

## MS15C37

### N & P-Channel 30-V (D-S) MOSFET

#### Features

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

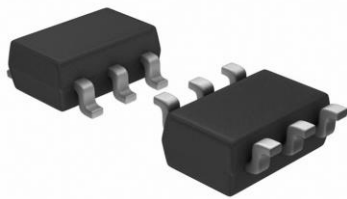
#### Applications

- DC/DC Conversion
- Power Routing
- Motor Drives

Package type : SC70-6

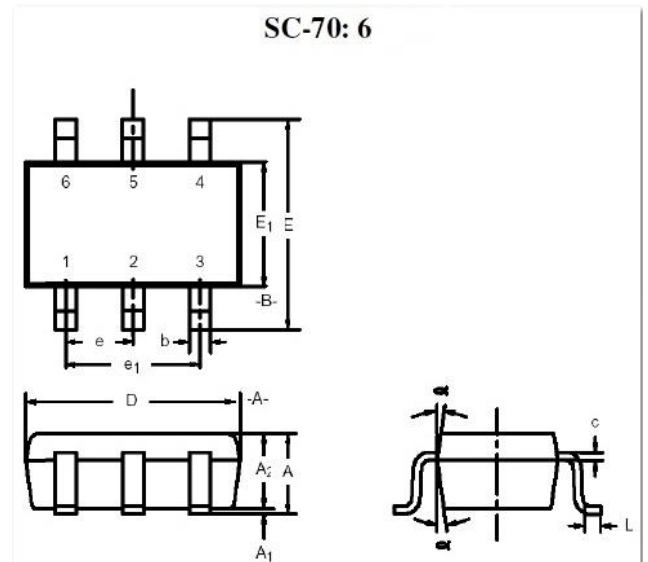
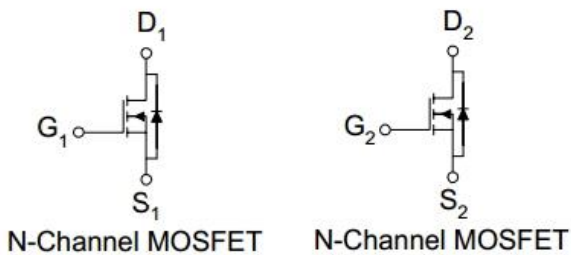
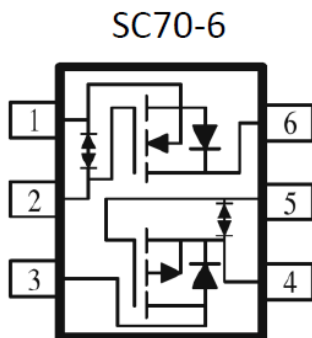
#### Packing & Order Information

3,000/Reel



**RoHS**  
COMPLIANT

Graphic symbol



Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.90	–	1.10	0.035	–	0.043
A <sub>1</sub>	–	–	0.10	–	–	0.004
A <sub>2</sub>	0.80	–	1.00	0.031	–	0.039
b	0.15	–	0.30	0.006	–	0.012
c	0.10	–	0.25	0.004	–	0.010
D	1.80	2.00	2.20	0.071	0.079	0.087
E	1.80	2.10	2.40	0.071	0.083	0.094
E <sub>1</sub>	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65BSC			0.026BSC		
e <sub>1</sub>	1.20	1.30	1.40	0.047	0.051	0.055
L	0.10	0.20	0.30	0.004	0.008	0.012
α	7°Nom			7°Nom		

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#### MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

##### Absolute Maximum Ratings (Tc=25°C unless otherwise specified)

Symbol	Parameter	Nch Limit	Pch Limit	Unit
V <sub>DS</sub>	Drain-Source Voltage	30	-30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	±20	V
I <sub>D</sub>	Continuous Drain Current <sup>a</sup> (T <sub>A</sub> =25°C)	1.5	1.0	A
	Continuous Drain Current <sup>a</sup> (T <sub>A</sub> =70°C)	1.25	0.86	A
I <sub>DM</sub>	Pulsed Drain Current <sup>b</sup>	10	-10	A
I <sub>S</sub>	Continuous Source Current (Diode Conduction) <sup>a</sup>	0.36	-0.35	A
P <sub>D</sub>	Power Dissipation <sup>a</sup> (T <sub>A</sub> =25°C)	0.3	0.3	W
	Power Dissipation <sup>a</sup> (T <sub>A</sub> =70°C)	0.21	0.21	W
T <sub>J</sub> /T <sub>STG</sub>	Operating Junction and Storage Temperature	-55 to 150		°C

