GOSTONE

RoHS COMPLIANT

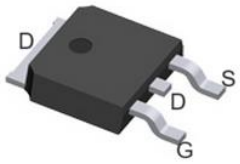
N-Channel 650V,540mΩ max,Super Junction MOSFET

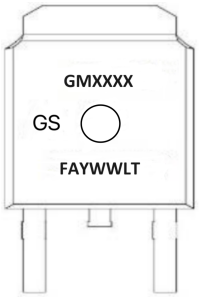
GMJ541N65L1

Product Summary

V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
650	540 @ V_{GS} = 10V	8(1)

View and Internal Schematic Diagram





TO-252

NOTE:
LOGO - GS
GMXXXXX- Part number code
F - Fab location code
A - Assembly location code
Y - Year code
WW - Week code
L&T - Assembly lot code

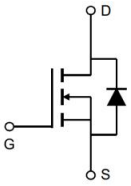
Features

- Low $R_{DS(on)}$ and Fom
- Low Switching loss
- 100% avalanche tested. High avalanche ruggedness
- Excellent stability and uniformity

Application

- LED lighting
- LCD&PDP TV
- Adapter
- UPS / Solar

Equivalent circuit



Absolute Maximum Rating (Ta=25°C)

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	650	V
Gate-source voltage		V_{GS}	±30	V
Continuous drain current(1)	T_C=25℃(1)	I_D	8	A
	T_C=100℃ (1)		5	
Pulsed drain current(2)		$I_{D,pulse}$	32	
Avalanche energy, single pulse(3)		E_{AS}	65	mJ
Power dissipation	T_C=25℃	P_D	73	W
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 150	℃

Thermal Characteristic (Ta=25°C)

Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	1.70	℃/W
Thermal resistance, junction-to-ambient	Steady state	$R_{\theta JA}$	142	

Electrical characteristics (Ta=25°C ± 3°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter						
Drain to source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 1 mA	650			V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 1 mA	3	3.4	4	V
Gate-body leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±30 V			±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = 650 V, V_{GS} = 0 V			1	μA
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 5.5 A		420	540	mΩ
Gate resistance	R_g	f = 1 MHz, open drain		14		Ω
Dynamic(4)						
Total gate charge	Q_g	V_{DS} = 400 V, I_D = 5.5A, V_{GS} = 10 V		15.7		nC
Gate-source charge	Q_{gs}			3.2		
Gate-drain charge	Q_{gd}			6.5		
Turn-on delay time	$t_{d(on)}$	V_{DS} = 400 V, I_D = 4 A, V_{GS} = 10 V, R_{GEN} = 27 Ω		16		ns
Rise time	t_r			17		
Turn-off delay time	$t_{d(off)}$			76		
Fall time	t_f			15		
Input capacitance	C_{iss}	V_{DS} = 100 V, V_{GS} = 0 V, f = 1M Hz		465		pF
Output capacitance	C_{oss}			23		
Reverse transfer capacitance	C_{rss}			1.2		
Reverse Diode Characteristics(4)						
Diode forward voltage	V_{SD}	V_{GS} = 0 V, I_F = 5.5 A		0.85	1.1	V
Reverse recovery time	t_{rr}	V_{DS} = 100 V,I_F = 5.5 A, di/dt = 100 A/μs		209		ns
Reverse recovery charge	Qrr			1.74		uC

Notes

(1) Limited by maximum junction temperature.

(2) Pulse width limited by maximum junction temperature.

(3) V_{DS} = 100 V, V_{GS} = 10 V, L = 30 mH.

(4) Guaranteed by design, not subject to production testing.

