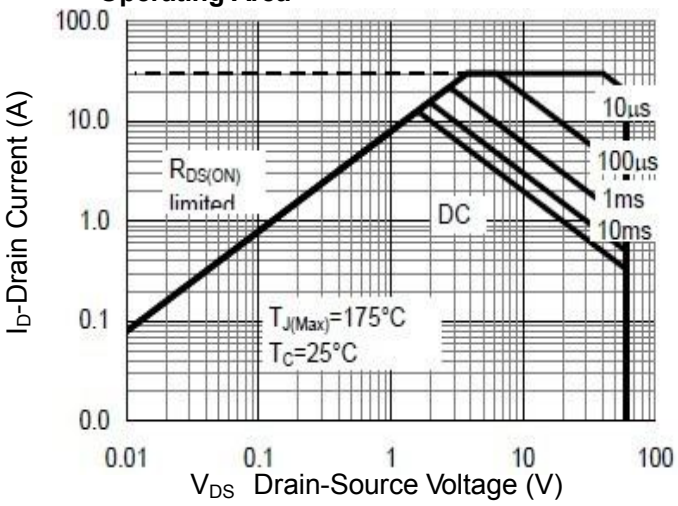


Figure10. Single Pulse Power Rating Junction-to-Cas

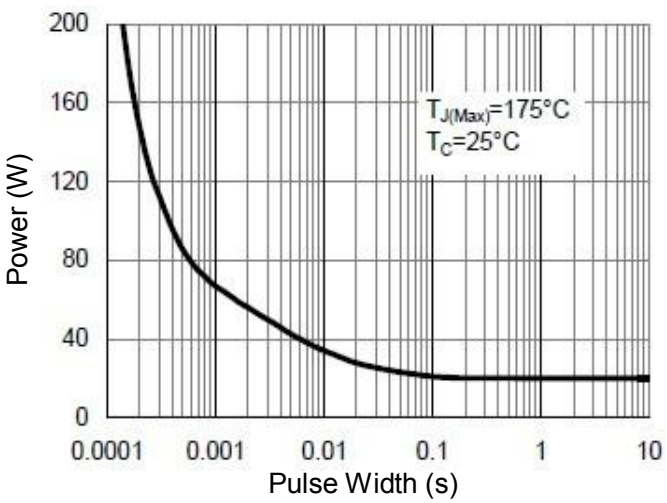


Figure11. Normalized Maximum Transient Thermal Impedance

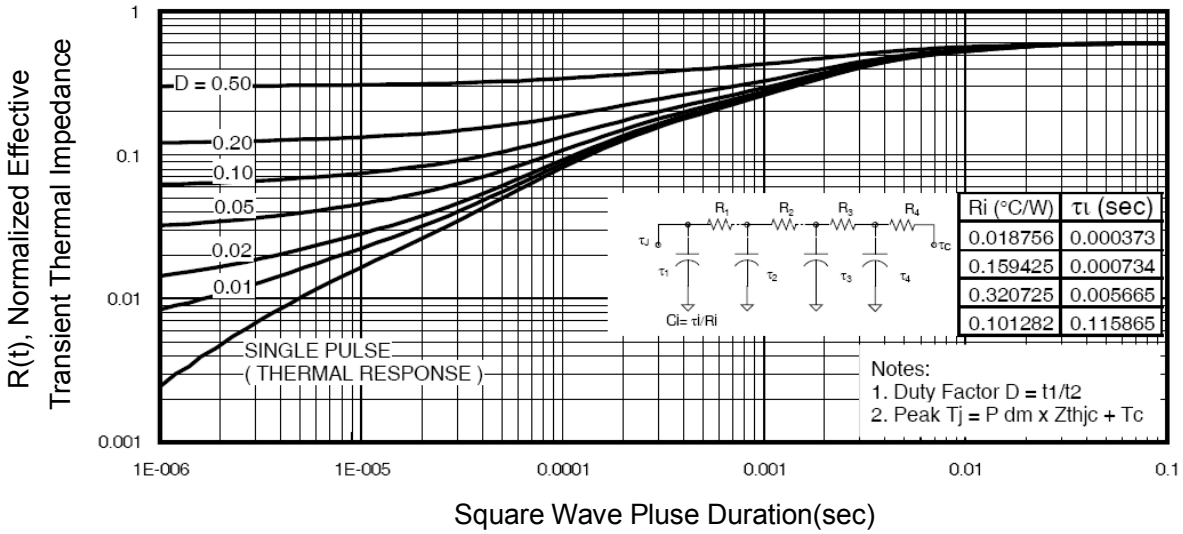


Fig 12. Gate Charge Test Circuit & Waveform