##### Thermal Resistance Ratings

Symbol	Parameter	Maximum	Units
R <sub>THJA</sub>	Maximum Junction-to-Ambient C/W <sup>a</sup> (t ≤ 10 sec)	415	°C/W
	Maximum Junction-to-Ambient C/W <sup>a</sup> (Steady-State)	460	

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 <sub>GS(th)</sub>	Gate-Source Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA (Nch) V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA (Pch)	1 -1			V
I <sub>GSS</sub>	Gate-Body Leakage	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V (Pch)			±10	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V (Nch) V <sub>DS</sub> = -24 V, V <sub>GS</sub> = 0 V (Pch)			1 -1	uA
I <sub>D(on)</sub>	On-State Drain Current <sup>A</sup>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V (Nch) V <sub>DS</sub> = -5 V, V <sub>GS</sub> = -10 V (Pch)	1.8 1.2			A
R <sub>DS(on)</sub>	Drain-Source On-Resistance <sup>A</sup>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 1.1 A (Nch) V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 0.88 A (Pch) V <sub>GS</sub> = -10 V, I <sub>D</sub> = -0.8 A (Nch) V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -0.64 A (Pch)			90 130 190 290	mΩ
g <sub>fs</sub>	Forward Transconductance <sup>A</sup>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 1.1 A (Nch) V <sub>DS</sub> = -15 V, I <sub>D</sub> = -0.8 A (Pch)		4 3		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> = 0.18 V, V <sub>GS</sub> = 0 V (Nch) I <sub>S</sub> = 0.175 V, V <sub>GS</sub> = 0 V (Pch)		0.74 -0.79		V

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Dynamic <sup>b</sup>						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$Q_g$	Total Gate Charge	N-Channel $V_{DS} = 15\text{ V}$ , $I_D = 1.2\text{ A}$ , $V_{GS} = 4.5\text{ V}$	--	0.9	--	nC
$Q_{gs}$	Gate-Source Charge		--	0.32	--	nC
$Q_{gd}$	Gate-Drain Charge		--	0.30	--	nC
$t_{d(on)}$	Turn-On Delay Time	N-Channel $V_{DS} = 15\text{ V}$ , $R_L = 12.5\ \Omega$ , $V_{GEN} = 10\text{ V}$ , $R_{GEN} = 6\ \Omega$ , $I_D = 2\text{ A}$	--	2	--	ns
$t_r$	Rise Time		--	7	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	13	--	ns
$t_f$	Fall Time		--	4	--	ns
$C_{iss}$	Input Capacitance	N-Channel $V_{DS} = 15\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1\text{ Mhz}$	--	118	--	pF
$C_{oss}$	Output Capacitance		--	20	--	pF
$C_{rss}$	Reverse Transfer Capacitance		--	16	--	pF
$Q_g$	Total Gate Charge	P-Channel $V_{DS} = -15\text{ V}$ , $I_D = -0.8\text{ A}$ , $V_{GS} = -4.5\text{ V}$	--	2.3	--	nC
$Q_{gs}$	Gate-Source Charge		--	0.64	--	nC
$Q_{gd}$	Gate-Drain Charge		--	0.75	--	nC
$t_{d(on)}$	Turn-On Delay Time	P-Channel $V_{DS} = -15\text{ V}$ , $R_L = 18.7\ \Omega$ , $V_{GEN} = 10\text{ V}$ , $R_{GEN} = 6\ \Omega$ , $I_D = -0.8\text{ A}$	--	5	--	ns
$t_r$	Rise Time		--	7	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	13	--	ns
$t_f$	Fall Time		--	5	--	ns
$C_{iss}$	Input Capacitance	P-Channel $V_{DS} = -15\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1\text{ Mhz}$	--	132	--	pF
$C_{oss}$	Output Capacitance		--	23	--	pF
$C_{rss}$	Reverse Transfer Capacitance		--	18	--	pF

