Siliconix

SMD/SMU15N05

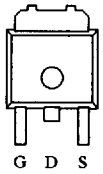
N-Channel Enhancement-Mode Transistors

175°C Maximum Junction Temperature

Product Summary

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D[a] (A)
50	0.10	15

TO-252

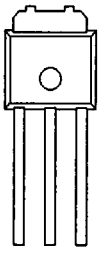


Drain connected to Tab

Top View

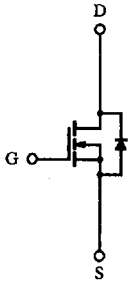
Order Number: SMD15N05

TO-251



Top View

Order Number: SMU15N05



N-Channel MOSFET

Absolute Maximum Ratings (T_C = 25°C Unless Otherwise Noted)

Parameter		Symbol	SMD15N05	SMU15N05	Unit
Drain-Source Voltage		V_{DS}	50	50	V
Gate-Source Voltage		V_{GS}	±20	±20	
Continuous Drain Current[b]	T_A = 25°C	I_D	3.3[b]	2.3[c]	A
	T_A = 100°C		1.9[b]	1.3[c]	
Pulsed Drain Current (maximum current limited by package)		I_{DM}	24	24	
Power Dissipation	T_C = 25°C	P_D	40	40	W
	T_A = 25°C		2.0[b]	1.0[c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	−55 to 175		°C
Lead Temperature ($^1/_{16}$" from case for 10 sec.)		T_L	300		

Thermal Resistance Ratings

Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Free Air, PC Board Mount	R_{thJA}	50	60	°C/W
Junction-to-Ambient Free Air, Vertical Mount			125	
Junction-to-Case	R_{thJC}		3.0	

Notes:

a. Calculated Rating for T_C = 25°C, for comparison purposes only. This cannot be used as continuous rating (see Absolute Maximum Ratings and Typical Characteristics).
b. Surface mounted on PC board.
c. Free air, vertical mount.

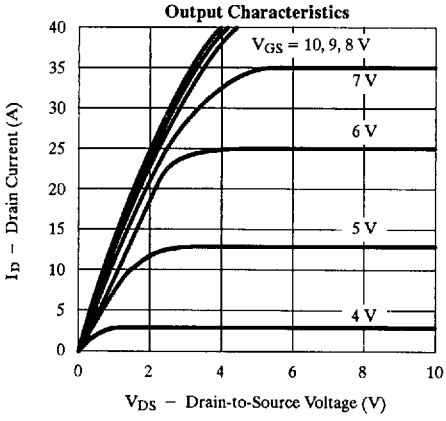
Specifications (T_J = 25°C Unless Otherwise Noted)

Parameter	Symbol	Test Condition		Min	Typ[a]	Max	Unit
Static							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 µA		50			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA		2.0		4.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V				±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0 V				25	µA
		V_{DS} = 40 V, V_{GS} = 0 V, T_J = 125°C				250	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V		15			A
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 7.5 A			0.07	0.10	Ω
		V_{GS} = 10 V, I_D = 7.5 A, T_J = 125°C			0.13	0.18	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 7.5 A		3.0	4.8		S
Dynamic							
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz			550		pF
Output Capacitance	C_{oss}				320		
Reverse Transfer Capacitance	C_{rss}				100		
Total Gate Charge[c]	Q_g	V_{DS} = 25 V, V_{GS} = 10 V, I_D = 15 A			15	30	nC
Gate-Source Charge[c]	Q_{gs}				3.5		
Gate-Drain Charge[c]	Q_{gd}				5		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 25 V, R_L = 1.67 Ω I_D ≅ 15 A, V_{GEN} = 10 V, R_G = 25 Ω			15	30	ns
Rise Time[c]	t_r				50	85	
Turn-Off Delay Time[c]	$t_{d(off)}$				80	90	
Fall Time[c]	t_f				80	110	
Source-Drain Diode Ratings and Characteristics							
Continuous Current	I_S		SMD15N05			3.3	A
			SMU15N05			1.0	
Pulsed Current	I_{SM}					24	
Forward Voltage[b]	V_{SD}	I_F = 3.3 A, V_{GS} = 0 V			1.8	2.3	V
Reverse Recovery Time	t_{rr}	I_F = 3.3 A, dI_F/dt = 100 A/µs			65		ns
Reverse Recovery Charge	Q_{rr}				0.16		µC

