

MS45C41

N & P-Channel 40-V (D-S) MOSFET

Features

- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

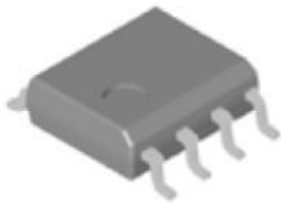
Typical Applications:

- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

Package type : SO-8

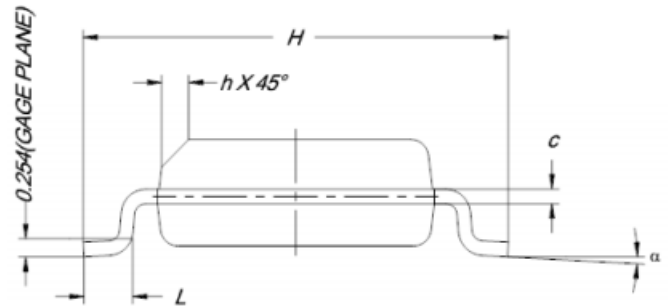
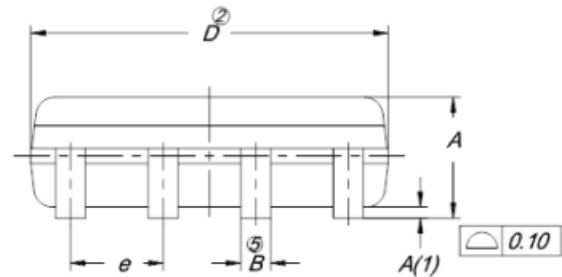
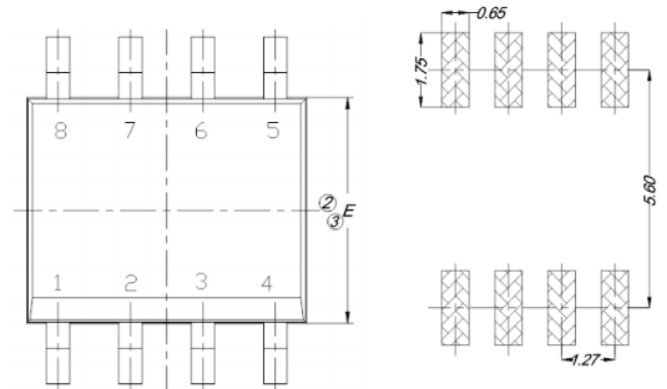
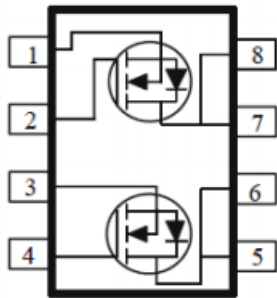
Packing & Order Information

3,000/Reel



**RoHS
COMPLIANT**

Graphic symbol



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	1.35	1.55	1.75
A(1)	0.10	0.18	0.25
B	0.38	0.45	0.51
C	0.19	0.22	0.25
D	4.80	4.90	5.00
E	3.80	3.90	4.00
e	1.27 BSC		
H	5.80	6.00	6.20
L	0.50	0.72	0.93
α	0°	4°	8°
h	0.25	0.38	0.50

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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Nch	Pch	Unit
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
I_D	Continuous Drain Current ^a ($T_A=25^\circ\text{C}$)	5.8	-3.9	A
	Continuous Drain Current ^a ($T_A=70^\circ\text{C}$)	4.5	-3.1	A
I_{DM}	Pulsed Drain Current ^b	20	-20	A
I_S	Continuous Source Current (Diode Conduction) ^a	2.6	-2.5	A
P_D	Power Dissipation ^a ($T_A=25^\circ\text{C}$)	2.1	2.1	W
	Power Dissipation ^a ($T_A=70^\circ\text{C}$)	1.3	1.3	W
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to 150		$^\circ\text{C}$

