

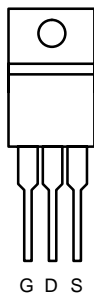


## P-Channel 30-V (D-S) 175°C MOSFET

## PRODUCT SUMMARY

$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>a</sup>
-30	0.007 @ $V_{GS} = -10$ V	$\pm 75$
	0.010 @ $V_{GS} = -4.5$ V	$\pm 75$

TO-220AB

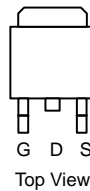


Top View

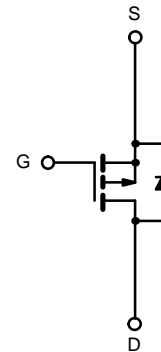
SUP75P03-07

DRAIN connected to TAB

TO-263



SUB75P03-07



P-Channel MOSFET

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

Parameter		Symbol	Limit	Unit
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$T_C = 25^\circ\text{C}$	$I_D$	-75 <sup>a</sup>	A
	$T_C = 125^\circ\text{C}$		-65	
Pulsed Drain Current		$I_{DM}$	-240	
Avalanche Current		$I_{AR}$	-60	
Repetitive Avalanche Energy <sup>b</sup>	$L = 0.1$ mH	$E_{AR}$	180	mJ
Power Dissipation	$T_C = 25^\circ\text{C}$ (TO-220AB and TO-263)	$P_D$	187 <sup>d</sup>	W
	$T_A = 25^\circ\text{C}$ (TO-263) <sup>c</sup>		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) <sup>c</sup>	$R_{thJA}$	40	$^\circ\text{C/W}$
	Free Air (TO-220AB)	$R_{thJA}$	62.5	
Junction-to-Case		$R_{thJC}$	0.8	

