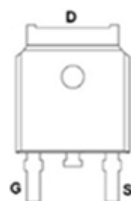
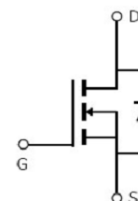


Main Product Characteristics:

V_{DSS}	20V
$R_{DS(on)}$	3.9m Ω (typ.)
I_D	60A ①


TO-252

Pin Assignment

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	60	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ①	42	
I_{DM}	Pulsed Drain Current ②	210	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation ③	60	W
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-to-Source Voltage	± 12	V
E_{AS}	Single Pulse Avalanche Energy @ $L=0.5\text{mH}$	200	mJ
$T_J \quad T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

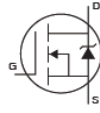
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ③	—	2.1	$^{\circ}\text{C}/\text{W}$

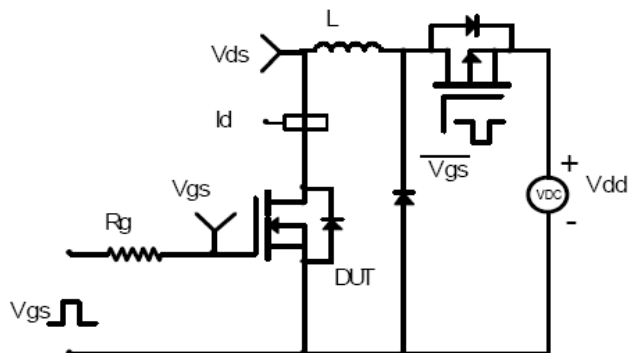
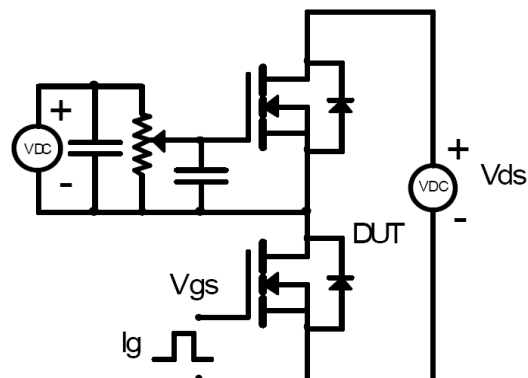
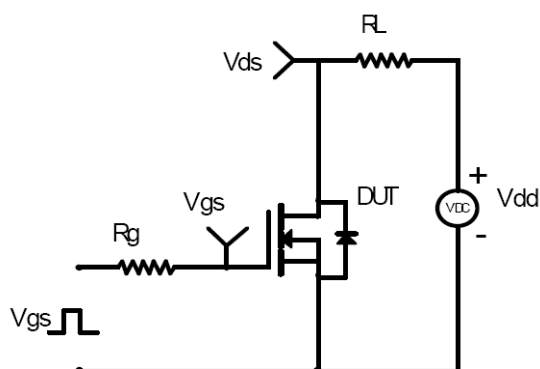
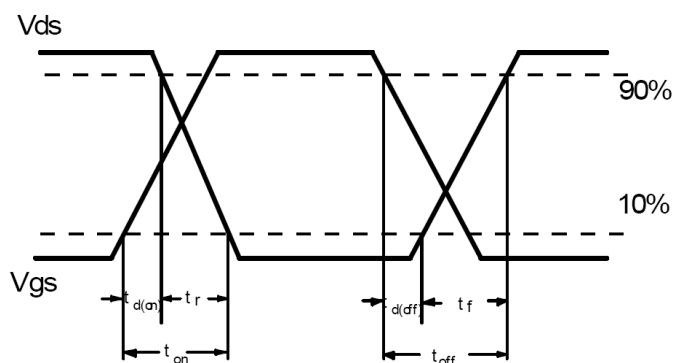
Electrical Characteristics @ $T_A=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	20	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	3.9	5.5	m Ω	$V_{GS}=4.5\text{V}, I_D = 30\text{A}$
		—	5.8	8		$V_{GS}=2.5\text{V}, I_D = 20\text{A}$
$V_{GS(th)}$	Gate threshold voltage	0.5	—	1	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 12\text{V}$
		—	—	-100		$V_{GS} = -12\text{V}$
Q_g	Total gate charge	—	27	—	nC	$I_D = 20\text{A},$ $V_{DS}=10\text{V},$ $V_{GS} = 10\text{V}$
Q_{gs}	Gate-to-Source charge	—	6.5	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	6.4	—		
$t_{d(on)}$	Turn-on delay time	—	6.2	—	ns	$V_{GS}=4.5\text{V}, V_{DS} = 10\text{V},$ $R_{GEN}=3\Omega, I_D = 2\text{A}$
t_r	Rise time	—	17.1	—		
$t_{d(off)}$	Turn-Off delay time	—	29.5	—		
t_f	Fall time	—	16.6	—		
C_{iss}	Input capacitance	—	2000	—	pF	$V_{GS} = 0\text{V}$ $V_{DS} = 10\text{V}$ $f = 1\text{MHz}$
C_{oss}	Output capacitance	—	500	—		
C_{riss}	Reverse transferecapacitance	—	200	—		

