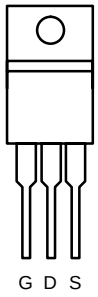
P-Channel 30-V (D-S), 175°C MOSFET

175°C Rated
Maximum Junction Temperature
TrenchFET®
Power MOSFETs

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
–30	0.008	–75[a]

TO-220AB

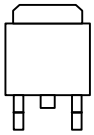


Top View

SUP75P03-08

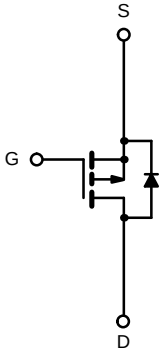
DRAIN connected to TAB

TO-263



Top View

SUB75P03-08



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C UNLESS OTHERWISE NOTED)				
Parameter		**Symbol**	**Limit**	**Unit**
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (T_J = 175°C)	T_C = 25°C	I_D	–75[a]	A
	T_C = 125°C		–65	
Pulsed Drain Current		I_{DM}	–200	
Avalanche Current		I_{AR}	–75	
Repetitive Avalanche Energy[b]	L = 0.1 mH	E_{AR}	280	mJ
Power Dissipation	T_C = 25°C (TO-220AB and TO-263)	P_D	250[d]	W
	T_A = 25°C (TO-263)[c]		3.7	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 175	°C

THERMAL RESISTANCE RATINGS				
Parameter		**Symbol**	**Limit**	**Unit**
Junction-to-Ambient	PCB Mount (TO-263)[c]	R_{thJA}	40	°C/W
	Free Air (TO-220AB)	R_{thJA}	62.5	
Junction-to-Case		R_{thJC}	0.6	

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.

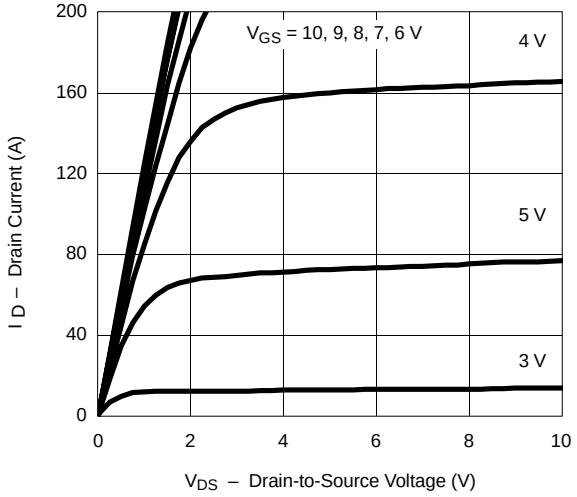
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = –250 μA	–30			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} = –30 V, V_{GS} = 0 V			–1	μA
		V_{DS} = –30 V, V_{GS} = 0 V, T_J = 125°C			–50	
		V_{DS} = –30 V, V_{GS} = 0 V, T_J = 175°C			–150	
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			0.008	Ω
		V_{GS} = –10 V, I_D = –30 A, T_J = 125°C			0.012	
		V_{GS} = –10 V, I_D = –30 A, T_J = 175°C			0.015	
Forward Transconductance[a]	g_{fs}	V_{DS} = –15 V, I_D = –30 A	30			S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = –25 V, f = 1 MHz		6900		pF
Output Capacitance	C_{oss}			1850		
Reversen Transfer Capacitance	C_{rss}			570		
Total Gate Charge[c]	Q_g	V_{DS} = –15 V, V_{GS} = –10 V, I_D = –75 A		115	140	nC
Gate-Source Charge[c]	Q_{gs}			30		
Gate-Drain Charge[c]	Q_{gd}			10		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = –15 V, R_L = 0.2 Ω I_D ≅ –75 A, V_{GEN} = –10 V, R_G = 2.5 Ω		10	20	ns
Rise Time[c]	t_r			16	30	
Turn-Off Delay Time[c]	$t_{d(off)}$			140	200	
Fall Time[c]	t_f			80	140	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)[b]						
Continuous Current	I_S				–75	A
Pulsed Current	I_{SM}				–200	
Forward Voltage[a]	V_{SD}	I_F = –75 A, V_{GS} = 0 V		–1.1	–1.4	V
Reverse Recovery Time	t_{rr}	I_F = –75 A, di/dt = 100 A/μs		60	100	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			2.5	5	A
Reverse Recovery Charge	Q_{rr}			0.008	0.016	μC