Thermal Resistance Ratings

Symbol	Parameter	Maximum	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ^a ($t \leq 10$ sec)	62.5	$^\circ\text{C/W}$
	Maximum Junction-to-Ambient ^a (Steady-State)	110	

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	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ (N-ch) $V_{DS} = V_{GS}, I_D = -250\mu\text{A}$ (P-ch)	1 -1			V
I_{GSS}	Gate-Body Leakage	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 32$ V, $V_{GS} = 0$ V (N-ch) $V_{DS} = -32$ V, $V_{GS} = 0$ V (P-ch)			1 -1	μA
$I_{D(on)}$	On-State Drain Current	$V_{DS} = 5$ V, $V_{GS} = 10$ V (N-ch) $V_{DS} = -5$ V, $V_{GS} = -10$ V (P-ch)	10 -10			A
$r_{DS(on)}$	Drain-Source On-Resistance	$V_{GS} = 10$ V, $I_D = 5.3$ A (N-ch) $V_{GS} = 4.5$ V, $I_D = 4.4$ A (N-ch) $V_{GS} = -10$ V, $I_D = -3.6$ A (N-ch) $V_{GS} = -4.5$ V, $I_D = -2.6$ A (N-ch)			42 60 90 125	$\text{m}\Omega$
g_{fs}	Forward Transconductance	$V_{GS} = 15$ V, $I_D = 5.3$ A (N-ch) $V_{GS} = -15$ V, $I_D = -3.6$ A (P-ch)		13 11		S
V_{SD}	Diode Forward Voltage	$I_S = 1.3$ A, $V_{GS} = 0$ V (N-ch) $I_S = -1.2$ A, $V_{GS} = 0$ V (P-ch)		0.77 -0.81		V

