

MS70N03

N-Channel 30-V (D-S) MOSFET

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
P_D	Power Dissipation ^a ($T_A=25^{\circ}\text{C}$)	50	W
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +175	$^{\circ}\text{C}$
$R_{\theta JA}$	Maximum Junction-to-Ambient ^a ($t \leq 10$ sec)	40	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Maximum Junction-to-Ambient ^a (Steady-State)	3	

Notes

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

Static

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	1			V
I_{GSS}	Gate-Body Leakage	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}$ $V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}, T_J = 55^{\circ}\text{C}$			1 25	μA
$I_{D(on)}$	On-State Drain Current	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	120			A
$r_{DS(on)}$	Drain-Source On-Resistance	$V_{DS} = 10\text{ V}, I_D = 20\text{ A}$ $V_{GS} = 4.5\text{ V}, I_D = 18\text{ A}$			6 8	m Ω
g_{fs}	Forward Transconductance	$V_{GS} = 15\text{ V}, I_D = 20\text{ A}$		20		S
V_{SD}	Diode Forward Voltage	$I_S = 15\text{ A}, V_{GS} = 0\text{ V}$		0.84		V

Dynamic

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	$V_{DS} = 15\text{ V}, I_D = 20\text{ A},$ $V_{GS} = 4.5\text{ V}$	--	20	--	nC
Q_{gs}	Gate-Source Charge		--	7.3	--	nC
Q_{gd}	Gate-Drain Charge		--	11	--	nC
$t_{d(on)}$	Turn-On Delay Time	$I_D = 20\text{ A}, R_L = 0.8\ \Omega,$ $V_{GEN} = 10\text{ V}, R_{GEN} = 6\ \Omega$ $V_{DS} = 15\text{ V}$	--	10	--	ns
t_r	Rise Time		--	13	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	51	--	ns
t_f	Fall Time		--	21	--	ns
C_{ISS}	Input Capacitance	$V_{DS} = 15\text{ V}$ $f = 1\text{ MHz}, V_{GS} = 0\text{ V}$	--	1785	--	pF
C_{OSS}	Output Capacitance		--	323	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	285	--	pF

Notes

- Pulse test: PW $\leq 300\mu\text{s}$ duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

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Typical Electrical Characteristics

