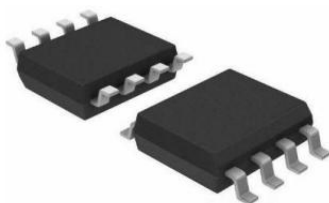
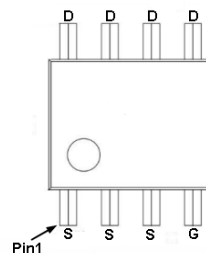
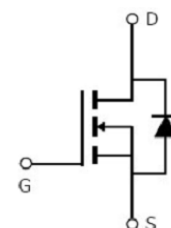


Main Product Characteristics

V_{DSS}	60V
$R_{DS(on)}$	7.5m Ω (typ.)
I_D	20A ①


SOP-8

Pin Assignment

Schematic Diagram

Features and Benefits

- Advanced 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 @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V ①	20	A
I_{DM}	Pulsed Drain Current ②	48	
P_D @TC = 25°C	Power Dissipation ③	4	W
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ L=0.3mH	30	mJ
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

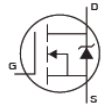
Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
R _{θJA}	Junction-to-ambient (t ≤ 10s) ④	—	31	°C/W

Electrical Characterizes @T_A=25°C unless otherwise specified

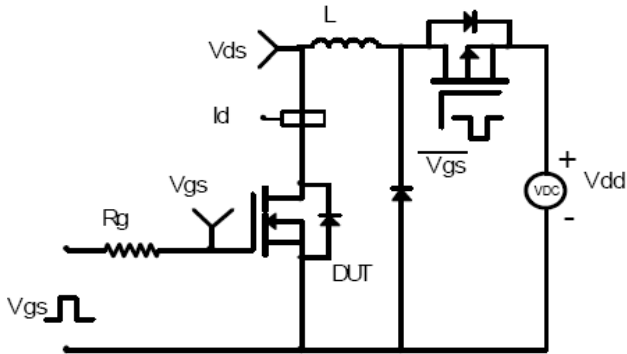
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)DSS}	Drain-to-Source breakdown voltage	60	—	—	V	V _{GS} = 0V, I _D = 250μA
R _{DS(on)}	Static Drain-to-Source on-resistance	—	7.5	10	mΩ	V _{GS} =10V, I _D =20A
		—	10	13		V _{GS} =4.5V, I _D =10A
V _{GS(th)}	Gate threshold voltage	1	—	2.5	V	V _{DS} = V _{GS} , I _D = 250μA
I _{DSS}	Drain-to-Source leakage current	—	—	1	μA	V _{DS} = 40V, V _{GS} = 0V
I _{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V _{GS} = 20V
		—	—	-100		V _{GS} = -20V
Q _g	Total gate charge	—	18.0	—	nC	I _D = 10A, V _{DS} =50V, V _{GS} = 10V
Q _{gs}	Gate-to-Source charge	—	3.2	—		
Q _{gd}	Gate-to-Drain("Miller") charge	—	3.0	—		
t _{d(on)}	Turn-on delay time	—	17.5	—	nS	V _{GS} =10V, V _{DD} =50V, R _{GEN} =2Ω I _D =10A
t _r	Rise time	—	3.5	—		
t _{d(off)}	Turn-Off delay time	—	34.4	—		
t _f	Fall time	—	5.1	—		
C _{iss}	Input capacitance	—	1180	—	pF	V _{GS} = 0V V _{DS} = 50V f = 100kHz
C _{oss}	Output capacitance	—	195	—		
C _{rss}	Reverse transfer capacitance	—	4	—		

