

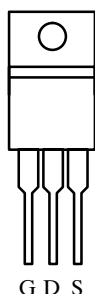
## P-Channel Enhancement-Mode Transistors

### Product Summary

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
-60	0.020	-65 <sup>a</sup>

**175°C Rated**  
Maximum Junction Temperature

TO-220AB

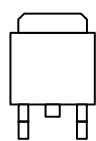


Top View

SUP65P06-20

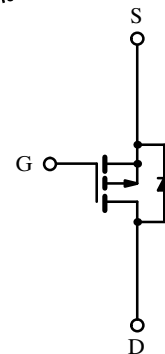
DRAIN connected to TAB

TO-263



Top View

SUB65P06-20



P-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	-65 <sup>a</sup>
		$T_C = 125^\circ\text{C}$	-39
Pulsed Drain Current	$I_{DM}$	-200	A
Avalanche Current	$I_{AR}$	-60	
Repetitive Avalanche Energy <sup>b</sup>	$E_{AR}$	180	mJ
Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$ (TO-220AB and TO-263)	187 <sup>d</sup>
		$T_A = 125^\circ\text{C}$ (TO-263) <sup>c</sup>	3.7
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 175	$^\circ\text{C}$

### Thermal Resistance Ratings

Parameter	Symbol	Limit	Unit
Junction-to-Ambient	$R_{thJA}$	PCB Mount (TO-263) <sup>c</sup>	40
		Free Air (TO-220AB)	62.5
Junction-to-Case	$R_{thJC}$	0.8	$^\circ\text{C}/\text{W}$

Notes:

- Package limited.
- Duty cycle  $\leq 1\%$ .
- When mounted on 1" square PCB (FR-4 material).
- See SOA curve for voltage derating.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70289. A SPICE Model data sheet is available for this product (FaxBack document #70543).

