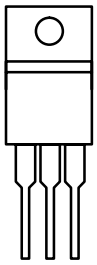
N-Channel 60-V (D-S), 175 °C MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
60	0.014	70[a]

Pb-free Available

RoHS* COMPLIANT

TO-220AB

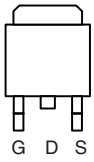


Top View

SUP70N06-14

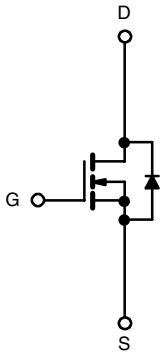
DRAIN connected to TAB

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 °C, unless otherwise noted				
Parameter		**Symbol**	**Limit**	**Unit**
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current (T_J = 175 °C)	T_C = 25 °C	I_D	70[a]	A
	T_C = 100 °C		49	
Pulsed Drain Current		I_{DM}	160	
Avalanche Current		I_{AR}	70	
Repetitive Avalanche Energy[b]	L = 0.1 mH	E_{AR}	180	mJ
Power Dissipation	T_C = 25 °C (TO-220AB and TO-263)	P_D	142[c]	W
	T_A = 25 °C (TO-263)[d]		3.7	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS				
Parameter		**Symbol**	**Limit**	**Unit**
Junction-to-Ambient	PCB Mount (TO-263)[d]	R_{thJA}	40	°C/W
	Free Air (TO-220AB)		62.5	
Junction-to-Case		R_{thJC}	1.05	

Notes:
a. Package limited.
b. Duty cycle ≤ 1 %.
c. See SOA curve for voltage derating.
d. 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.

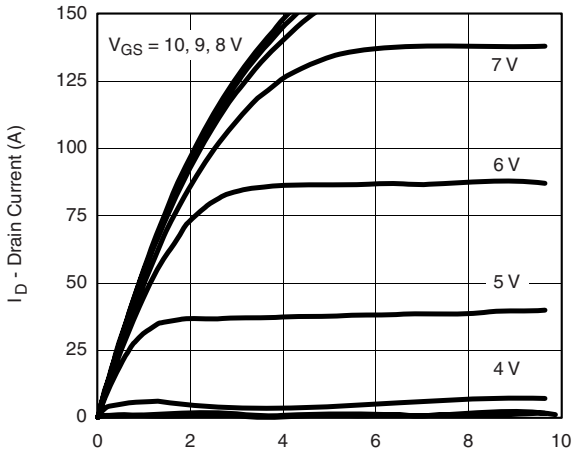
* Pb containing terminations are not RoHS compliant, exemptions may apply.

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 µA	60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_{DS} = 1 mA	2.0	3.0	4.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	µA
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 175 °C			150	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	70			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 30 A			0.014	Ω
		V_{GS} = 10 V, I_D = 30 A, T_J = 125 °C			0.023	
		V_{GS} = 10 V, I_D = 30 A, T_J = 175 °C			0.028	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 30 A	25	50		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		2400		pF
Output Capacitance	C_{oss}			490		
Reverse Transfer Capacitance	C_{rss}			130		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 60 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 V, R_L = 0.47 Ω I_D ≅ 60 A, V_{GEN} = 10 V, R_G = 2.5 Ω		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 °C[b]						
Continuous Current	I_S				70	A
Pulsed Current	I_{SM}				160	
Forward Voltage[a]	V_{SD}	I_F = 70 A, V_{GS} = 0 V			1.4	V
Reverse Recovery Time	t_{rr}	I_F = 60 A, di/dt = 100 A/µs		47		ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			3.5		A
Reverse Recovery Charge	Q_{rr}			0.08		µC

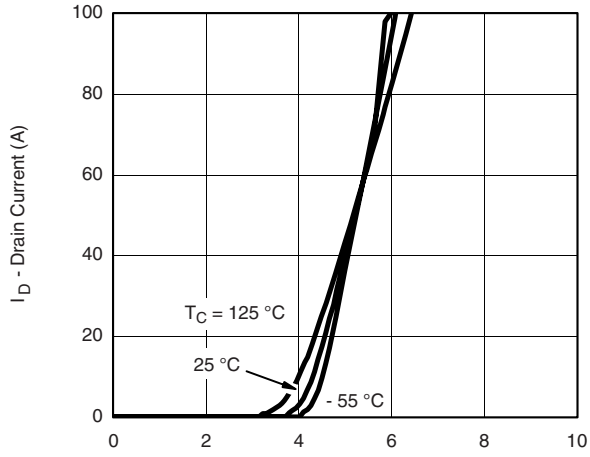
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