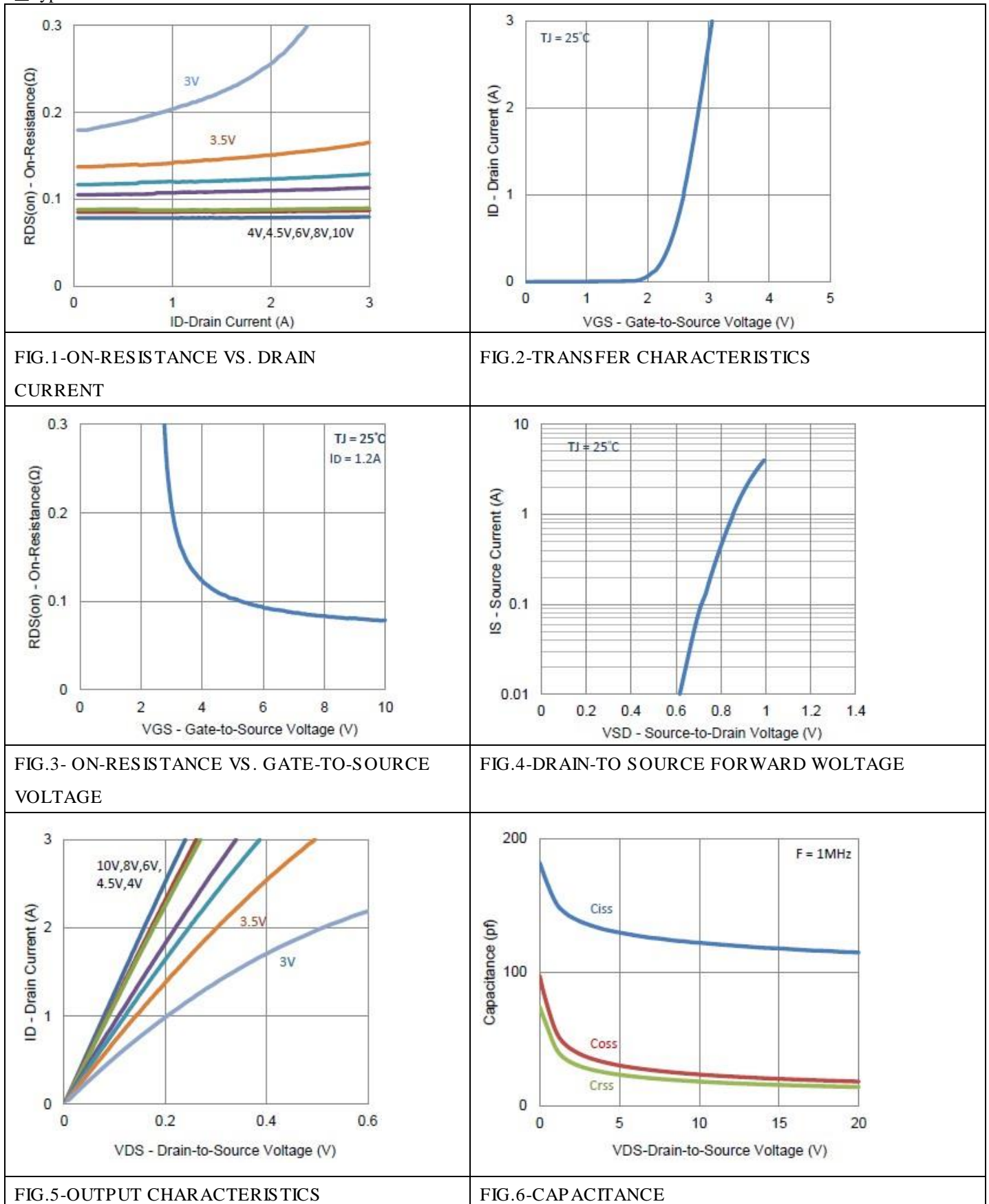
#### Notes :

- Pulse test:  $PW \leq 300\mu s$  duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.
- Repetitive rating, pulse width limited by junction temperature.