Source-Drain Ratings and Characteristics

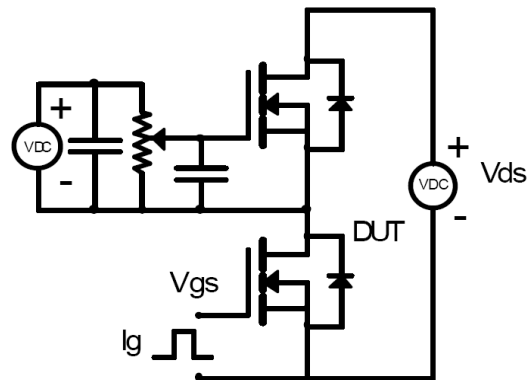
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode) ①	—	—	60	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode)	—	—	180	A	
V _{SD}	Diode Forward Voltage	—	—	1.3	V	I _S =20A, V _{GS} =0V, T _J = 25°C
t _{rr}	Reverse Recovery Time	—	40	—	nS	T _J = 25°C, I _F = 10A,
Q _{rr}	Reverse Recovery Charge	—	35	—	nC	di/dt = 100A/μs

Test circuits and Waveforms

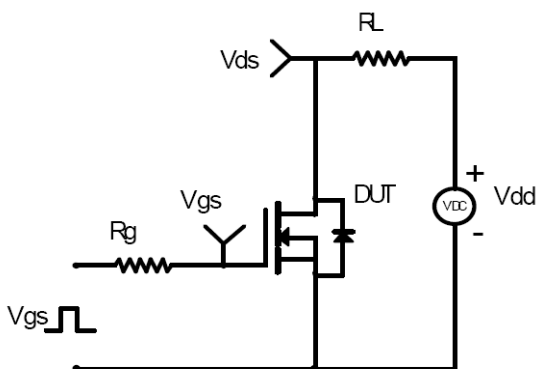
EAS Test Circuit:



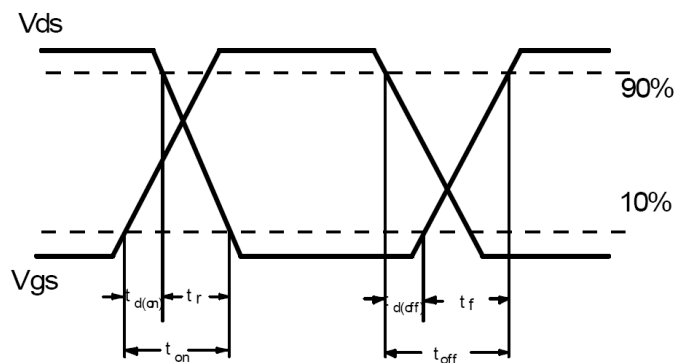
Gate charge test circuit:



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 PD is based on max. junction temperature, using junction-to-case thermal resistance.
- ④ The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$

