

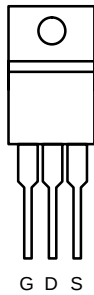


P-Channel 40-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
-40	0.015 @ $V_{GS} = -10$ V	-65
	0.023 @ $V_{GS} = -4.5$ V	-50

TO-220AB

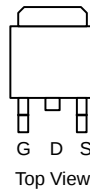


Top View

SUP65P04-15

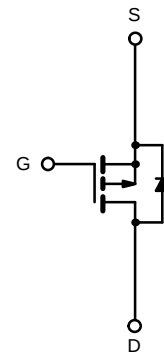
DRAIN connected to TAB

TO-263



Top View

SUB65P04-15



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 175^\circ\text{C}$)	$T_C = 25^\circ\text{C}$	I_D	-65	A
	$T_C = 125^\circ\text{C}$		-37	
Pulsed Drain Current		I_{DM}	-240	
Avalanche Current		I_{AR}	-60	
Repetitive Avalanche Energy ^a		E_{AR}	180	mJ
Power Dissipation	$T_C = 25^\circ\text{C}$ (TO-220AB and TO-263)	P_D	120 ^c	W
	$T_A = 25^\circ\text{C}$ (TO-263) ^b		3.75	
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	PCB Mount (TO-263) ^b	R_{thJA}	40	$^\circ\text{C/W}$
	Free Air (TO-220AB)	R_{thJA}	62.5	
Junction-to-Case		R_{thJC}	1.25	

Notes:

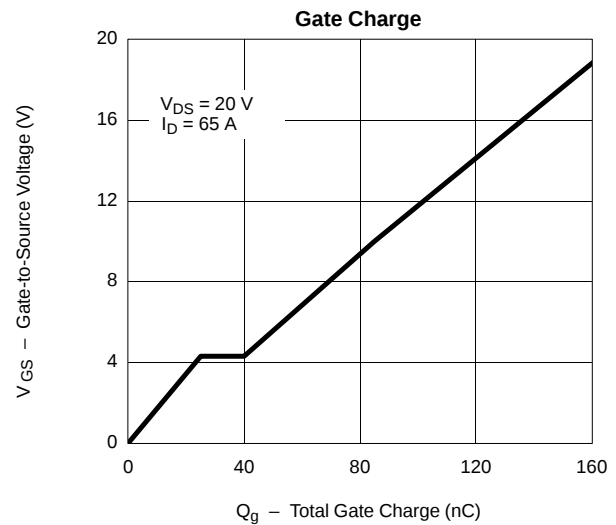
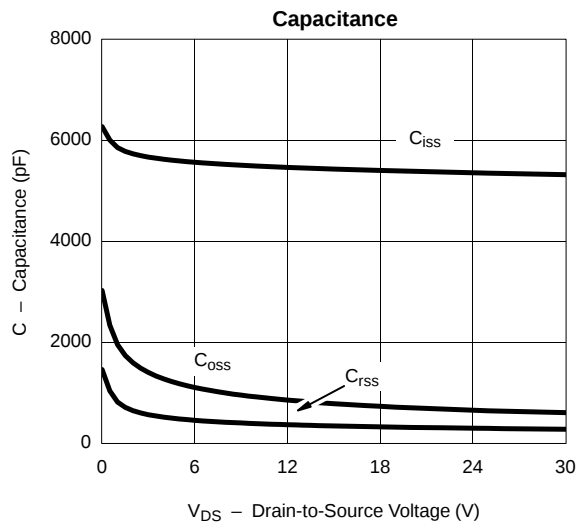
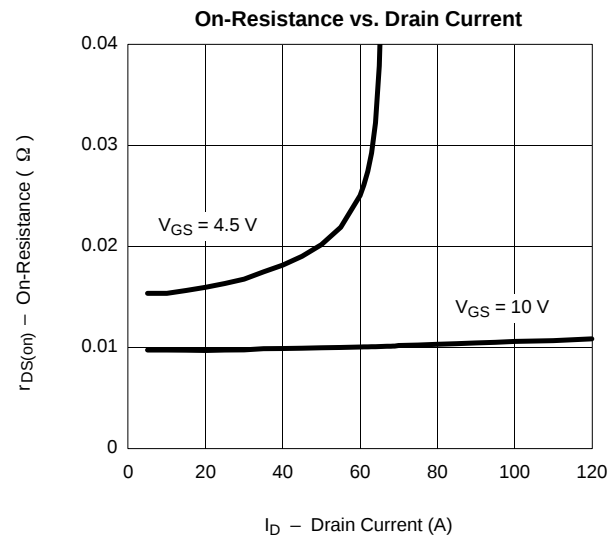
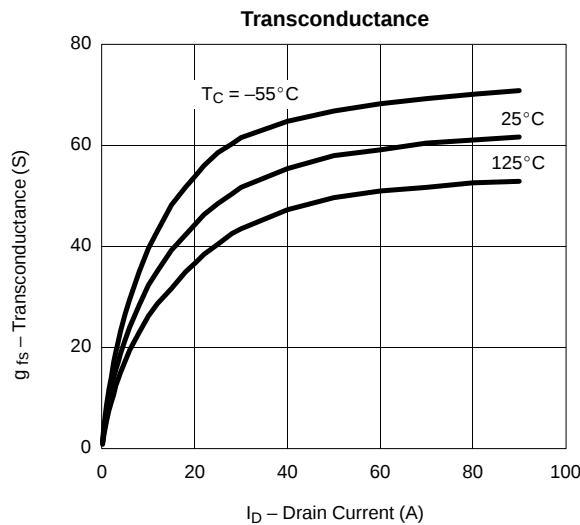
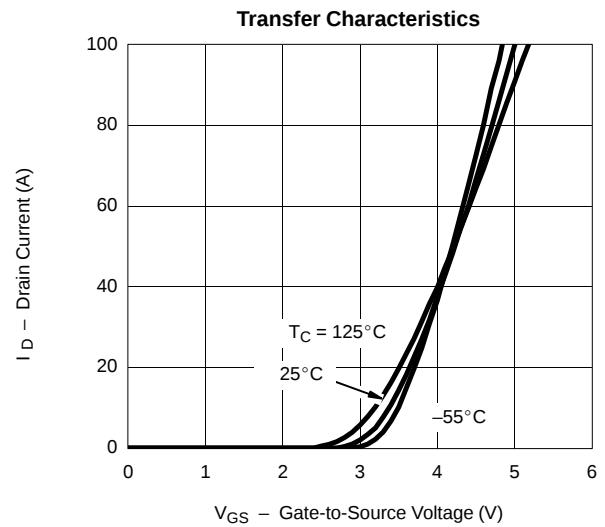
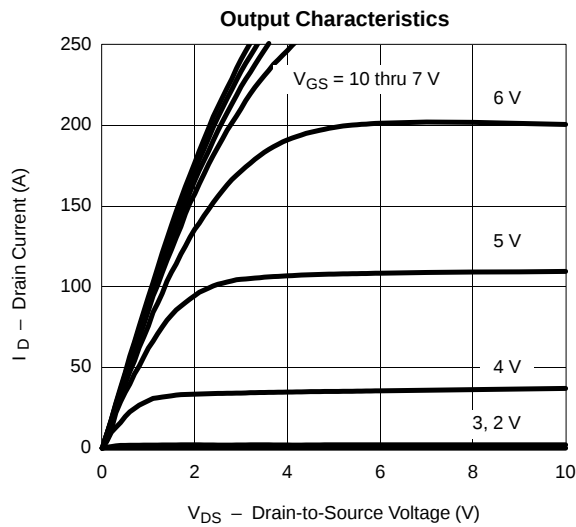
- Duty cycle $\leq 1\%$.
- When mounted on 1" square PCB (FR-4 material).
- See SOA curve for voltage derating.

