

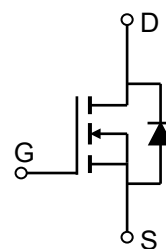
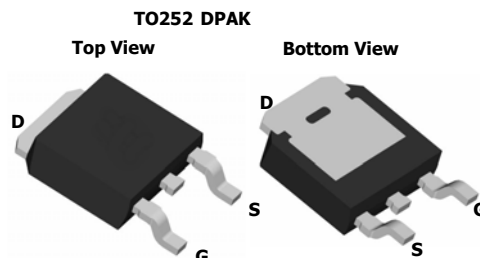
40V N-Channel MOSFET

Features

- 40V, 50A
- $R_{DS(ON)}$ Typ = 6.9mΩ @ $V_{GS} = 10V$
- $R_{DS(ON)}$ Typ = 10.4mΩ @ $V_{GS} = 4.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge

Application

- Load Switch
- PWM Application
- Power Management



Absolute Maximum Ratings (@ $T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter		Value	Units
V_{DS}	Drain-to-Source Voltage		40	V
V_{GS}	Gate-to-Source Voltage		±20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	50	A
		$T_C = 100^\circ\text{C}$	36	A
I_{DM}	Pulsed Drain Current ⁽¹⁾		240	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾		72	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	48	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		2.6	°C/W
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C



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Electrical Characteristics ($T_J = 25^\circ\text{C}$ 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 = 20A	-	6.9	7.7	mΩ
		V _{GS} = 4.5V, I _D = 10A	-	10.4	12.6	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 20V, f = 1MHz	-	1224	-	pF
C _{oss}	Output Capacitance		-	153	-	pF
C _{rss}	Reverse Transfer Capacitance		-	133	-	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 20V, I _D = 20A	-	45	-	nC
Q _{gs}	Gate Source Charge		-	8	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	11	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 10V, V _{DD} = 20V I _D = 20A, R _{GEN} = 3Ω	-	12	-	ns
t _r	Turn-On Rise Time		-	25	-	ns
t _{d(off)}	Turn-Off DelayTime		-	43	-	ns
t _f	Turn-Off Fall Time		-	10	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	50	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	240	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S = 20A	-	-	1.2	V
t _{rr}	Body Diode Reverse Recovery Time	I _F = 20A, di/dt = 100A/us	-	11	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	5	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 20\text{V}$, $V_G = 10\text{V}$, $R_G = 25\Omega$, $L = 0.5\text{mH}$, $I_{AS} = 17\text{A}$
 3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.

