



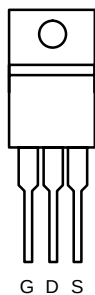
N-Channel 40-V (D-S), 175°C MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
40	0.010 @ $V_{GS} = 10$ V	70
	0.014 @ $V_{GS} = 4.5$ V	58

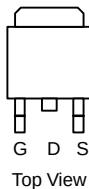
175°C Rated
Maximum Junction Temperature

TO-220AB

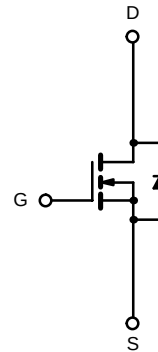
Top View
SUP70N04-10

DRAIN connected to TAB

TO-263



SUB70N04-10



N-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	70	A
	$T_C = 100^\circ\text{C}$		47	
Pulsed Drain Current		I_{DM}	140	
Avalanche Current		I_{AR}	60	mJ
Repetitive Avalanche Energy ^a		E_{AR}	180	
Power Dissipation		P_D	107 ^b	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient	PCB Mount (TO-263) ^c	R_{thJA}	35	40	$^\circ\text{C/W}$
	Free Air (TO-220)		45	50	
Junction-to-Case		R_{thJC}	1.2	1.4	

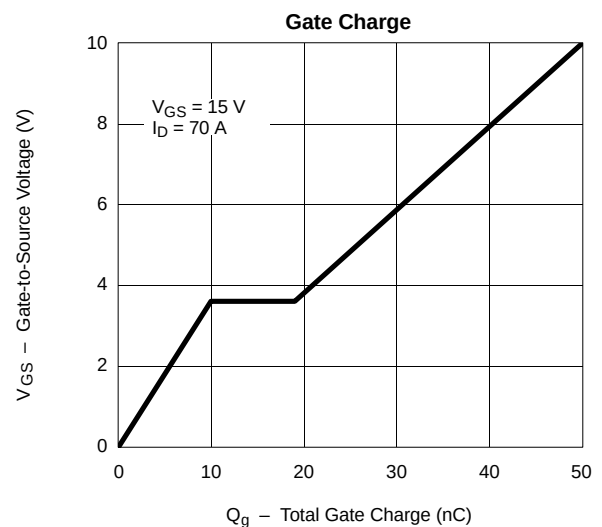
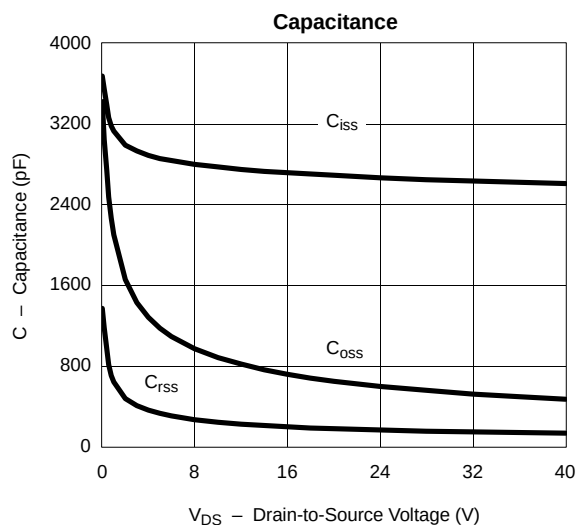
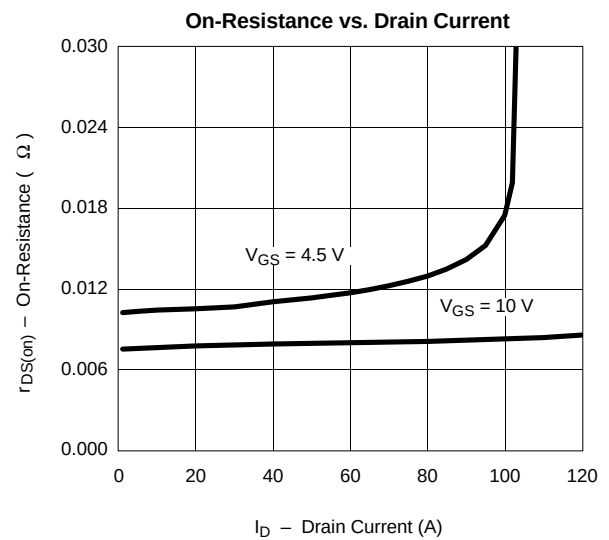
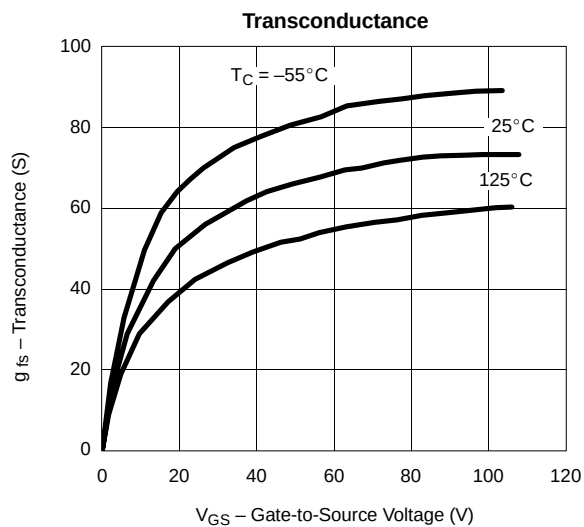
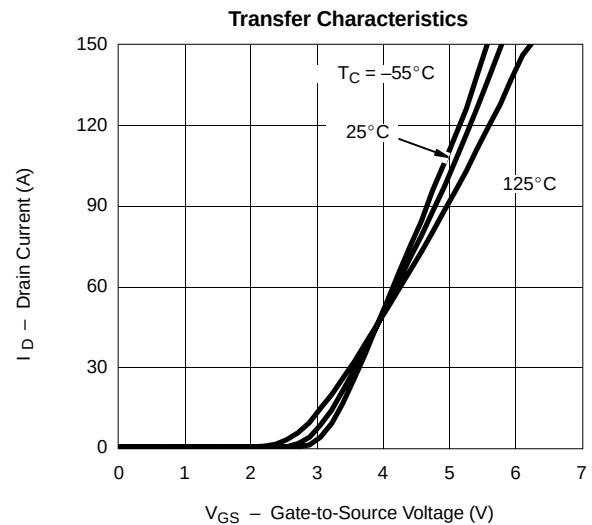
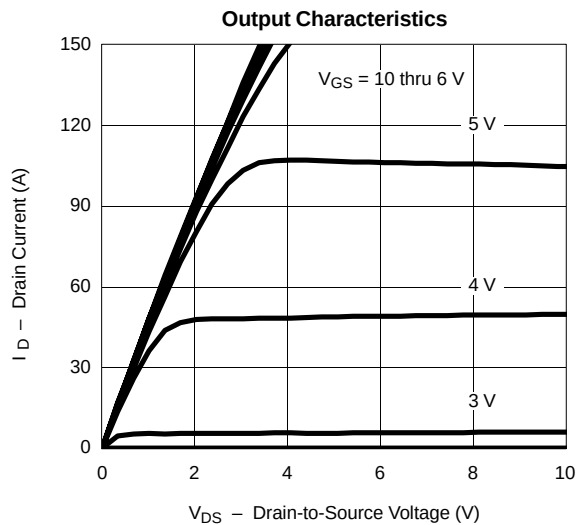
Notes:

