

SMD15N05-VB Datasheet

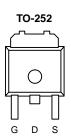
N-Channel 60 V (D-S) MOSFET

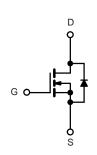
PRODUCT SUMMARY				
V _{DS} (V)	$R_{DS(on)}(\Omega)$	I _D (A) ^a		
60	0.010 at V _{GS} = 10 V	58		
00	0.013 at V _{GS} = 4.5 V	56		

FEATURES

- 175 °C Junction Temperature
- Trench Power MOSFET
- Material categorization:







N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)						
Parameter	Symbol	Limit	Unit			
Gate-Source Voltage	V_{GS}	± 20	V			
Continuous Drain Current (T _{.I} = 175 °C) ^b	T _C = 25 °C	I-	58			
Continuous Drain Current (1 _J = 175 °C)	T _C = 100 °C	l I _D	48 ^a			
Pulsed Drain Current	I _{DM}	100	A			
Continuous Source Current (Diode Conduction)	I _S	50 ^a				
Avalanche Current	I _{AS} 50					
Single Avalanche Energy (Duty Cycle ≤ 1 %)	L = 0.1 mH	E _{AS}	125	mJ		
Maximum Power Dissination	T _C = 25 °C	P _D	136	w		
Maximum Power Dissipation	T _A = 25 °C		3 ^b , 8.3 ^{b, c}			
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 175	°C		

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Maximum lunction to Ambienta	t ≤ 10 sec	R _{thJA}	15	18		
Maximum Junction-to-Ambient ^a	Steady State	I thJA	40	50	°C/W	
Maximum Junction-to-Case	·	R _{thJC}	0.85	1.1		

Notes:

- a. Package limited.
- b. Surface mounted on 1" x 1" FR4 board.
- c. $t \le 10$ s.

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1



SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)							
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	60			V	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	1	2	3	V	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
		$V_{DS} = 60 \text{ V}, V_{GS} = 0 \text{ V}$			1		
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = 60 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 125 ^{\circ}\text{C}$			50	μΑ	
		$V_{DS} = 60 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 175 ^{\circ}\text{C}$			250		
On-State Drain Current ^b	I _{D(on)}	$V_{DS} = 5 \text{ V}, V_{GS} = 10 \text{ V}$	60			Α	
		V _{GS} = 10 V, I _D = 20 A		0.010			
D : 0	D	V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C		0.016		Ω	
Drain-Source On-State Resistance ^b	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C		0.020			
		V _{GS} = 4.5 V, I _D = 15 A		0.013			
Forward Transconductance ^b	9 _{fs}	V _{DS} = 15 V, I _D = 20 A		60		S	
Dynamic	•			•			
Input Capacitance	C _{iss}			2650			
Output Capacitance	C _{oss}	$V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$		470		pF	
Reverse Transfer Capacitance	C _{rss}			225			
Total Gate Charge ^c	Q_g			47	70		
Gate-Source Charge ^c	Q _{gs}	$V_{DS} = 30 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 50 \text{ A}$		10		nC	
Gate-Drain Charge ^c	Q_{gd}			12			
Turn-On Delay Time ^c	t _{d(on)}			10	20		
Rise Time ^c	t _r	$V_{DD} = 30 \text{ V, R}_{L} = 0.6 \Omega$		15	25		
Turn-Off Delay Time ^c	t _{d(off)}	$I_D \cong 50 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 2.5 \Omega$		35	50	ns	
Fall Time ^c	t _f			20	30		
Source-Drain Diode Ratings and Cha	aracteristics (T _C = 25 °C)					
Pulsed Current	I _{SM}				60	Α	
Diode Forward Voltage	V_{SD}	I _F = 20 A, V _{GS} = 0 V		1	1.5	V	
Reverse Recovery Time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs		45	100	ns	

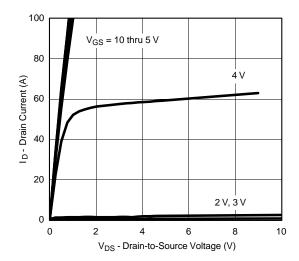
Notes:

- a. For design aid only; not subject to production testing.
- b. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$
- c. Independent of operating temperature.

