

P-Channel 30 V (D-S) 175 °C MOSFET

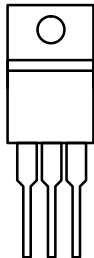
PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a
- 30	0.007 at V _{GS} = - 10 V	± 75
	0.010 at V _{GS} = - 4.5 V	± 75

FEATURES

- Compliant to RoHS Directive 2002/95/EC

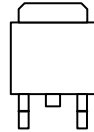

 Available
RoHS*
 COMPLIANT

TO-220AB


G D S

Top View

SUP75P03-07

TO-263


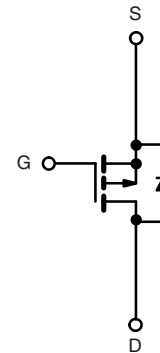
G D S

Top View

SUB75P03-07

DRAIN connected to TAB

Ordering Information: SUB75P03-07 (TO-263)
 SUB75P03-07-E3 (TO-263, Lead (Pb)-free)
 SUP75P03-07 (TO-220AB)
 SUP75P03-07-E3 (TO-220AB, Lead (Pb)-free)



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)	I _D	T _C = 25 °C	- 75 ^a
		T _C = 125 °C	- 65
Pulsed Drain Current	I _{DM}	- 240	A
Avalanche Current	I _{AR}	- 60	
Repetitive Avalanche Energy ^b	E _{AR}	180	mJ
Power Dissipation	P _D	T _C = 25 °C (TO-220AB and TO-263)	187 ^d
		T _A = 25 °C (TO-263) ^c	3.75
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient	R _{thJA}	PCB Mount (TO-263) ^c	40
		Free Air (TO-220AB)	62.5
Junction-to-Case	R _{thJC}	0.8	°C/W

Notes:

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

* Pb containing terminations are not RoHS compliant, exemptions may apply.

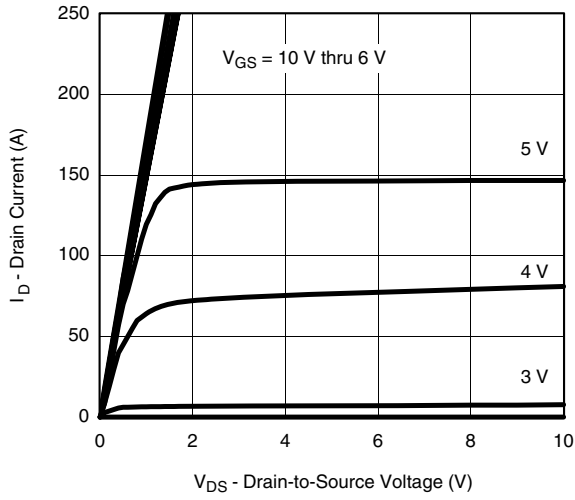
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1		-3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			-50	
		$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			-250	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	-120			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -30\text{ A}$		0.0055	0.007	Ω
		$V_{GS} = -10\text{ V}, I_D = -30\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.010	
		$V_{GS} = -10\text{ V}, I_D = -30\text{ A}, T_J = 175\text{ }^\circ\text{C}$			0.013	
		$V_{GS} = -4.5\text{ V}, I_D = -20\text{ A}$		0.008	0.010	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -75\text{ A}$	20			S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = -25\text{ V}, f = 1\text{ MHz}$		9000		μF
Output Capacitance	C_{oss}			1565		
Reverse Transfer Capacitance	C_{rss}			715		
Total Gate Charge ^c	Q_g	$V_{DS} = -15\text{ V}, V_{GS} = -10\text{ V}, I_D = -75\text{ A}$		160	240	nC
Gate-Source Charge ^c	Q_{gs}			32		
Gate-Drain Charge ^c	Q_{gd}			30		
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 0.2\text{ }\Omega$ $I_D \equiv -75\text{ A}, V_{GEN} = -10\text{ V}, R_g = 2.5\text{ }\Omega$		25	40	ns
Rise Time ^c	t_r			225	360	
Turn-Off Delay Time ^c	$t_{d(off)}$			150	240	
Fall Time ^c	t_f			210	340	
Source-Drain Diode Ratings and Characteristics^b ($T_C = 25\text{ }^\circ\text{C}$)						
Continuous Current	I_S				-75	A
Pulsed Current	I_{SM}				-240	
Forward Voltage ^a	V_{SD}	$I_F = -75\text{ A}, V_{GS} = 0\text{ V}$		-1.2	-1.5	V
Reverse Recovery Time	t_{rr}	$I_F = -75\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		55	100	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			2.5	5	A
Reverse Recovery Charge	Q_{rr}			0.07	0.25	μC