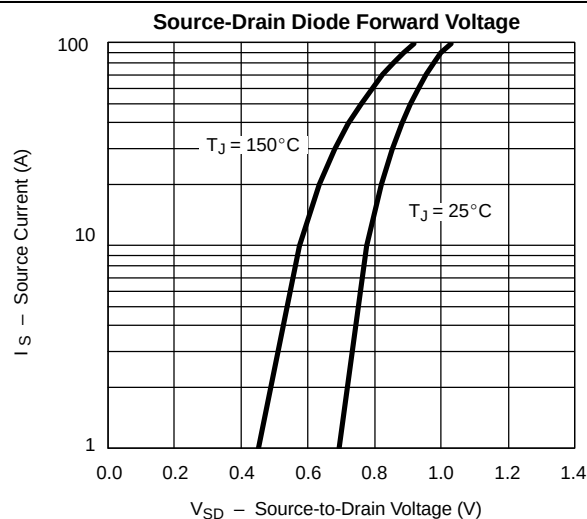
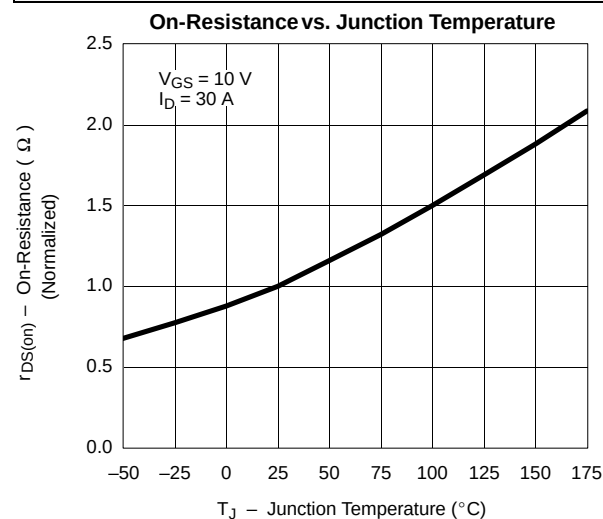
- Duty cycle $\leq 1\%$.
- See SOA curve for voltage derating.
- Surface mounted on 1" FR4 board.

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 _{DS} = 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			150	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	70			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 30 A		0.008	0.010	Ω
		V _{GS} = 10 V, I _D = 30 A, T _J = 125 °C		0.014	0.017	
		V _{GS} = 10 V, I _D = 30 A, T _J = 175 °C		0.0175	0.022	
		V _{GS} = 4.5 V, I _D = 20 A		0.011	0.014	
		V _{GS} = 4.5 V, I _D = 20 A, T _J = 125 °C		0.019	0.024	
		V _{GS} = 4.5 V, I _D = 20 A, T _J = 175 °C		0.024	0.031	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 30 A	20	57		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		2700		pF
Output Capacitance	C _{oss}			600		
Reverse Transfer Capacitance	C _{rss}			160		
Total Gate Charge ^c	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 70 A		50	100	nC
Gate-Source Charge ^c	Q _{gs}			10		
Gate-Drain Charge ^c	Q _{gd}			9		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 15 V, R _L = 0.2 Ω I _D ≈ 70 A, V _{GEN} = 10 V, R _G = 2.5 Ω		14	30	ns
Rise Time ^c	t _r			12	30	
Turn-Off Delay Time ^c	t _{d(off)}			58	100	
Fall Time ^c	t _f			30	60	
Source-Drain Diode Ratings and Characteristics (T _C = 25 °C) ^b						
Continuous Current	I _S				70	A
Pulsed Current	I _{SM}				140	
Forward Voltage ^a	V _{SD}	I _F = 70 A, V _{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 70 A, di/dt = 100 A/μs		50	100	ns

Notes:

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
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**