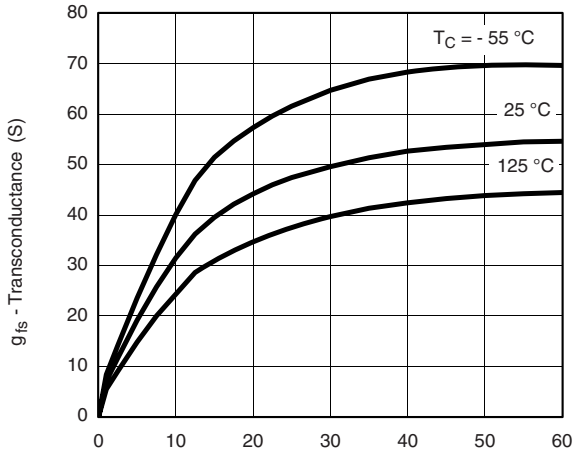
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



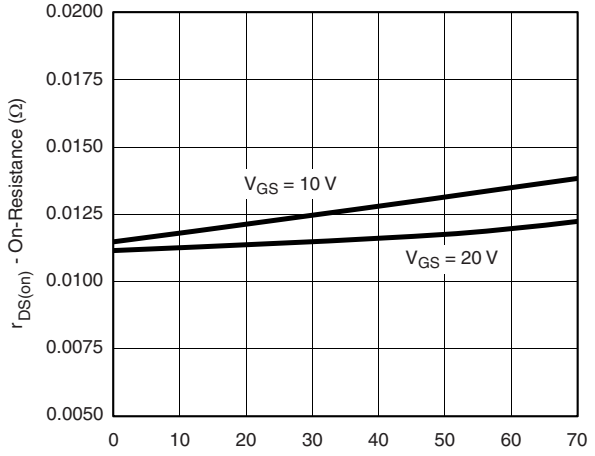
Output Characteristics



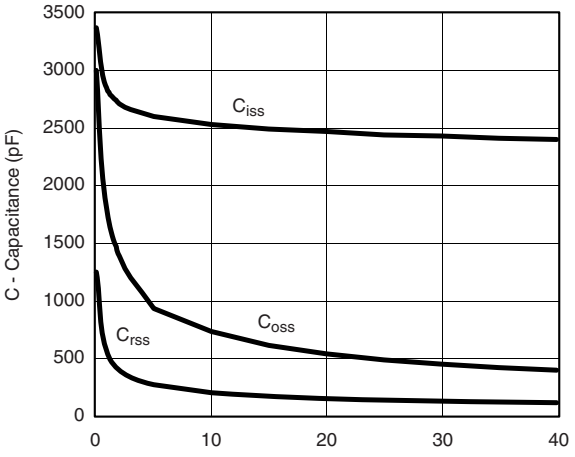
Transfer Characteristics



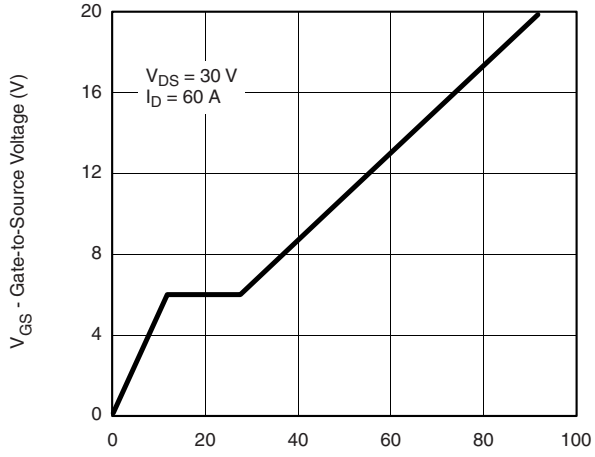
Transconductance



On-Resistance vs. Drain Current

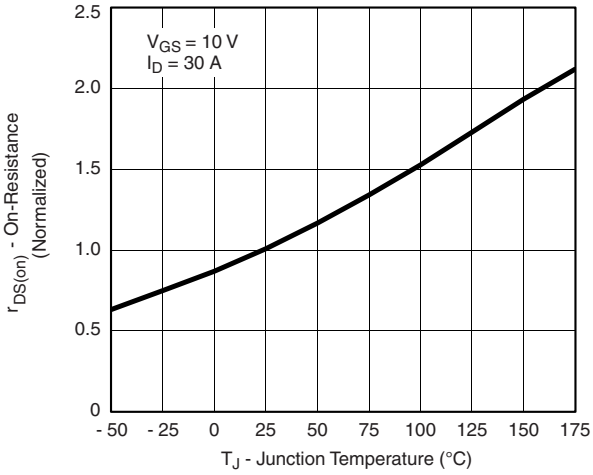


Capacitance

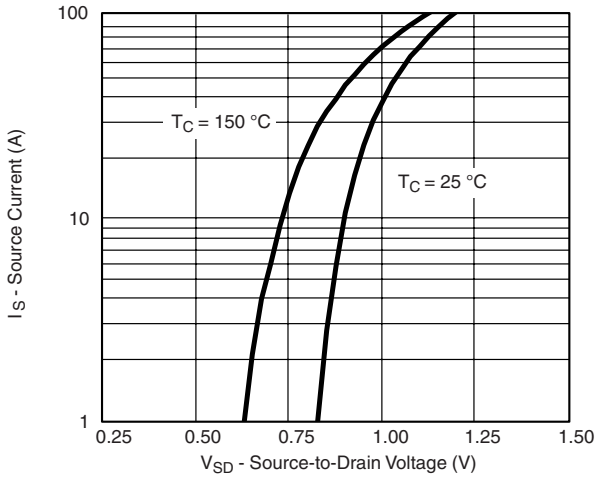


Gate Charge

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

