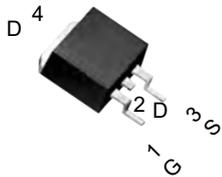


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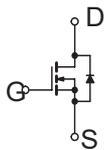
N Channel Power MOSFETs



Dimensions TO-263

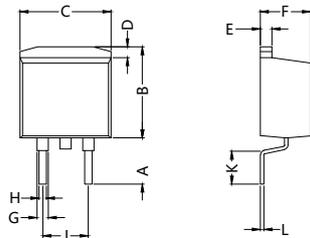
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	5.00	5.60	0.197	0.220
B	9.32	10.52	0.367	0.414
C	9.60	10.40	0.378	0.409
D	1.10	1.40	0.043	0.055
E	1.20	1.50	0.047	0.059
F	4.32	4.82	0.170	0.190
G	1.15	1.65	0.045	0.065
H	0.64	1.00	0.025	0.039
J	4.80	5.20	0.189	0.205
K	2.80	3.90	0.110	0.154
L	0.30	0.45	0.012	0.018

G=Gate, D=Drain, S=Source



TO-263(D²PAK)

- 1, Gate
- 2, Drain
- 3, Source
- 4, Drain Fin



Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	50	A
Drain Current-Continuous($T_C=100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	36	A
Pulsed Drain Current	I_{DM}	150	A
Maximum Power Dissipation	P_D	300	W
Single pulse avalanche energy ^(Note 5)	E_{AS}	58	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.5	$^\circ\text{C/W}$
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N Channel Power MOSFETs

Electrical Characteristics

(T_J=25°C, unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{SG} =0V I _D =250μA	200	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =200V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	3	4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =25A	-	31	39	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =20A	-	58	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C _{iss}	V _{DS} =100V, V _{GS} =0V, F=1.0MHz	-	2905	-	PF
Output Capacitance	C _{oss}		-	242	-	PF
Reverse Transfer Capacitance	C _{rss}		-	10.7	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =125V, I _D =20A V _{GS} =10V, R _G =10Ω	-	10	-	nS
Turn-on Rise Time	t _r		-	18	-	nS
Turn-Off Delay Time	t _{d(off)}		-	22	-	nS
Turn-Off Fall Time	t _f		-	8	-	nS
Total Gate Charge	Q _g	V _{DD} =125V, I _D =20A, V _{GS} =10V	-	34	-	nC
Gate-Source Charge	Q _{gs}		-	11	-	nC
Gate-Drain Charge	Q _{gd}		-	4	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{DS}	V _{GS} =0V, I _F =20A	-	0.9	-	V
Diode Forward Current (Note 2)	I _S		-	-	50	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F =20A di/dt = 100A/μs ^(Note3)	-	140	-	nS
Reverse Recovery Charge	Q _{rr}		-	630	-	nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition : T_J=25°C, V_{DD}=30V, V_G=10V, L=0.4mH, R_G=25Ω



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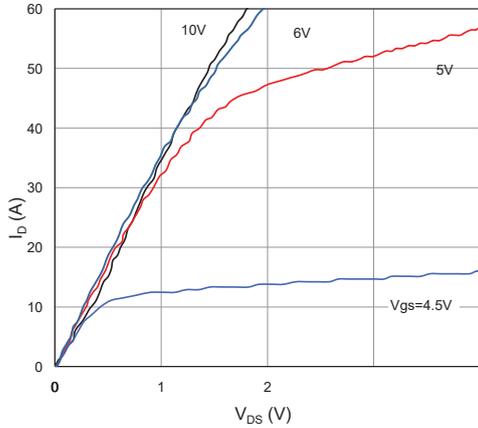