Source-Drain Ratings and Characteristics

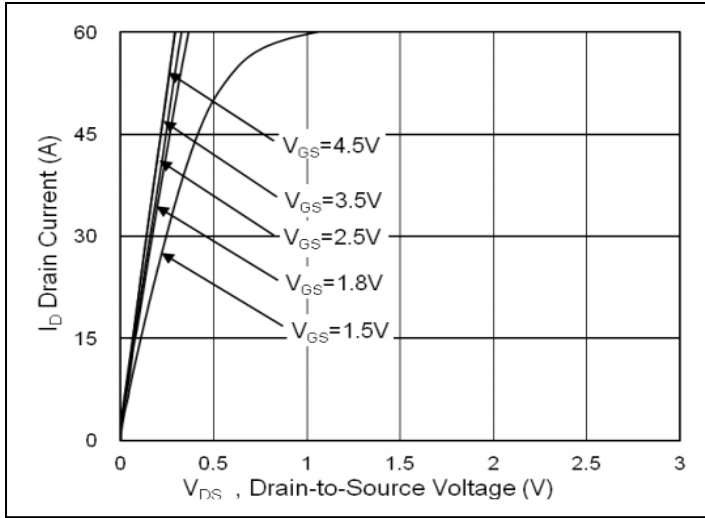
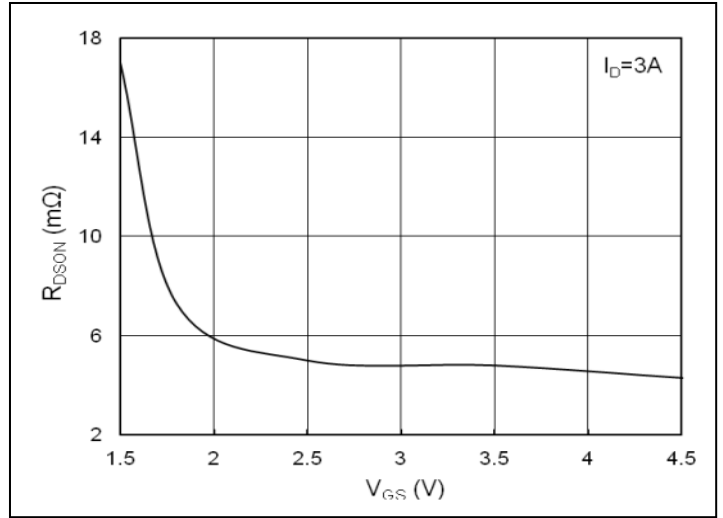
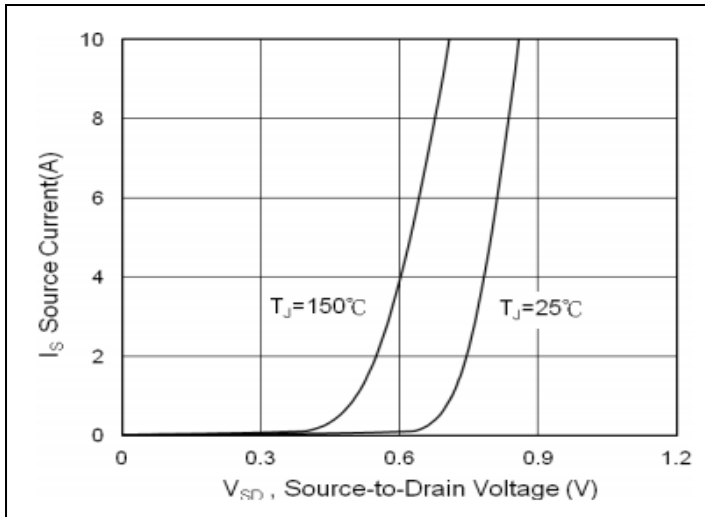
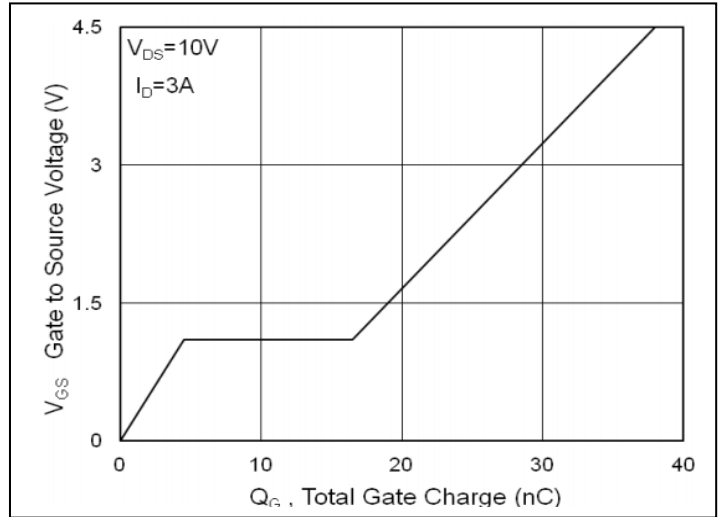
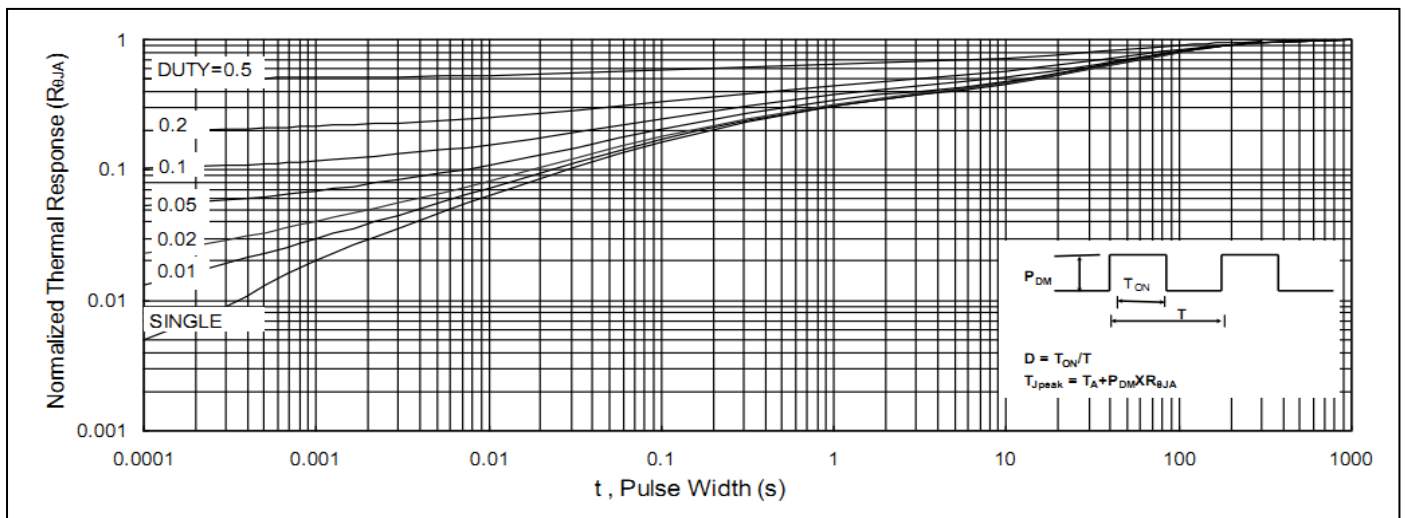
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode) ①	—	—	60	A	MOSFET symbol showing the integral reverse p-n junction diode. 
V_{SD}	Diode Forward Voltage	—	—	1.2	V	$I_S=10\text{A}, V_{GS}=0\text{V}$
t_{rr}	Reverse Recovery Time	—	25.1	—	ns	$T_J = 25^{\circ}\text{C}, I_F = 20\text{A},$ $di/dt = 100\text{A}/\mu\text{s}$
Q_{rr}	Reverse Recovery Charge	—	23.8	—	nC	

