TEMIC

Siliconix

SMD/SMU25N05-45L

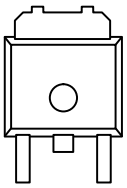
N-Channel Enhancement-Mode Transistors, Logic Level

175°C Maximum Junction Temperature

Product Summary

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D[a] (A)
50	0.045	25

TO-252

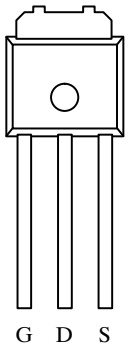


Top View

Order Number:
SMD25N05-45L

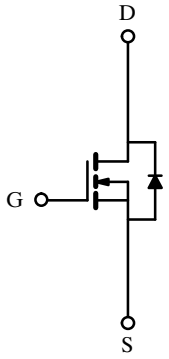
Drain Connected to Tab

TO-251



Top View

Order Number:
SMU25N05-45L



N-Channel MOSFET

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

Parameter		Symbol	Limit	Unit
Gate-Source Voltage		V_{GS}	±16	V
Continuous Drain Current (T_J = 150°C)[b]	T_A = 25°C	I_D	5.0	A
	T_A = 100°C		3.1	
Pulsed Drain Current		I_{DM}	100	
Continuous Source Current (Diode Conduction)		I_S	5	
Avalanche Current		I_{AR}	25	
Repetitive Avalanche Energy (Duty Cycle ≤ 1%)	L = 0.1 mH	E_{AR}	31	mJ
Maximum Power Dissipation	T_C = 25°C	P_D	50	W
	T_A = 25°C		2[b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	−55 to 175	°C

Thermal Resistance Ratings

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[b]	R_{thJA}		60	°C/W
Maximum Junction-to-Case	R_{thJC}		2.5	
Case-to-Sink	R_{thCS}	1.0		

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 or mounted vertically in free air.

SMD/SMU25N05-45L

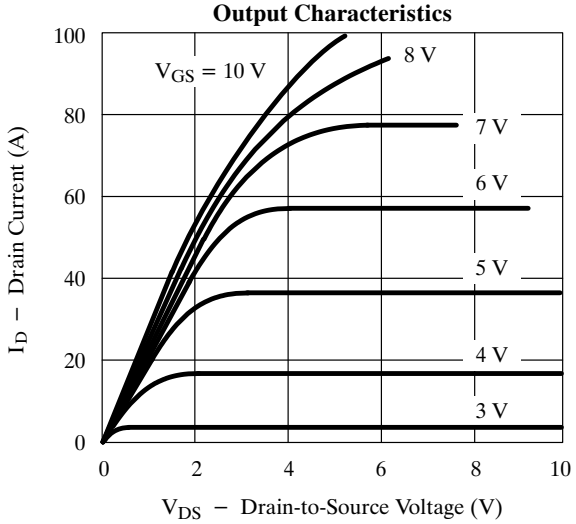
Specifications (T_J = 25°C Unless Otherwise Noted)

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 = 1 mA	1.0	1.8	3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±16 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0 V			2	µA
		V_{DS} = 40 V, V_{GS} = 0 V, T_J = 125°C			100	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 2 V, V_{GS} = 10V	25			A
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 12.5 A		0.035	0.045	Ω
		V_{GS} = 10 V, I_D = 12.5 A, T_J = 125°C		0.060	0.080	
		V_{GS} = 5 V, I_D = 12.5 A		0.045	0.070	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 12.5 A		19		S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		950		pF
Output Capacitance	C_{oss}			320		
Reverse Transfer Capacitance	C_{rss}			110		
Total Gate Charge[c]	Q_g	V_{DS} = 25 V, V_{GS} = 10 V, I_D = 25 A		22	36	nC
Gate-Source Charge[c]	Q_{gs}			5	10	
Gate-Drain Charge[c]	Q_{gd}			10	16	
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 25 V, R_L = 1 Ω I_D ≅ 25 A, V_{GEN} = 10 V, R_G = 7.5 Ω		10	20	ns
Rise Time[c]	t_r			21	40	
Turn-Off Delay Time[c]	$t_{d(off)}$			35	60	
Fall Time[c]	t_f			20	40	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)						
Pulsed Current	I_{SM}				100	A
Diode Forward Voltage	V_{SD}	I_F = 25 A, V_{GS} = 0 V		1.0	1.8	V
Reverse Recovery Time	t_{rr}	I_F = 25 A, di/dt = 100 A/µs		120		ns