Typical Performance Characteristics

Fig 1. Output Characteristics (T_j=25℃)

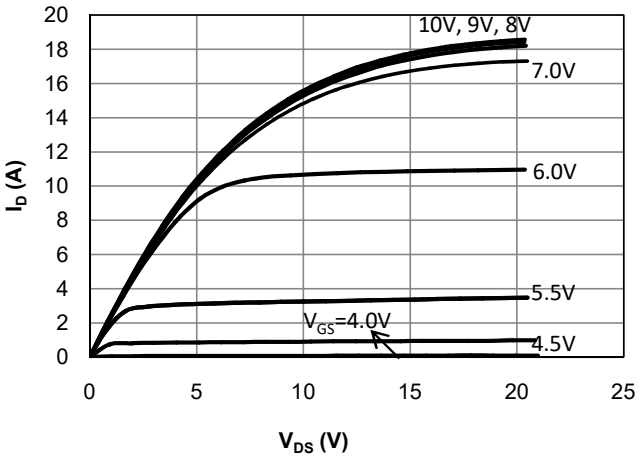


Fig 2. Output Characteristics (T_j=150℃)

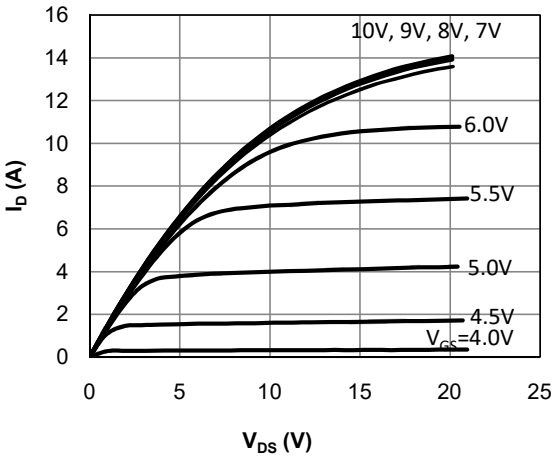


Fig 3: Transfer Characteristics

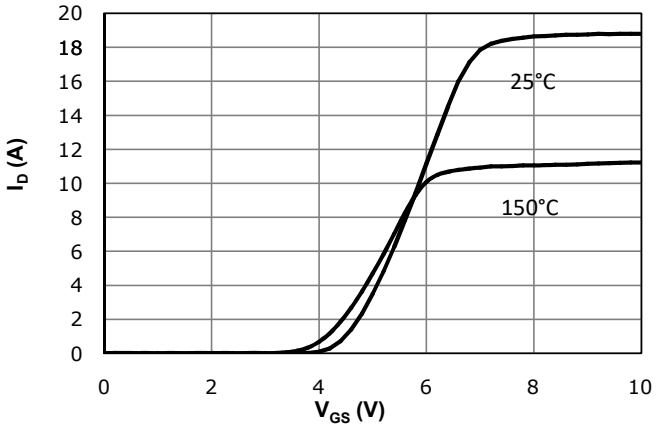


Fig 4: V_{TH} vs. T_j Temperature Characteristics

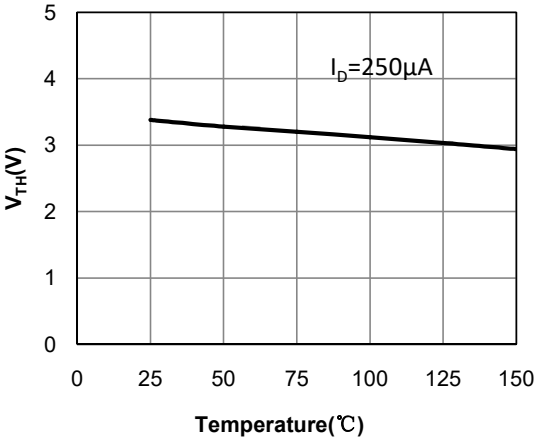


Fig 5: $R_{DS(on)}$ vs. I_{DS} Characteristics(T_j=25℃)