Notes:

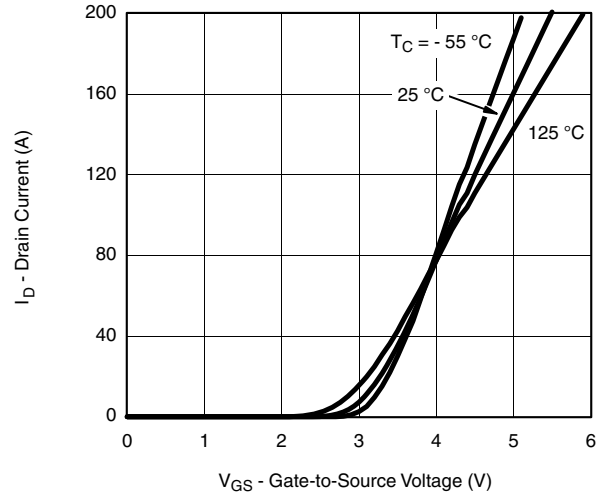
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

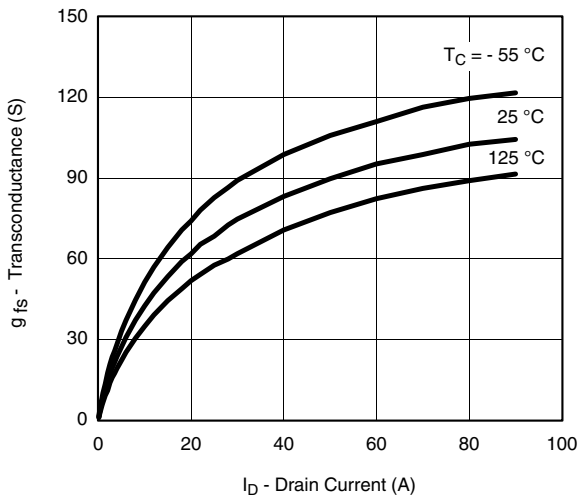
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