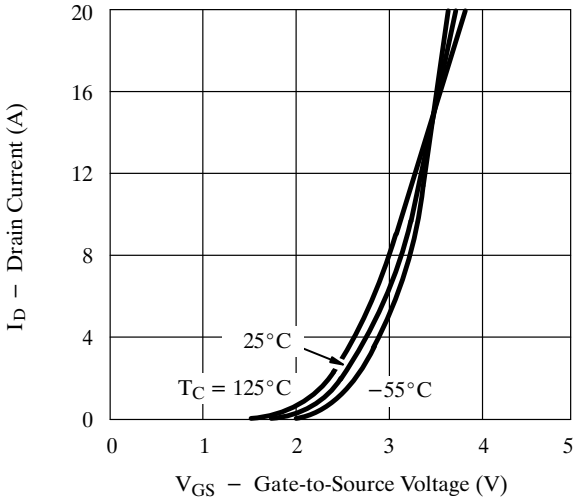
Notes:
a. For design aid only; not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
c. Independent of operating temperature.

Typical Characteristics (25°C Unless Otherwise Noted)

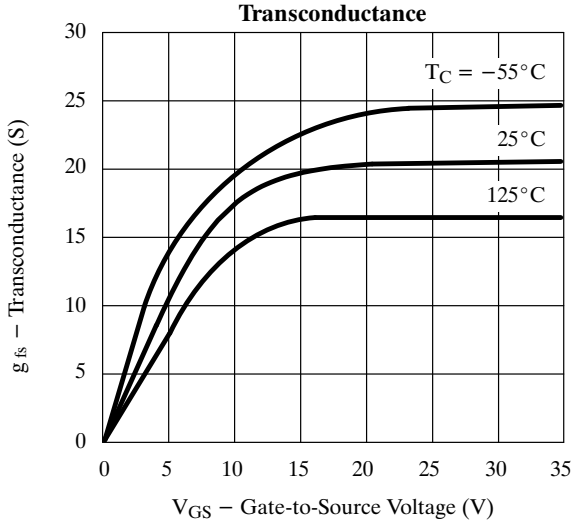
Output Characteristics



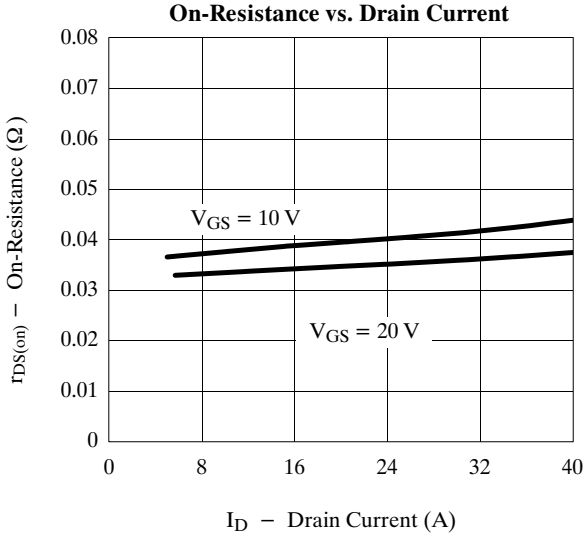
Transfer Characteristics



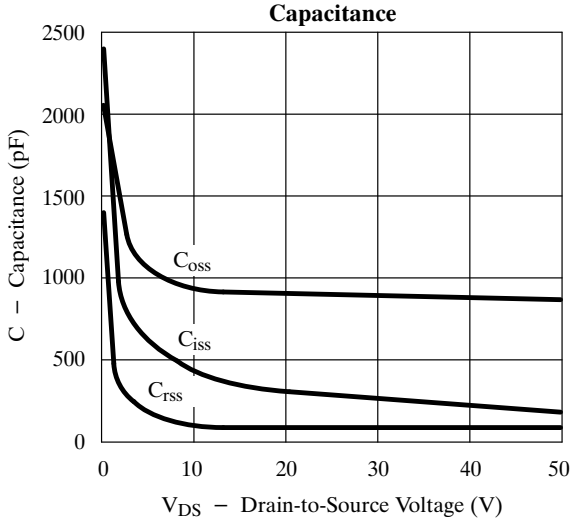
Transconductance



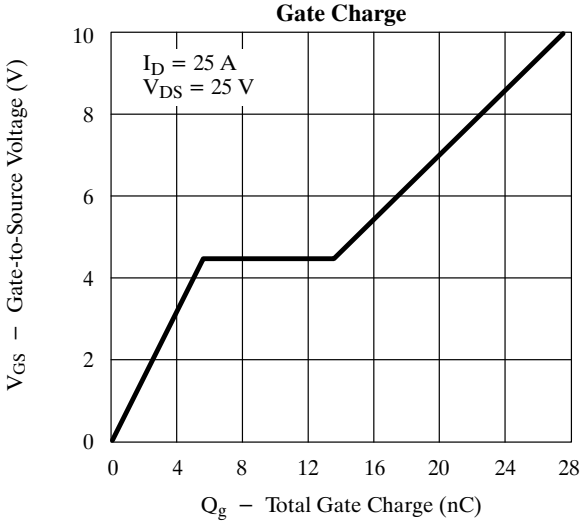