Fig 1. Typical Output Characteristics

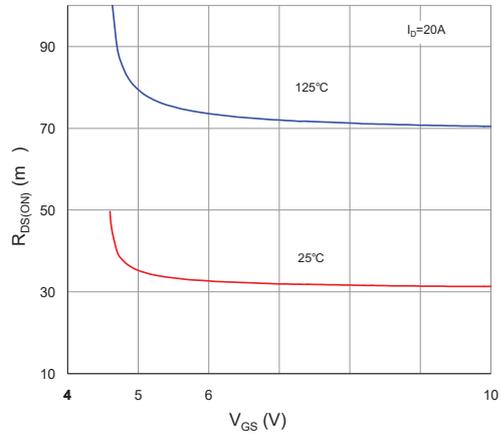


Figure 2. On-Resistance vs. Gate-Source Voltage

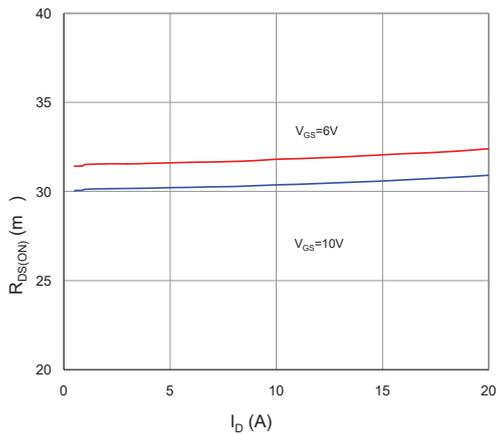


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

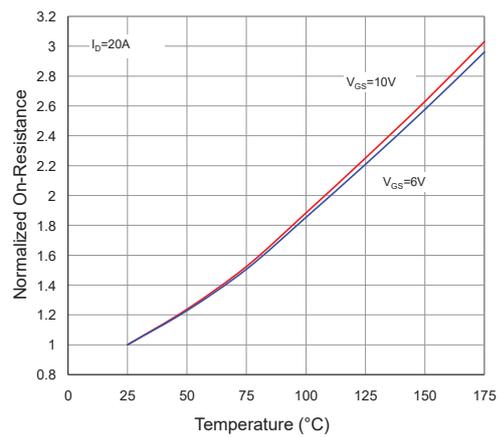


Figure 4. Normalized On-Resistance vs. Junction Temperature

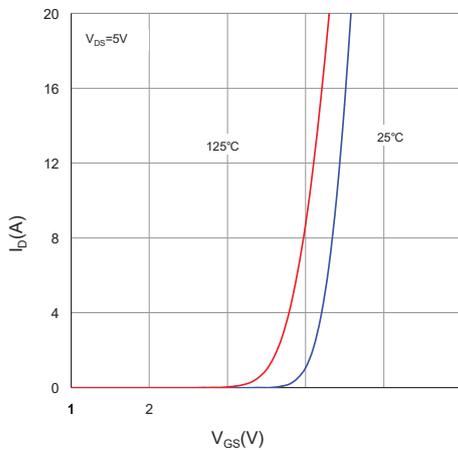


Figure 5. Typical Transfer Characteristics

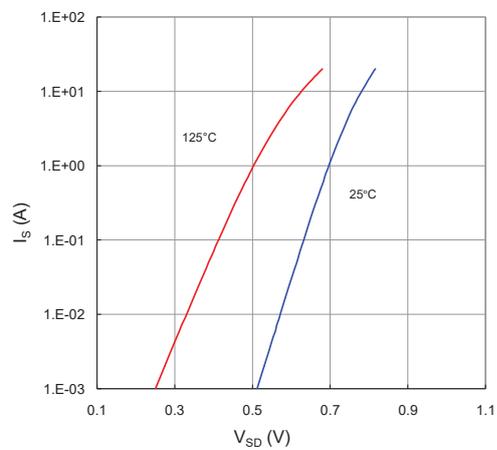


Figure 6. Typical Source-Drain Diode Forward Voltage

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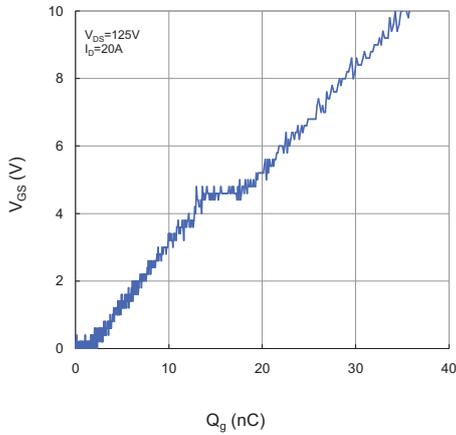