Typical electrical and thermal characteristics

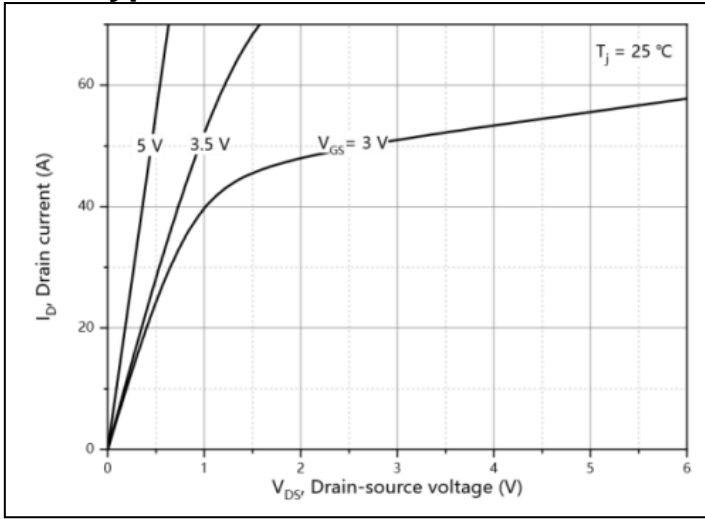


Figure 1: Typical Output Characteristics

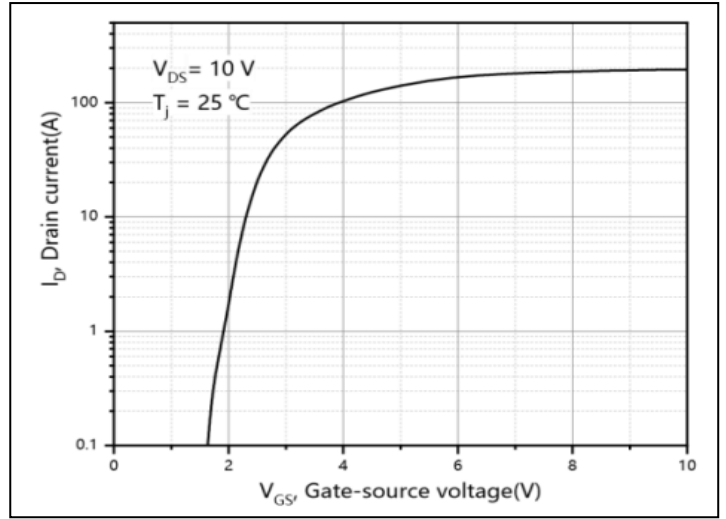


Figure 2: Type Transfer Characteristics

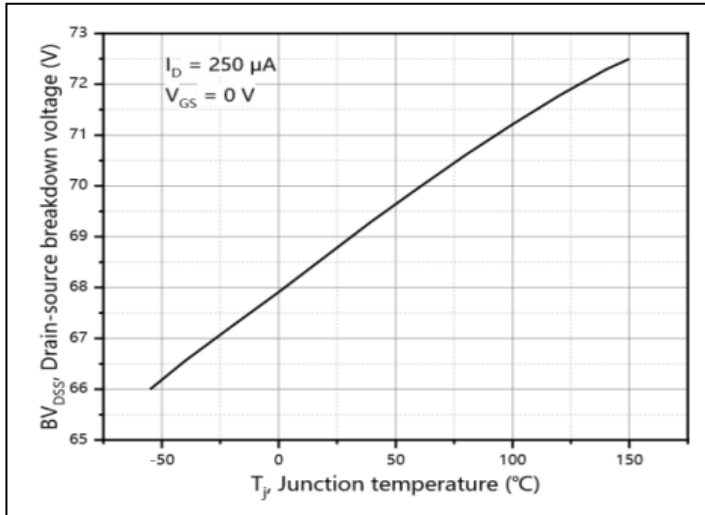


Figure 3: Drain-to-Source Breakdown Voltage Vs. Case Temperature

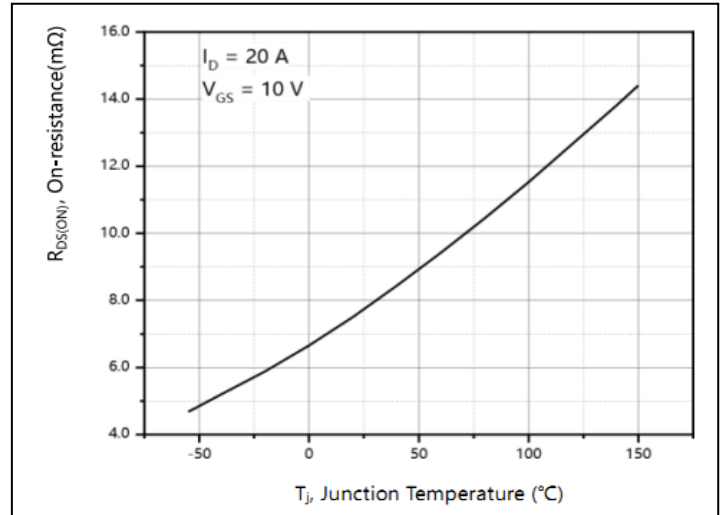


Figure 4: Normalized On-Resistance Vs. Case Temperature