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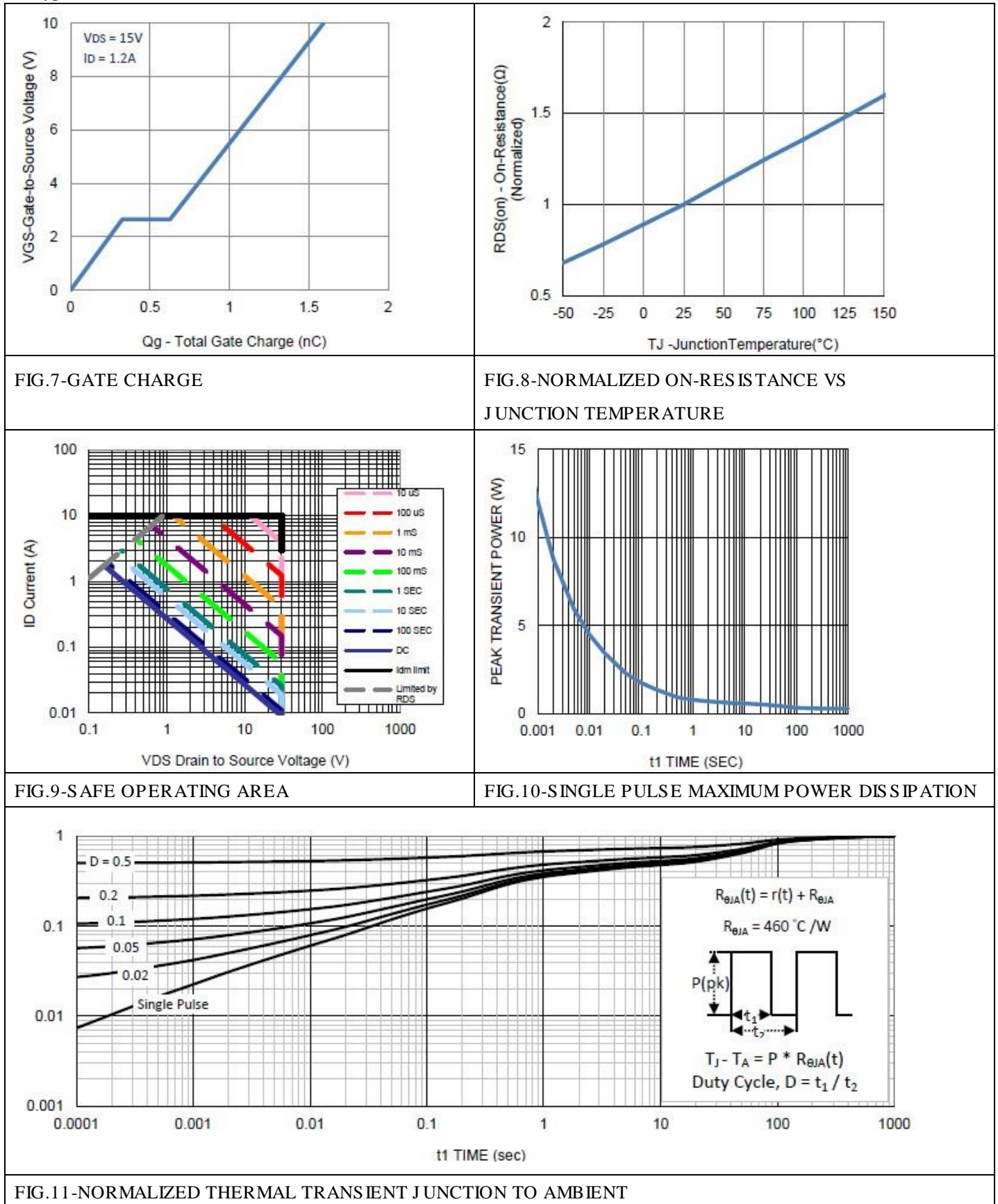
#### Typical Electrical Characteristics - N-channel