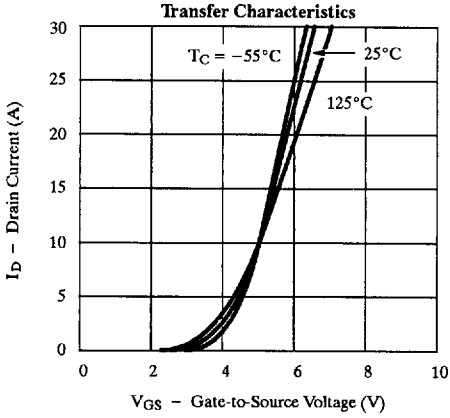
Notes:
a. For design aid only; not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
c. Independent of operating temperature.

Typical Characteristics (25°C Unless Otherwise Noted)

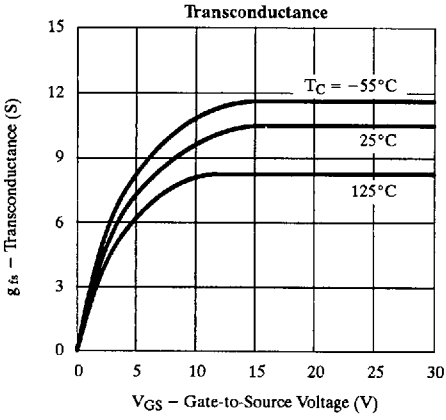
Output Characteristics



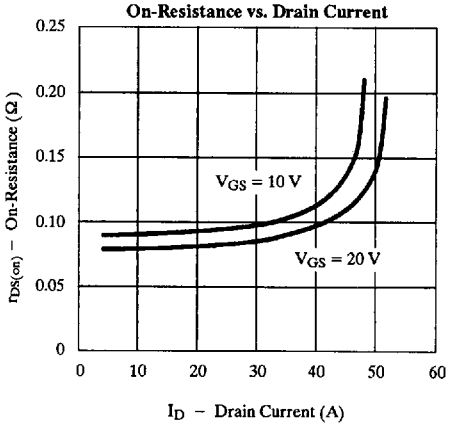
Transfer Characteristics



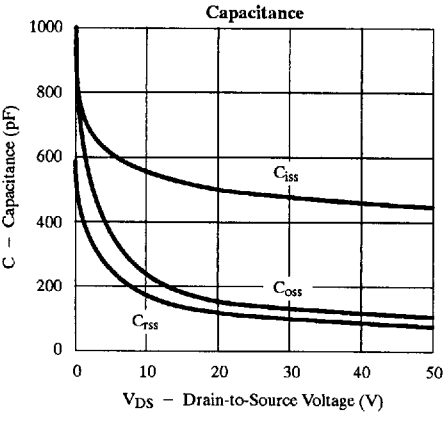
Transconductance



