

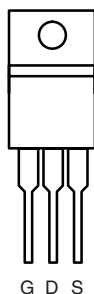
# N-Channel 60-V (D-S), 175 °C MOSFET

## PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
60	0.014	70 <sup>a</sup>



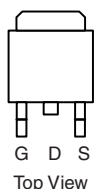
**RoHS\***  
COMPLIANT

**TO-220AB**


Top View

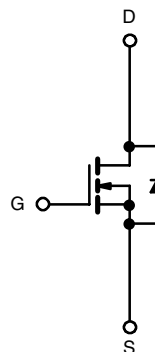
SUP70N06-14

DRAIN connected to TAB

**TO-263**


Top View

SUB70N06-14



N-Channel MOSFET

**Ordering Information:** SUB70N06-14  
SUB70N06-14-E3 (Lead (Pb)-free)  
SUP70N06-14-E3 (Lead (Pb)-free)

## ABSOLUTE MAXIMUM RATINGS $T_C = 25\text{ }^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Limit	Unit
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_J = 175\text{ }^\circ\text{C}$ )	$I_D$	$T_C = 25\text{ }^\circ\text{C}$ 70 <sup>a</sup>	A
		$T_C = 100\text{ }^\circ\text{C}$ 49	
Pulsed Drain Current	$I_{DM}$	160	
Avalanche Current	$I_{AR}$	70	
Repetitive Avalanche Energy <sup>b</sup>	$E_{AR}$	180	mJ
Power Dissipation	$P_D$	$T_C = 25\text{ }^\circ\text{C}$ (TO-220AB and TO-263) 142 <sup>c</sup>	W
		$T_A = 25\text{ }^\circ\text{C}$ (TO-263) <sup>d</sup> 3.7	
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	$R_{thJA}$	PCB Mount (TO-263) <sup>d</sup> 40	$^\circ\text{C/W}$
		Free Air (TO-220AB) 62.5	
Junction-to-Case	$R_{thJC}$	1.05	

Notes:

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

For SPICE model information via the Worldwide Web: <http://www.vishay.com/www/product/spice.htm>.

