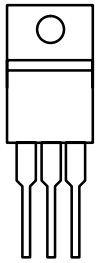
P-Channel 8-V (D-S), 175°C MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
–8	0.052 @ V_{GS} = –4.5 V	–15
	0.070 @ V_{GS} = –2.5 V	–10
	0.105 @ V_{GS} = –1.8 V	–10.5

175°C Rated
Maximum Junction Temperature
TrenchFET® Power MOSFETs

TO-220AB

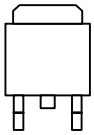


Top View

SUP15P01-52

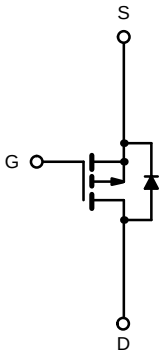
DRAIN connected to TAB

TO-263



Top View

SUB15P01-52



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	–8	V
Gate-Source Voltage		V_{GS}	±8	
Continuous Drain Current (T_J = 175°C)	T_C = 25°C	I_D	–15	A
	T_C = 125°C		–8.7	
Pulsed Drain Current		I_{DM}	–25	
Avalanche Current		I_{AR}	–10	
Repetitive Avalanche Energy[b]	L = 0.1 mH	E_{AR}	5	mJ
Power Dissipation	T_C = 25°C (TO-220AB and TO-263)	P_D	25[d]	W
	T_A = 25°C (TO-263)[c]		2.1	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient	PCB Mount (TO-263)[c]	R_{thJA}	58	70	°C/W
Junction-to-Case		R_{thJC}	5	6	
Junction-to-Lead		R_{thJL}	16	20	

Notes:
a. Package limited.
b. Duty cycle ≤ 1%.
c. When mounted on 1" square PCB (FR-4 material).
d. See SOA curve for voltage derating.

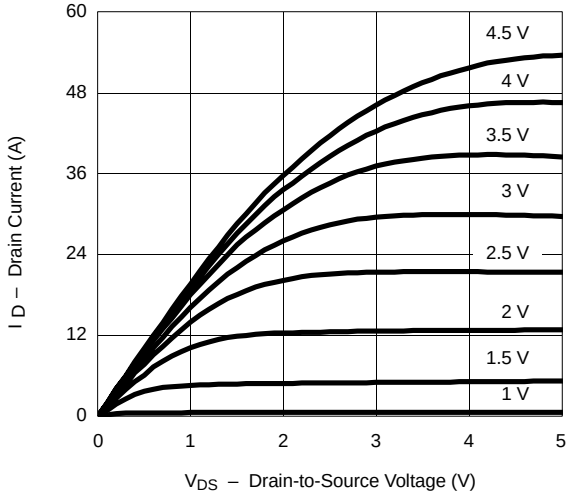
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = –250 μA	–8			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = –250 μA	–0.45			
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –6.4 V, V_{GS} = 0 V			–1	μA
		V_{DS} = –6.4 V, V_{GS} = 0 V, T_J = 125°C			–50	
		V_{DS} = –6.4 V, V_{GS} = 0 V, T_J = 175°C			–150	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = –5 V, V_{GS} = –4.5 V	–25			A
		V_{DS} = –5 V, V_{GS} = –2.5 V	–10			
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = –4.5 V, I_D = –10 A		0.043	0.052	Ω
		V_{GS} = –4.5 V, I_D = –10 A, T_J = 125°C			0.065	
		V_{GS} = –4.5 V, I_D = –10 A, T_J = 175°C			0.075	
		V_{GS} = –2.5 V, I_D = –5 A			0.070	
		V_{GS} = –1.8 V, I_D = –2 A			0.105	
Forward Transconductance[a]	g_{fs}	V_{DS} = –5 V, I_D = –10 A		16		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = –4 V, f = 1 MHz		1300		pF
Output Capacitance	C_{oss}			430		
Reversen Transfer Capacitance	C_{rss}			245		
Total Gate Charge[c]	Q_g	V_{DS} = –4 V, V_{GS} = –4.5 V, I_D = –10 A		10.5	15	nC
Gate-Source Charge[c]	Q_{gs}			1.6		
Gate-Drain Charge[c]	Q_{gd}			2		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = –4 V, R_L = 0.22 Ω I_D ≃ –15 A, V_{GEN} = –4.5 V, R_G = 2.5 Ω		10	20	ns
Rise Time[c]	t_r			16	25	
Turn-Off Delay Time[c]	$t_{d(off)}$			30	45	
Fall Time[c]	t_f			25	40	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)[b]						
Continuous Current	I_s				–15	A
Pulsed Current	I_{SM}				–25	
Forward Voltage[a]	V_{SD}	I_F = –15 A, V_{GS} = 0 V			–1.5	V
Reverse Recovery Time	t_{rr}	I_F = –15 A, di/dt = 100 A/μs		45	75	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			–1	–1.5	A
Reverse Recovery Charge	Q_{rr}			0.023	0.056	μC