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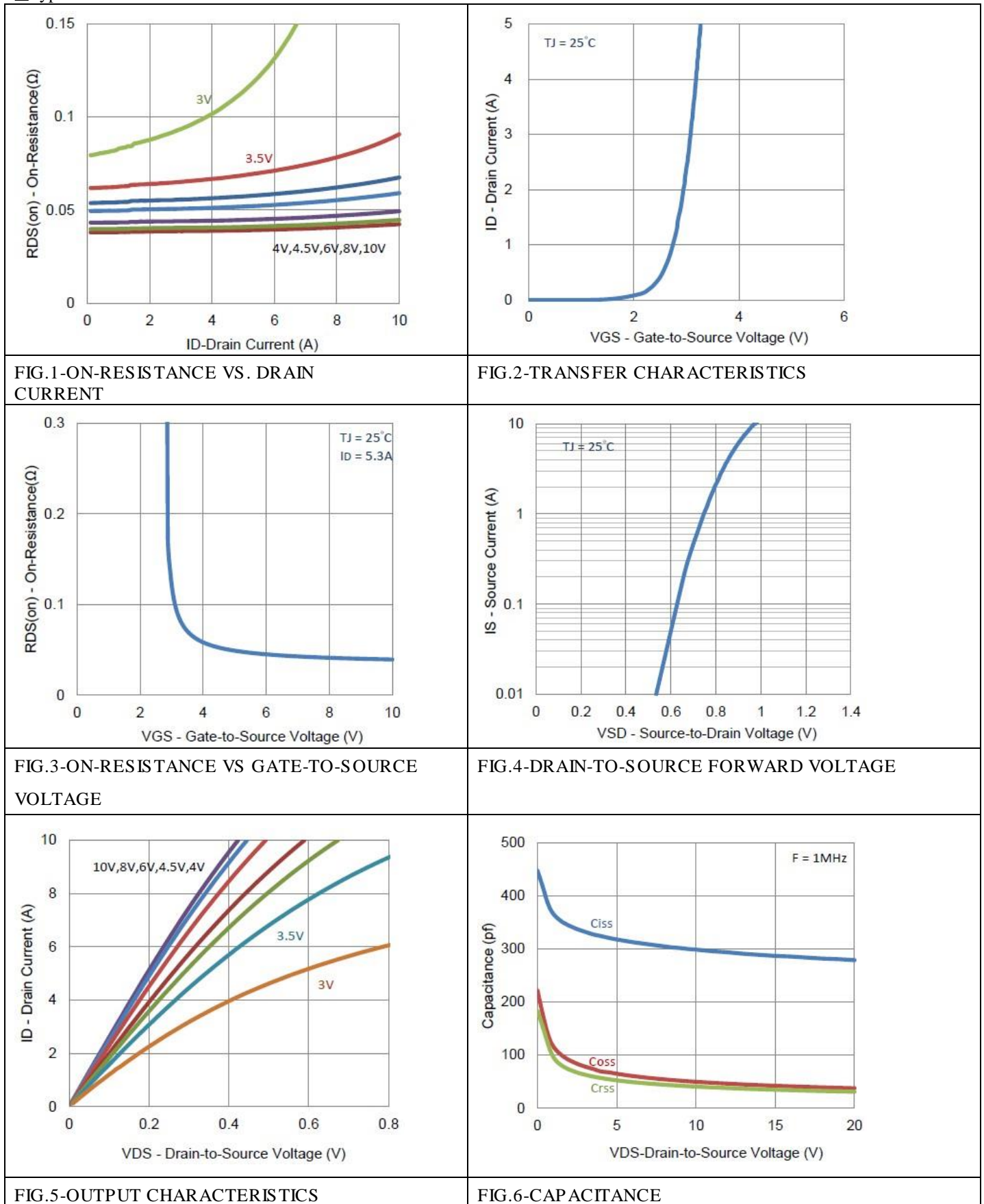
Dynamic ^b						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	N-Channel $V_{DS} = 20\text{ V}$, $I_D = 5.3\text{ A}$, $V_{GS} = 10\text{ V}$	--	3.6	--	nC
Q_{gs}	Gate-Source Charge		--	1.3	--	nC
Q_{gd}	Gate-Drain Charge		--	1.4	--	nC
$t_{d(on)}$	Turn-On Delay Time	N-Channel $I_D = 5.3\text{ A}$, $R_L = 3.5\ \Omega$, $V_{GEN} = 10\text{ V}$, $R_{GEN} = 6\ \Omega$, $V_{DD} = 20\text{ V}$	--	2	--	ns
t_r	Rise Time		--	18	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	16	--	ns
t_f	Fall Time		--	5	--	ns
C_{ISS}	Input Capacitance	N-Channel $V_{DS} = 15\text{ V}$ $f = 1\text{ MHz}$, $V_{GS} = 0\text{ V}$	--	287	--	pF
C_{OSS}	Output Capacitance		--	42	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	34	--	pF
Q_g	Total Gate Charge	P-Channel $V_{DS} = -20\text{ V}$, $I_D = -3.6\text{ A}$, $V_{GS} = -10\text{ V}$	--	5.8	--	nC
Q_{gs}	Gate-Source Charge		--	1.6	--	nC
Q_{gd}	Gate-Drain Charge		--	2.3	--	nC

Dynamic ^b						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	P-Channel $I_D = -3.6\text{ A}$, $R_L = 5.5\ \Omega$, $V_{GEN} = -10\text{ V}$, $R_{GEN} = 6\ \Omega$, $V_{DD} = -20\text{ V}$	--	4	--	ns
t_r	Rise Time		--	5	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	17	--	ns
t_f	Fall Time		--	7	--	ns
C_{ISS}	Input Capacitance	P-Channel $V_{DS} = -15\text{ V}$ $f = 1\text{ MHz}$, $V_{GS} = 0\text{ V}$	--	384	--	pF
C_{OSS}	Output Capacitance		--	36	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	36	--	pF

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Typical Electrical Characteristics - N-channel



