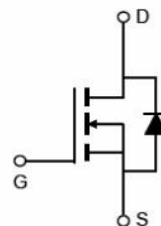


**Main Product Characteristics:**

$V_{DSS}$	100V
$R_{DS(on)}$	18m $\Omega$ (typ.)
$I_D$	40A



TO-220



Schematic Diagram

**Features and Benefits:**

- Advanced MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature


**Description:**

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

**Absolute Max Rating:**

Symbol	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ①	40	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ①	24	
$I_{DM}$	Pulsed Drain Current②	160	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation③	119	W
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$T_J \quad T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

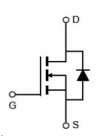
**Thermal Resistance**

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ③	—	1.05	$^{\circ}\text{C}/\text{W}$

**Electrical Characteristics @ $T_A=25^{\circ}\text{C}$  unless otherwise specified**

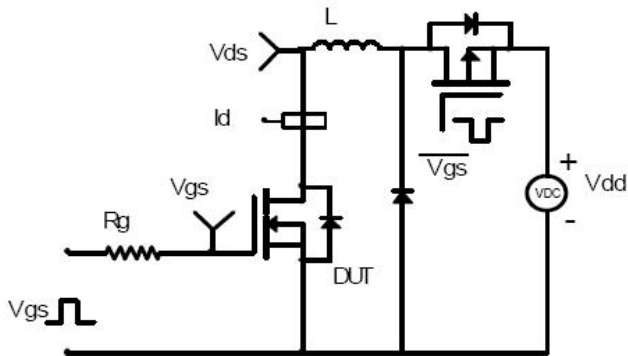
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	100	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	18	24	m $\Omega$	$V_{GS}=10\text{V}, I_D=20\text{A}$
$V_{GS(th)}$	Gate threshold voltage	2	—	4	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
$I_{DSS}$	Drain-to-Source leakage current $T_J=25^{\circ}\text{C}$	—	—	1	$\mu\text{A}$	$V_{DS}=100\text{V}, V_{GS}=0\text{V},$
$I_{GSS}$	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS}=20\text{V}, V_{DS}=0\text{V}$
		—	—	-100		$V_{GS}=-20\text{V}, V_{DS}=0\text{V}$
$Q_g$	Total gate charge	—	80	—	nC	$V_{GS}=10\text{V}, V_{DS}=50\text{V},$ $I_D=20\text{A}$
$Q_{gs}$	Gate-to-Source charge	—	21	—		
$Q_{gd}$	Gate-to-Drain("Miller") charge	—	23	—		
$t_{d(on)}$	Turn-on delay time	—	18	—	ns	$V_{GS}=10\text{V}$ $V_{DS}=50\text{V}$ $R_G=6\Omega$ $I_D=20\text{A}$
$t_r$	Rise time	—	28	—		
$t_{d(off)}$	Turn-Off delay time	—	46	—		
$t_f$	Fall time	—	11	—		
$C_{iss}$	Input capacitance	—	3820	—	pF	$V_{GS}=0\text{V}$ $V_{DS}=25\text{V}$ $f=1\text{MHz}$
$C_{oss}$	Output capacitance	—	198	—		
$C_{rss}$	Reverse transfer capacitance	—	157	—		

**Source-Drain Ratings and Characteristics**

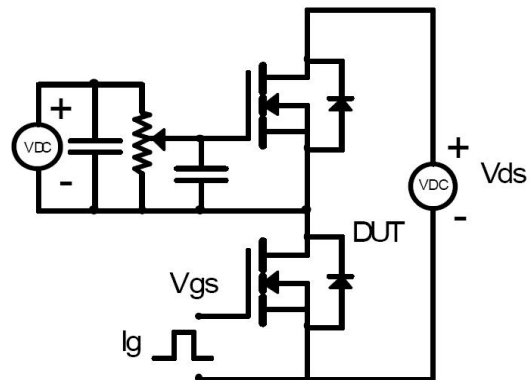
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	40	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode)	—	—	160	A	
$V_{SD}$	Diode Forward Voltage	—	—	1.2	V	$I_S=20\text{A}, V_{GS}=0\text{V}$
$t_{rr}$	Reverse Recovery Time	—	44	—	ns	$T_J = 25^{\circ}\text{C}, I_F = 15\text{A}, di/dt =$ $100\text{A}/\mu\text{s}$
$Q_{rr}$	Reverse Recovery Charge	—	72	—	nC	

## Test Circuits and Waveforms

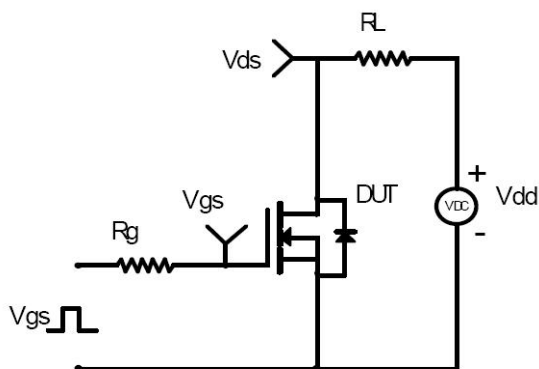
EAS Test Circuit:



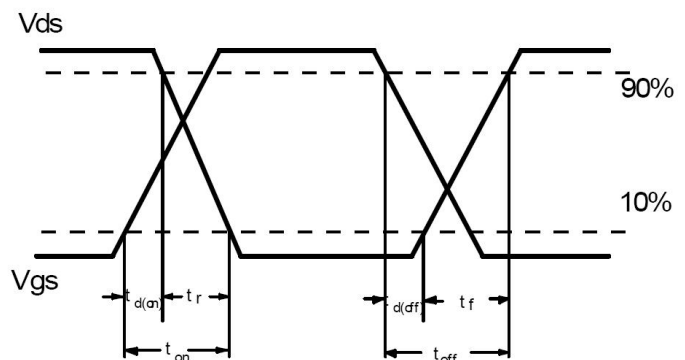
Gate Charge Test Circuit:



Switching Time Test Circuit:



Switching Waveforms:



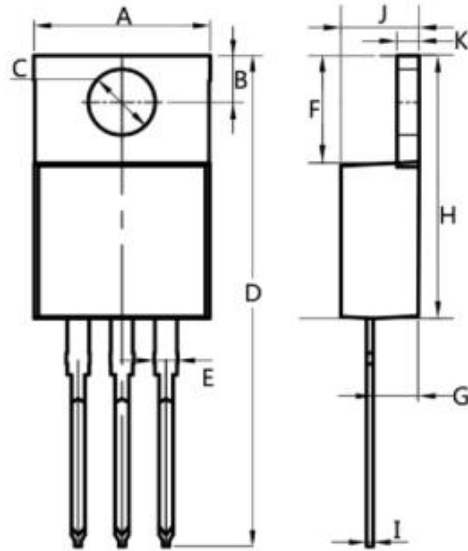
### Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation  $P_D$  is based on max. junction temperature, using junction-to-case thermal resistance.

**Mechanical Data:**

Unit:mm

TO-220AB



Dim.	Min.	Max.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4
All Dimensions in millimeter		

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