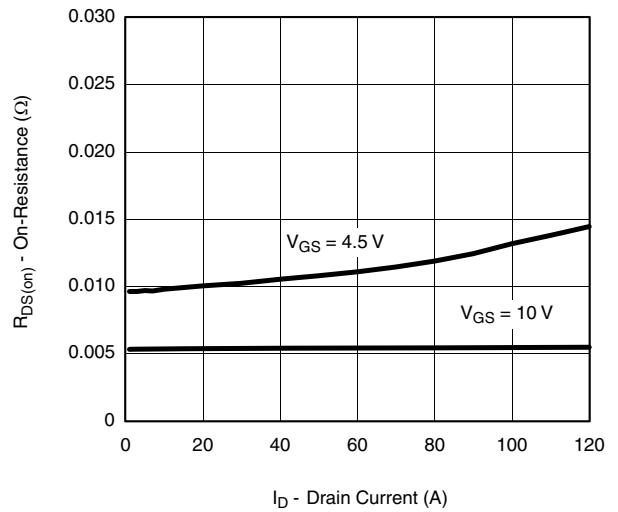
Output Characteristics



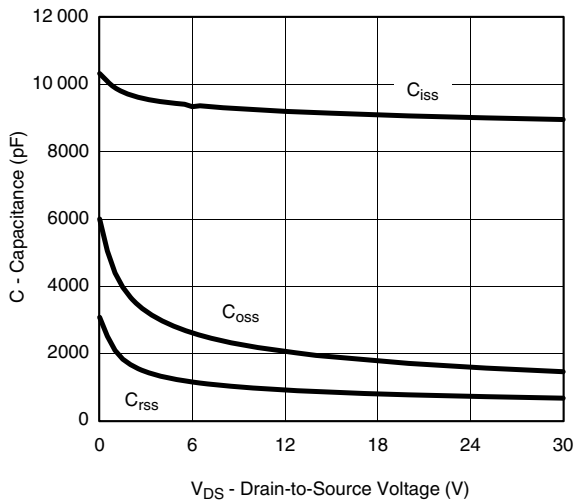
Transfer Characteristics



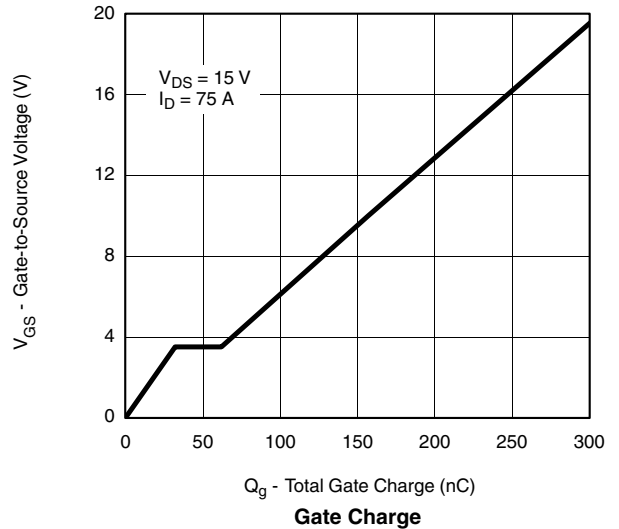
Transconductance



On-Resistance vs. Drain Current

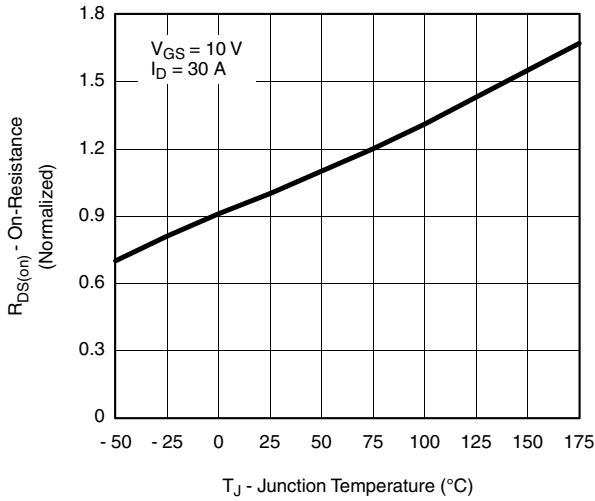