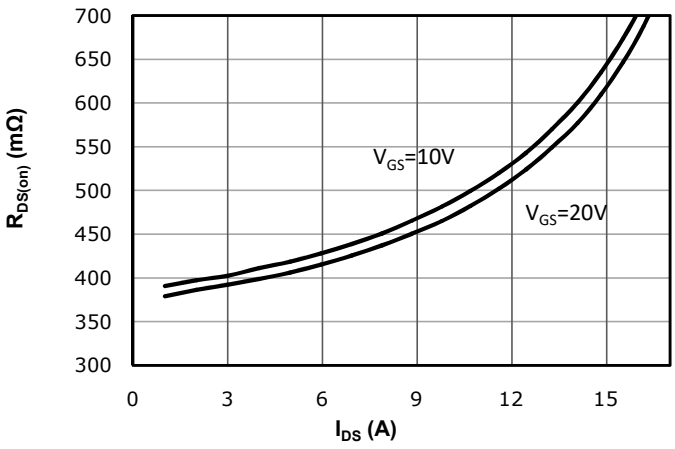
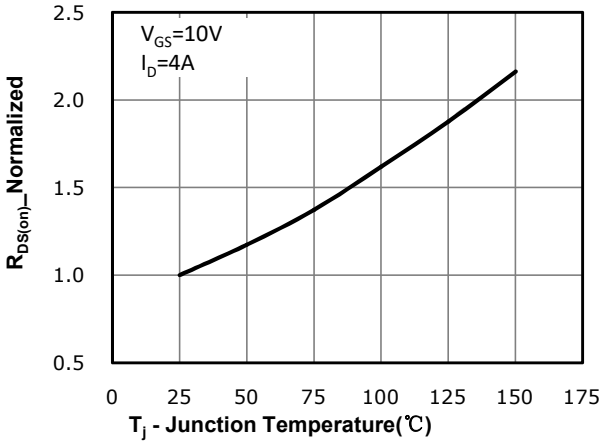


