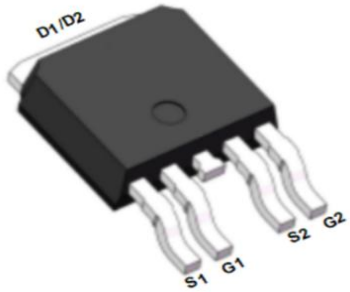
Features

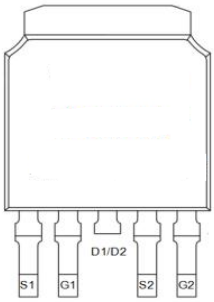
- 40V, 19A
  $R_{DS(ON)}$ Typ = 26mΩ @ V_{GS} = 10V
  $R_{DS(ON)}$ Typ = 34mΩ @ V_{GS} = 4.5V
- -40V, -13A
  $R_{DS(ON)}$ Typ = 52mΩ @ V_{GS} = -10V
  $R_{DS(ON)}$ Typ = 65mΩ @ V_{GS} = -4.5V
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free
- 100% UIS TESTED!
- 100% ΔVds TESTED!



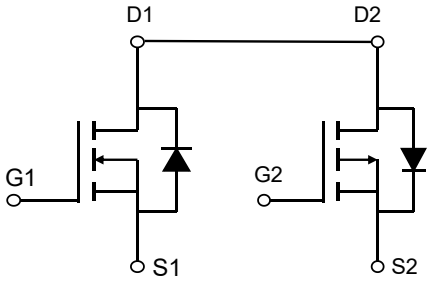
TO-252-4L

Application

- Load Switch
- PWM Application
- Power Management



Pin Assignment



Schematic Diagram

Absolute Maximum Ratings (@ T_J = 25°C unless otherwise specified)

Symbol	Parameter		N Value	P Value	Units
V_{DS}	Drain-to-Source Voltage		40	-40	V
V_{GS}	Gate-to-Source Voltage		±20	±20	V
I_D	Continuous Drain Current	T_C = 25°C	19	-13	A
		T_C = 100°C	11	-7.8	A
I_{DM}	Pulsed Drain Current [1]		76	-52	A
E_{AS}	Single Pulsed Avalanche Energy [2]		25	30	mJ
P_D	Power Dissipation	T_C = 25°C	20.7	20.7	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		6	6	°C/W
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150		°C

Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 40V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1	1.5	2	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = 10V, I_D = 3A	-	26	35	mΩ
		V_{GS} = 4.5V, I_D = 2.5A	-	34	50	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 20V, f = 1MHz	-	529	-	pF
C_{oss}	Output Capacitance		-	36	-	pF
C_{rss}	Reverse Transfer Capacitance		-	30	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V, V_{DS} = 20V, I_D = 5A	-	11	-	nC
Q_{gs}	Gate Source Charge		-	2	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	2	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 20V, I_D= 5A, R_{GEN} = 3Ω	-	4	-	ns
t_r	Turn-On Rise Time		-	2	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	15	-	ns
t_f	Turn-Off Fall Time		-	2	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	19	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	76	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 10A	-	-	1.2	V

Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = -250μA, V_{GS} = 0V	-40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -40V, V_{GS} = 0V	-	-	-1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	-1.1	-1.5	-2.2	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(3)	V_{GS} = -10V, I_D = -3A	-	52	73.0	mΩ
		V_{GS} = -4.5V, I_D = -2A	-	65	97.0	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = -20V, f = 1MHz	-	484	-	pF
C_{oss}	Output Capacitance		-	44	-	pF
C_{rss}	Reverse Transfer Capacitance		-	37	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to -10V, V_{DS} = -20V, I_D = -3A	-	8.5	-	nC
Q_{gs}	Gate Source Charge		-	1	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	2	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = -10V, V_{DD} = -20V, I_D= -5A, R_{GEN} = 3Ω	-	6	-	ns
t_r	Turn-On Rise Time		-	6	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	31	-	ns
t_f	Turn-Off Fall Time		-	19	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-13	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-52	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = -8A	-	-	-1.2	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25°C, V_{DD}=20V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=10A

   E_{AS} condition: Starting T_J=25°C, V_{DD}=-20V, V_G=-10V, R_G=25ohm, L=0.5mH, I_{AS}=-11A
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Test Circuit

