

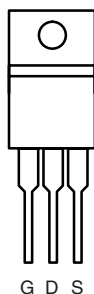
N-Channel 60-V (D-S), 175 °C MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
60	0.014	70 ^a



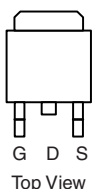
RoHS*
COMPLIANT

TO-220AB


Top View

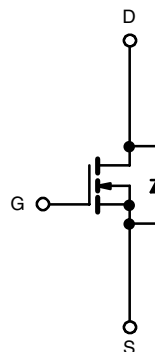
SUP70N06-14

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}	± 20	V
Continuous Drain Current ($T_J = 175\text{ }^\circ\text{C}$)	I_D	$T_C = 25\text{ }^\circ\text{C}$ 70 ^a	A
		$T_C = 100\text{ }^\circ\text{C}$ 49	
Pulsed Drain Current	I_{DM}	160	
Avalanche Current	I_{AR}	70	
Repetitive Avalanche Energy ^b	E_{AR}	180	mJ
Power Dissipation	P_D	$T_C = 25\text{ }^\circ\text{C}$ (TO-220AB and TO-263) 142 ^c	W
		$T_A = 25\text{ }^\circ\text{C}$ (TO-263) ^d 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) ^d 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>.

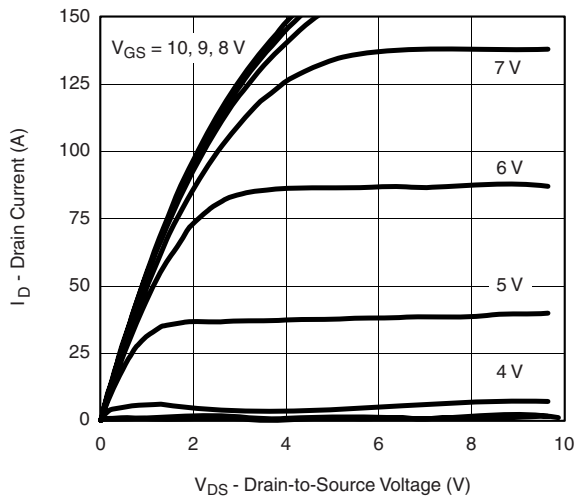
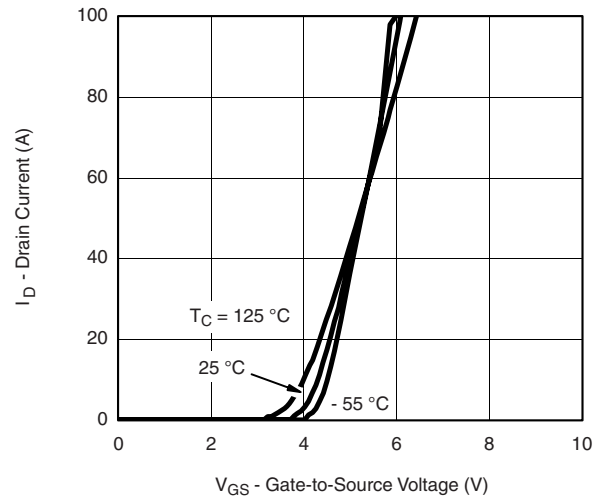
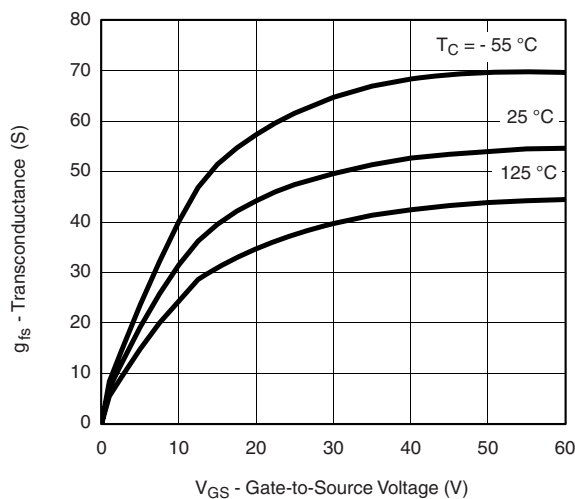
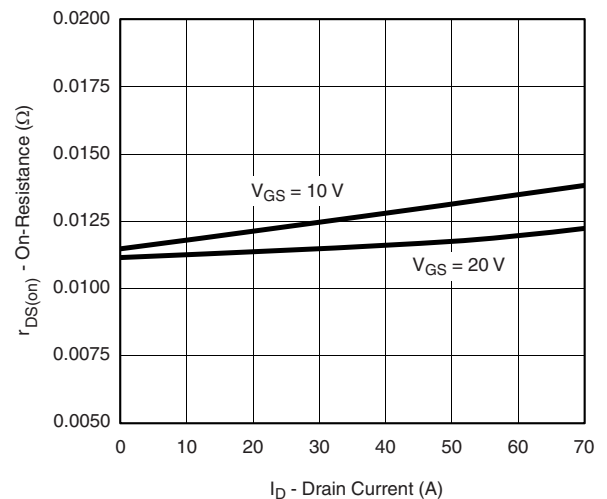
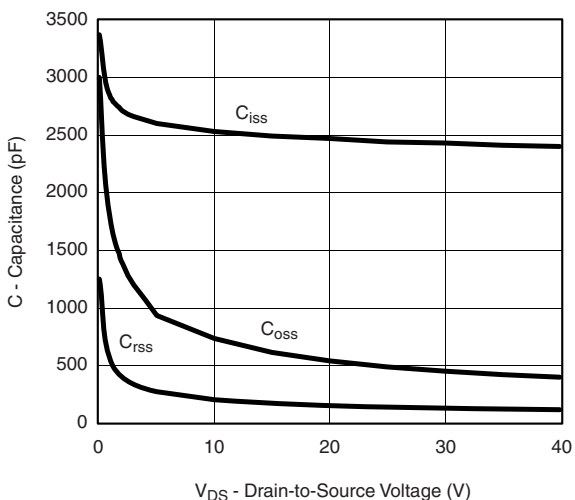
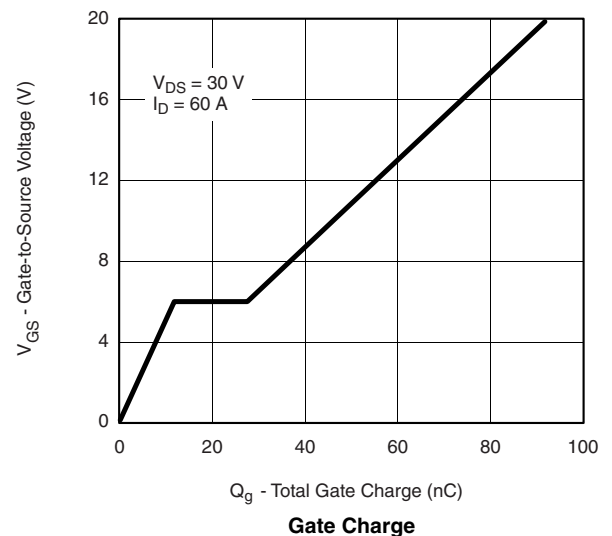
* Pb containing terminations are not RoHS compliant, exemptions may apply.