Fig 6: $R_{DS(on)}$ vs. Temperature



Typical Performance Characteristics

Fig 7: BV_{DSS} vs. Temperature

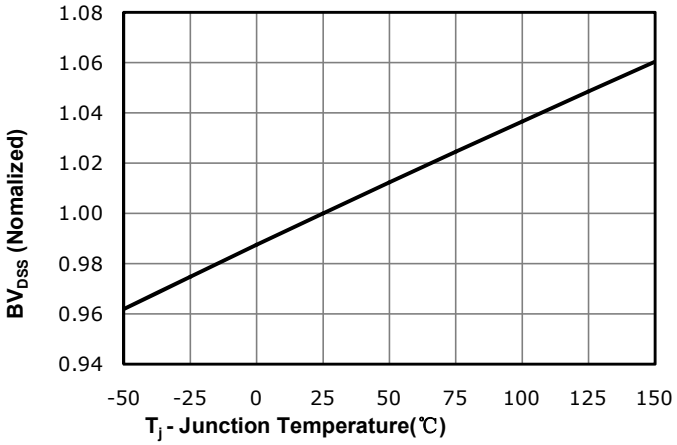


Fig 8: $R_{DS(on)}$ vs. Gate Voltage

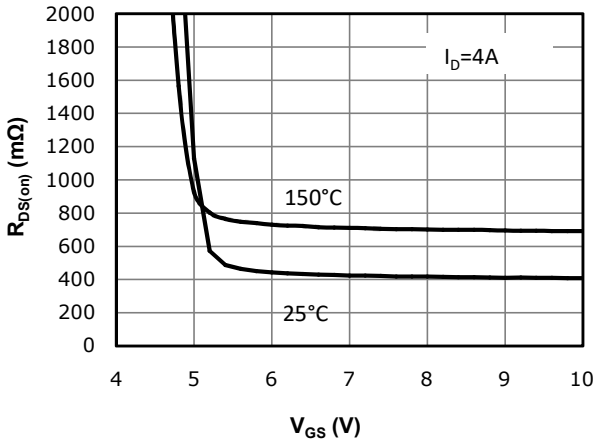


Fig 9: Body-diode Forward Characteristics