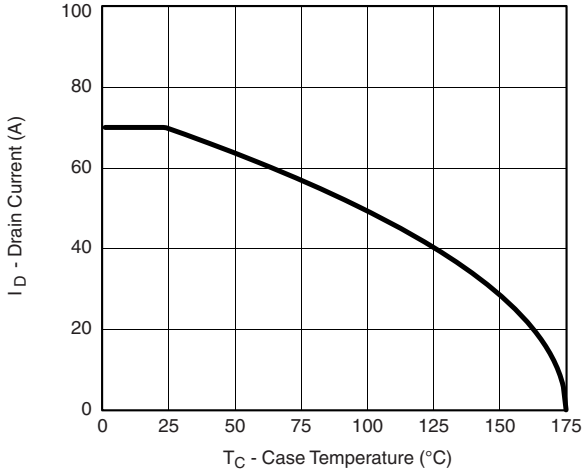


On-Resistance vs. Junction Temperature

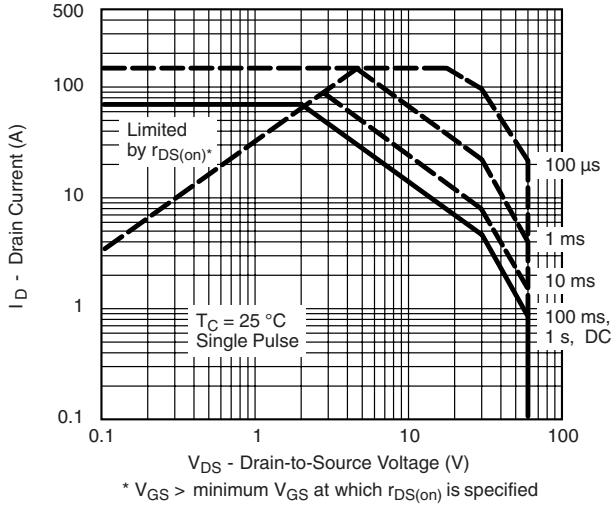


Source-Drain Diode Forward Voltage

THERMAL RATINGS

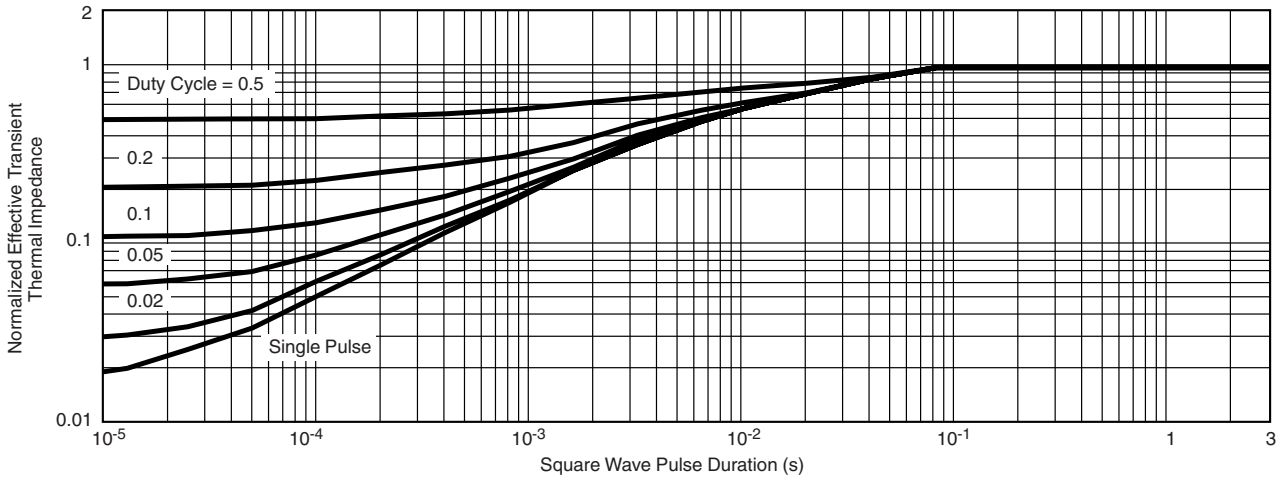


Maximum Avalanche and Drain Current vs. Case Temperature



* V_{GS} > minimum V_{GS} at which $r_{DS(on)}$ is specified

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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