

MCG53N06A-TP-VB Datasheet

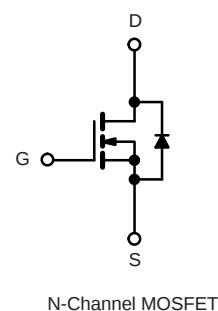
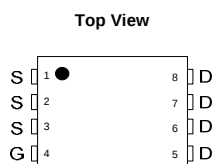
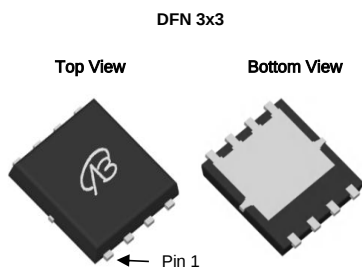
N-Channel 60V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^a
60	0.007 at $V_{GS} = 10$ V	50
	0.008 at $V_{GS} = 4.5$ V	45

FEATURES

- 175 °C Junction Temperature
- SGT technology Power MOSFET
- Material categorization:


RoHS
 COMPLIANT


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) ^b	I_D	50	A
		30 ^a	
Pulsed Drain Current	I_{DM}	150	
Continuous Source Current (Diode Conduction)	I_S	85 ^a	
Avalanche Current	I_{AS}	120	
Single Avalanche Energy (Duty Cycle ≤ 1 %)	E_{AS}	125	mJ
Maximum Power Dissipation	P_D	136	W
		3 ^b , 8.3 ^{b, c}	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	15	18	°C/W
		40	50	
Maximum Junction-to-Case	R_{thJC}	0.85	1.1	

Notes:

a. Package limited.

b. Surface mounted on 1" x 1" FR4 board.

 c. $t \leq 10$ s.

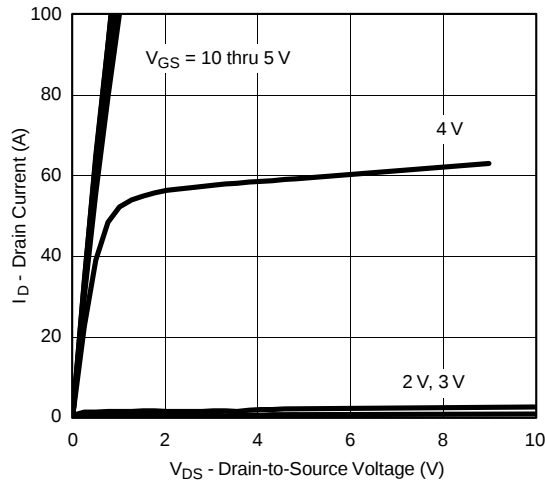
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	60			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1	2	3	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60V, V _{GS} = 0 V			1	μA
		V _{DS} = 60V, V _{GS} = 0 V, T _J = 125 °C			50	
		V _{DS} = 60V, V _{GS} = 0 V, T _J = 175 °C			250	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	60			A
Drain-Source On-State Resistance ^b	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.007		Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C		0.010		
		V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C		0.014		
		V _{GS} = 4.5 V, I _D = 20A		0.012		
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 20 A		60		S
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		5100		pF
Output Capacitance	C _{oss}			470		
Reverse Transfer Capacitance	C _{rss}			225		
Total Gate Charge ^c	Q _g	V _{DS} = 30 V, V _{GS} = 10 V, I _D = 50 A		68	70	nC
Gate-Source Charge ^c	Q _{gs}			11		
Gate-Drain Charge ^c	Q _{gd}			13		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 30 V, R _L = 0.6 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _g = 2.5 Ω		11	27	ns
Rise Time ^c	t _r			14	26	
Turn-Off Delay Time ^c	t _{d(off)}			36	55	
Fall Time ^c	t _f			26	35	
Source-Drain Diode Ratings and Characteristics (T _C = 25 °C)						
Pulsed Current	I _{SM}				150	A
Diode Forward Voltage	V _{SD}	I _F = 20 A, V _{GS} = 0 V		1	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs		4	135	ns

Notes:

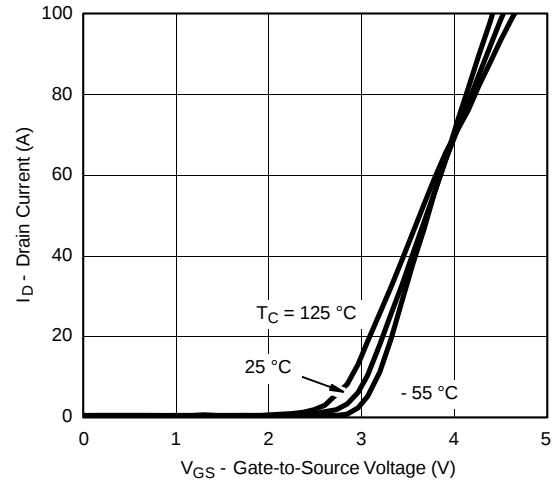
- a. For design aid only; not subject to production testing.
 b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 c. Independent of operating temperature.

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.

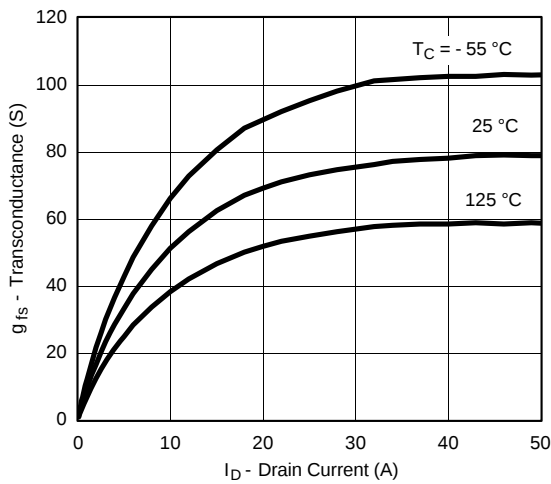
TYPICAL CHARACTERISTICS (25 °C unless noted)