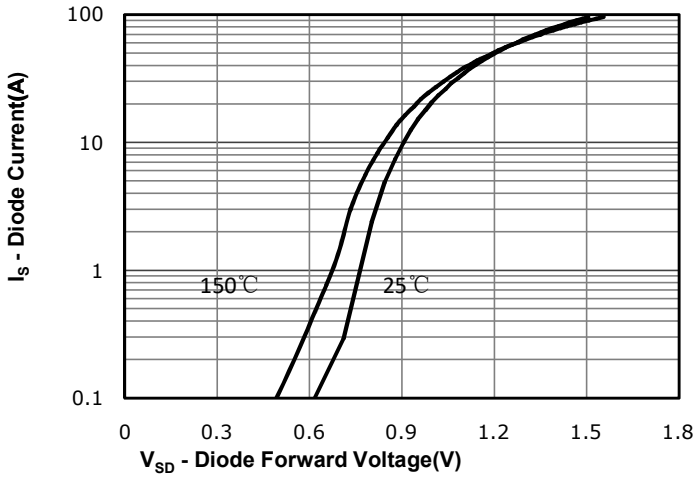


Fig 10: Gate Charge Characteristics

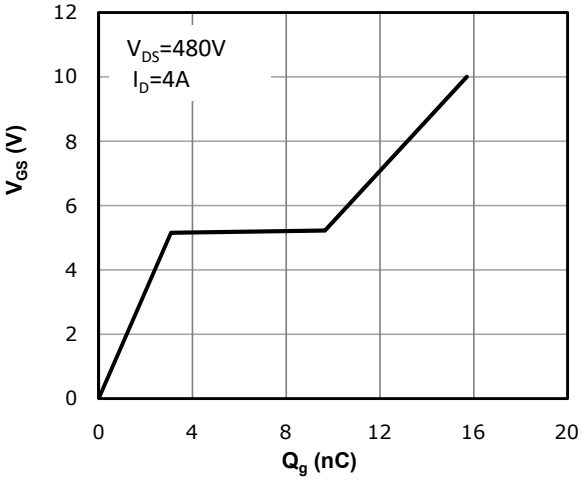


Fig 11: Capacitance Characteristics

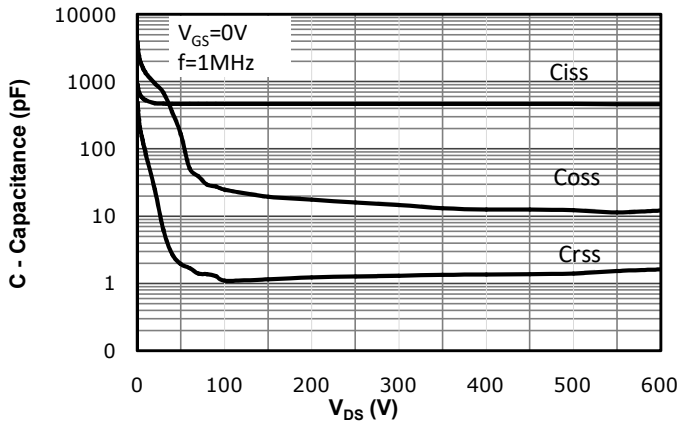
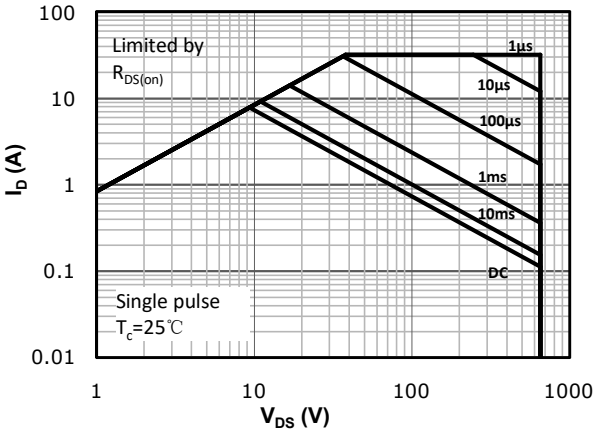
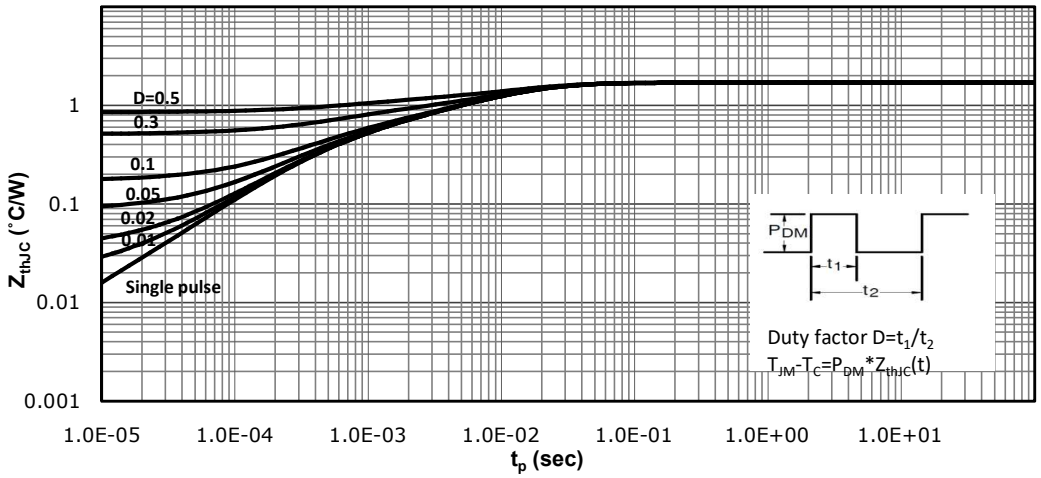