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}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 125\text{ }^{\circ}\text{C}$			50	
		$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 175\text{ }^{\circ}\text{C}$			150	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5\text{ V}$, $V_{GS} = 10\text{ V}$	70			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 30\text{ A}$			0.014	Ω
		$V_{GS} = 10\text{ V}$, $I_D = 30\text{ A}$, $T_J = 125\text{ }^{\circ}\text{C}$			0.023	
		$V_{GS} = 10\text{ V}$, $I_D = 30\text{ A}$, $T_J = 175\text{ }^{\circ}\text{C}$			0.028	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 30\text{ A}$	25	50		S
Dynamic ^b						
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 ^c	Q_g	$V_{DS} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 60\text{ A}$		45	70	nC
Gate-Source Charge ^c	Q_{gs}			12		
Gate-Drain Charge ^c	Q_{gd}			16		
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 30\text{ V}$, $R_L = 0.47\text{ }\Omega$ $I_D \cong 60\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_G = 2.5\text{ }\Omega$		13	30	ns
Rise Time ^c	t_r			11	30	
Turn-Off Delay Time ^c	$t_{d(off)}$			30	60	
Fall Time ^c	t_f			11	25	
Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^{\circ}\text{C}$ ^b						
Continuous Current	I_S				70	A
Pulsed Current	I_{SM}				160	
Forward Voltage ^a	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		μC