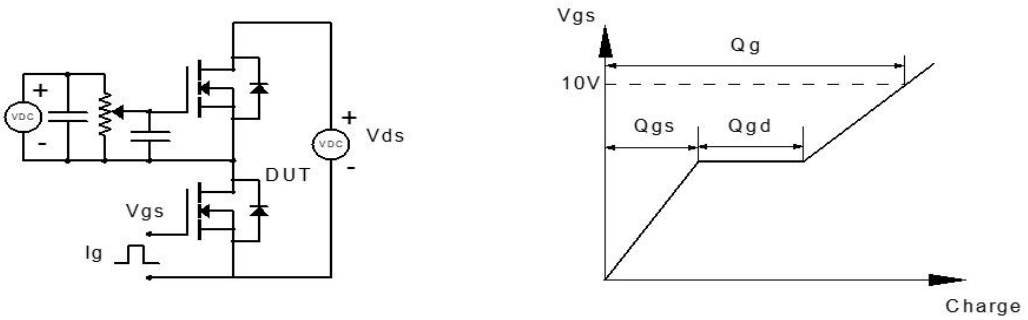


Figure 1: Gate Charge Test Circuit & Waveform

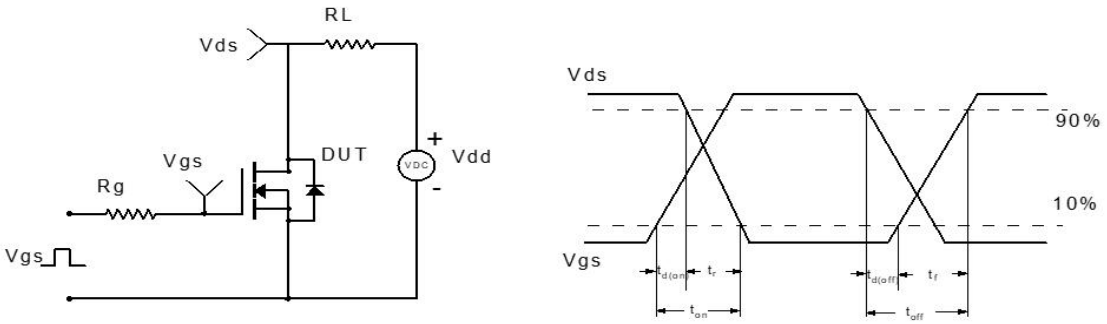


Figure 2: Resistive Switching Test Circuit & Waveform

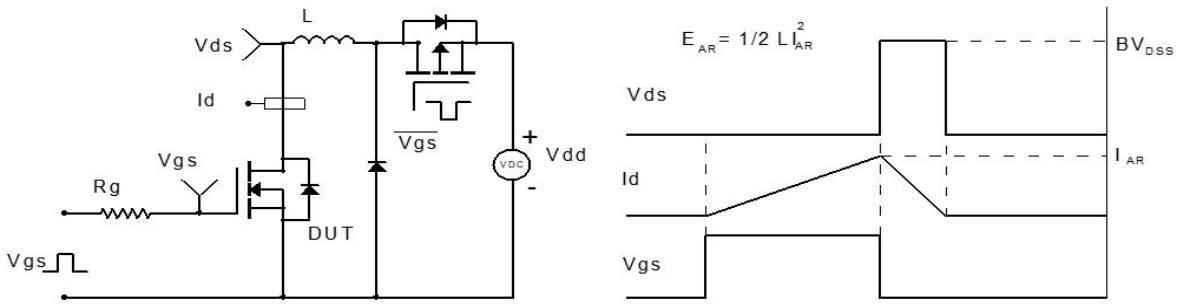


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

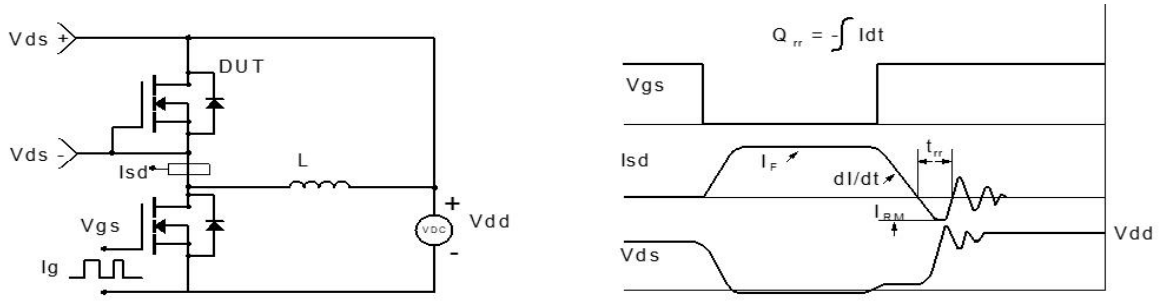
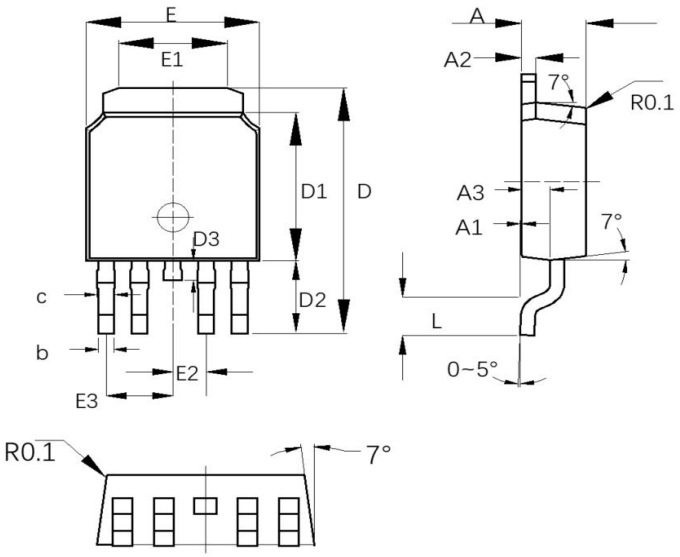


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(TO-252-4L)



COMMON DIMENSION (MM)			
PKG	TO-252-4L		
Symbol	MIN	MON	MAX
A	2.250	2.300	2.400
A1	0.010	0.060	0.150
A2	0.500	0.508	0.550
A3	0.960	1.010	1.060
b	0.570	0.600	0.630
c	-	-	0.900
D	9.800	10.025	10.35
D1	6.050	6.100	6.180
D2	2.850	2.900	2.950
D3	0.700	0.800	0.900
E	6.550	6.600	6.700
E1	4.050	4.130	4.200
E2	1.240	1.270	1.300
E3	2.510	2.540	2.570
L	1.400	1.500	1.600