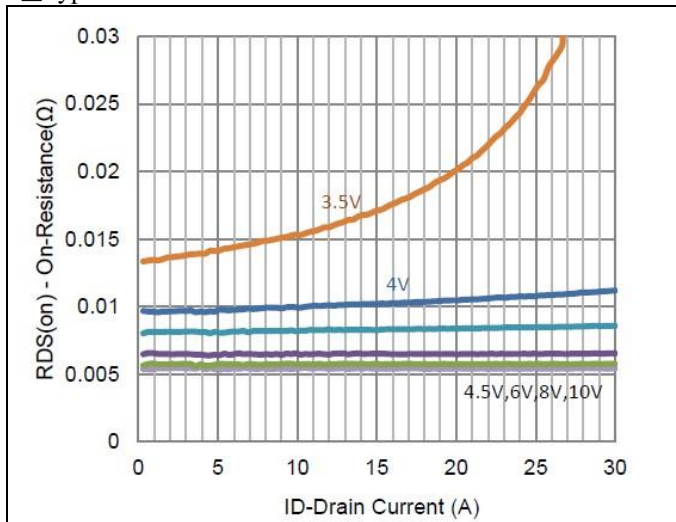


FIG.1-ON REGION CHARACTERISTICS

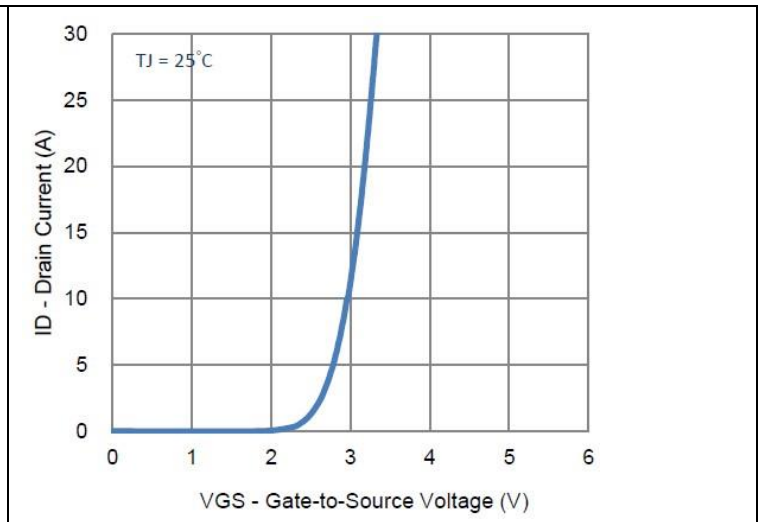


FIG.2-TRANSFER CHARACTERISTICS

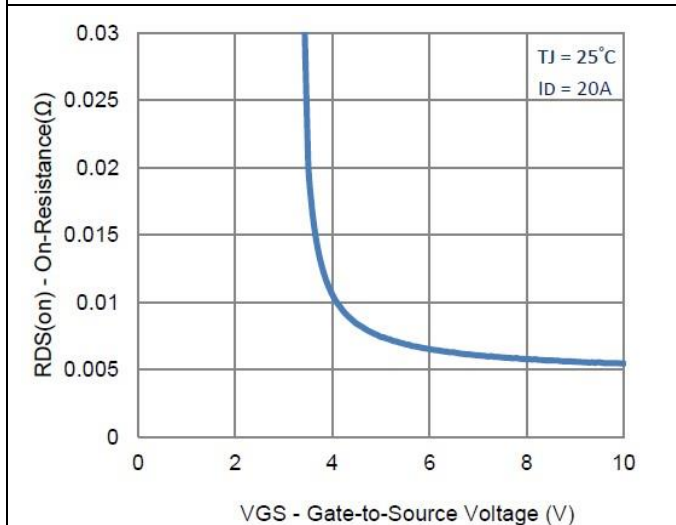


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

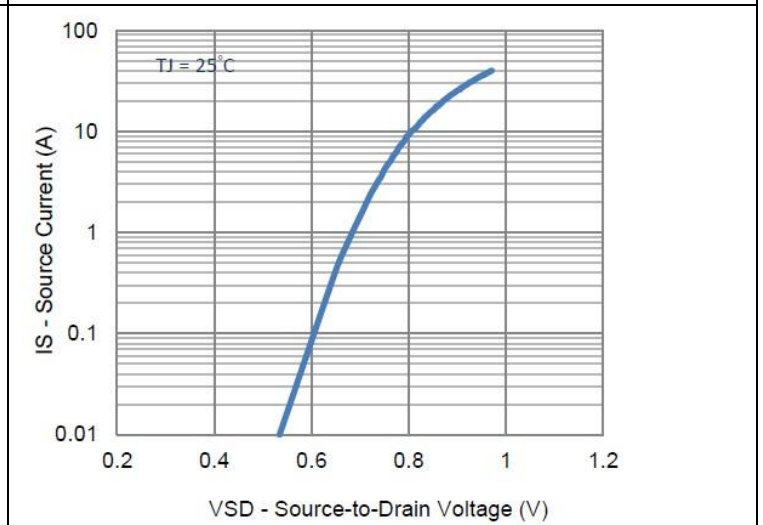


