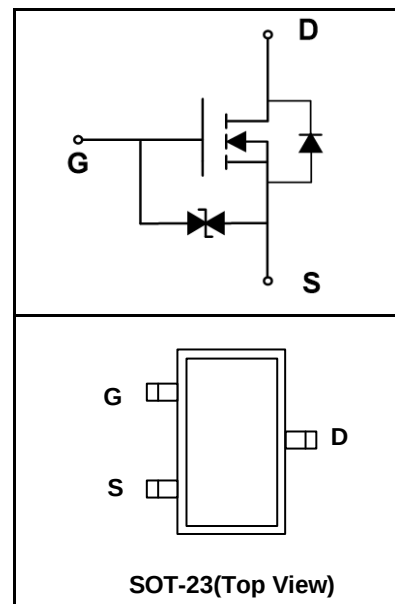


20V N-Channel Enhancement MOSFET

Features

- $V_{DS} = 20V$, $I_D = 7A$
- $R_{DS(on)} < 25m\Omega$ @ $V_{GS} = 4.5V$
- $R_{DS(on)} < 30m\Omega$ @ $V_{GS} = 2.5V$
- Trench LV MOSFET Technology
- SOT-23 Package
- Marking : Making Code
- RoHS Compliant
- ESD Protected



Applications

- Power Management Switches
- DC/DC Converter

Absolute Maximum Ratings ($T_A = 25^\circ C$, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 10	V
Continuous Drain Current	$T_A = 25^\circ C$	I_D	7	A
Pulsed Drain Current ¹		I_{DM}	28	A
Total Power Dissipation	$T_A = 25^\circ C$	P_D	1.3	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ²	$R_{\theta JA}$	96	$^\circ C/W$

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Electrical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	20	-	-	V
Gate-body Leakage current	I _{GSS}	V _{GS} = ±10V, V _{DS} = 0V	-	-	±10	μA
Drain Cut-off Current	I _{DSS}	V _{DS} = 20V, V _{GS} = 0	-	-	1	μA
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	0.5	0.75	0.9	V
Drain-Source on-Resistance ³	R _{DS(on)}	V _{GS} = 4.5V, I _D =6A	-	14	25	mΩ
		V _{GS} = 2.5V, I _D = 5A	-	18	30	
Dynamic Characteristics ⁴						
Input Capacitance	C _{iss}	V _{DS} = 10V, V _{GS} = 0V, f = 1MHz	-	850	-	pF
Output Capacitance	C _{oss}		-	140	-	
Reverse Transfer Capacitance	C _{rss}		-	105	-	
Switching Characteristics ⁴						
Total Gate Charge	Q _g	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 6A	-	11	-	nC
Gate-Source Charge	Q _{gs}		-	2	-	
Gate-Drain Charge	Q _{gd}		-	3.1	-	
Turn-On Time	t _{d(on)}	V _{GS} =4.5V, V _{DD} = 10V, R _G = 3Ω, I _D = 6A	-	5.2	-	ns
Rise Time	t _r		-	14	-	
Turn-Off Time	t _{d(off)}		-	23	-	
Fall Time	t _f		-	15	-	
Source-Drain Body Diode Characteristics						
Diode Forward Voltage ³	V _{SD}	V _{GS} = 0V, I _S = 1A	-	-	1.2	V
Continuous Source Current	I _S		-	-	7	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.
2. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. This value is guaranteed by design hence it is not included in the production test.