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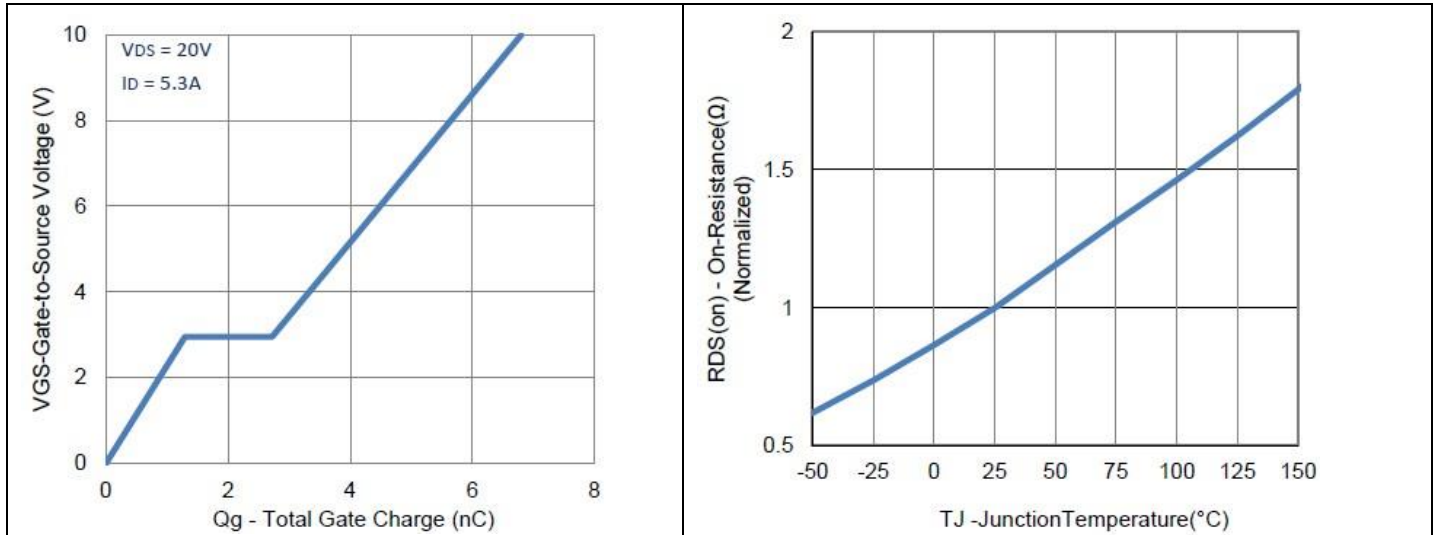