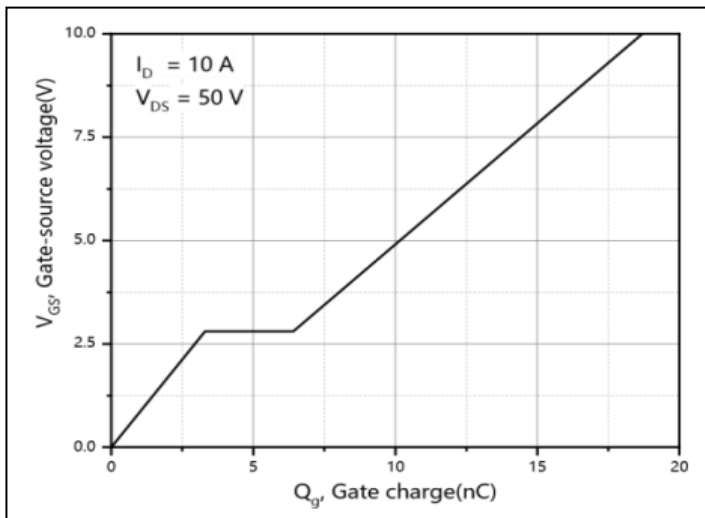


Figure 5: Gate Charge

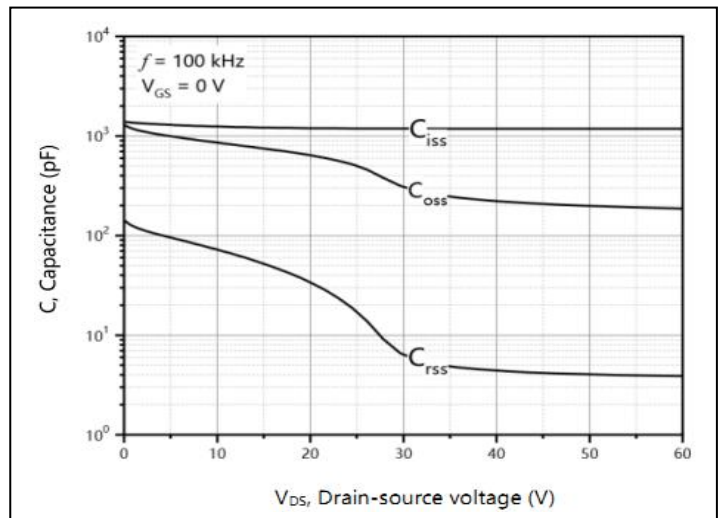


Figure 6: Capacitance

Typical electrical and thermal characteristics

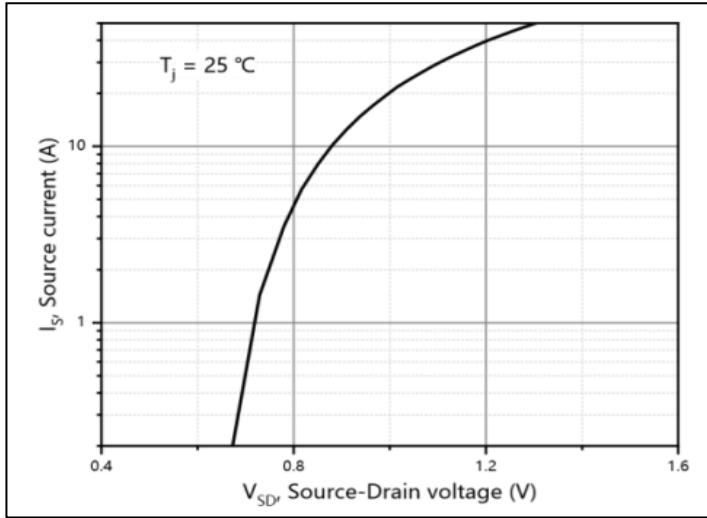


Figure 7: Forward Characteristics Of Body Diode

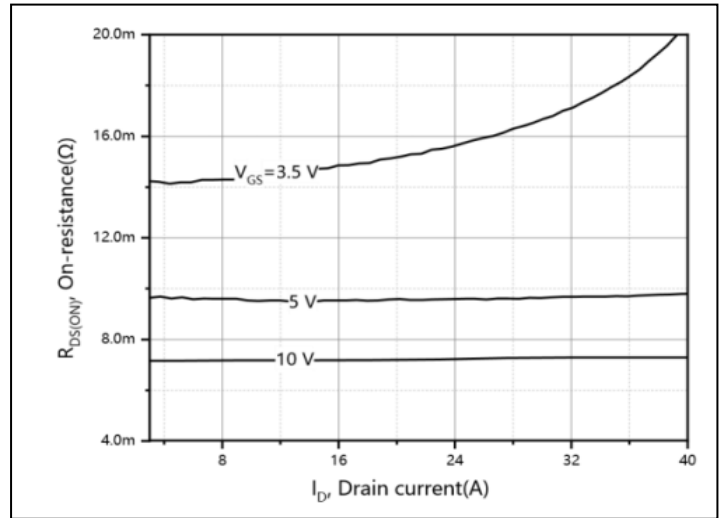


Figure 8: Drain-Source On-state Resistance

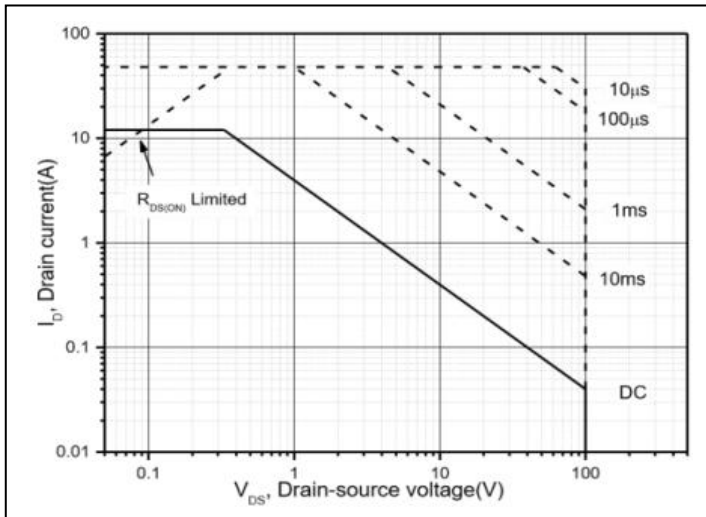