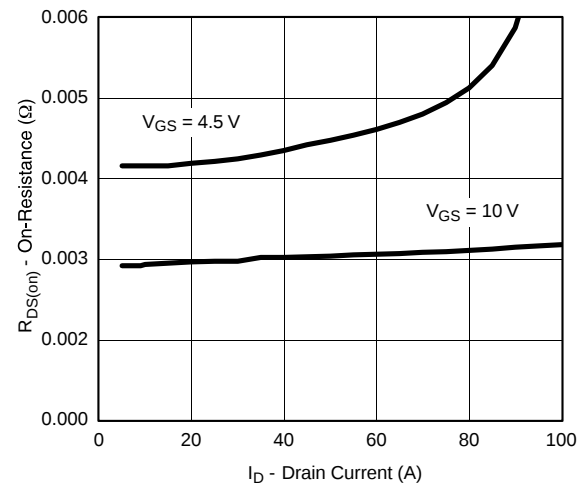
Output Characteristics



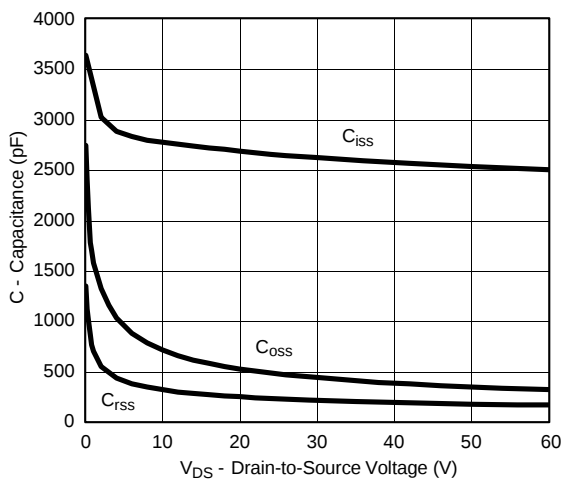
Transfer Characteristics



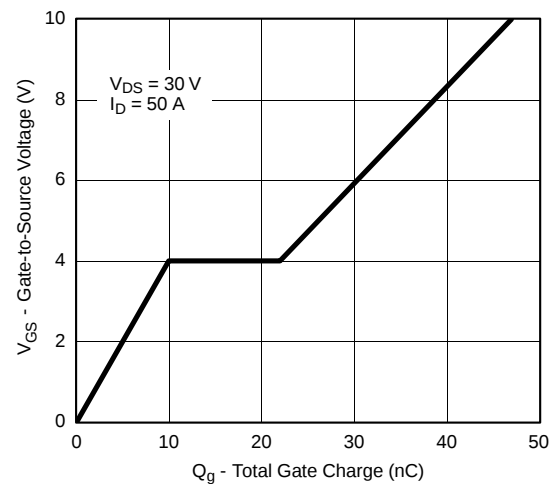
Transconductance



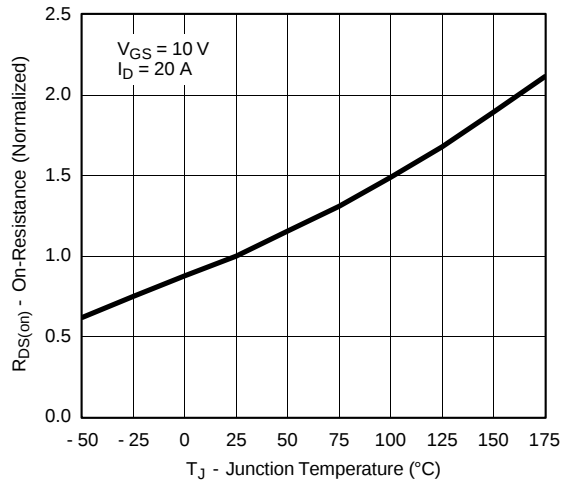
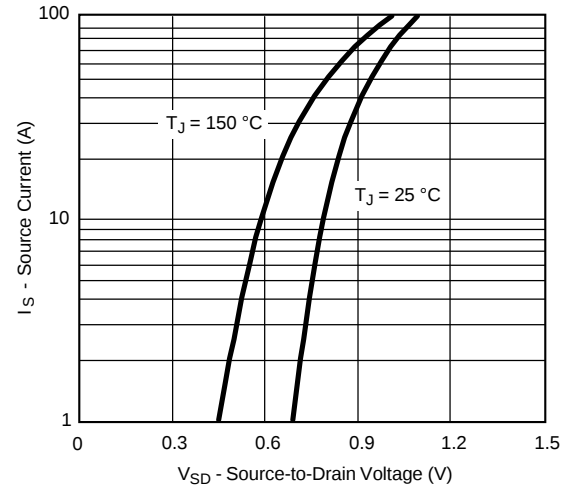
On-Resistance vs. Drain Current



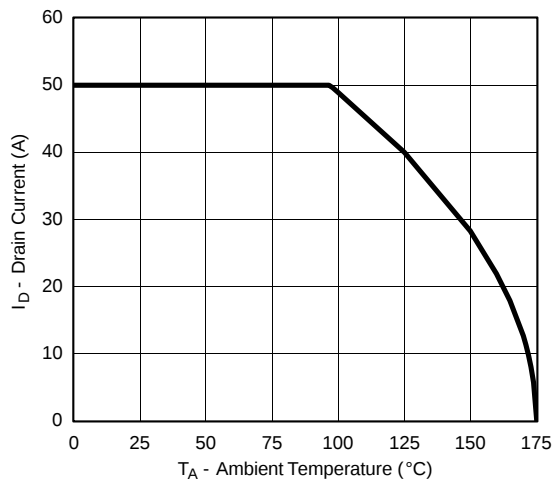
Capacitance



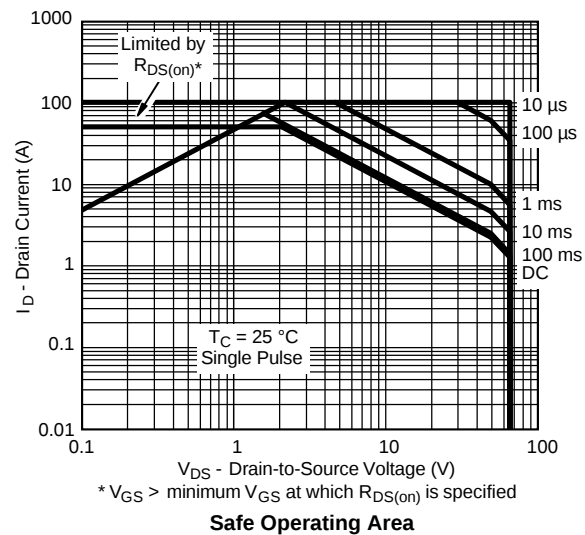
Gate Charge

TYPICAL CHARACTERISTICS (25 °C unless noted)**On-Resistance vs. Junction Temperature****Source-Drain Diode Forward Voltage**