FIG.7-GATE CHARGE

FIG.8-NORMALIZED ON-RESISTANCE VS JUNCTION TEMPERATURE

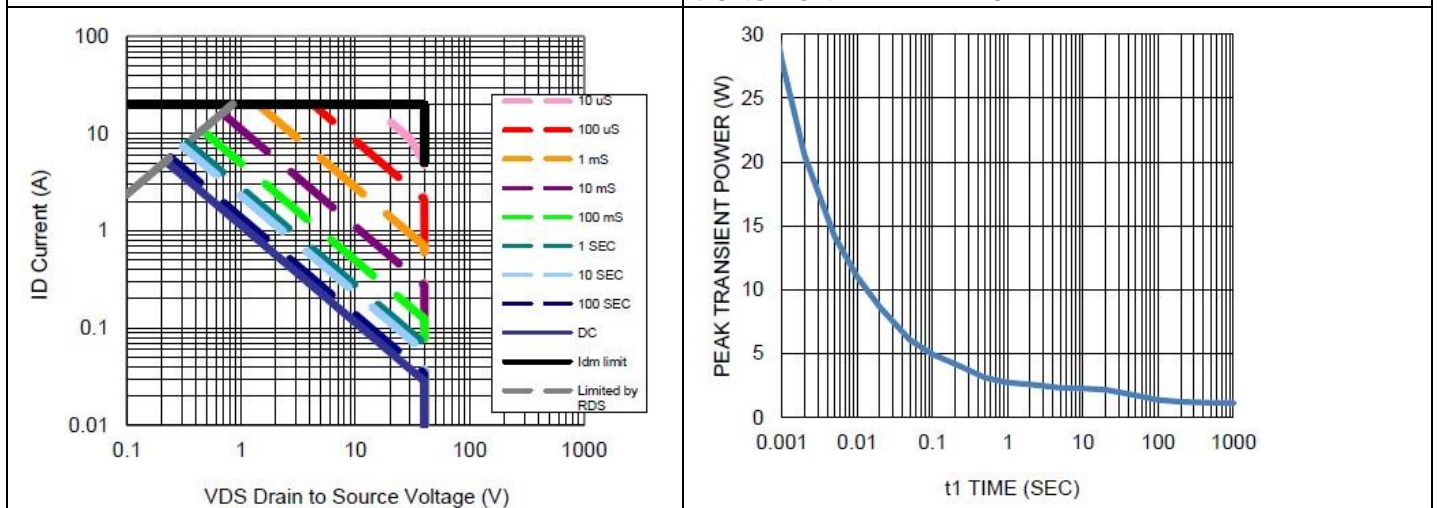


FIG.9-SAFE OPERATING AREA