## Notes:

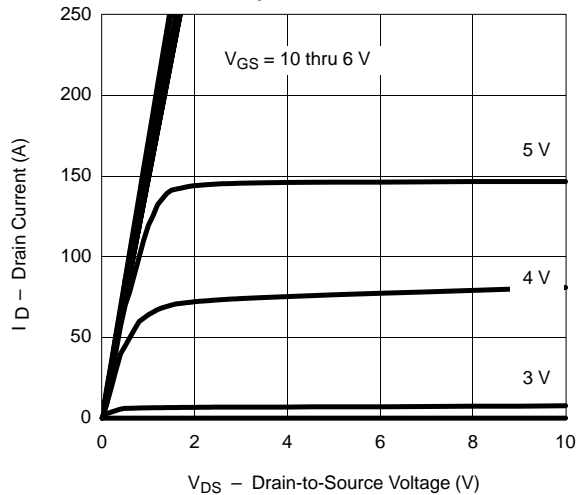
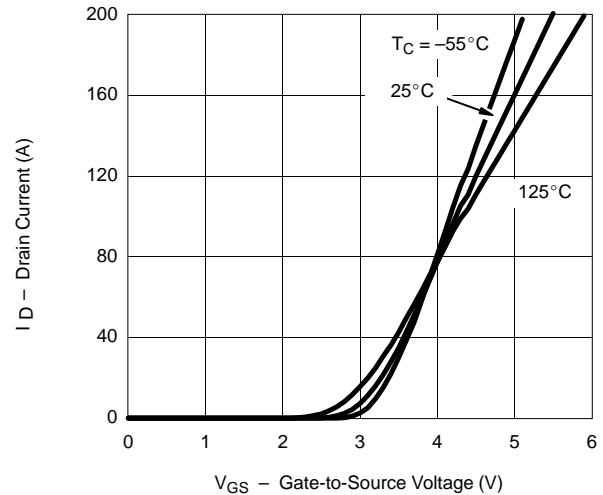
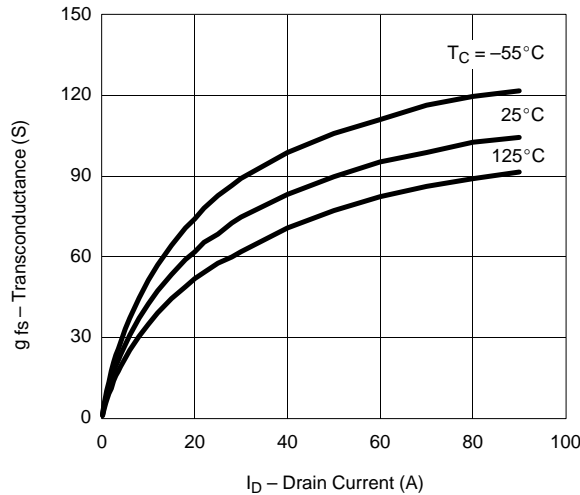
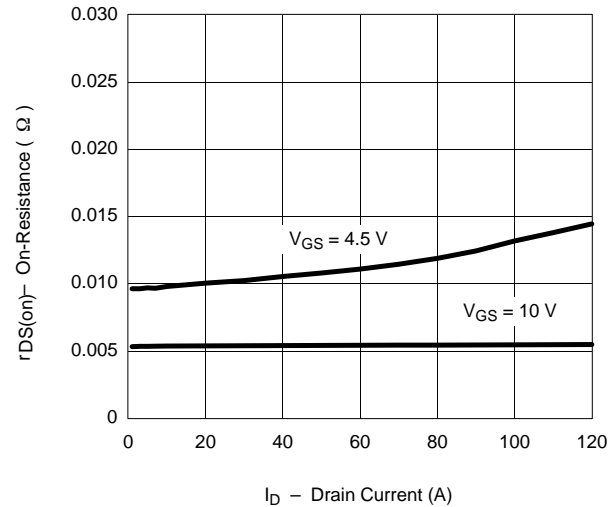
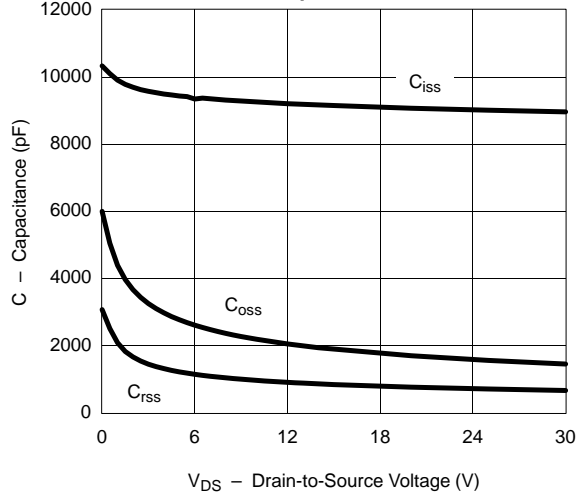
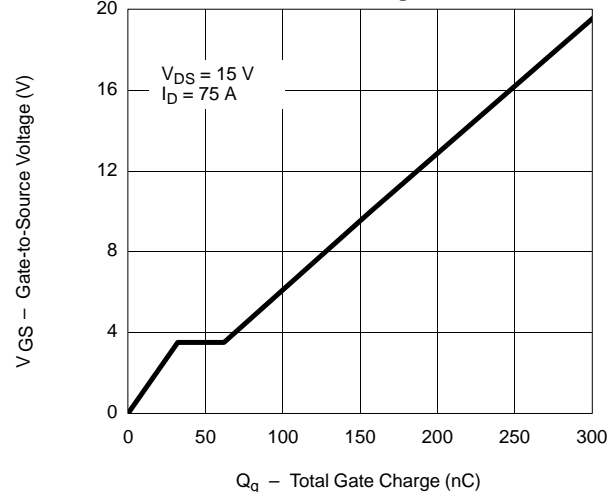
- Package limited.
- Duty cycle  $\leq 1\%$ .
- When mounted on 1" square PCB (FR-4 material).
- See SOA curve for voltage derating.