Fig 12: Safe Operating Area



Typical Performance Characteristics

Fig 13: Max. Transient Thermal Impedance



Test Circuits & Waveforms

Figure 14. Gate charge test circuit & waveforms

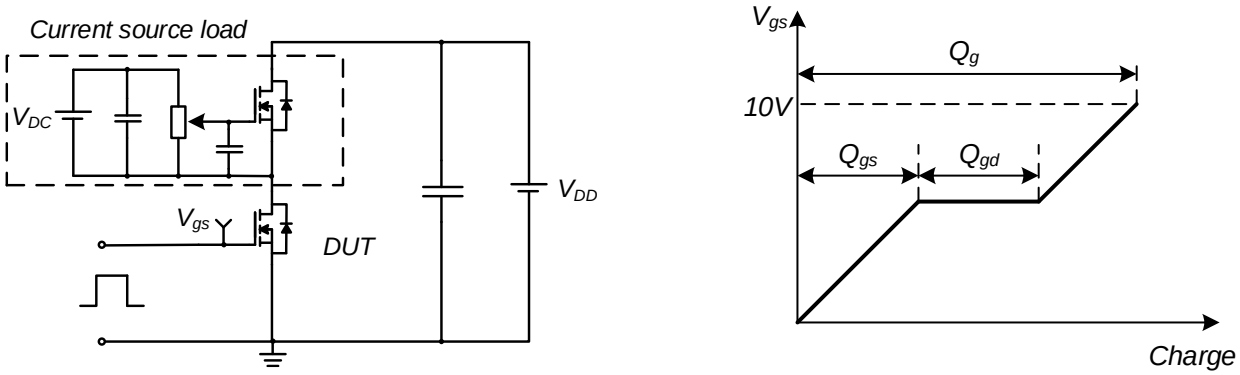


Figure 15. Switching time test circuit & waveforms

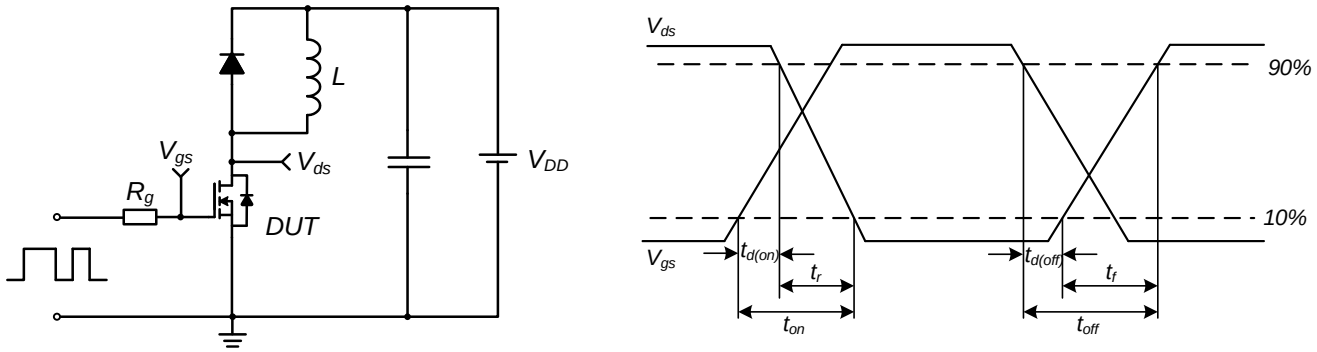


Figure 16. Diode reverse recovery test circuit & waveforms

