

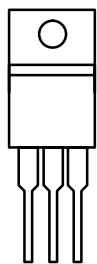


N-Channel 40-V (D-S), 175°C MOSFET

**175°C Rated**  
Maximum Junction Temperature

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

TO-220AB



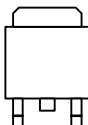
G D S

Top View

SUP70N04-10

DRAIN connected to TAB

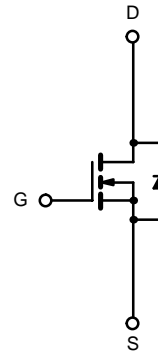
TO-263



G D S

Top View

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		$V_{GS}$	$\pm 20$	
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	
Repetitive Avalanche Energy <sup>a</sup>	$L = 0.1$ mH	$E_{AR}$	180	mJ
Power Dissipation	$T_C = 25^\circ\text{C}$	$P_D$	$107^b$	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) <sup>c</sup>	$R_{thJA}$	35	40	$^\circ\text{C/W}$
	Free Air (TO-220)		45	50	
Junction-to-Case		$R_{thJC}$	1.2	1.4	

Notes:

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



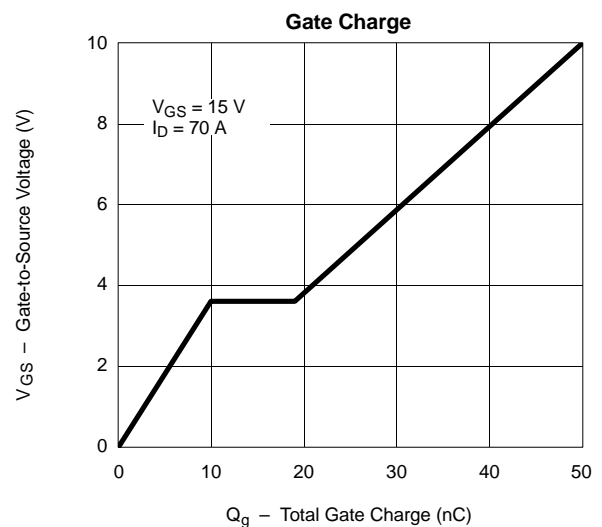
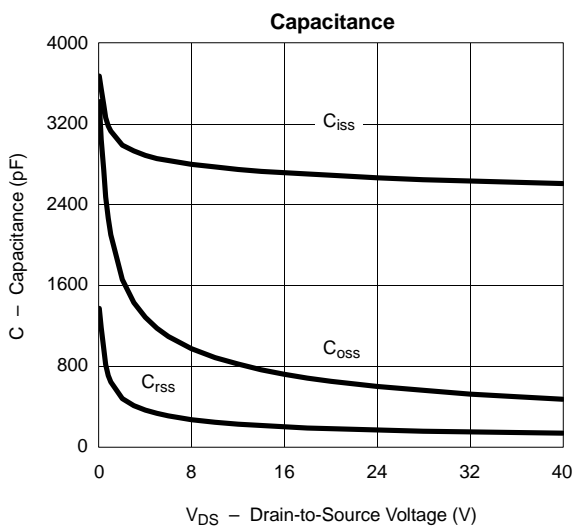
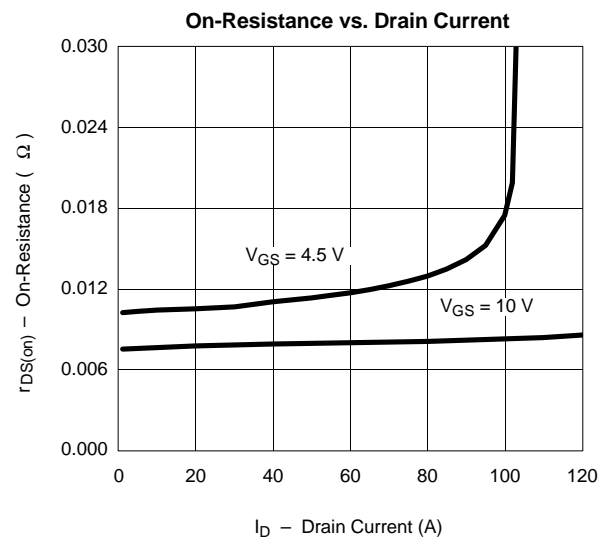
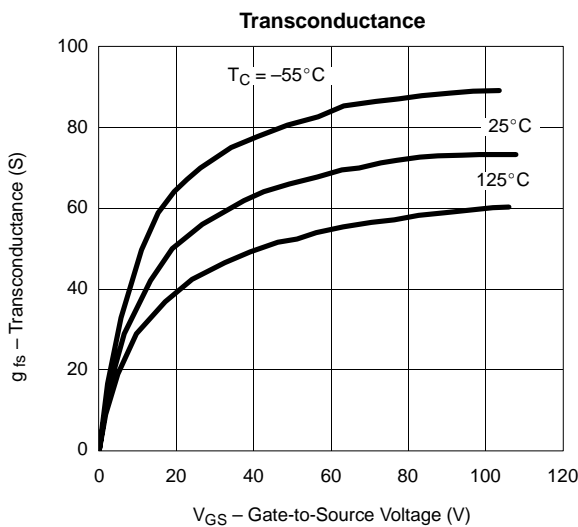
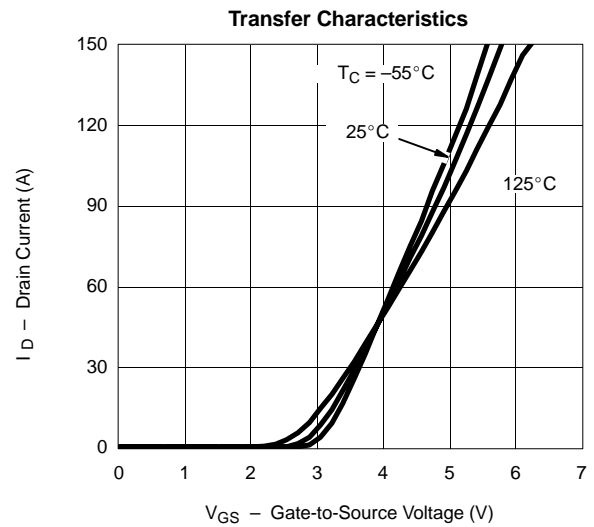
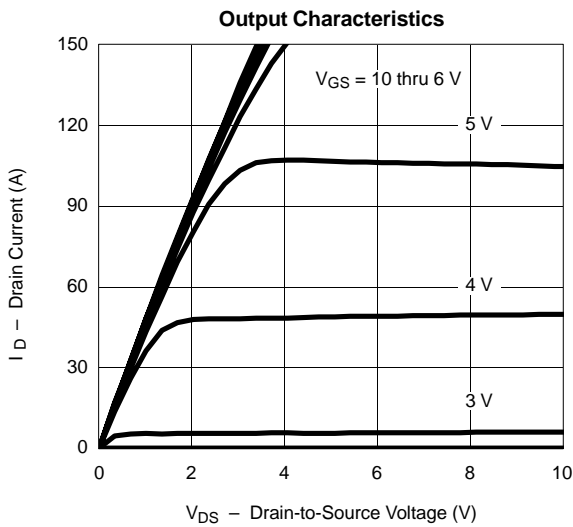
SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	40			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</sub> = 250 μA	1		3	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 40 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 40 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
		V <sub>DS</sub> = 40 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			150	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	70			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A		0.008	0.010	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 125 °C		0.014	0.017	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 175 °C		0.0175	0.022	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A		0.011	0.014	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C		0.019	0.024	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 175 °C		0.024	0.031	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 30 A	20	57		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		2700		pF
Output Capacitance	C <sub>oss</sub>			600		
Reverse Transfer Capacitance	C <sub>rss</sub>			160		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 70 A		50	100	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			10		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			9		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 0.2 Ω I <sub>D</sub> = 70 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω		14	30	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			12	30	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			58	100	
Fall Time <sup>c</sup>	t <sub>f</sub>			30	60	
<b>Source-Drain Diode Ratings and Characteristics (T<sub>C</sub> = 25 °C)<sup>b</sup></b>						
Continuous Current	I <sub>s</sub>				70	A
Pulsed Current	I <sub>SM</sub>				140	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 70 A, V <sub>GS</sub> = 0 V		1.0	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 70 A, di/dt = 100 A/μs		50	100	ns