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

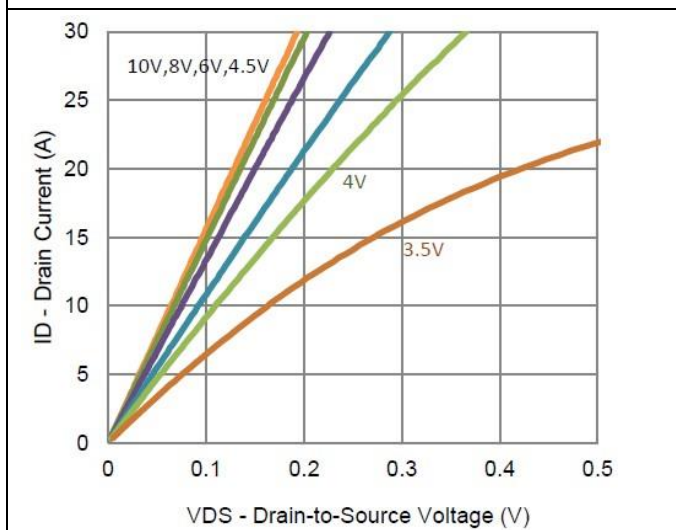


FIG.5-CAPACITANCE CHARACTERISTICS

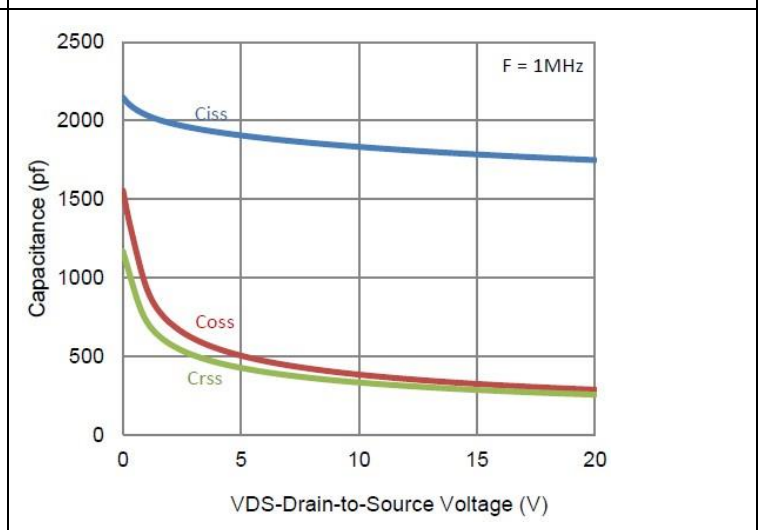


FIG.6-GATE CHARGE CHARACTERISTICS

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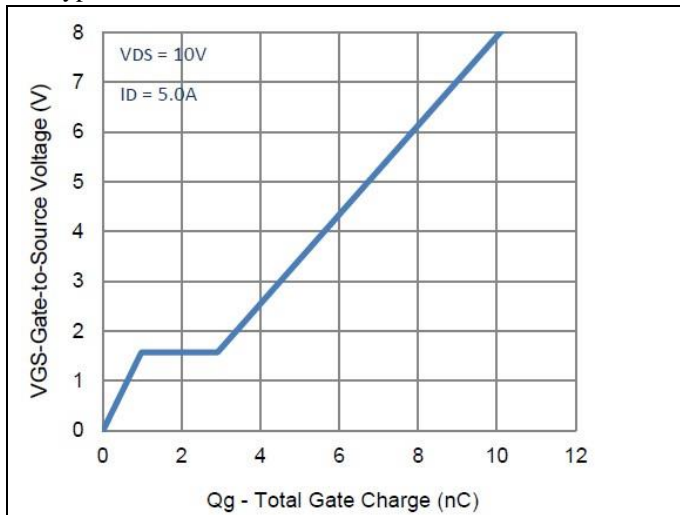


FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

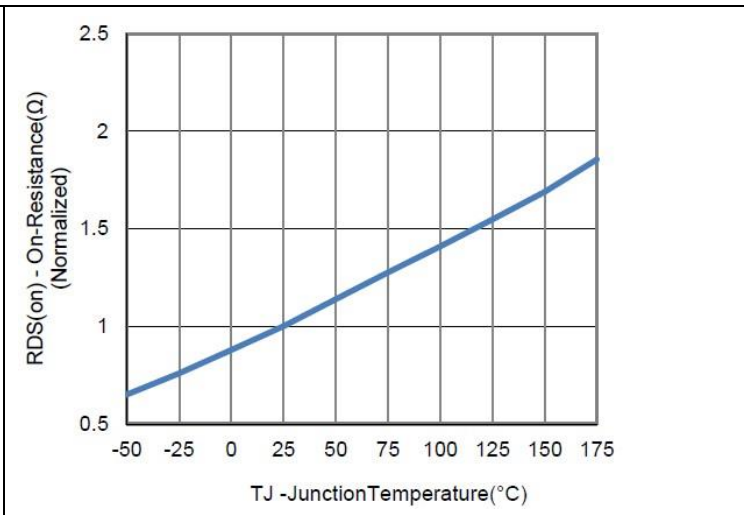


FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

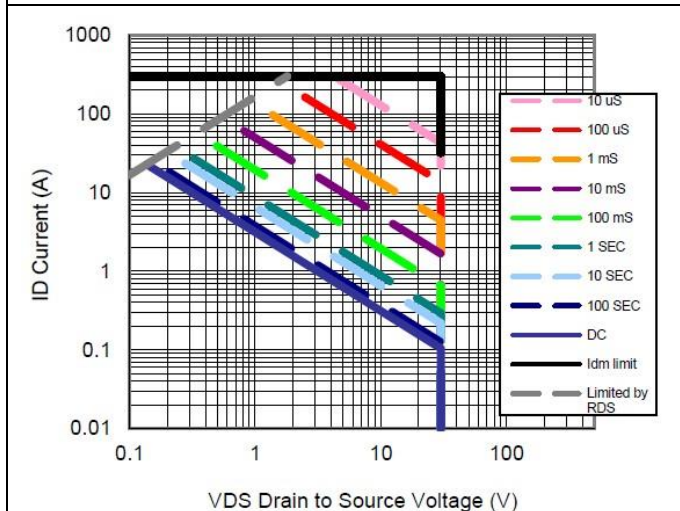


FIG.9-MAXIMUM SAFE OPERATING AREA

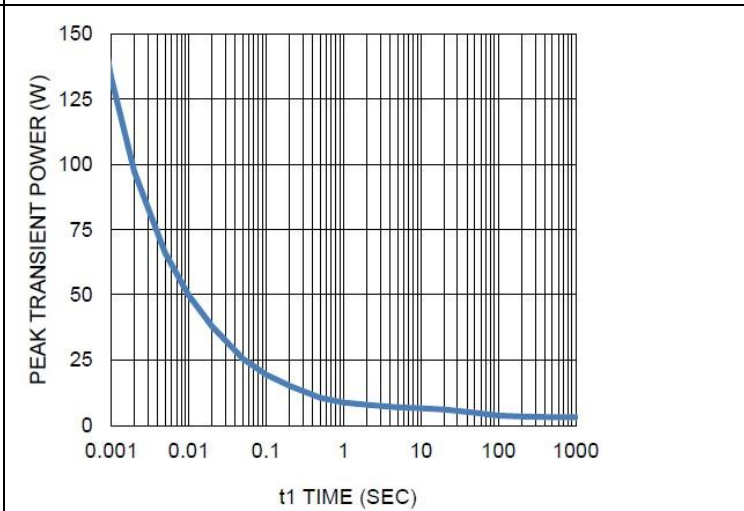


FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

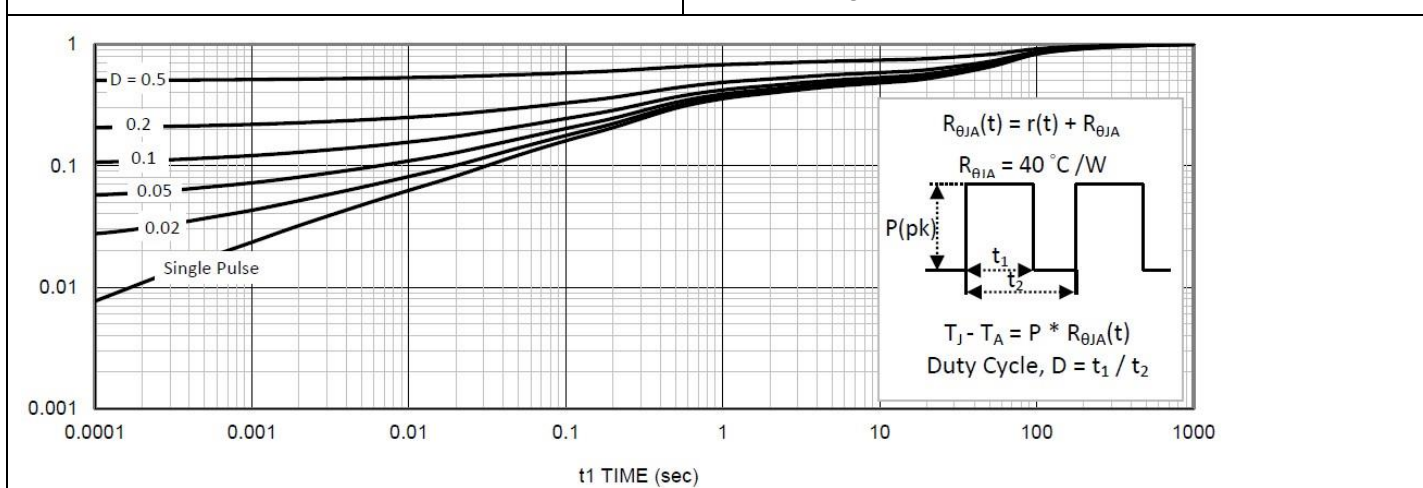


FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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