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

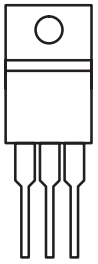
PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
60	0.022 at V_{GS} = 10 V	40
	0.025 at V_{GS} = 4.5 V	40

FEATURES

- TrenchFET® Power MOSFETs
- Maximum Junction Temperature: 175 °C Rated

Available
RoHS* COMPLIANT

TO-220AB



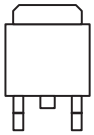
G D S

Top View

SUP40N06-25L

DRAIN connected to TAB

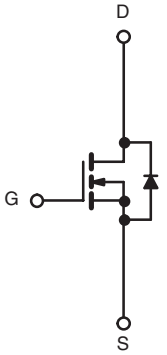
TO-263



G D S

Top View

SUB40N06-25L



N-Channel MOSFET

Ordering Information: TO-220AB: SUP40N06-25L
SUP40N06-25L-E3 (Lead (Pb)-free)
TO-263: SUB40N06-25L
SUB40N06-25L-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS T_C = 25 °C, unless otherwise noted				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 175 °C)	T_C = 25 °C	I_D	40	A
	T_C = 100 °C		25	
Pulsed Drain Current		I_{DM}	100	
Avalanche Current		I_{AR}	40	
Repetitive Avalanche Energy[a]	L = 0.1 mH	E_{AR}	80	mJ
Power Dissipation	T_C = 25 °C (TO-220AB and TO-263)	P_D	90[c]	W
	T_A = 25 °C (TO-263)[c]		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)[c]	R_{thJA}	40	°C/W
	Free Air (TO-220AB)		80	
Junction-to-Case		R_{thJC}	1.6	

Notes:
a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.
c. Surface Mounted on FR4 Board, t ≤ 10 sec.

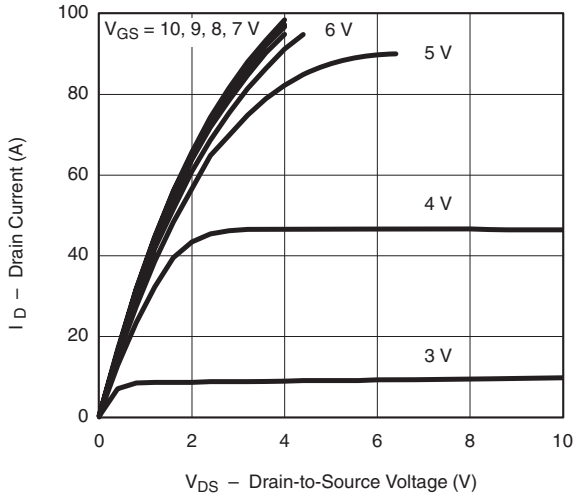
* Pb containing terminations are not RoHS compliant, exemptions may apply.

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_D = 250 µA	1.0	2.0	3.0	
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	40			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A			0.022	Ω
		V_{GS} = 10 V, I_D = 20 A, T_J = 125 °C			0.043	
		V_{GS} = 10 V, I_D = 20 A, T_J = 175 °C			0.053	
		V_{GS} = 4.5 V, I_D = 20 A			0.025	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 20 A				S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		1800		pF
Output Capacitance	C_{oss}			350		
Reverse Transfer Capacitance	C_{rss}			100		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 40 A		40	60	nC
Gate-Source Charge[c]	Q_{gs}			9		
Gate-Drain Charge[c]	Q_{gd}			10		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.8 Ω $I_D \cong$ 40 A, V_{GEN} = 10 V, R_G = 2.5 Ω		10	20	ns
Rise Time[c]	t_r			9	20	
Turn-Off Delay Time[c]	$t_{d(off)}$			28	50	
Fall Time[c]	t_f			7	15	
Source-Drain Diode Ratings and Characteristics T_C = 25 °C[b]						
Continuous Current	I_S				40	A
Pulsed Current	I_{SM}				100	
Forward Voltage[a]	V_{SD}	I_F = 40 A, V_{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 40 A, di/dt = 100 A/µs		48	100	ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$			6		A
Reverse Recovery Charge	Q_{rr}			0.15		µC

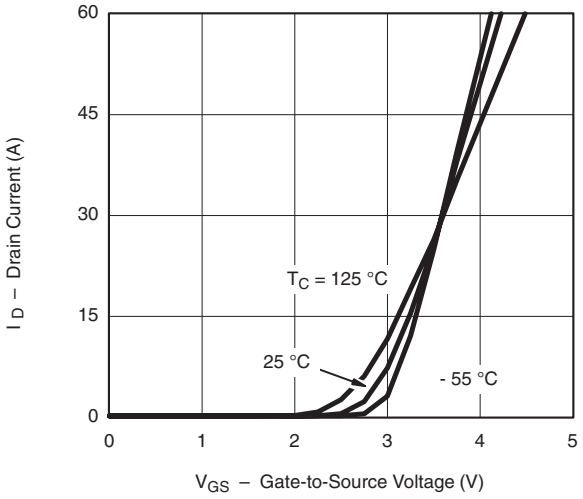
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