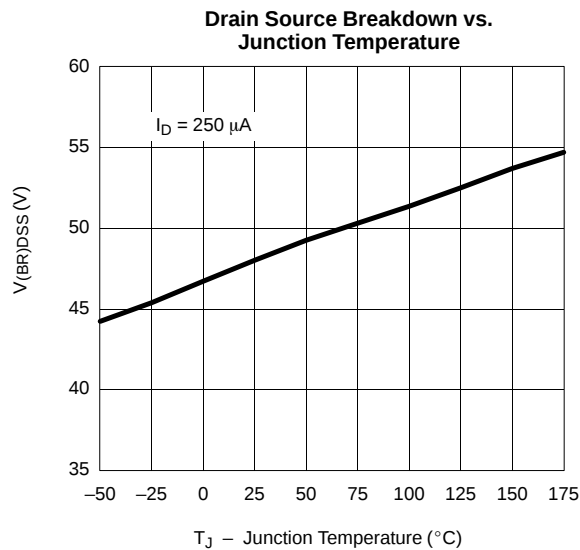
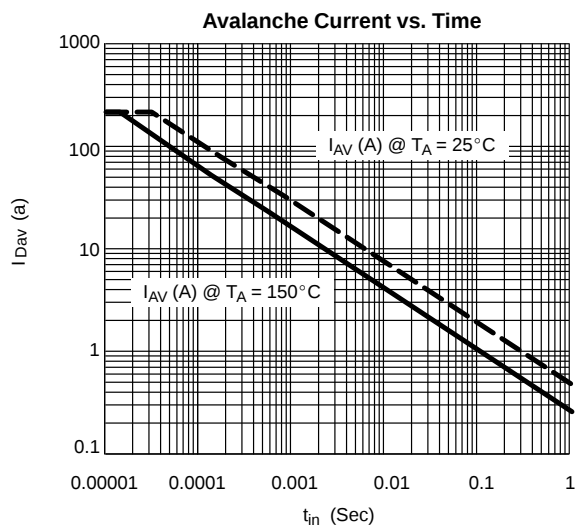
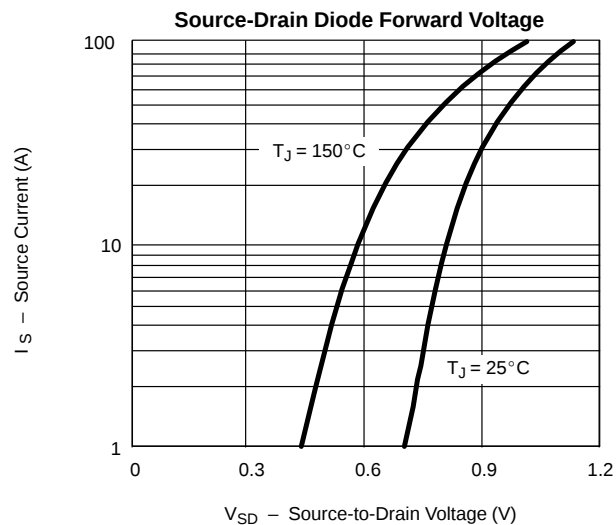
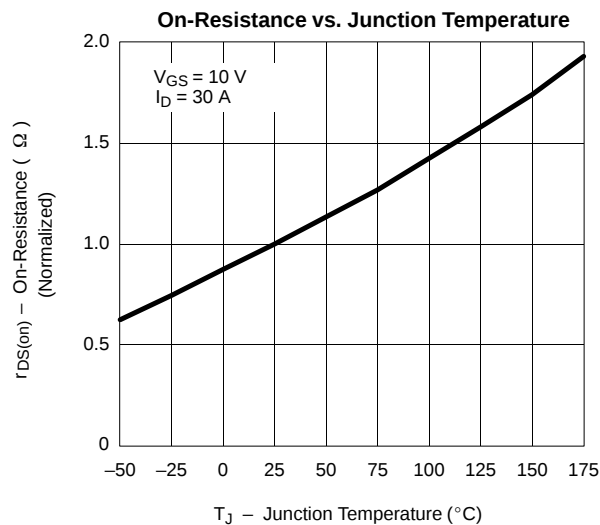
**SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)**