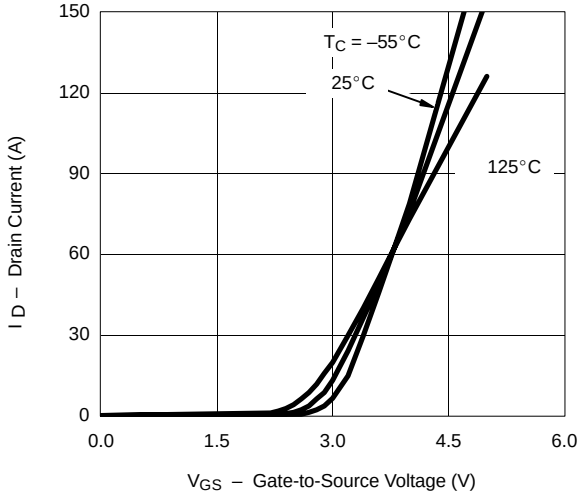
Notes:
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

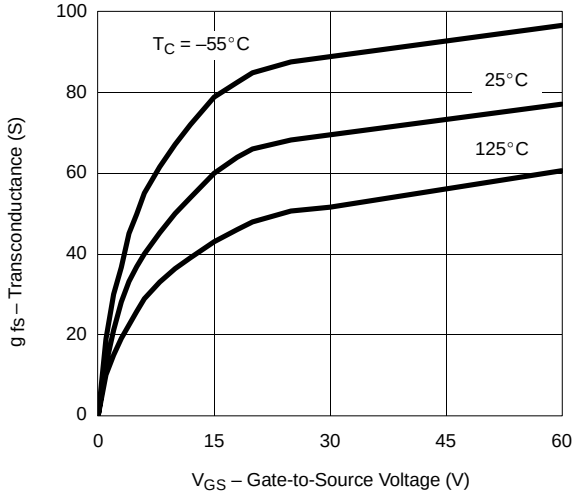
Output Characteristics



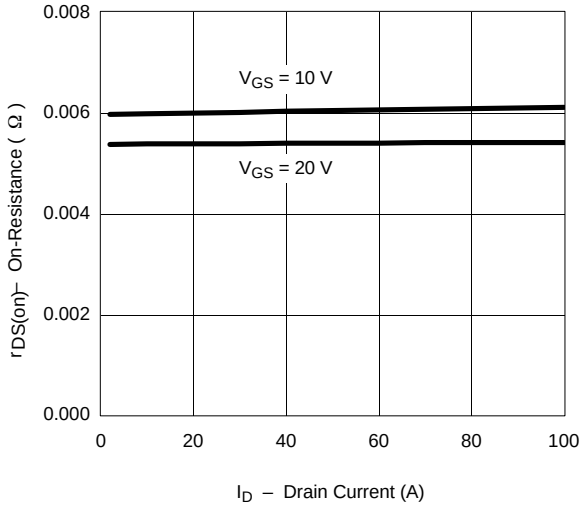
Transfer Characteristics



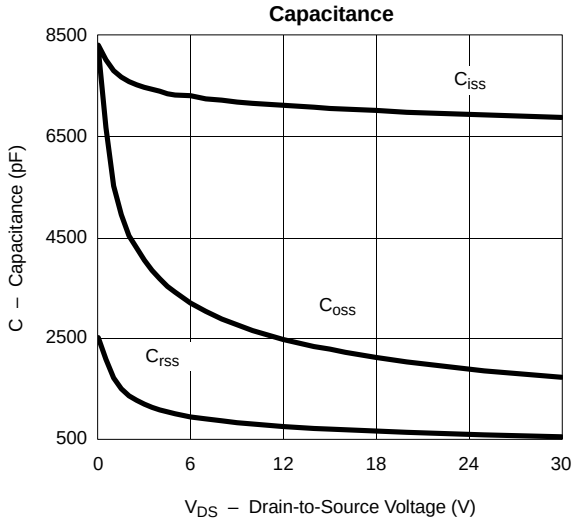
Transconductance



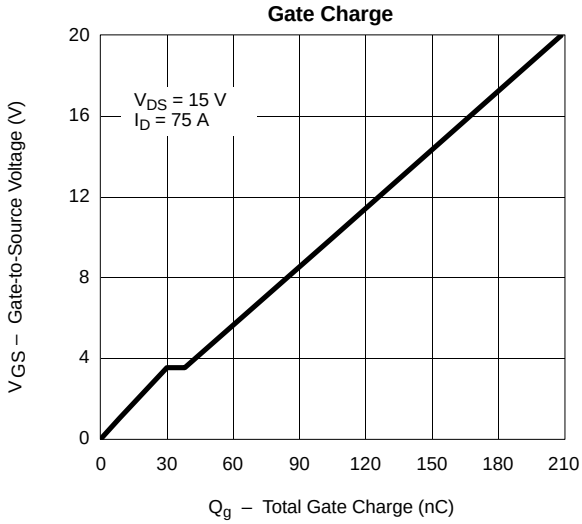
On-Resistance vs. Drain Current



Capacitance