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### N & P-Channel 30-V (D-S) MOSFET

#### Typical Electrical Characteristics - N-channel





## MS15C37

### N & P-Channel 30-V (D-S) MOSFET

■ Typical Electrical Characteristics - P-channel

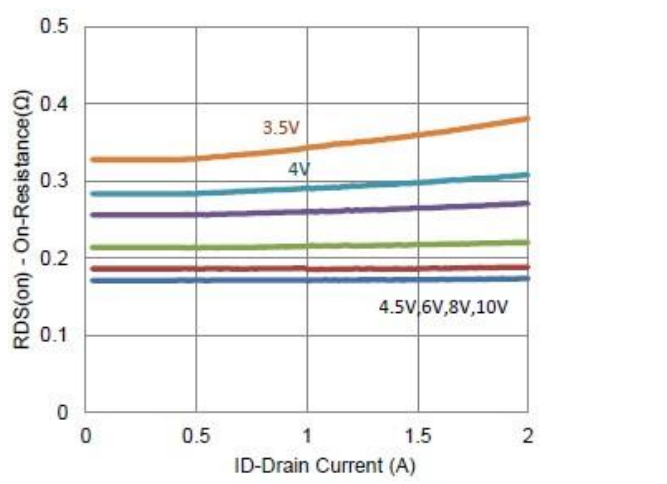


FIG.1-ON-RESISTANCE VS. DRAIN CURRENT