Notes:

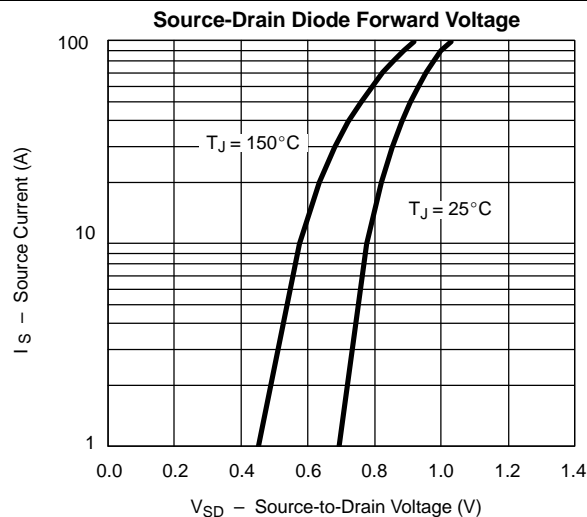
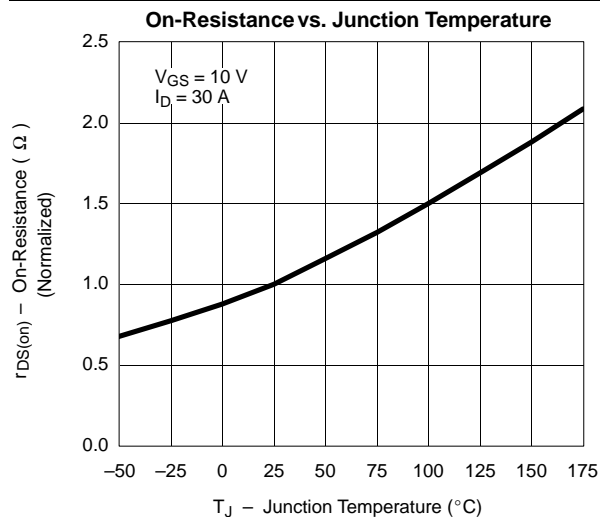
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.



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



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



### THERMAL RATINGS