**SPECIFICATIONS ( $T_J = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)**

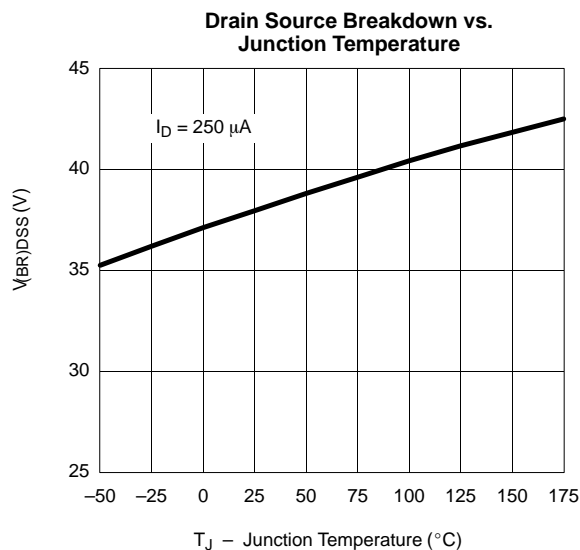
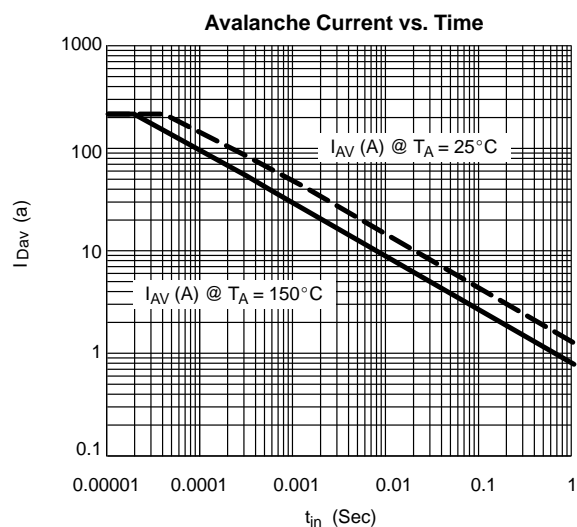
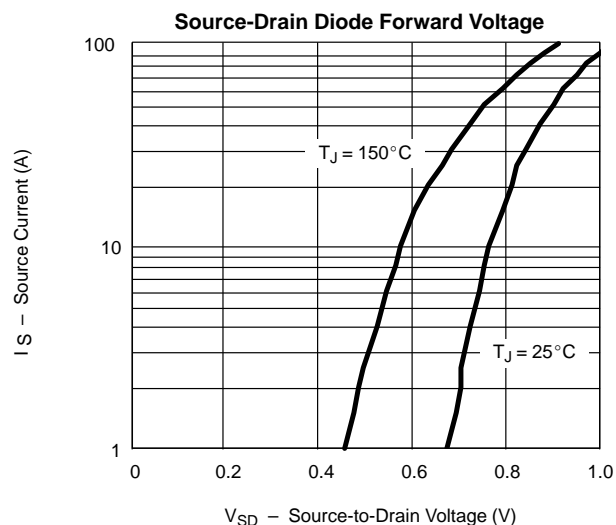
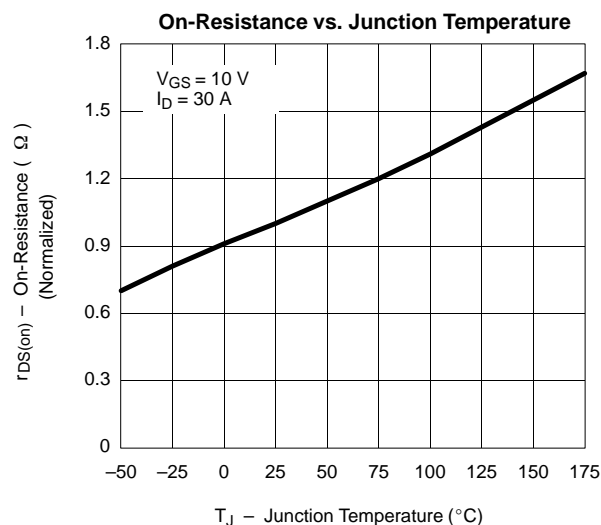
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = −250 μA	−30			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = −250 μA	−1		−3	
Gate-Body Leakage	I <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> = −30 V, V <sub>GS</sub> = 0 V			−1	μA
		V <sub>DS</sub> = −30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125°C			−50	
		V <sub>DS</sub> = −30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175°C			−250	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = −5 V, V <sub>GS</sub> = −10 V	−120			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		0.0055	0.007	Ω
		V <sub>GS</sub> = −10 V, I <sub>D</sub> = −30 A, T <sub>J</sub> = 125°C			0.010	
		V <sub>GS</sub> = −10 V, I <sub>D</sub> = −30 A, T <sub>J</sub> = 175°C			0.013	Ω
		V <sub>GS</sub> = −4.5 V, I <sub>D</sub> = −20 A		0.008	0.010	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = −15 V, I <sub>D</sub> = −75 A	20			S
Dynamic <sup>b</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = −25 V, f = 1 MHz		9000		pF
Output Capacitance	C <sub>oss</sub>			1565		
Reverse Transfer Capacitance	C <sub>rss</sub>			715		
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> = −75 A		160	240	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			32		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			30		
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> ≈ −75 A, V <sub>GEN</sub> = −10 V, R <sub>G</sub> = 2.5 Ω		25	40	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			225	360	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			150	240	
Fall Time <sup>c</sup>	t <sub>f</sub>			210	340	
Source-Drain Diode Ratings and Characteristics (T <sub>C</sub> = 25°C) <sup>b</sup>						
Continuous Current	I <sub>s</sub>				−75	A
Pulsed Current	I <sub>SM</sub>				−240	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = −75 A, V <sub>GS</sub> = 0 V		−1.2	−1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = −75 A, di/dt = 100 A/μs		55	100	ns
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>			2.5	5	A
Reverse Recovery Charge	Q <sub>rr</sub>			0.07	0.25	μC