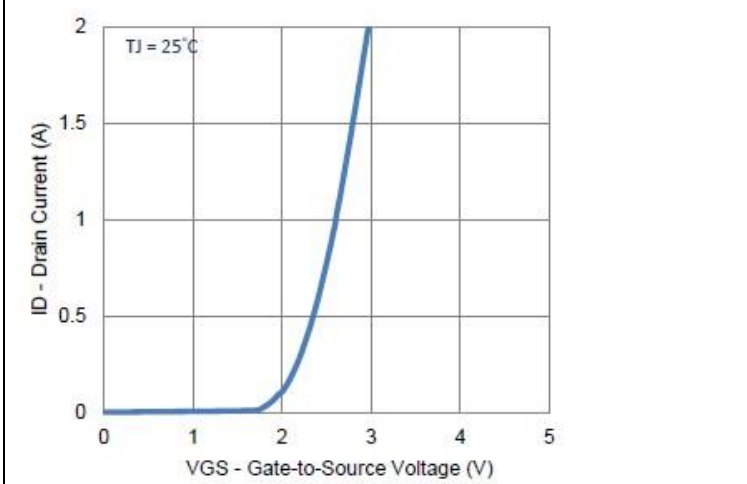


FIG.2-TRANSFER CHARACTERISTICS

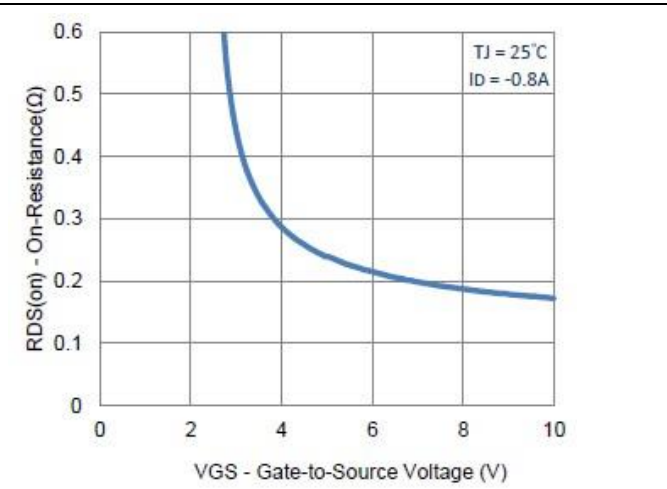


FIG.3- ON-RESISTANCE VS. GATE-TO-SOURCE VOLTAGE

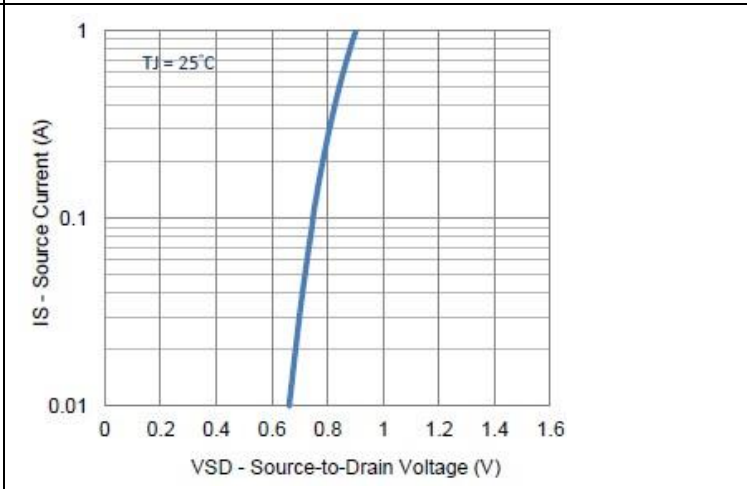


FIG.4-DRAIN-TO SOURCE FORWARD VOLTAGE

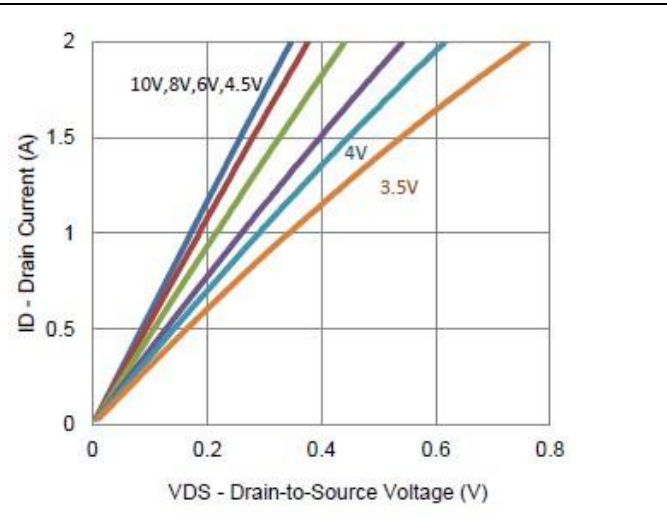


FIG.5-OUTPUT CHARACTERISTICS

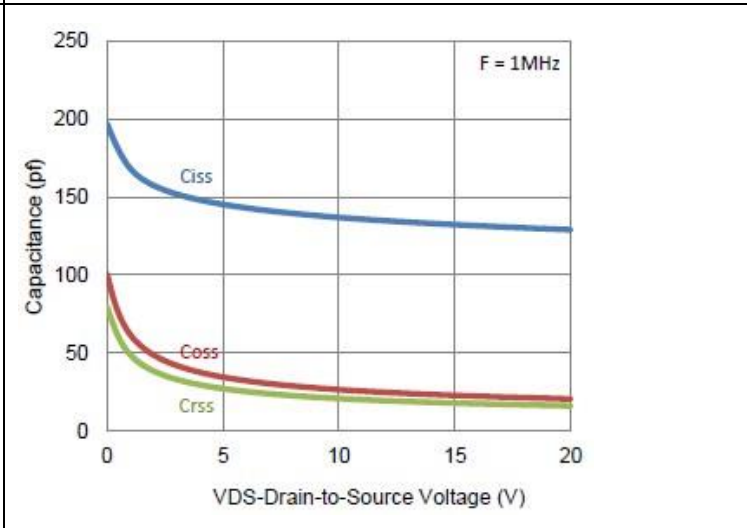