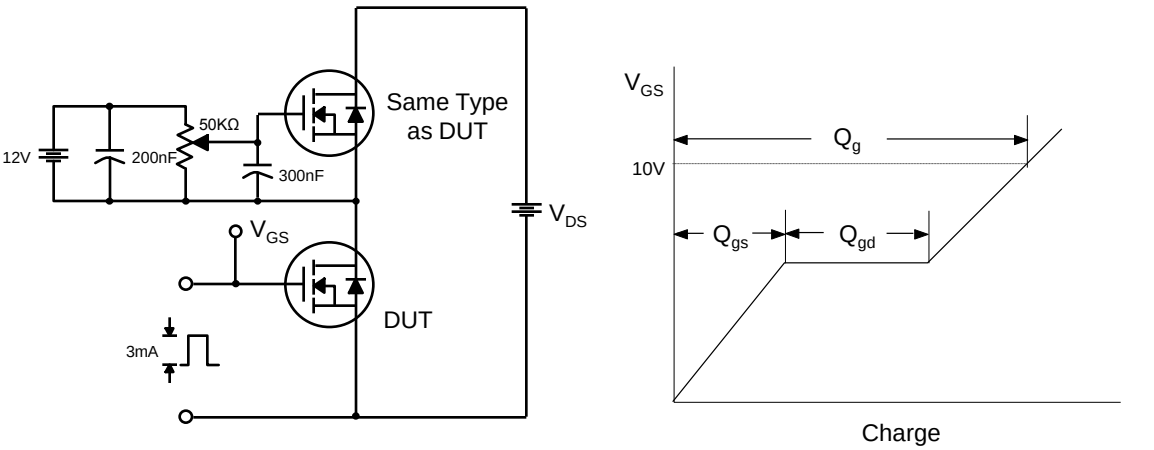


Fig 13. Resistive Switching Test Circuit & Waveforms

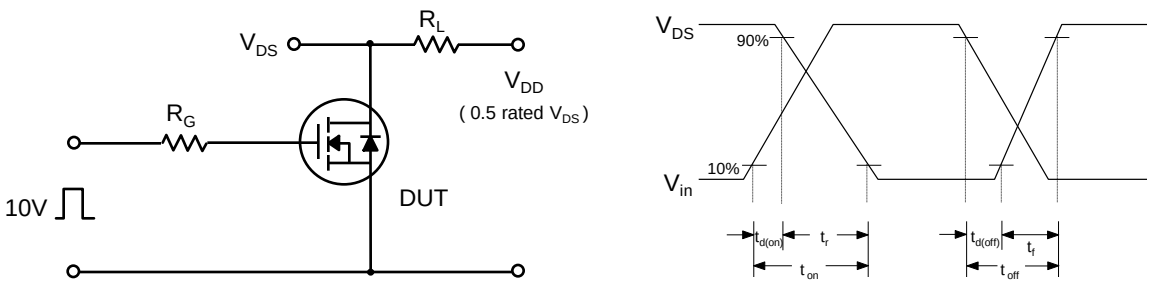


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

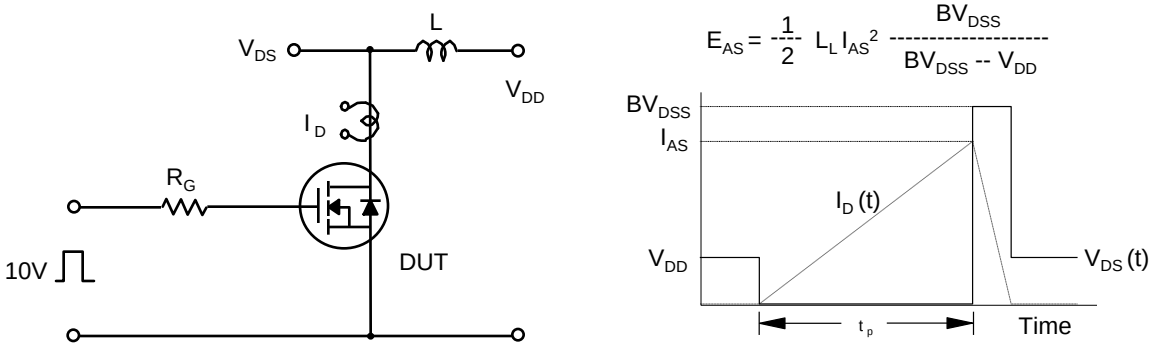
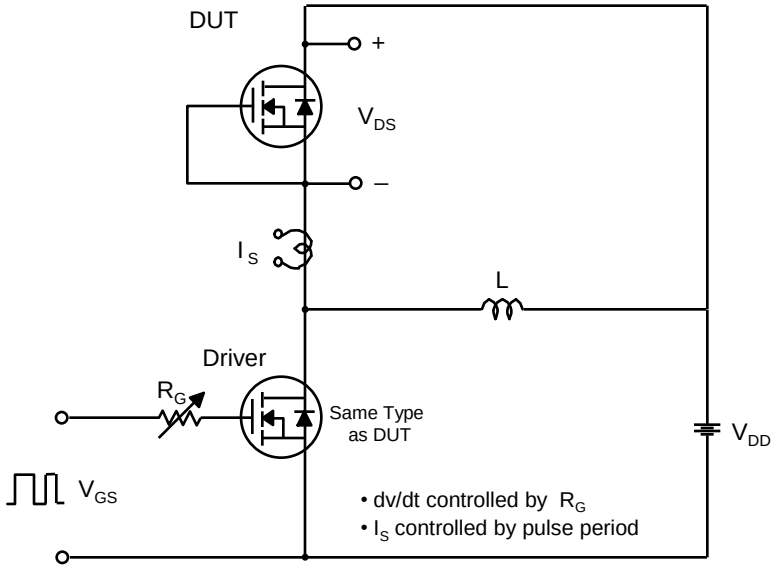
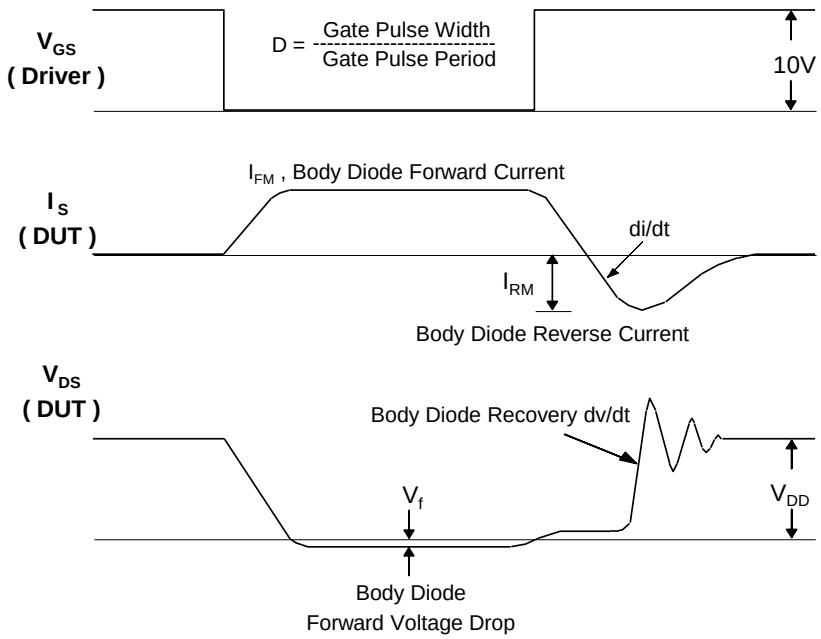


