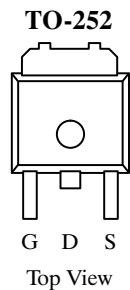


## N-Channel Enhancement-Mode Transistors, Logic Level

### Product Summary

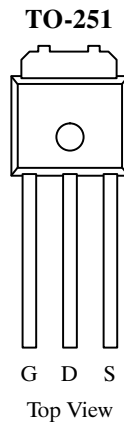
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D^a$ (A)
50	0.045	25

**175°C Rated**  
Maximum Junction Temperature

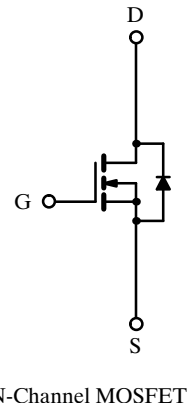


Order Number:  
SMD25N05-45L

Drain Connected to Tab



Order Number:  
SMU25N05-45L



### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	Limit	Unit
Gate-Source Voltage	$V_{GS}$	$\pm 16$	V
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ ) <sup>b</sup>	$I_D$	$T_A = 25^\circ\text{C}$	5.0
		$T_A = 100^\circ\text{C}$	3.1
Pulsed Drain Current	$I_{DM}$	100	A
Continuous Source Current (Diode Conduction)	$I_S$	5	
Avalanche Current	$I_{AR}$	25	
Repetitive Avalanche Energy (Duty Cycle $\leq 1\%$ )	$E_{AR}$	31	mJ
Maximum Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$	50
		$T_A = 25^\circ\text{C}$	2 <sup>b</sup>
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 175	$^\circ\text{C}$

### Thermal Resistance Ratings

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b</sup>	$R_{thJA}$		60	$^\circ\text{C}/\text{W}$
Maximum Junction-to-Case	$R_{thJC}$		2.5	
Case-to-Sink	$R_{thCS}$	1.0		

Notes:

- Calculated Rating for  $T_C = 25^\circ\text{C}$ , for comparison purposes only. This cannot be used as continuous rating (see Absolute Maximum Ratings and Typical Characteristics).
- Surface mounted on PC board or mounted vertically in free air.

Subsequent updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #1411.