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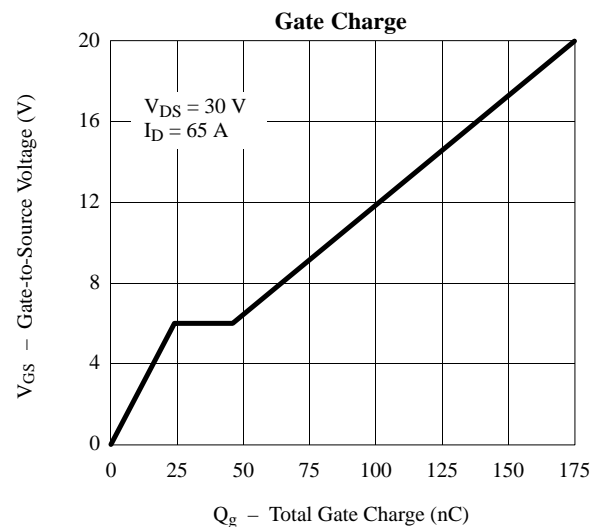
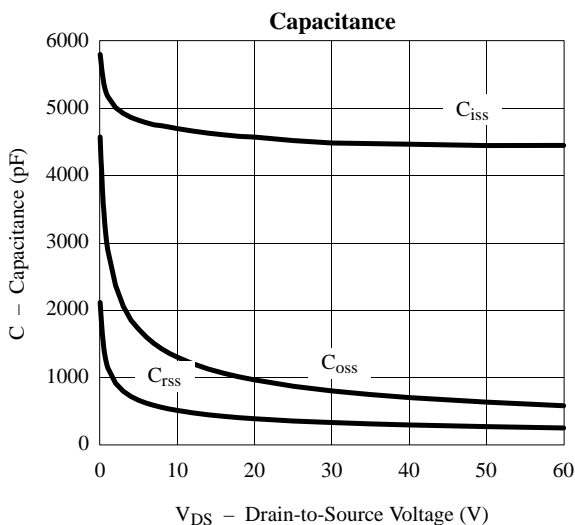
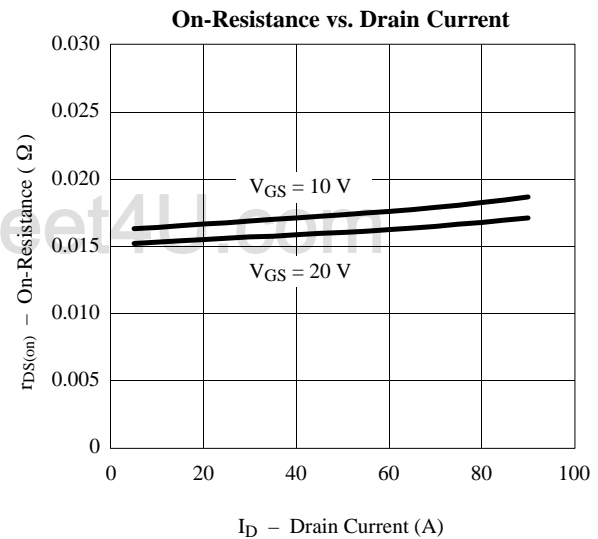
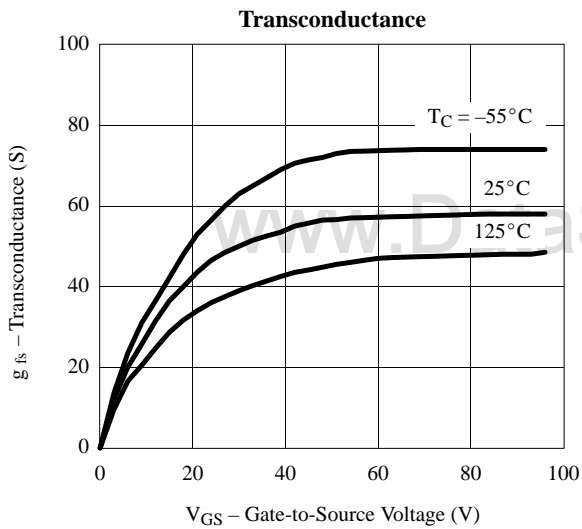
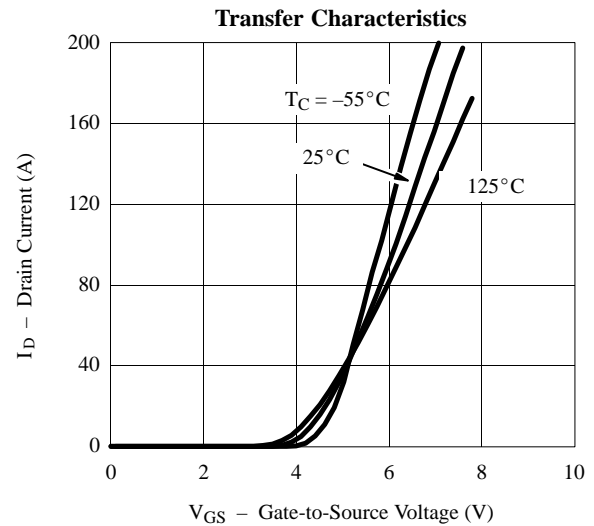
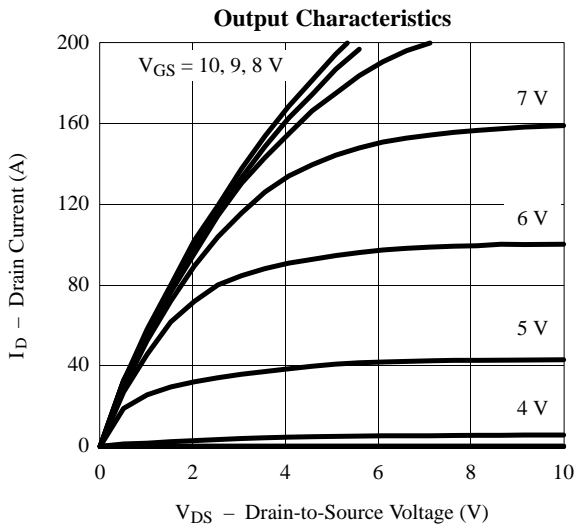
## Specifications ( $T_J = 25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\ \mu\text{A}$	-60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\ \mu\text{A}$	-2.0	-3.0	-4.0	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			-50	
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}, T_J = 175^\circ\text{C}$			-150	
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	-120			A
Drain-Source On-State Resistance <sup>b</sup>	$r_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -30\text{ A}$		0.017	0.020	$\Omega$
		$V_{GS} = -10\text{ V}, I_D = -30\text{ A}, T_J = 125^\circ\text{C}$			0.033	
		$V_{GS} = -10\text{ V}, I_D = -30\text{ A}, T_J = 175^\circ\text{C}$			0.042	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -30\text{ A}$	25			S
<b>Dynamic<sup>a</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = -25\text{ V}, f = 1\text{ MHz}$		4500		pF
Output Capacitance	$C_{oss}$			870		
Reverse Transfer Capacitance	$C_{rss}$			350		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = -30\text{ V}, V_{GS} = -10\text{ V}, I_D = -65\text{ A}$		85	120	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			24		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			22		
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 0.47\ \Omega$ $I_D \approx -65\text{ A}, V_{GEN} = -10\text{ V}, R_G = 2.5\ \Omega$		15	40	ns
Rise Time <sup>c</sup>	$t_r$			40	80	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			65	120	
Fall Time <sup>c</sup>	$t_f$			30	60	
<b>Source-Drain Diode Ratings and Characteristics (<math>T_C = 25^\circ\text{C}</math>)<sup>a</sup></b>						
Continuous Current	$I_s$				-65	A
Pulsed Current	$I_{SM}$				-200	
Forward Voltage <sup>b</sup>	$V_{SD}$	$I_F = -65\text{ A}, V_{GS} = 0\text{ V}$		-1.1	-1.4	V
Reverse Recovery Time	$t_{rr}$	$I_F = -65\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		70	120	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			7	9	A
Reverse Recovery Charge	$Q_{rr}$			0.245	0.54	$\mu\text{C}$