FIG.10-SINGLE PULSE MAXIMUM POWER DISSIPATION

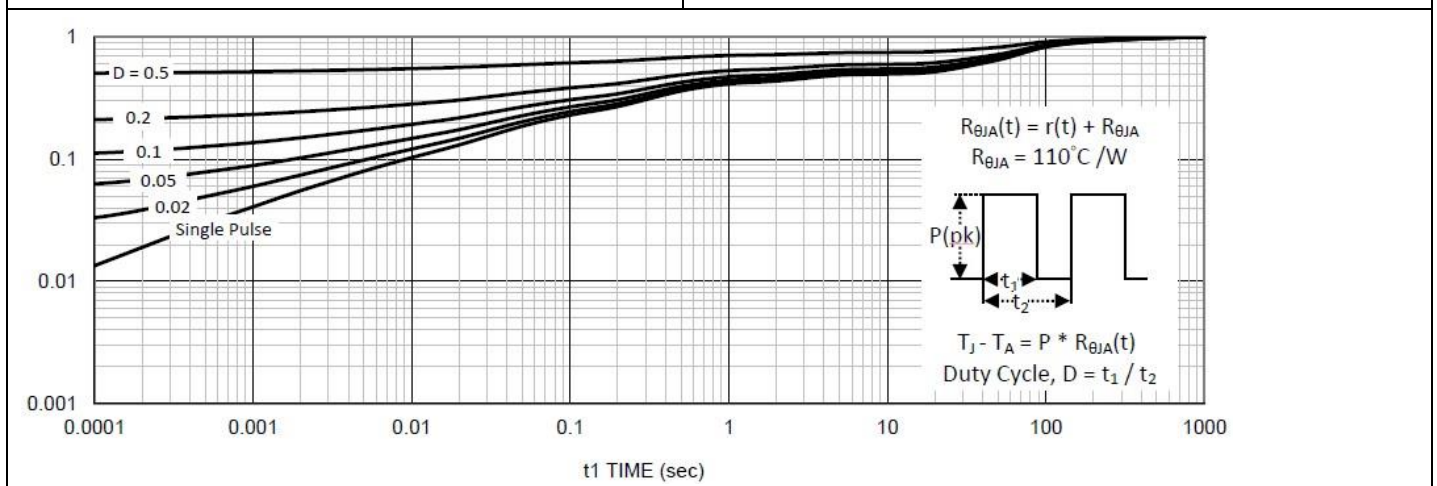
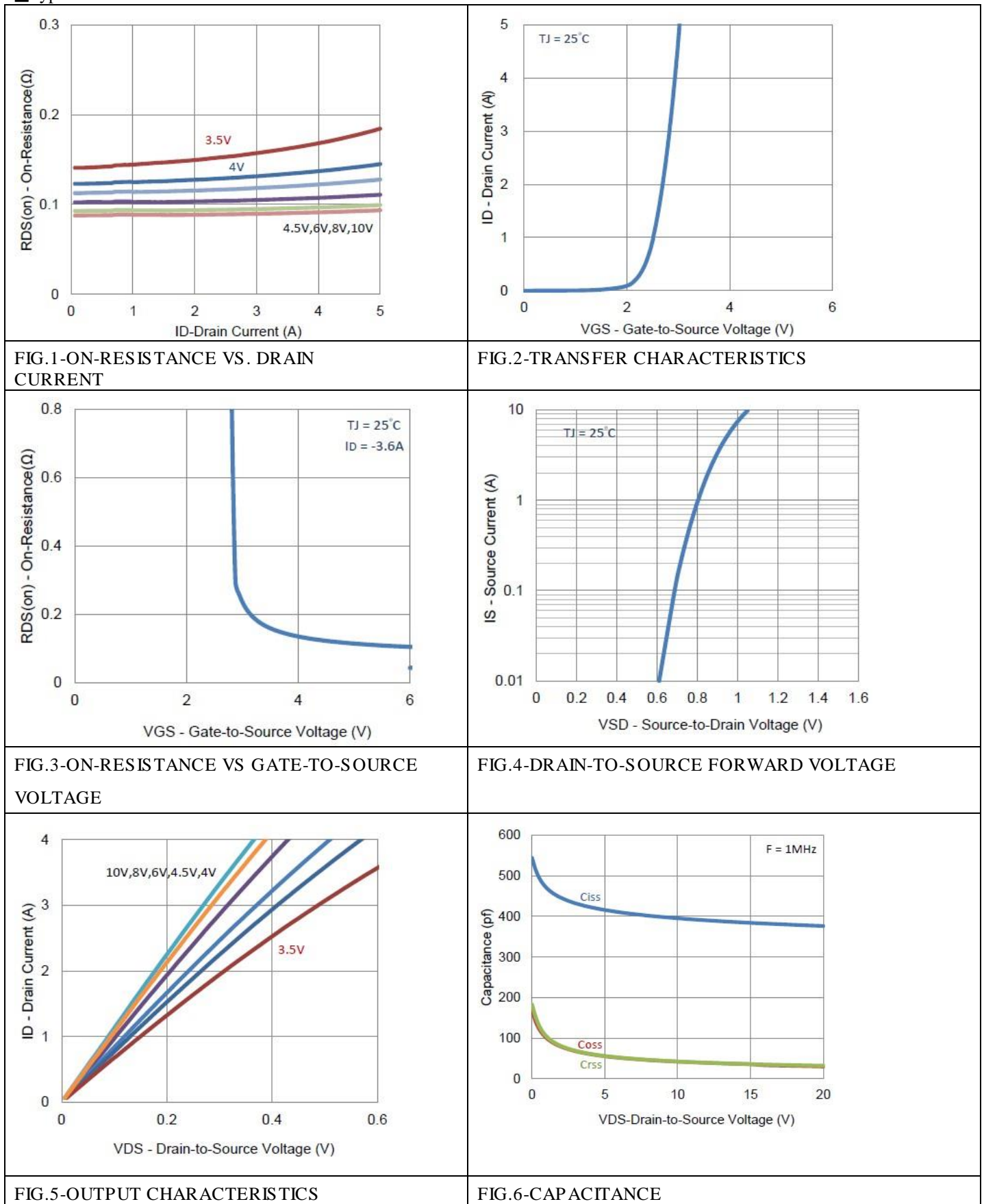