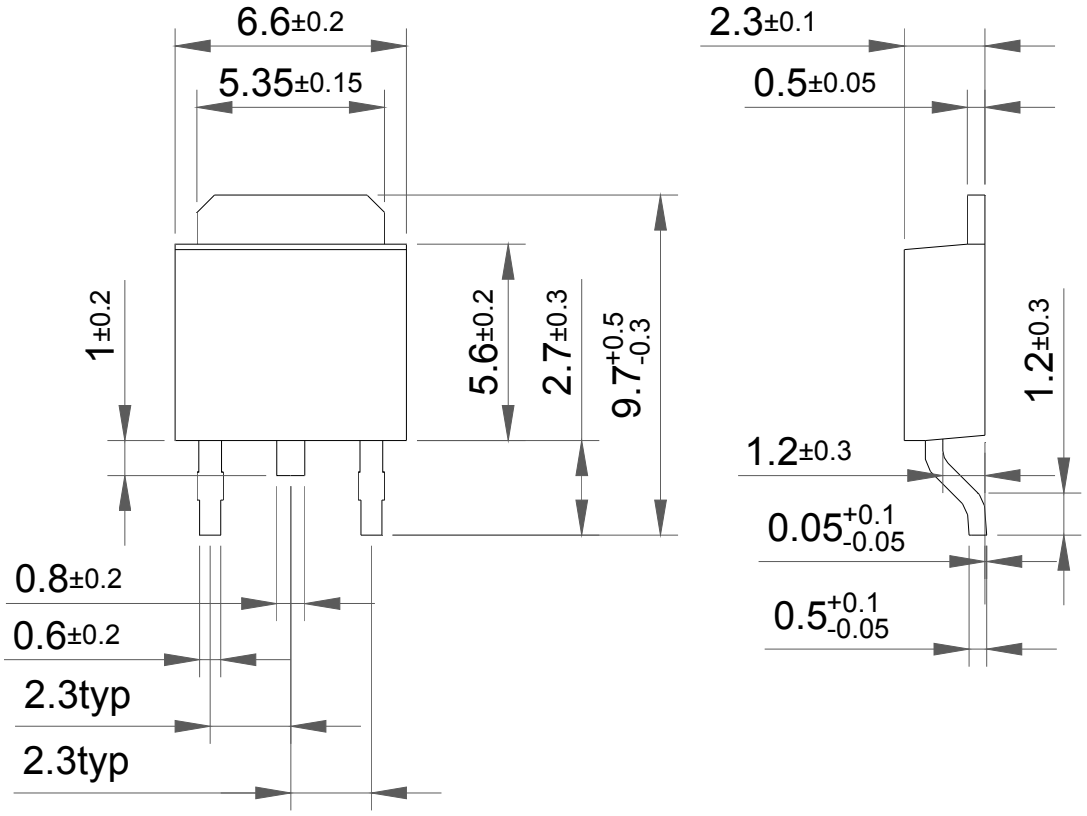
Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms





Package Dimension

TO-252



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TO-251