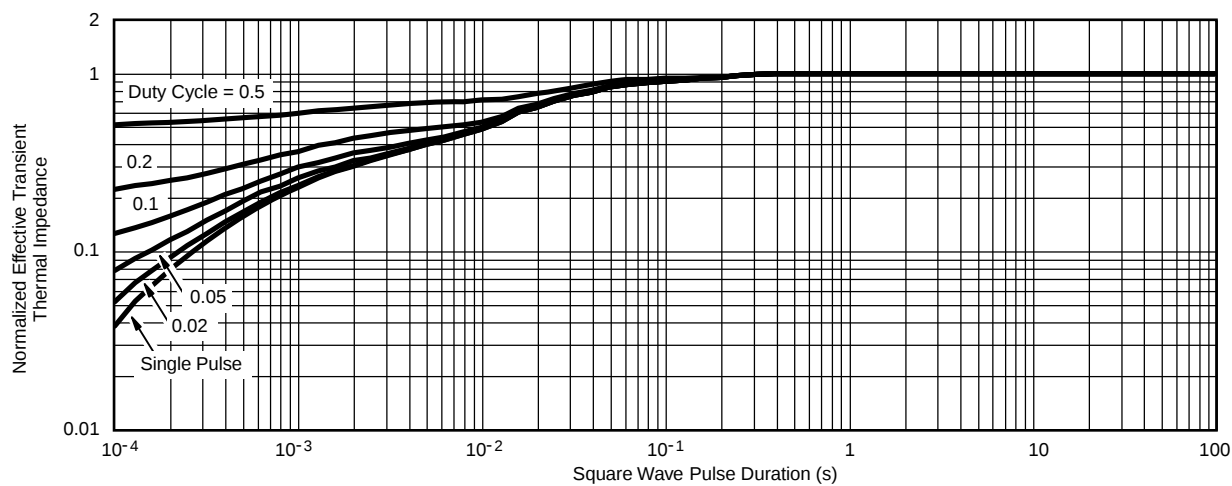
THERMAL RATINGS



Maximum Drain Current vs. Ambient Temperature

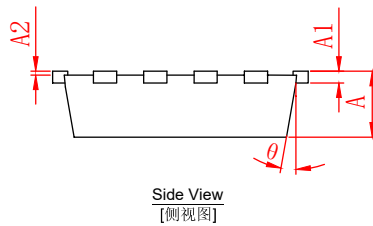
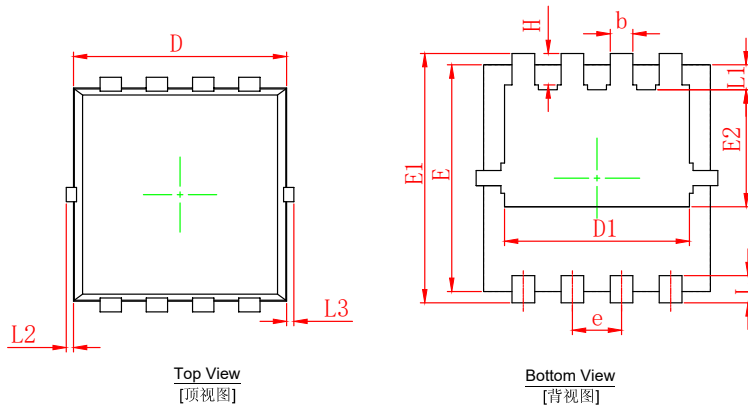


Safe Operating Area



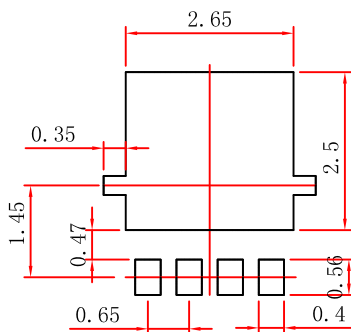
Normalized Thermal Transient Impedance, Junction-to-Case

PDFNWB3×3-8L Package Outline Dimensions



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.650	0.850	0.026	0.033
A1	0.203REF.		0.008REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.050	2.550	0.081	0.100
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.450	1.650	0.057	0.065
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
Φ	9°	13°	9°	13°

Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

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