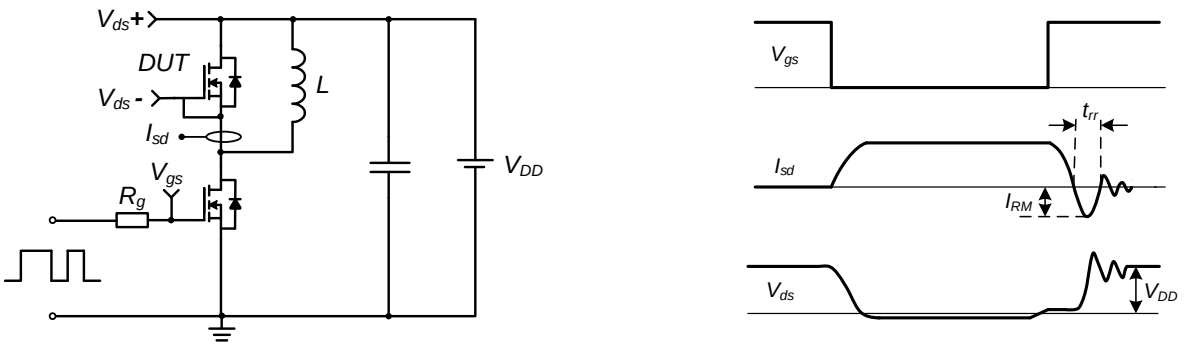
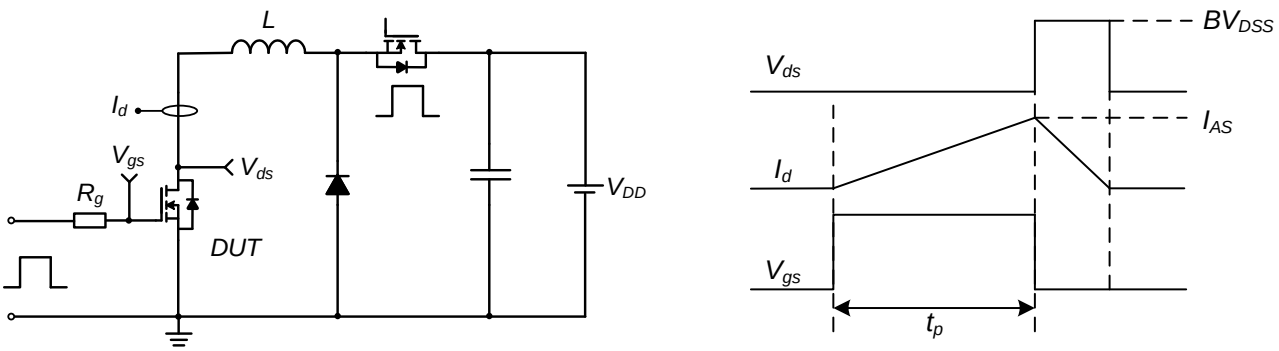
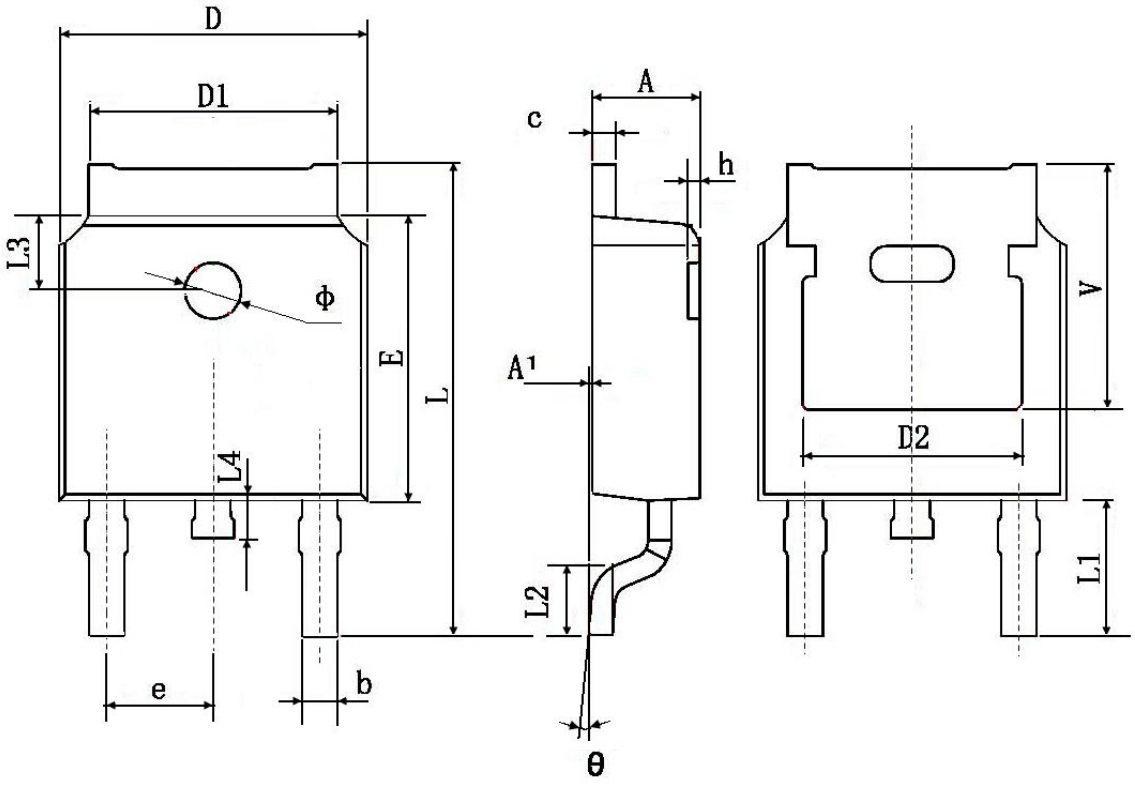


Figure 17. Unclamped inductive switching test circuit & waveforms



Package outline dimensions: TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

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