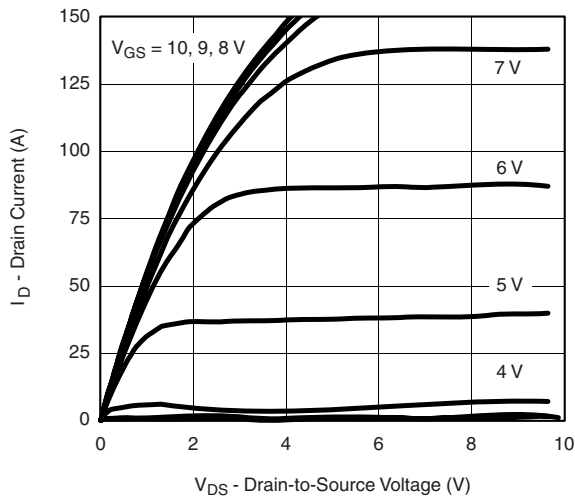
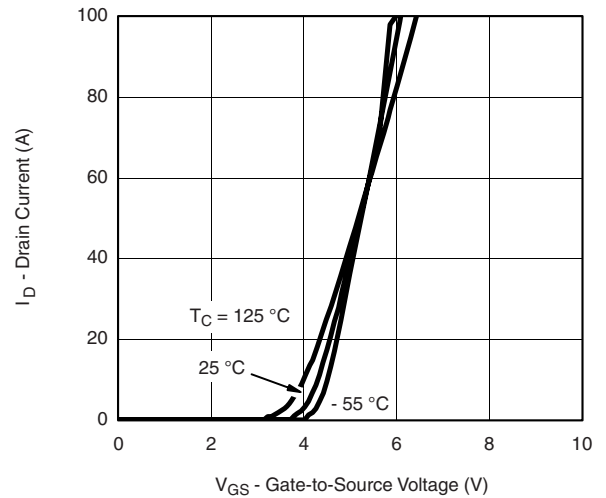
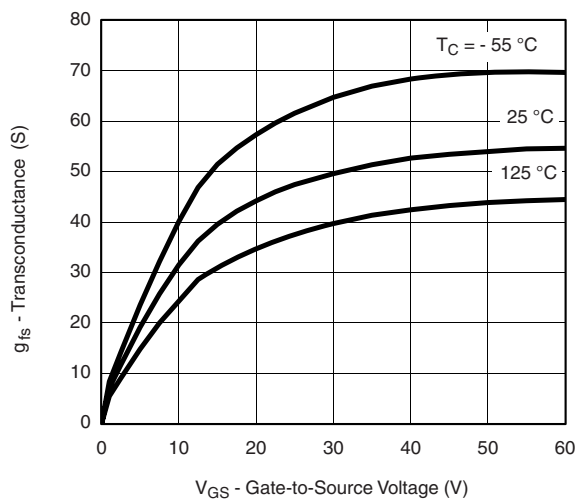
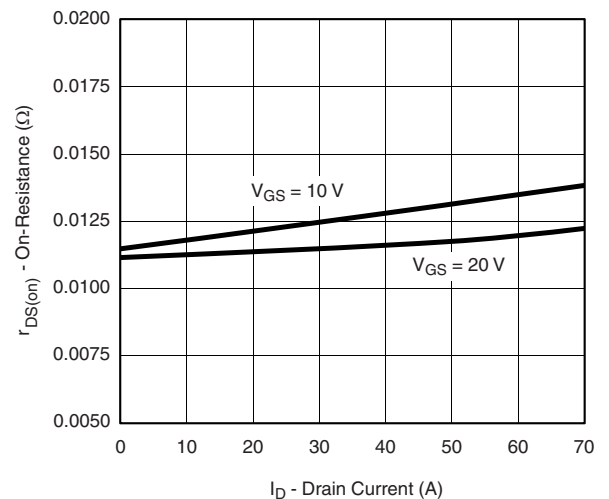
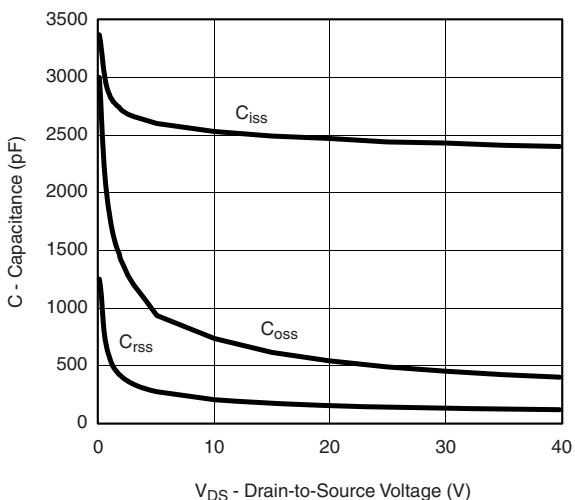
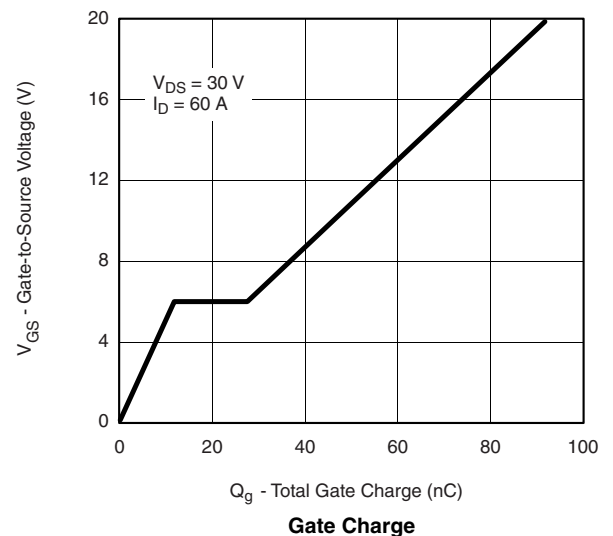
\* Pb containing terminations are not RoHS compliant, exemptions may apply.