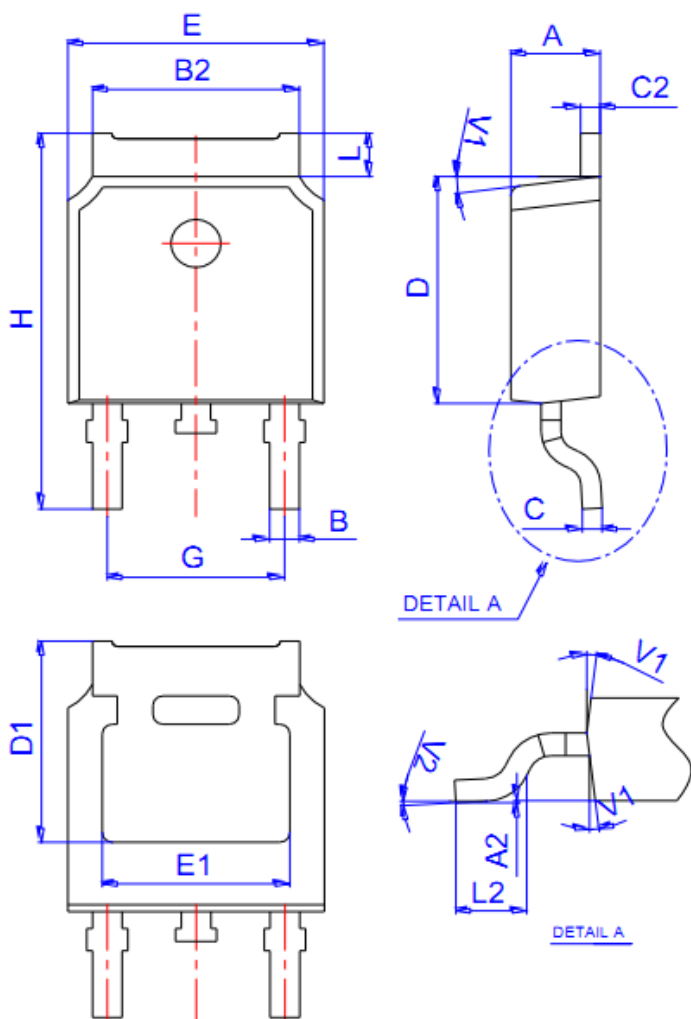
Test Circuits and Waveforms

EAS Test Circuit:

Gate Charge Test Circuit:

Switching Time Test Circuit:

Switching Waveforms:


Notes:

- ① Calculated continuous current based on maximum allow able 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.

Typical Electrical and Thermal Characteristics

Figure1. Typical Output Characteristics

Figure2. On-Resistance vs. Gate Source

Figure3. Forward Characteristics of Reverse

Figure4. Gate Charge

Figure5. Transient Thermal Impedance

Mechanical Data


Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

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Customer Service**Worldwide Sales and Service:**

Sales@silikron.com

Technical Support:

Technical@silikron.com

Suzhou Silikron Semiconductor Corp.

501 , NW-20,Nanopolis, 99th Jinjihu Avenue ,Industrial Park ,Suzhou ,P.R, CHINA

TEL: (86-512) 62560688

FAX: (86-512) 62560688-8092

E-mail: Sales@silikron.com