Capacitance

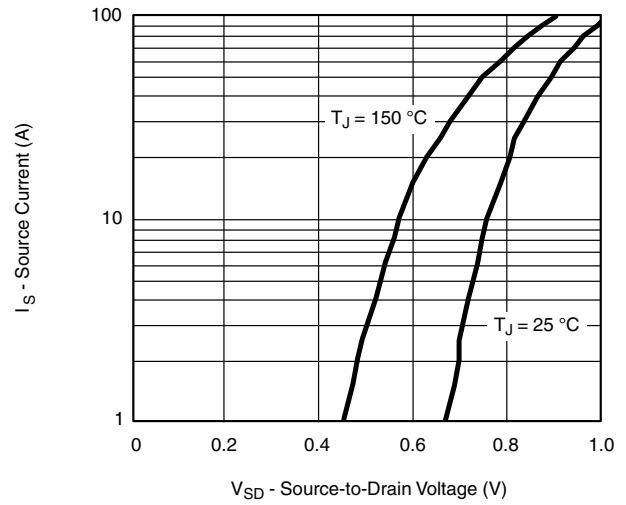


Gate Charge

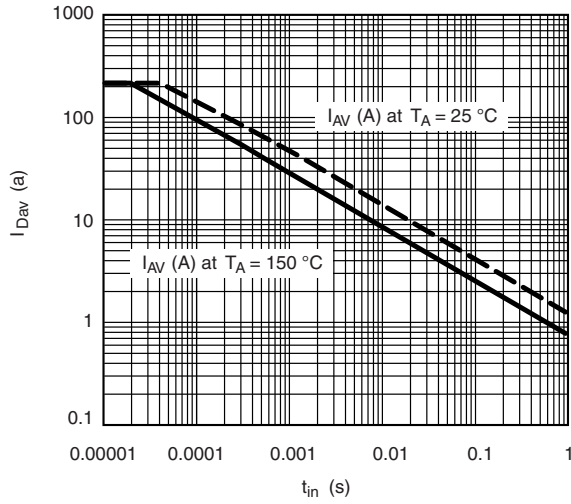
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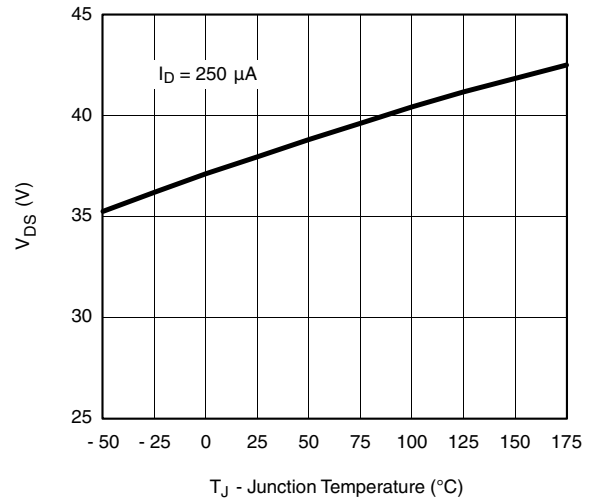
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