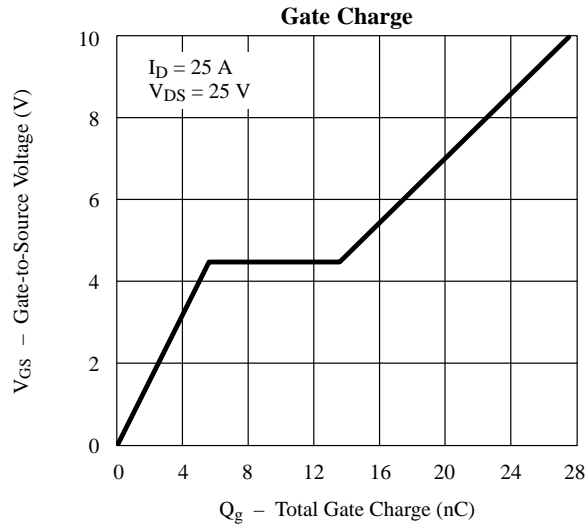
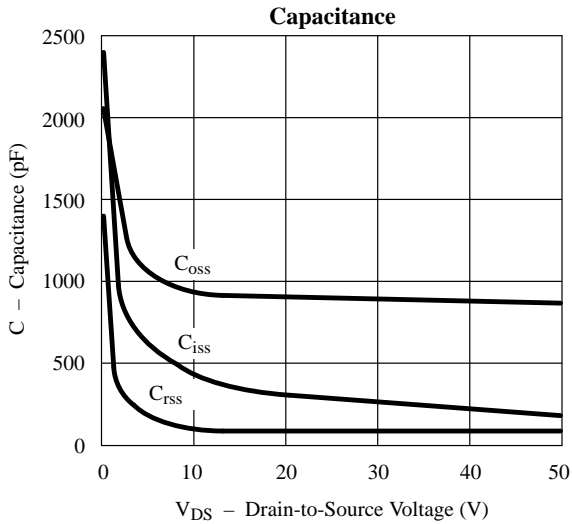
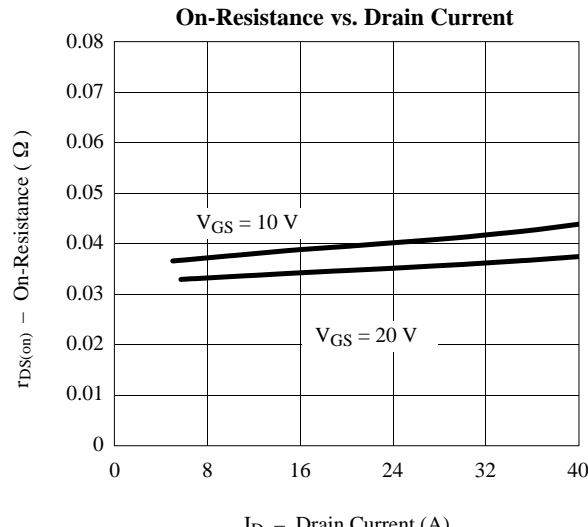
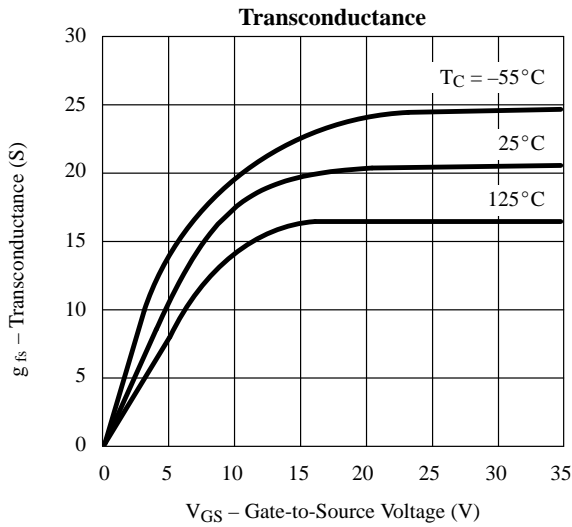
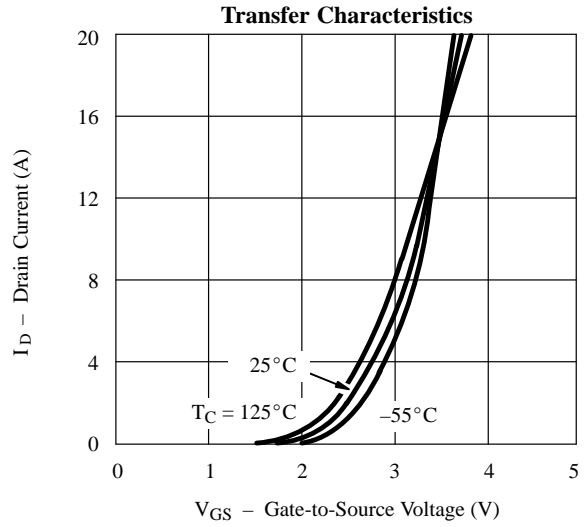
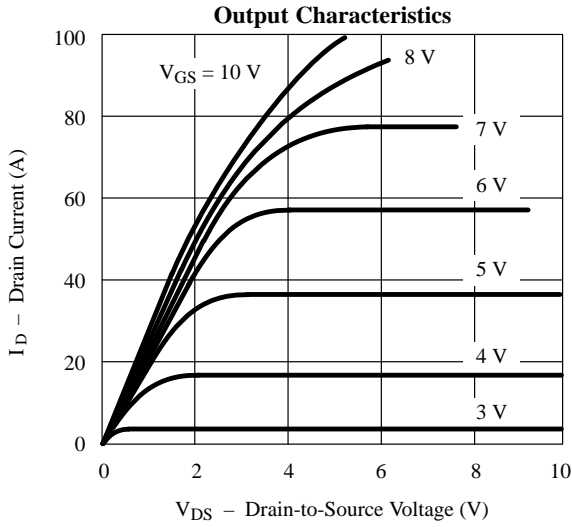
## Specifications ( $T_J = 25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typ <sup>a</sup>	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	50			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1\ \text{mA}$	1.0	1.8	3.0	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 16\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}$			2	$\mu\text{A}$
		$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			100	
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} = 2\text{ V}, V_{GS} = 10\text{V}$	25			A
Drain-Source On-State Resistance <sup>b</sup>	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 12.5\text{ A}$		0.035	0.045	$\Omega$
		$V_{GS} = 10\text{ V}, I_D = 12.5\text{ A}, T_J = 125^\circ\text{C}$		0.060	0.080	
		$V_{GS} = 5\text{ V}, I_D = 12.5\text{ A}$		0.045	0.070	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 12.5\text{ A}$		19		S
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		950		$\text{pF}$
Output Capacitance	$C_{oss}$			320		
Reverse Transfer Capacitance	$C_{rss}$			110		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = 25\text{ V}, V_{GS} = 10\text{ V}, I_D = 25\text{ A}$		22	36	$\text{nC}$
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			5	10	
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			10	16	
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = 25\text{ V}, R_L = 1\ \Omega$ $I_D \cong 25\text{ A}, V_{GEN} = 10\text{ V}, R_G = 7.5\ \Omega$		10	20	$\text{ns}$
Rise Time <sup>c</sup>	$t_r$			21	40	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			35	60	
Fall Time <sup>c</sup>	$t_f$			20	40	
<b>Source-Drain Diode Ratings and Characteristics (<math>T_C = 25^\circ\text{C}</math>)</b>						
Pulsed Current	$I_{SM}$				100	A
Diode Forward Voltage	$V_{SD}$	$I_F = 25\text{ A}, V_{GS} = 0\text{ V}$		1.0	1.8	V
Reverse Recovery Time	$t_{rr}$	$I_F = 25\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		120		ns