FIG.11-NORMALIZED THERMAL TRANSIENT JUNCTION TO AMBIENT

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Typical Electrical Characteristics - P-channel



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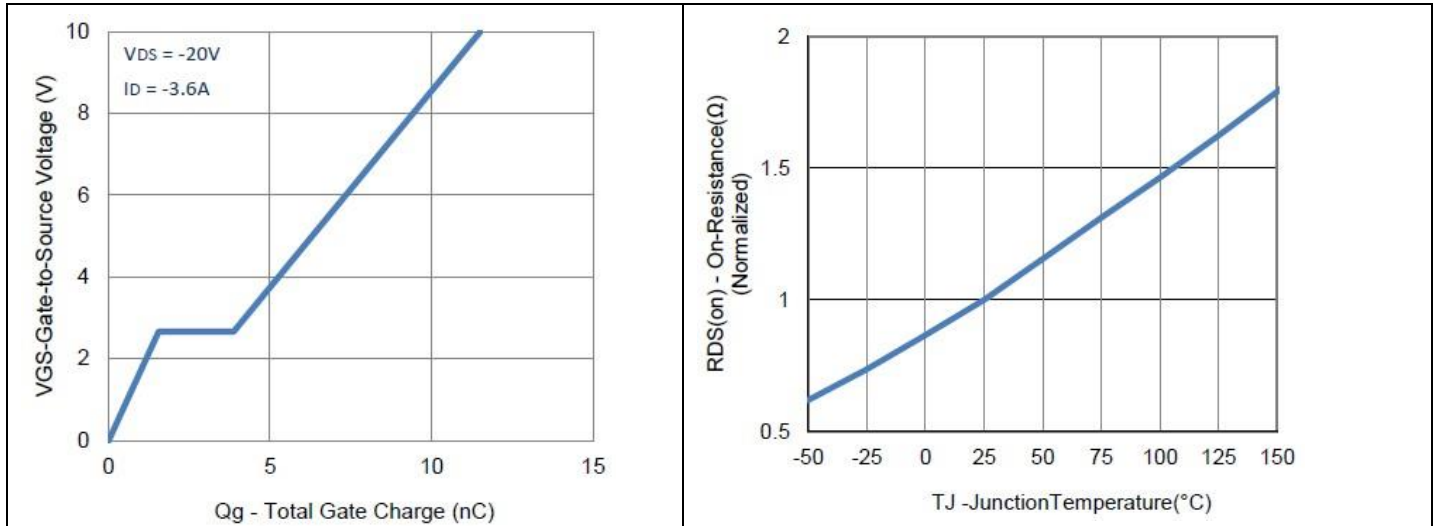