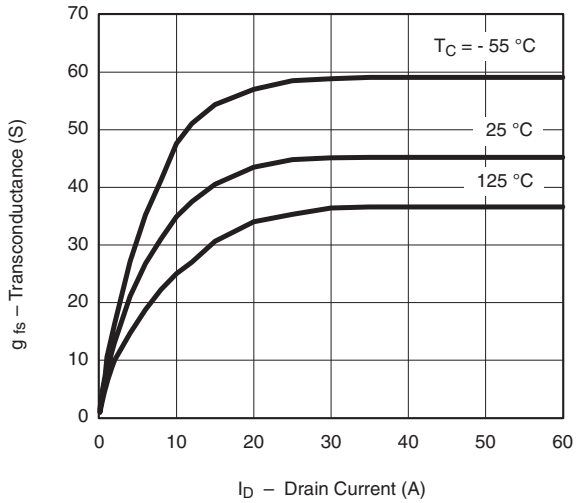
TYPICAL CHARACTERISTICS 25 °C unless noted



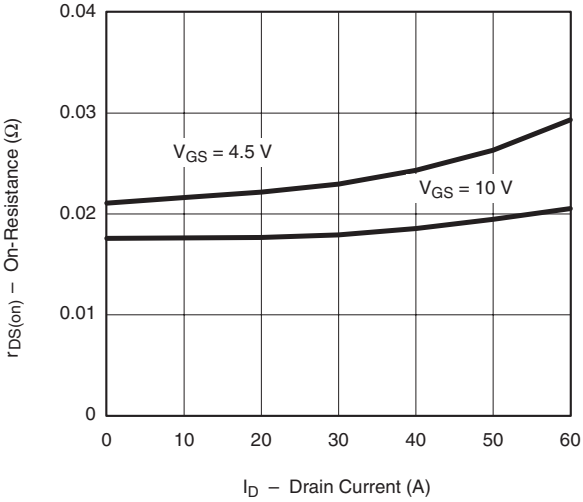
Output Characteristics



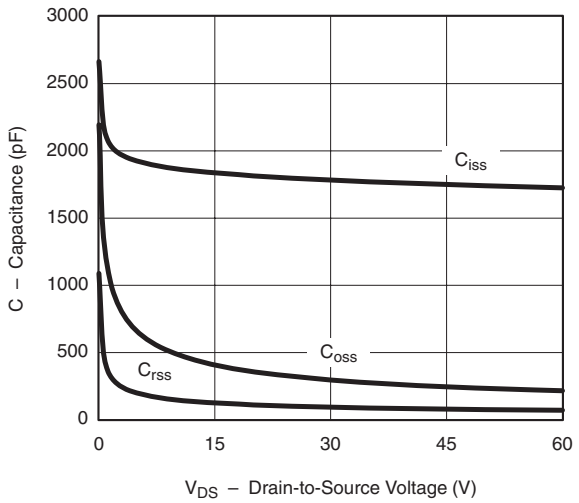
Transfer Characteristics



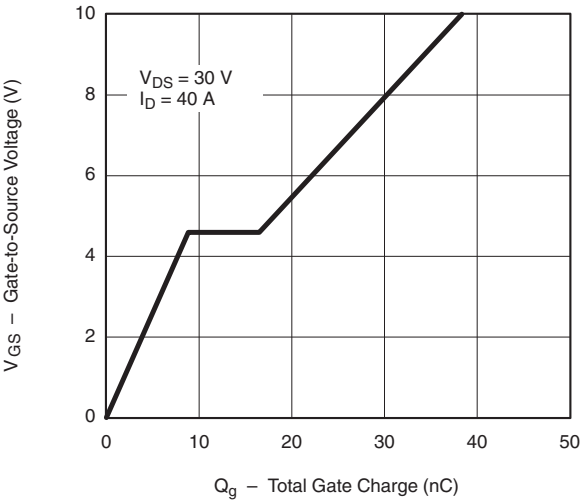
Transconductance



On-Resistance vs. Drain Current

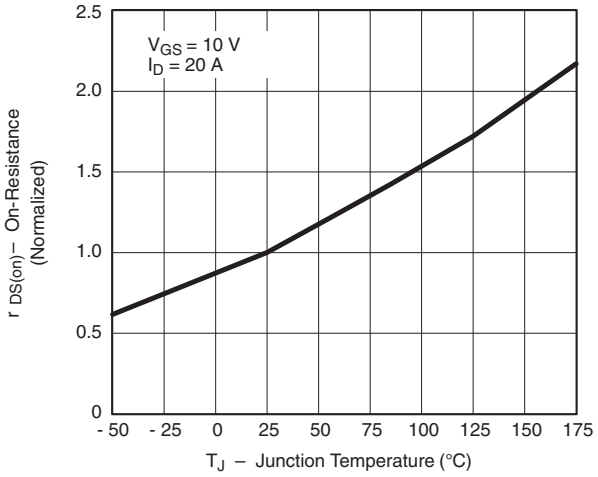


Capacitance

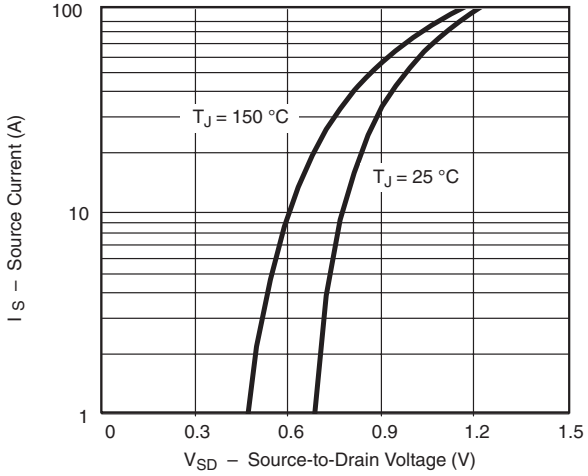