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

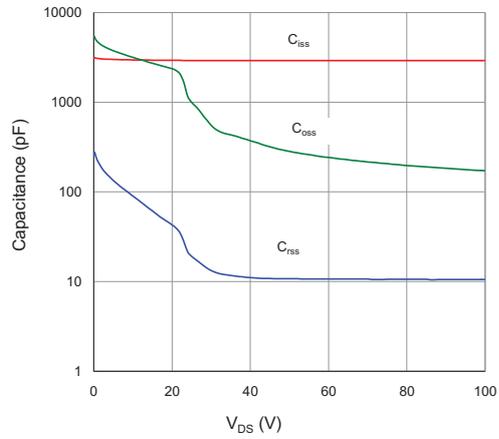


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

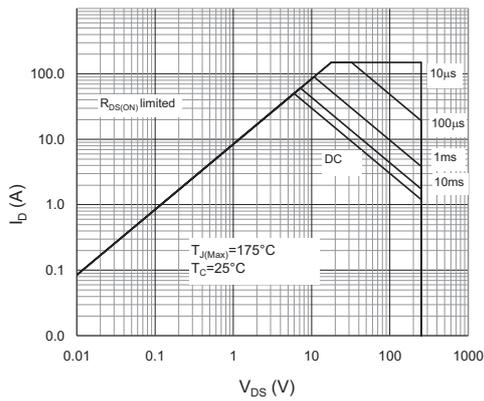


Figure 9. Maximum Safe Operating Area

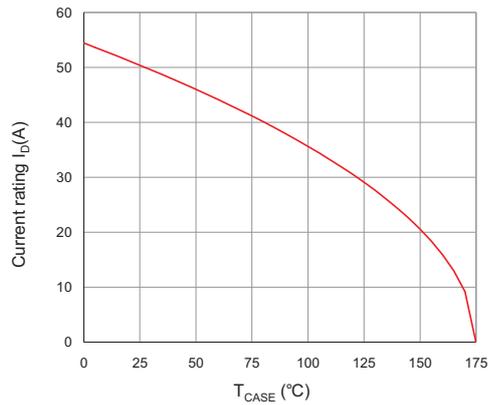


Figure 10. Maximum Drain Current vs. Case Temperature

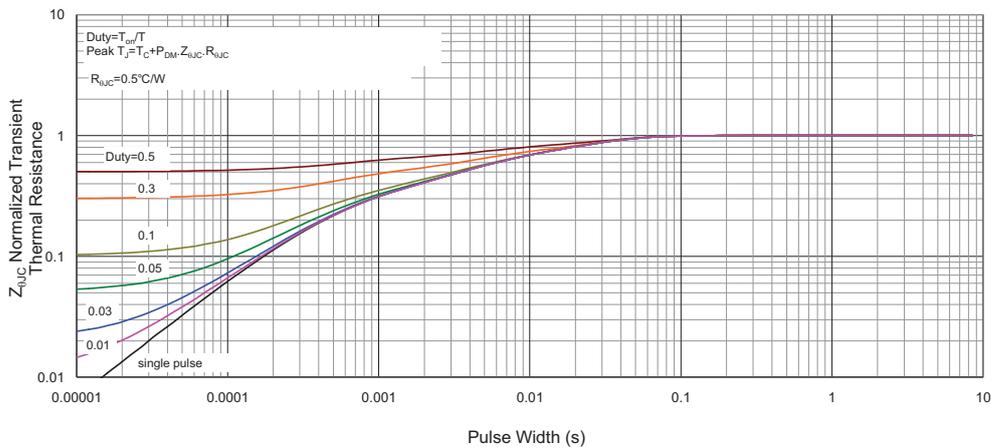


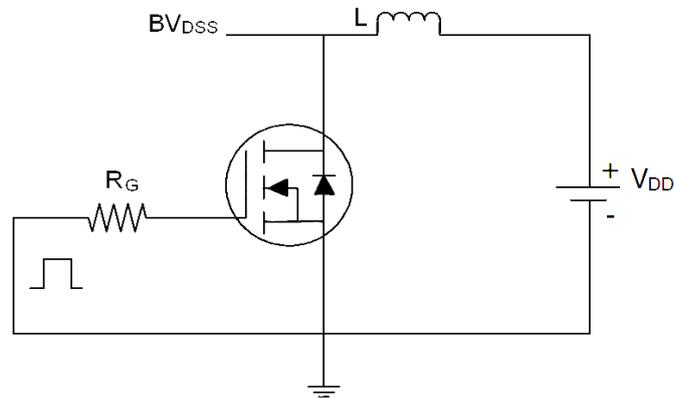
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