FIG.7-GATE CHARGE

FIG.8-NORMALIZED ON-RESISTANCE VS JUNCTION TEMPERATURE

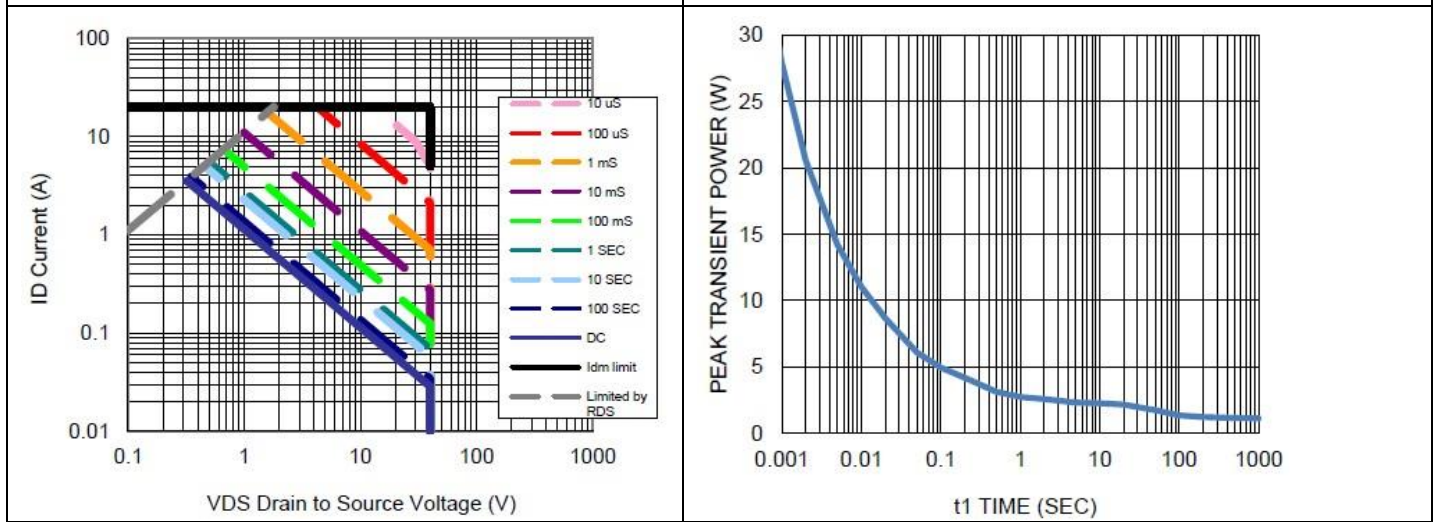


FIG.9-SAFE OPERATING AREA

FIG.10-SINGLE PULSE MAXIMUM POWER DISSIPATION

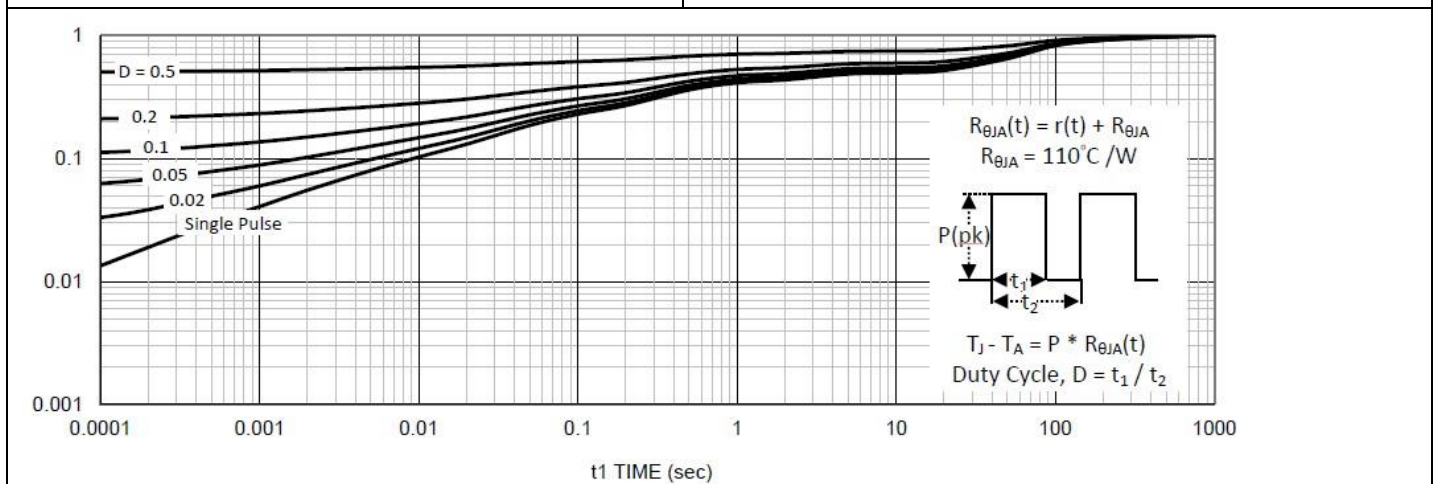


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Disclaimer

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