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Test Circuit

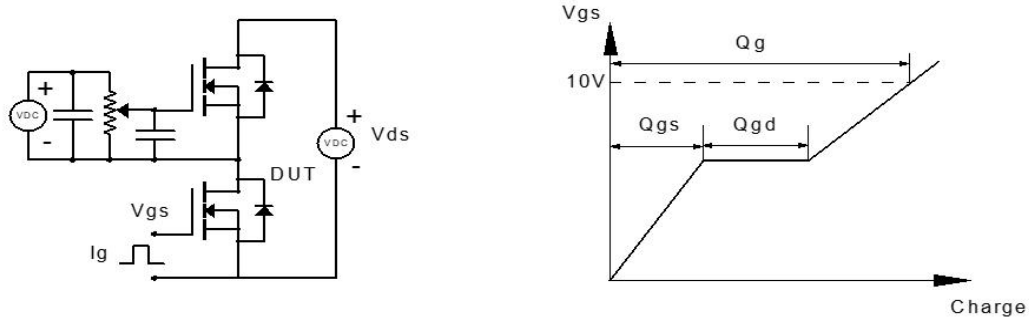


Figure 1: Gate Charge Test Circuit & Waveform

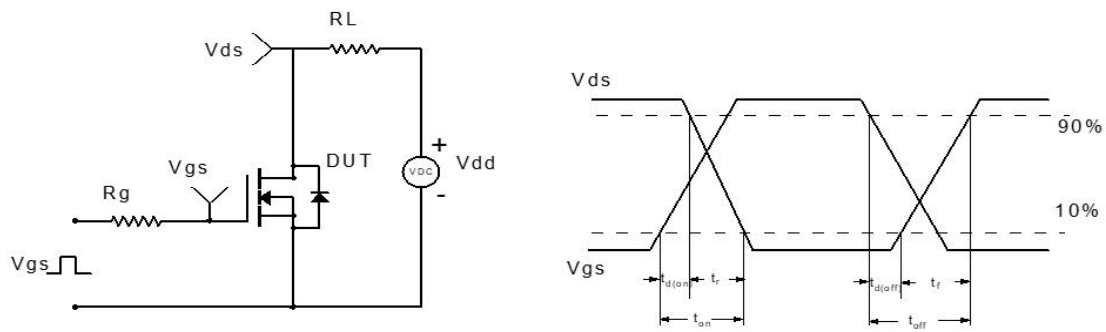


Figure 2: Resistive Switching Test Circuit & Waveform

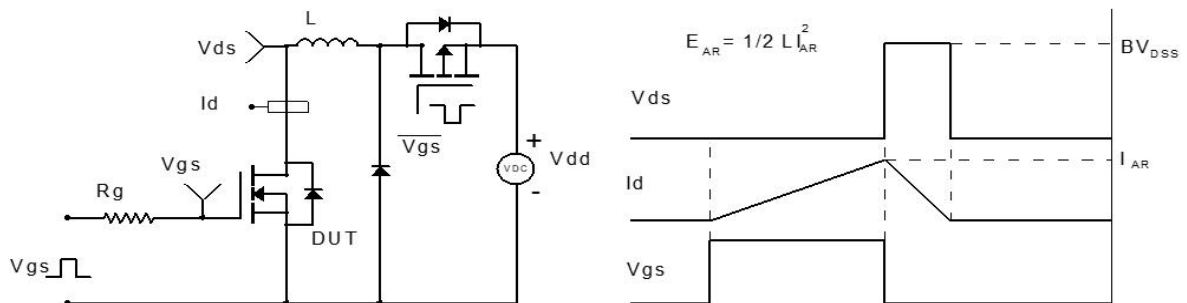


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

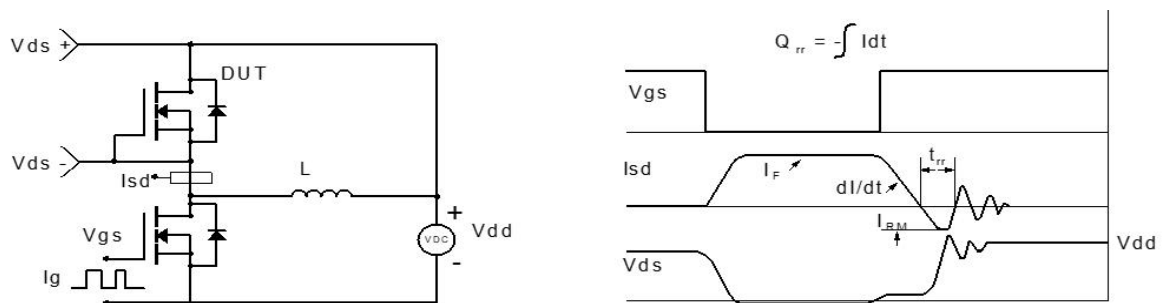
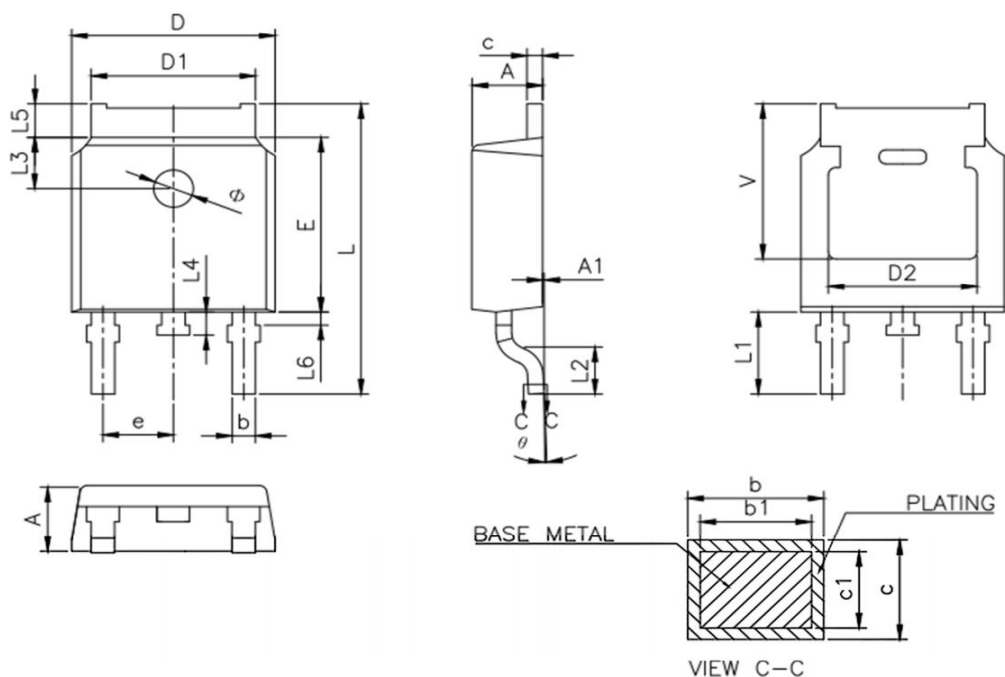


Figure 4: Diode Recovery Test Circuit & Waveform

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Package Mechanical Data(TO-252-3L)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.00	—	0.127
b	0.66	—	0.86
b1	0.65	0.76	0.81
D	6.50	6.60	6.70
D1	5.10	5.33	5.46
c	0.47	—	0.60
c1	0.46	0.51	0.56
D2	4.83 REF.		
E	6.00	6.10	6.20
e	2.186	2.286	2.386
L	9.80	10.10	10.40
L1	2.90 REF.		
L2	1.40	1.50	1.60
L3	1.80 REF.		
L4	0.60	0.80	1.00
L5	0.90	—	1.25
L6	0.15	—	0.75
ϕ	1.10	—	1.30
θ	0°	—	8°
V	5.40 REF.		