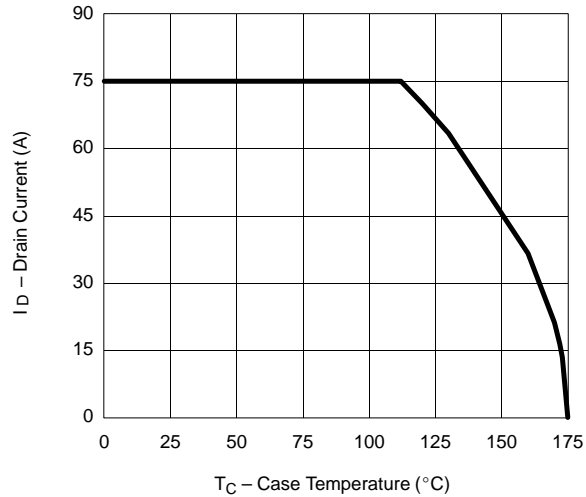
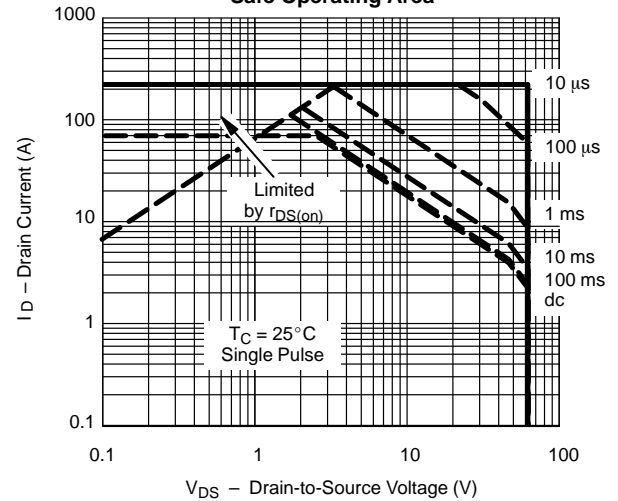
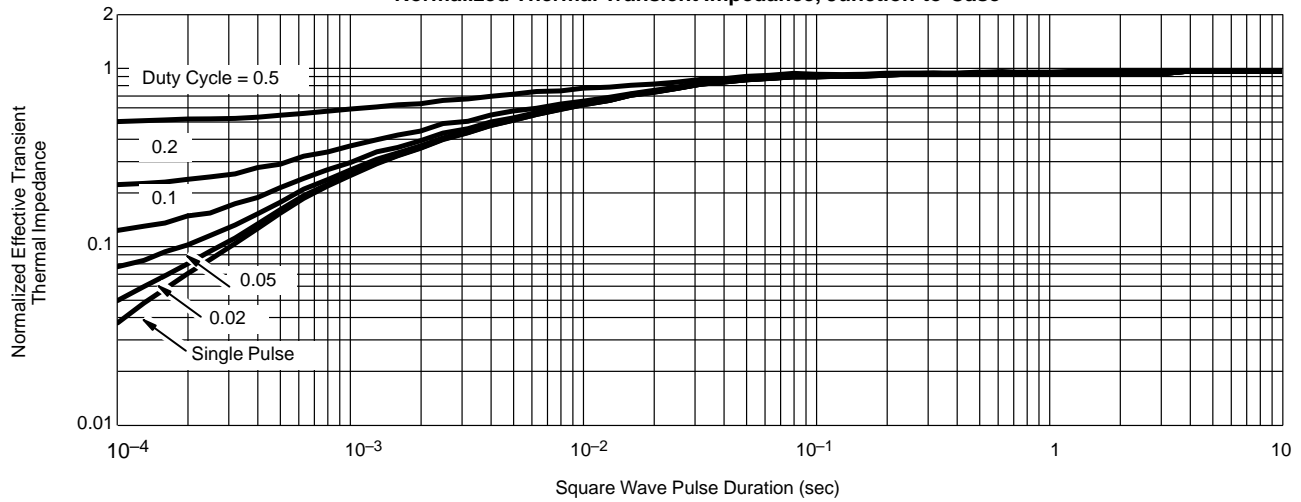
## Notes:

- 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)****Output Characteristics****Transfer Characteristics****Transconductance****On-Resistance vs. Drain Current****Capacitance****Gate Charge**

## 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**

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