Gate Charge

TYPICAL CHARACTERISTICS 25 °C unless noted

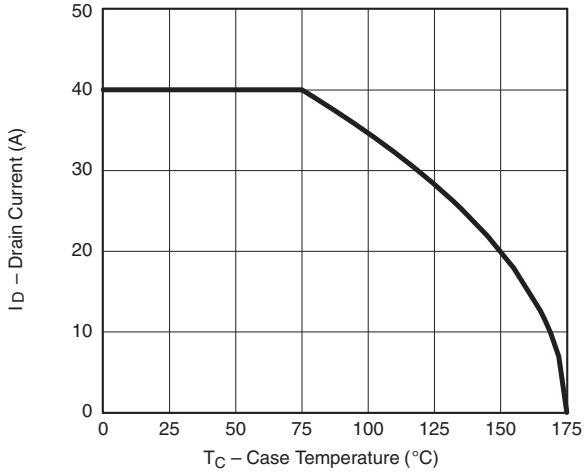


On-Resistance vs. Junction Temperature

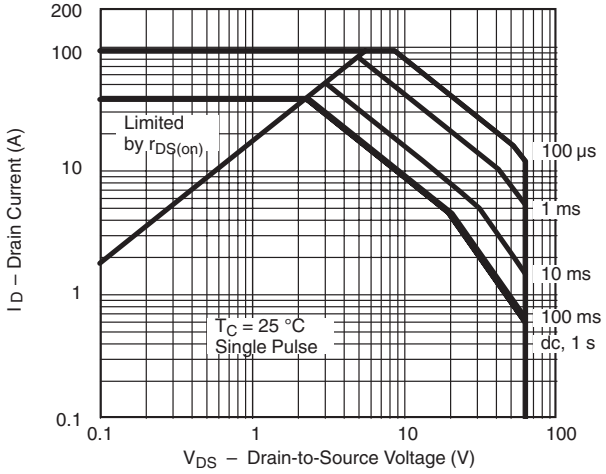


Source-Drain Diode Forward Voltage

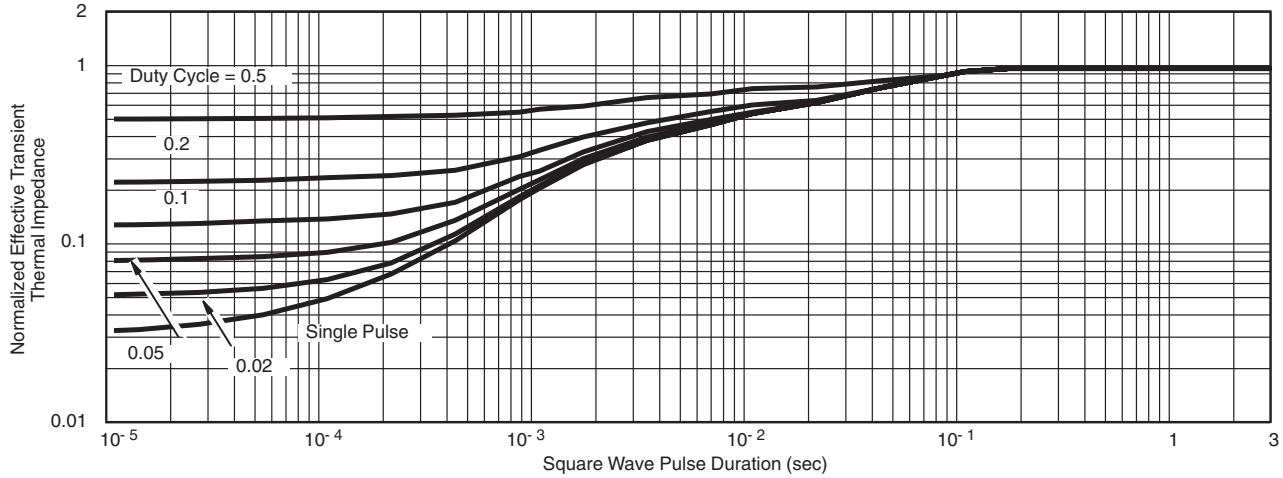
THERMAL RATINGS



Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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