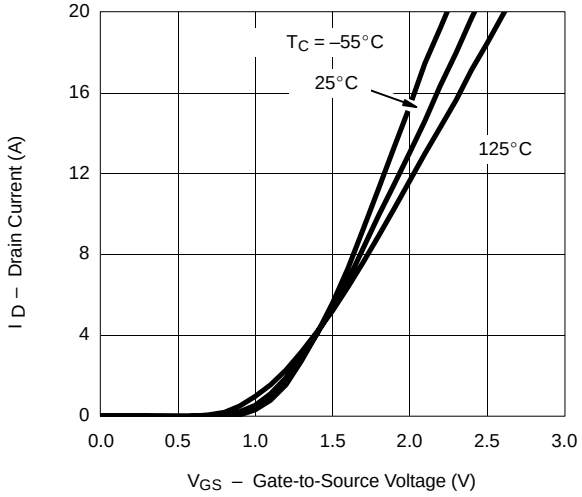
Notes:
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

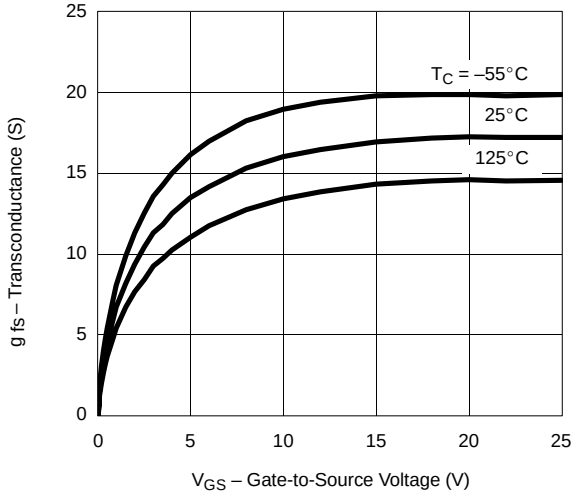
Output Characteristics



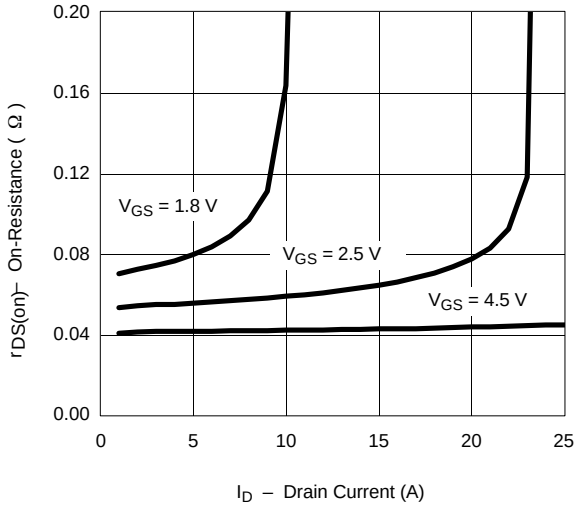
Transfer Characteristics



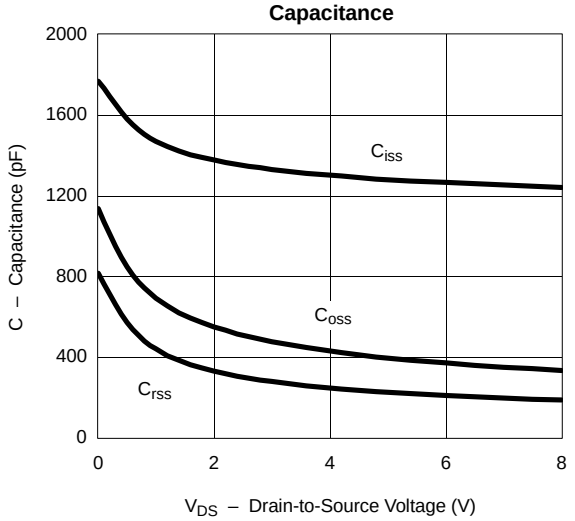
Transconductance



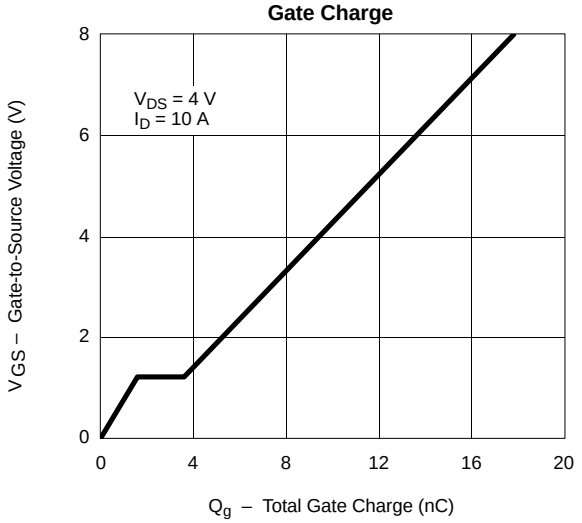
On-Resistance vs. Drain Current



Capacitance