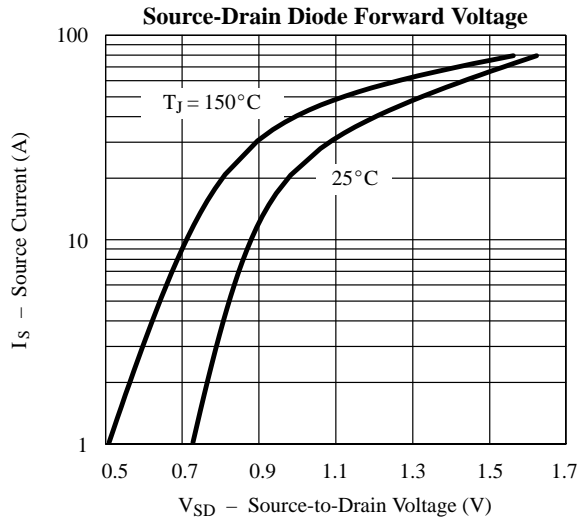
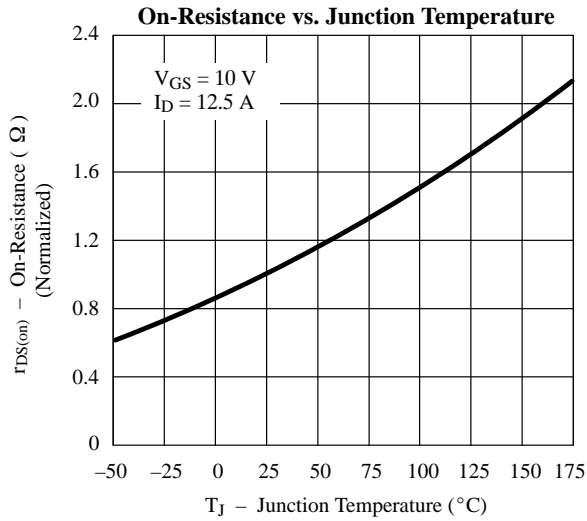
Notes:

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

**Typical Characteristics (25°C Unless Otherwise Noted)**



## Typical Characteristics (25°C Unless Otherwise Noted)



## Thermal Ratings