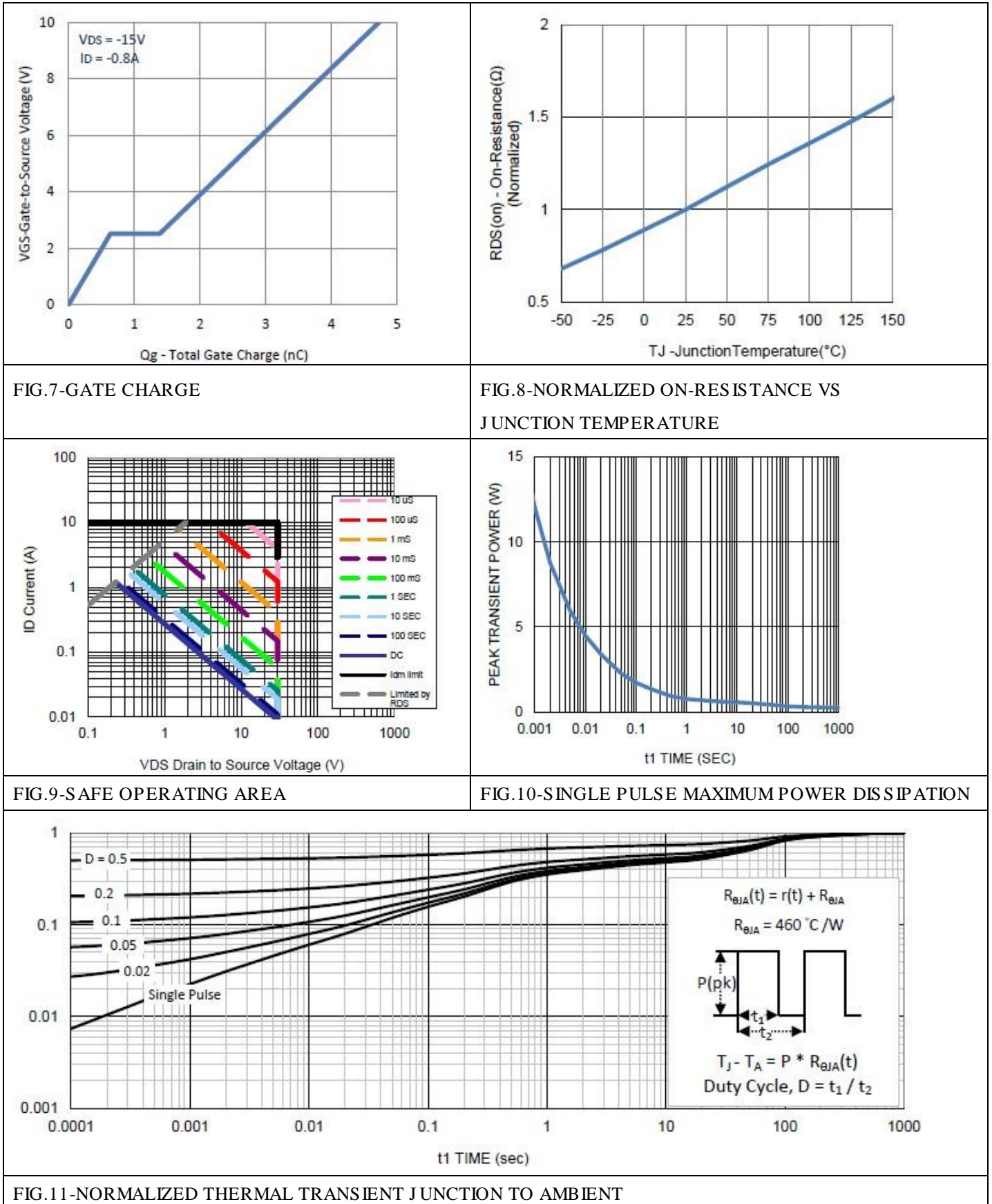


FIG.6-CAPACITANCE

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### N & P-Channel 30-V (D-S) MOSFET

#### Typical Electrical Characteristics - P-channel



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#### Disclaimer

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