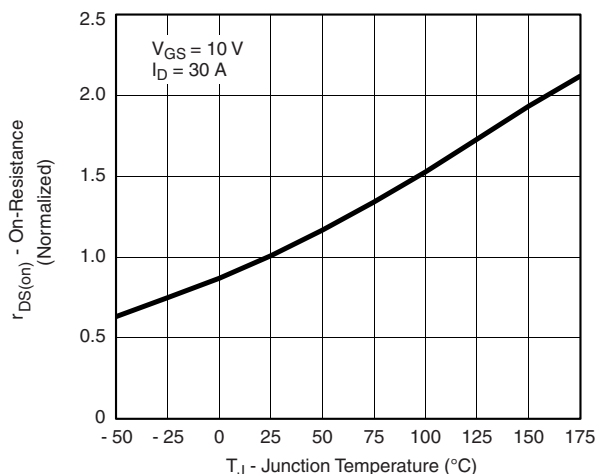
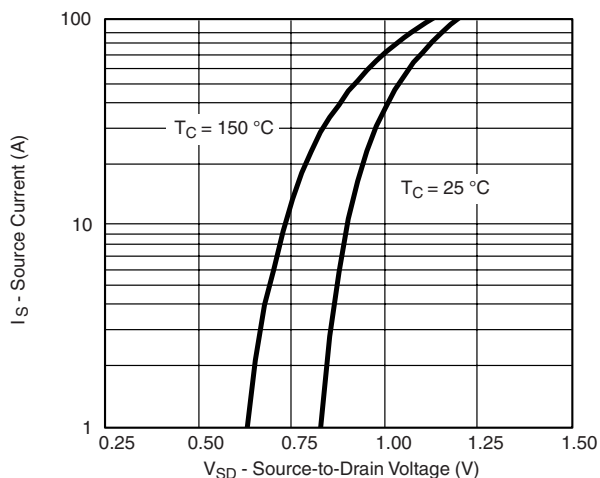
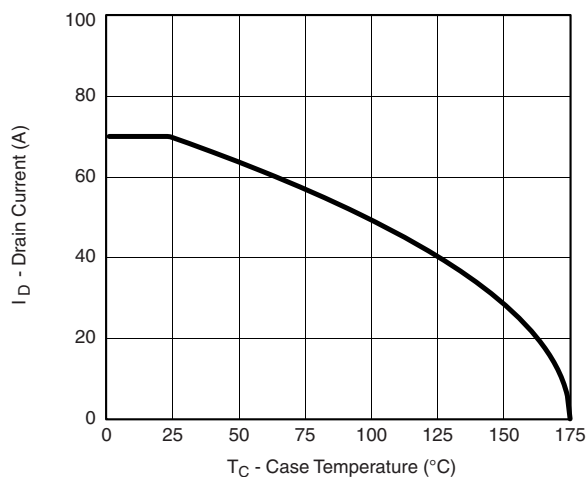
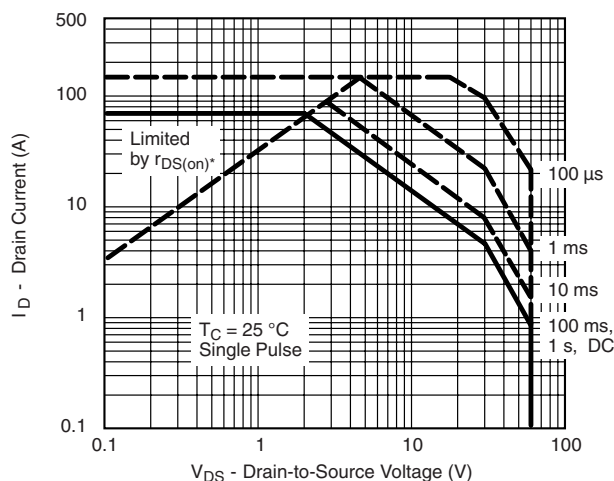
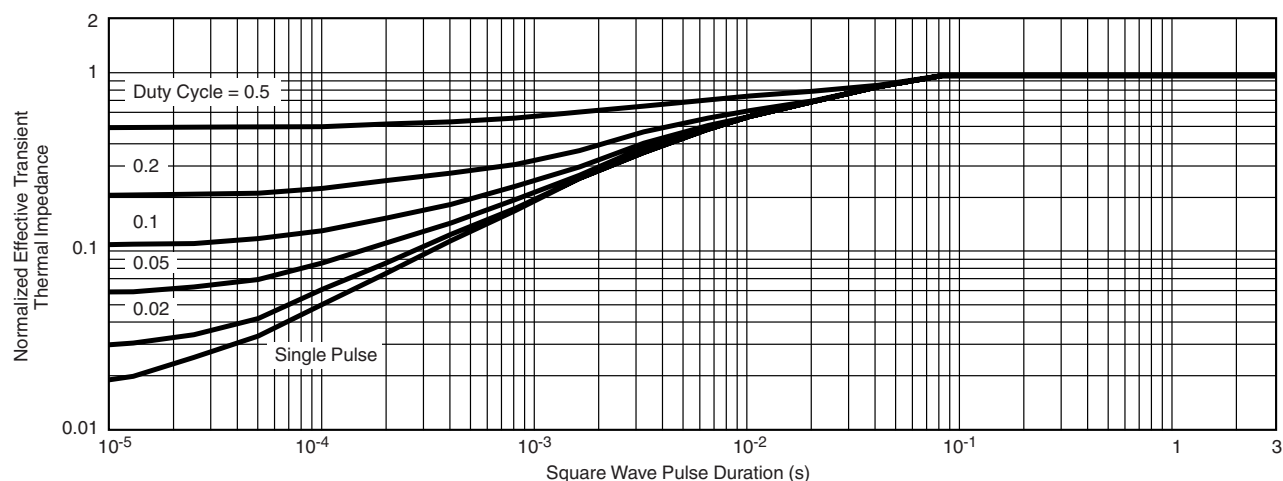
SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$ , $I_D = 250\text{ }\mu\text{A}$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_{DS} = 1\text{ mA}$	2.0	3.0	4.0	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 60\text{ V}$ , $V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 60\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 125\text{ }^{\circ}\text{C}$			50	
		$V_{DS} = 60\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 175\text{ }^{\circ}\text{C}$			150	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = 5\text{ V}$ , $V_{GS} = 10\text{ V}$	70			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10\text{ V}$ , $I_D = 30\text{ A}$			0.014	$\Omega$
		$V_{GS} = 10\text{ V}$ , $I_D = 30\text{ A}$ , $T_J = 125\text{ }^{\circ}\text{C}$			0.023	
		$V_{GS} = 10\text{ V}$ , $I_D = 30\text{ A}$ , $T_J = 175\text{ }^{\circ}\text{C}$			0.028	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}$ , $I_D = 30\text{ A}$	25	50		S
Dynamic <sup>b</sup>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$		2400		pF
Output Capacitance	$C_{oss}$			490		
Reverse Transfer Capacitance	$C_{rss}$			130		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 60\text{ A}$		45	70	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			12		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			16		
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = 30\text{ V}$ , $R_L = 0.47\text{ }\Omega$ $I_D \cong 60\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_G = 2.5\text{ }\Omega$		13	30	ns
Rise Time <sup>c</sup>	$t_r$			11	30	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			30	60	
Fall Time <sup>c</sup>	$t_f$			11	25	
Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^{\circ}\text{C}$ <sup>b</sup>						
Continuous Current	$I_S$				70	A
Pulsed Current	$I_{SM}$				160	
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_F = 70\text{ A}$ , $V_{GS} = 0\text{ V}$			1.4	V
Reverse Recovery Time	$t_{rr}$	$I_F = 60\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$		47		ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			3.5		A
Reverse Recovery Charge	$Q_{rr}$			0.08		$\mu\text{C}$

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.

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**

**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted**On-Resistance vs. Junction Temperature****Source-Drain Diode Forward Voltage****THERMAL RATINGS****Maximum Avalanche and Drain Current vs. Case Temperature**\*  $V_{GS} > \text{minimum } V_{GS} \text{ at which } r_{DS(on)} \text{ is specified}$ **Safe Operating Area****Normalized Thermal Transient Impedance, Junction-to-Case**

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