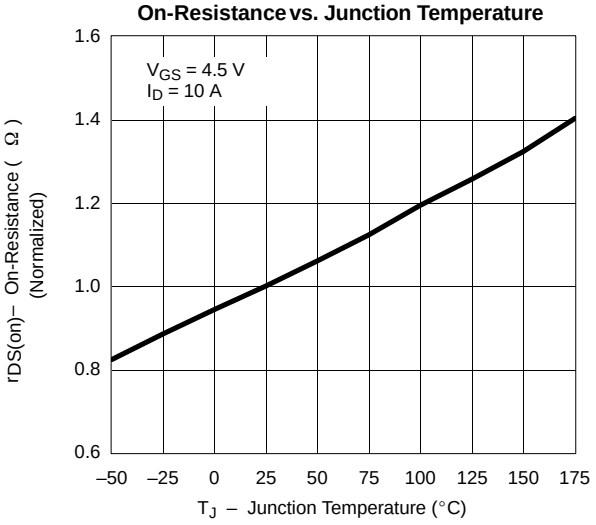


Gate Charge

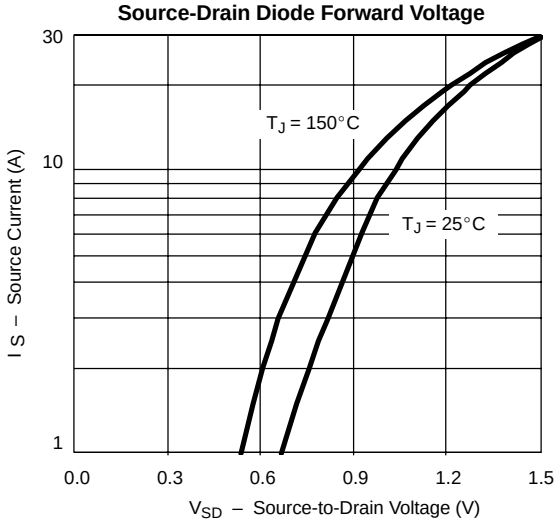


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

On-Resistance vs. Junction Temperature

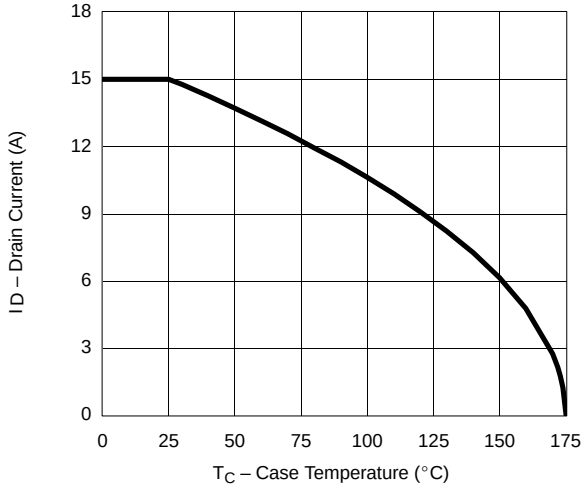


Source-Drain Diode Forward Voltage

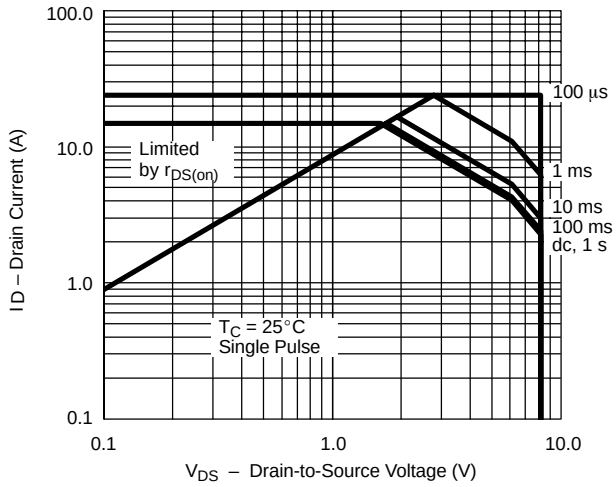


THERMAL RATINGS

Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case