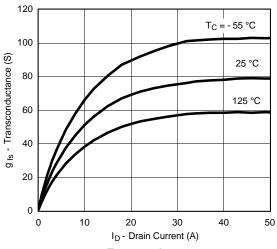
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



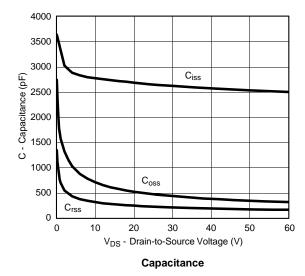
TYPICAL CHARACTERISTICS (25 °C unless noted)

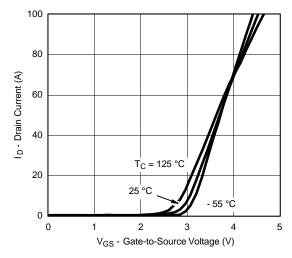


Output Characteristics

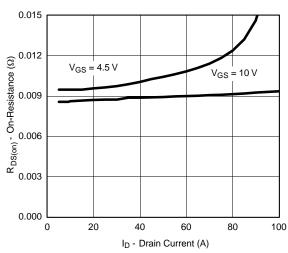


Transconductance

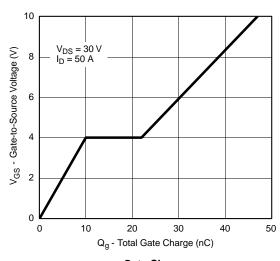




Transfer Characteristics



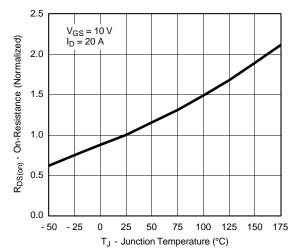
On-Resistance vs. Drain Current



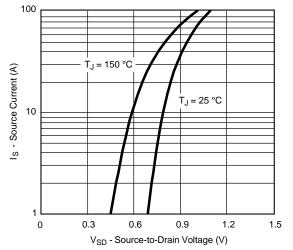
Gate Charge



TYPICAL CHARACTERISTICS (25 °C unless noted)



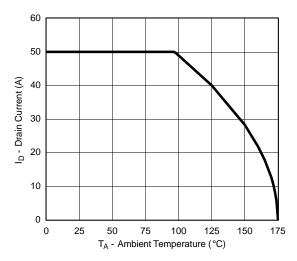
On-Resistance vs. Junction Temperature

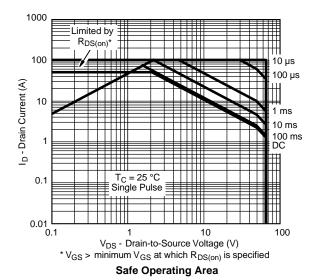


Source-Drain Diode Forward Voltage

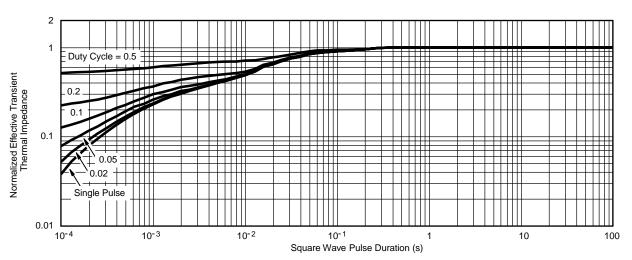


THERMAL RATINGS





Maximum Drain Current vs. Ambient Temperature



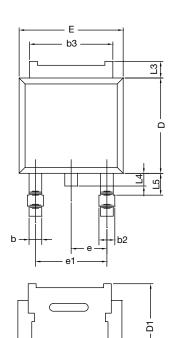
Normalized Thermal Transient Impedance, Junction-to-Case

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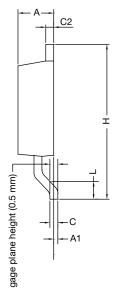
5



TO-252AA CASE OUTLINE



E1



	MILLIMETERS		INC	HES	
DIM.	MIN.	MAX.	MIN.	MAX.	
Α	2.18	2.38	0.086	0.094	
A1	-	0.127	-	0.005	
b	0.64	0.88	0.025	0.035	
b2	0.76	1.14	0.030	0.045	
b3	4.95	5.46	0.195	0.215	
С	0.46	0.61	0.018	0.024	
C2	0.46	0.89	0.018	0.035	
D	5.97	6.22	0.235	0.245	
D1	5.21	-	0.205	-	
Е	6.35	6.73	0.250	0.265	
E1	4.32	-	0.170	-	
Н	9.40	10.41	0.370	0.410	
е	2.28	BSC	0.090	BSC	
e1	4.56	4.56 BSC		BSC	
L	1.40	1.78	0.055	0.070	
L3	0.89	1.27	0.035	0.050	
L4	-	1.02	-	0.040	
L5	1.14	1.52	0.045	0.060	
FCN: X12-0247-Rev. M. 24-Dec-12					

ECN: X12-0247-Rev. M, 24-Dec-12 DWG: 5347

Note

• Dimension L3 is for reference only.



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