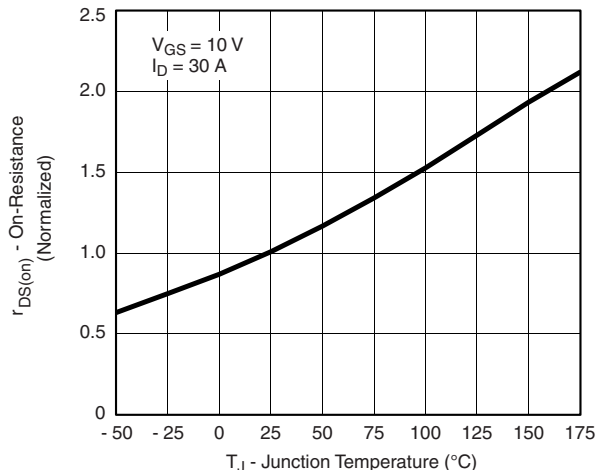
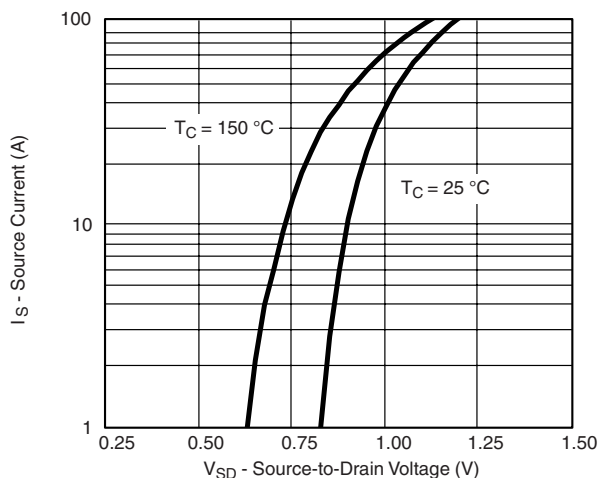
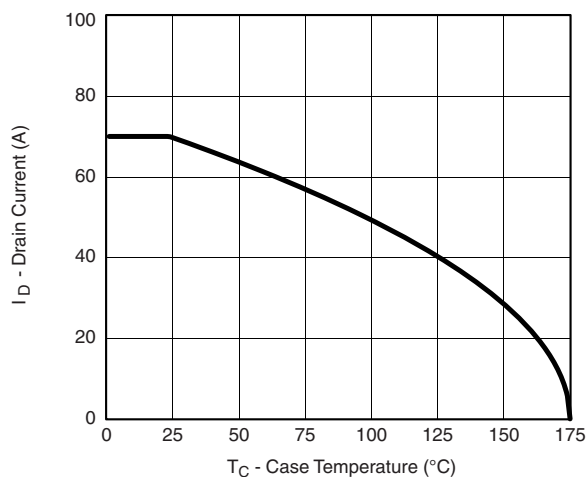
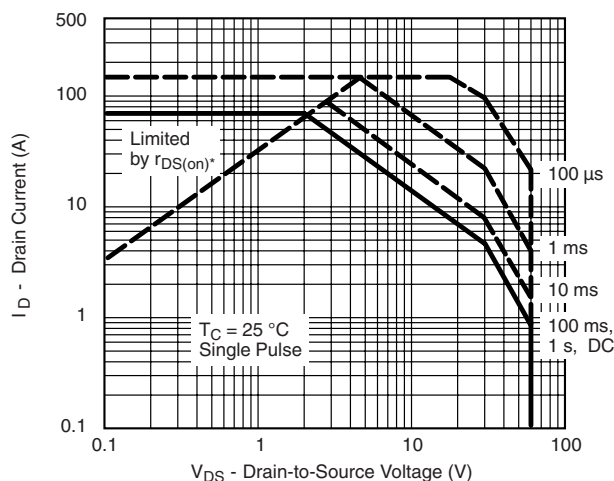
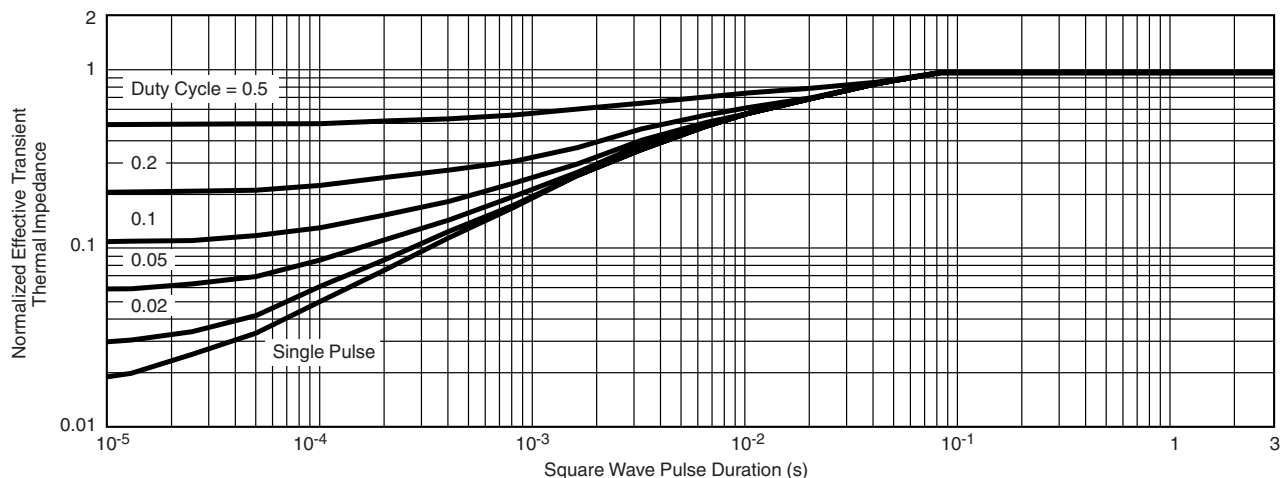
Notes:

- 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.

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**

Vishay Siliconix

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*** $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified**Safe Operating Area****Normalized Thermal Transient Impedance, Junction-to-Case**

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg70291>.



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