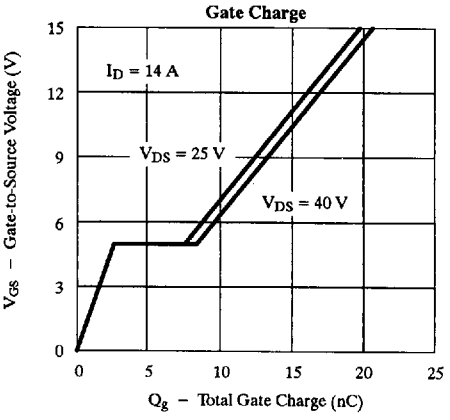
On-Resistance vs. Drain Current



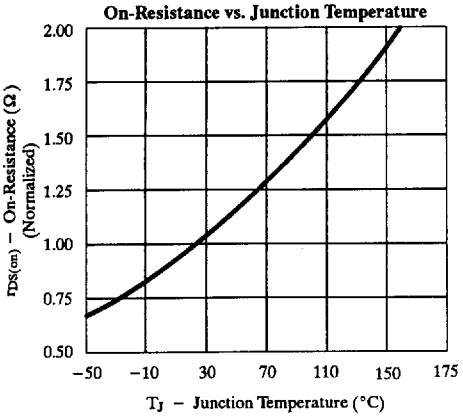
Capacitance

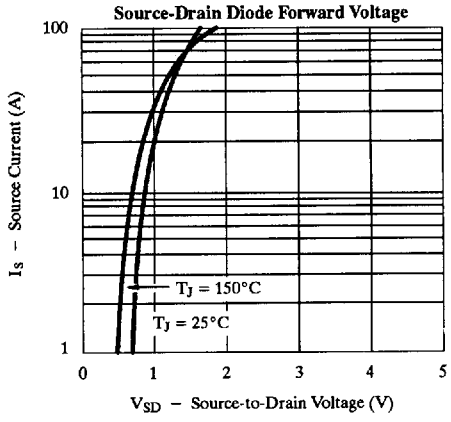


Gate Charge

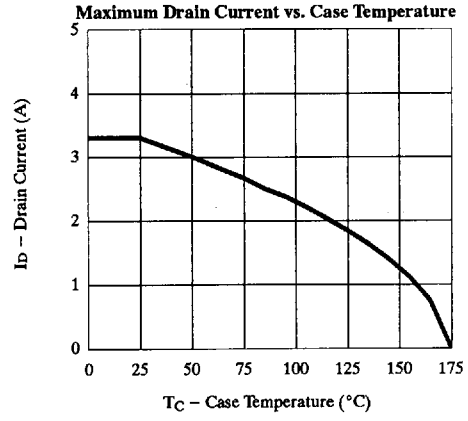


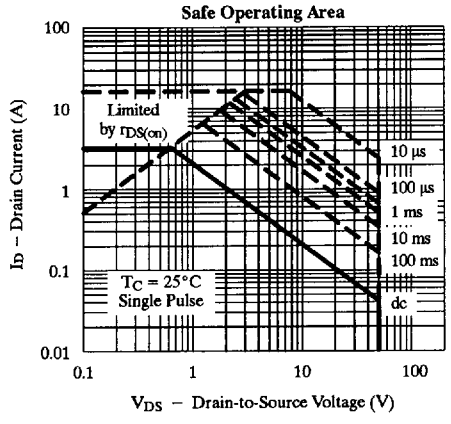
Typical Characteristics (25°C Unless Otherwise Noted)

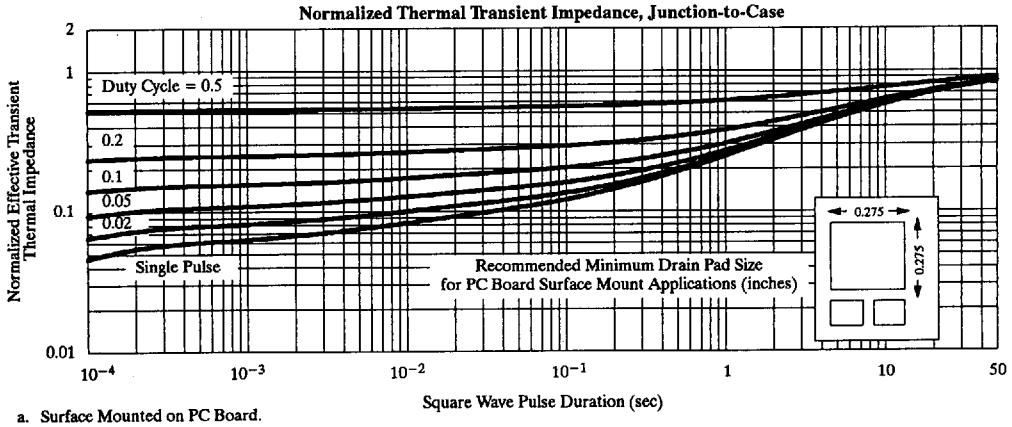




Thermal Ratings[a]







a. Surface Mounted on PC Board.