On-Resistance vs. Drain Current



Capacitance



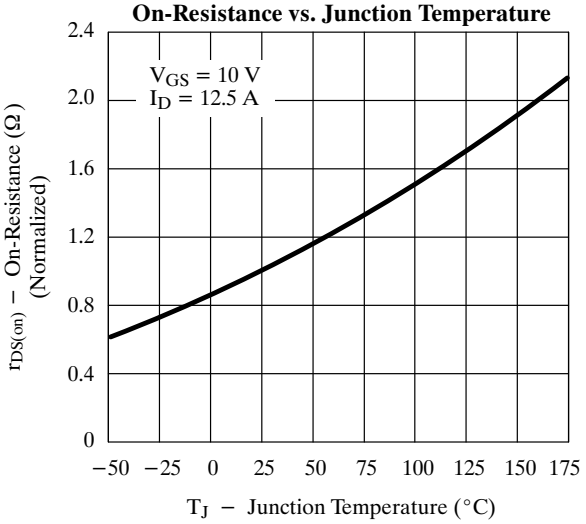
Gate Charge



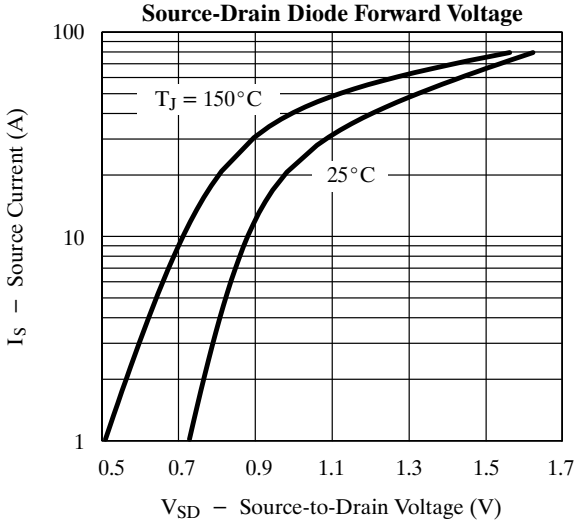
SMD/SMU25N05-45L

Typical Characteristics (25°C Unless Otherwise Noted)

On-Resistance vs. Junction Temperature

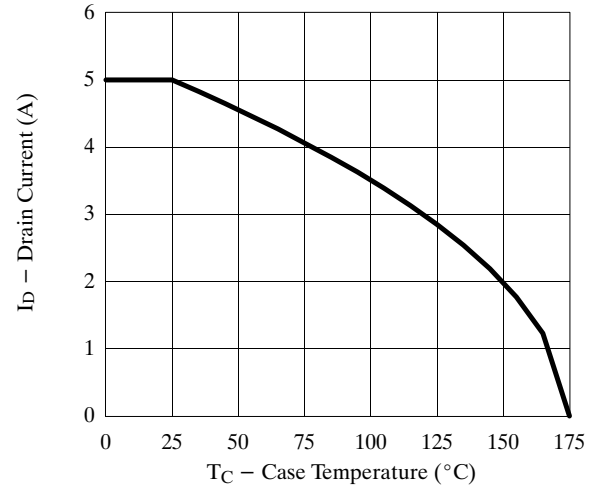


Source-Drain Diode Forward Voltage

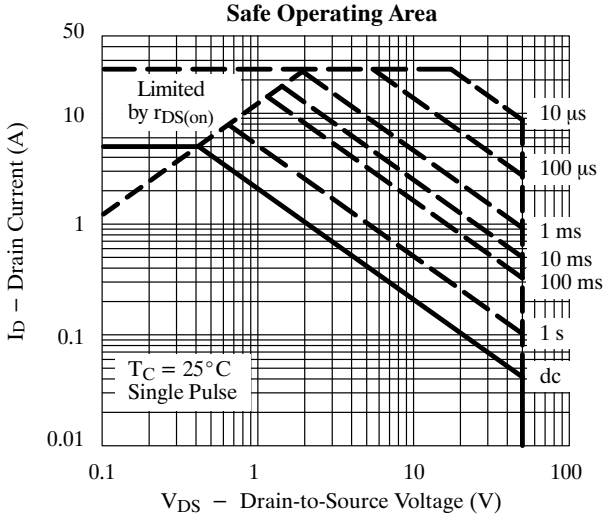


Thermal Ratings

Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case