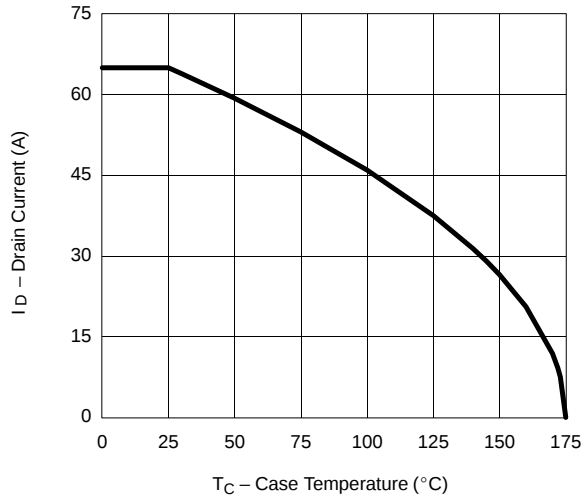
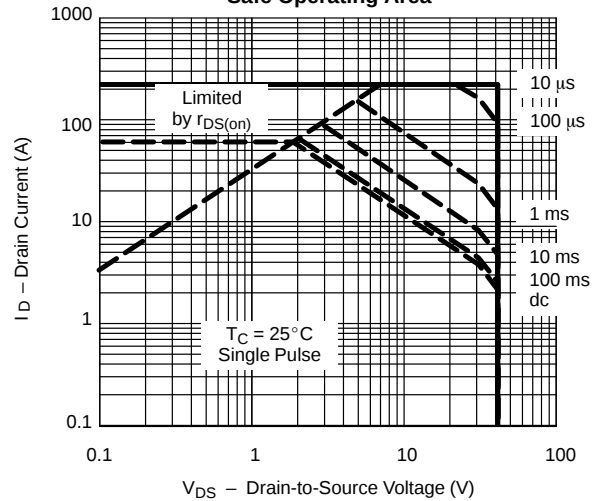
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = −250 μA	−40			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = −250 μA	−1		−3	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = −40 V, V _{GS} = 0 V			−1	μA
		V _{DS} = −40 V, V _{GS} = 0 V, T _J = 125°C			−50	
		V _{DS} = −40 V, V _{GS} = 0 V, T _J = 175°C			−250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = −5 V, V _{GS} = −10 V	−120			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = −10 V, I _D = −30 A		0.012	0.015	Ω
		V _{GS} = −10 V, I _D = −30 A, T _J = 125°C			0.024	
		V _{GS} = −10 V, I _D = −30 A, T _J = 175°C			0.030	
		V _{GS} = −4.5 V, I _D = −20 A		0.018	0.023	Ω
Forward Transconductance ^a	g _{fs}	V _{DS} = −15 V, I _D = −50 A	20			S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = −25 V, f = 1 MHz		5400		pF
Output Capacitance	C _{oss}			640		
Reversen Transfer Capacitance	C _{rss}			300		
Total Gate Charge ^c	Q _g	V _{DS} = −20 V, V _{GS} = −10 V, I _D = −65 A		85	130	nC
Gate-Source Charge ^c	Q _{gs}			25		
Gate-Drain Charge ^c	Q _{gd}			15		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = −20 V, R _L = 0.3 Ω I _D ≈ −65 A, V _{GEN} = −10 V, R _G = 2.5 Ω		15	25	ns
Rise Time ^c	t _r			380	580	
Turn-Off Delay Time ^c	t _{d(off)}			75	115	
Fall Time ^c	t _f			140	210	
Source-Drain Diode Ratings and Characteristics (T _C = 25°C) ^b						
Continuous Current	I _S				−65	A
Pulsed Current	I _{SM}				−240	
Forward Voltage ^a	V _{SD}	I _F = −65 A, V _{GS} = 0 V		−1.2	−1.5	V
Reverse Recovery Time	t _{rr}	I _F = −65 A, di/dt = 100 A/μs		40	80	ns
Peak Reverse Recovery Current	I _{RM(REC)}			2.0	4	A
Reverse Recovery Charge	Q _{rr}			0.04	0.1	μC

Notes:

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)


**THERMAL RATINGS****Maximum Avalanche and Drain Current
vs. Case Temperature****Safe Operating Area****Normalized Thermal Transient Impedance, Junction-to-Case**