## Notes:

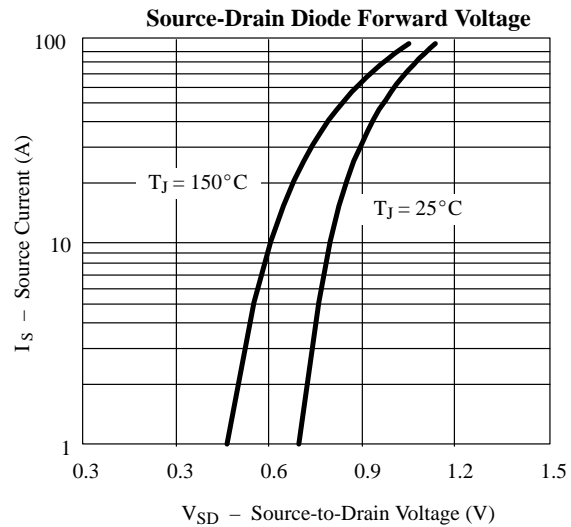
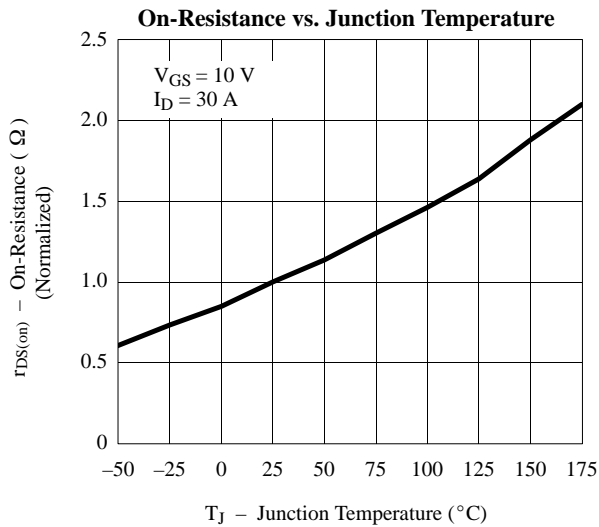
- Guaranteed by design, not subject to production testing.
- Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Independent of operating temperature.

## Typical Characteristics (25°C Unless Noted)



# SUP/SUB65P06-20

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



## Thermal Ratings