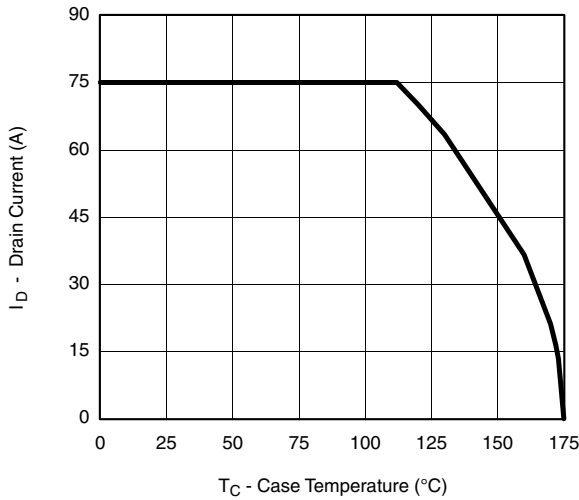


Avalanche Current vs. Time

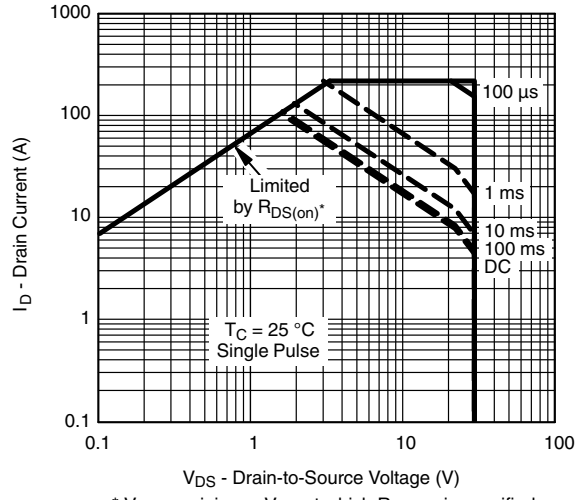


Drain Source Breakdown vs. Junction Temperature

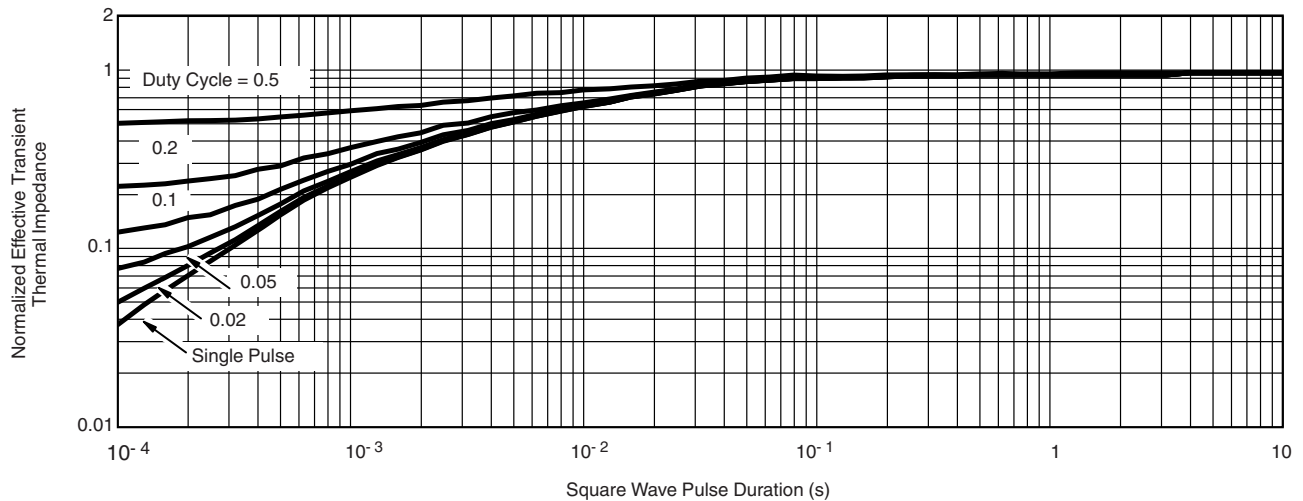
THERMAL RATINGS



Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

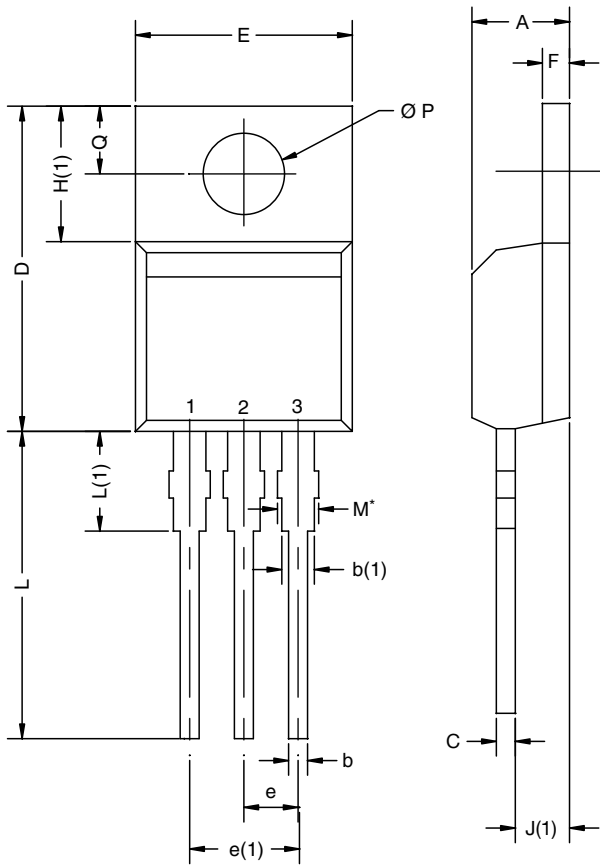


Normalized Thermal Transient Impedance, Junction-to-Case

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TO-220AB

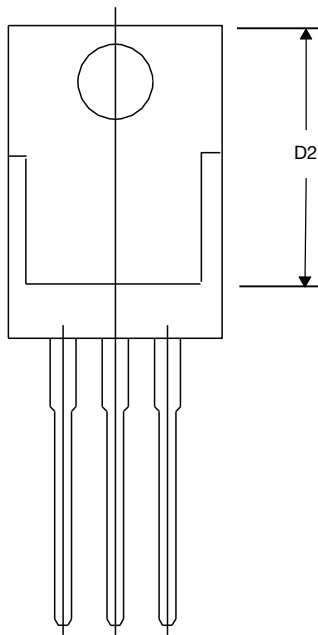


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
D2	12.19	12.70	0.480	0.500
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
$\varnothing P$	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118

ECN: T14-0413-Rev. P, 16-Jun-14
DWG: 5471

Note

* M = 1.32 mm to 1.62 mm (dimension including protrusion)
Heatsink hole for HVM





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