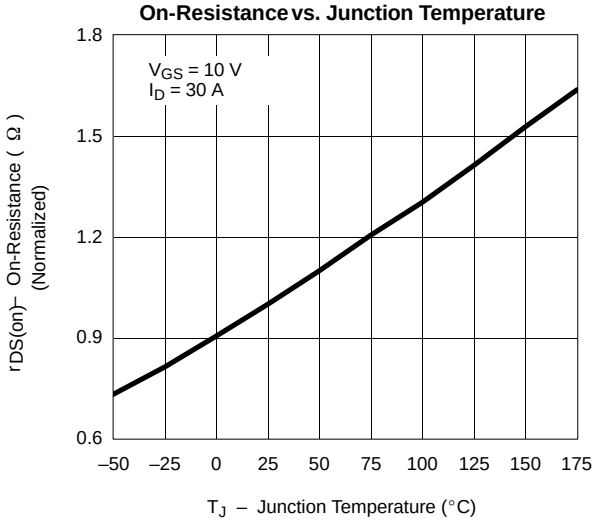


Gate Charge

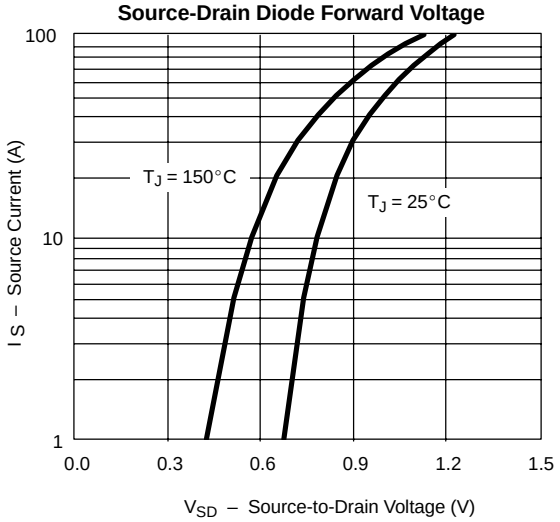


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

On-Resistance vs. Junction Temperature

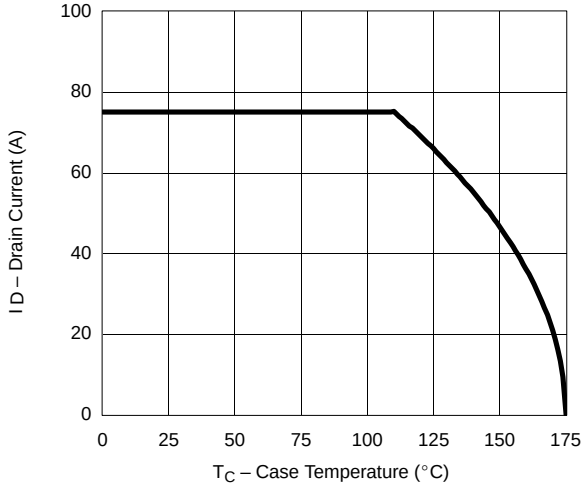


Source-Drain Diode Forward Voltage

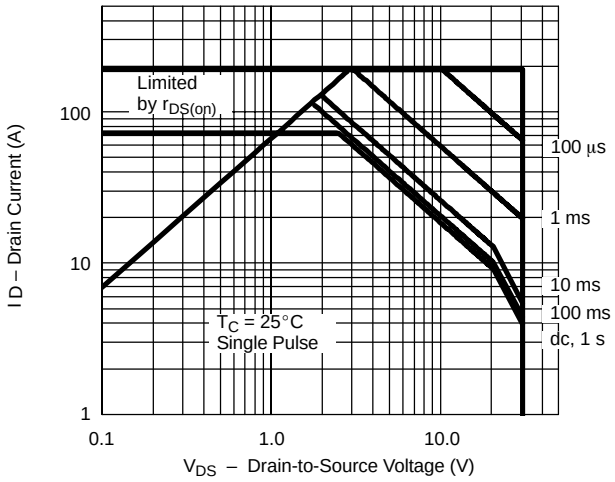


THERMAL RATINGS

Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case