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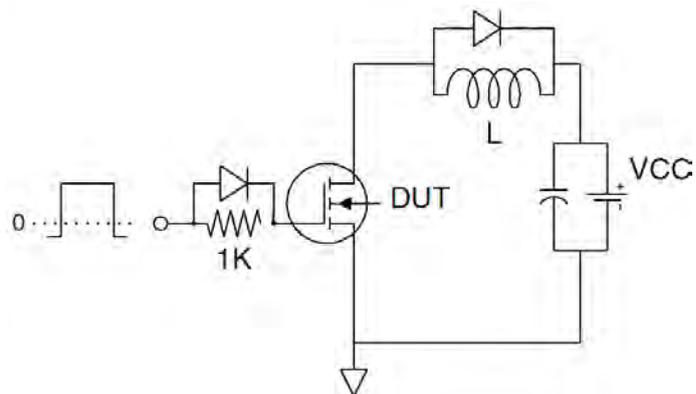
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Test Circuit

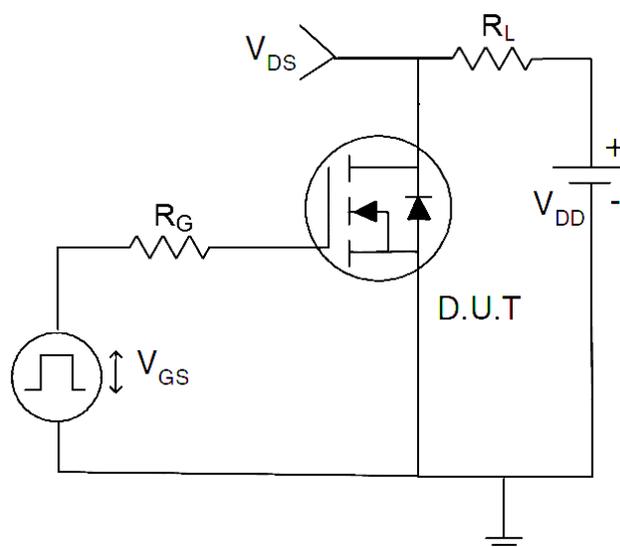
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



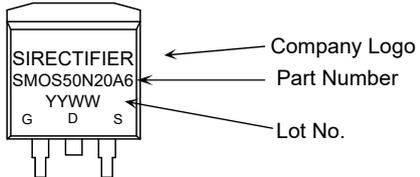
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Marking

SMOS50N20A6

(TO-263)



Ordering Information

Part Number	Package	Shipping	Marking Code
SMOS50N20A6	TO-263	50pcs / Tube or 800pcs / Tape & Reel	SMOS50N20A6