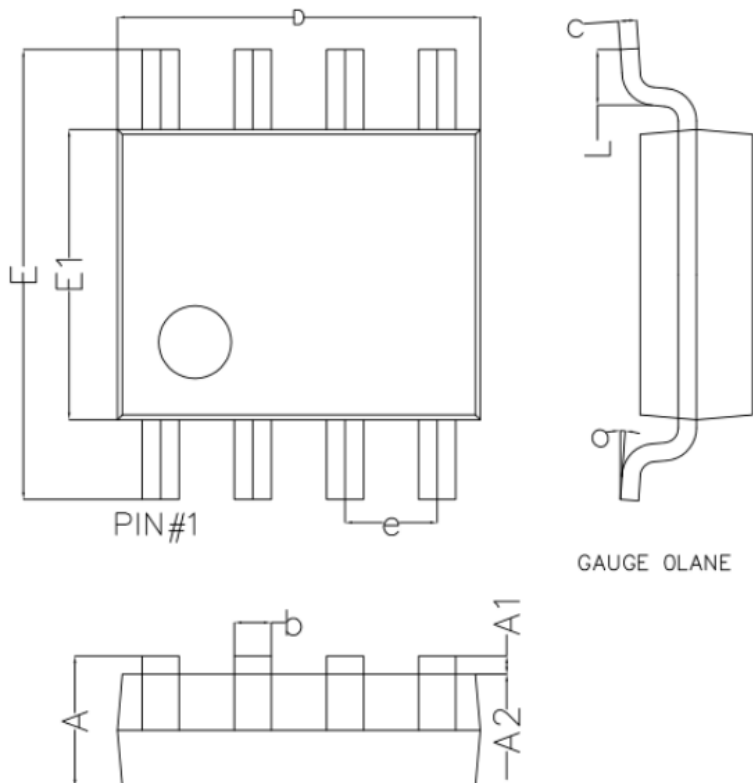


Figure 9: Safe Operation Area

Mechanical Data:



Symbol	Dim in mm		
	Min	Nor	Max
A	1.350	1.550	1.750
A1	0.100	0.175	0.250
A2	1.350	1.450	1.550
b	0.330	0.420	0.510
c	0.170	0.210	0.250
D	4.800	4.900	5.000
e	1.270 (BSC)		
E	5.800	6.000	6.200
E1	3.800	3.900	4.000
L	0.400	0.835	1.2700
o	0°	4°	8°

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