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Typical Characteristics

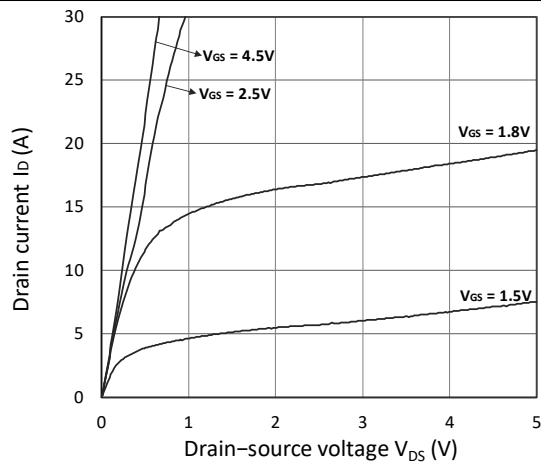


Figure 1. Output Characteristics

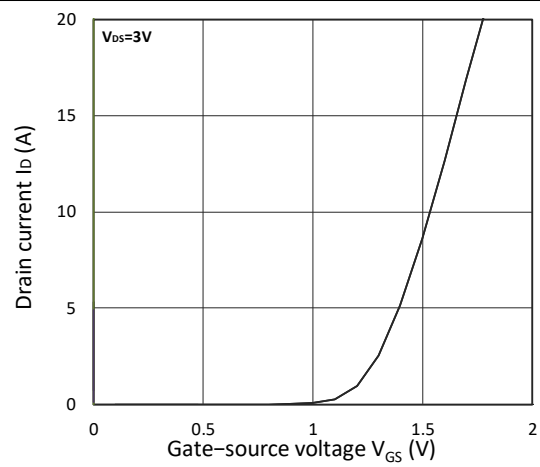


Figure 2. Transfer Characteristics

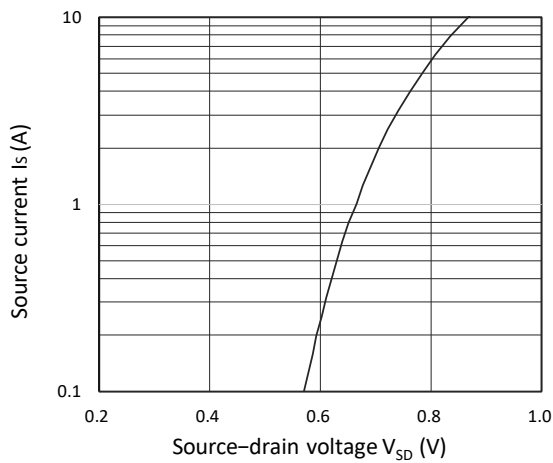


Figure 3. Forward Characteristics of Reverse

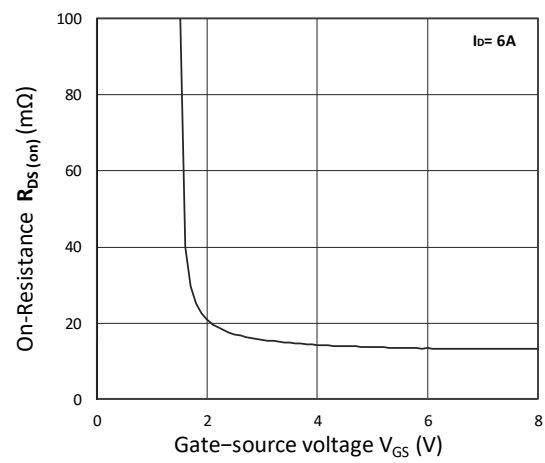


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

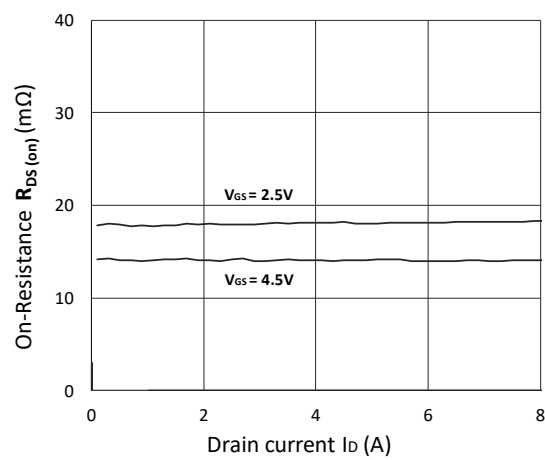


Figure 5. $R_{DS(ON)}$ vs. I_D

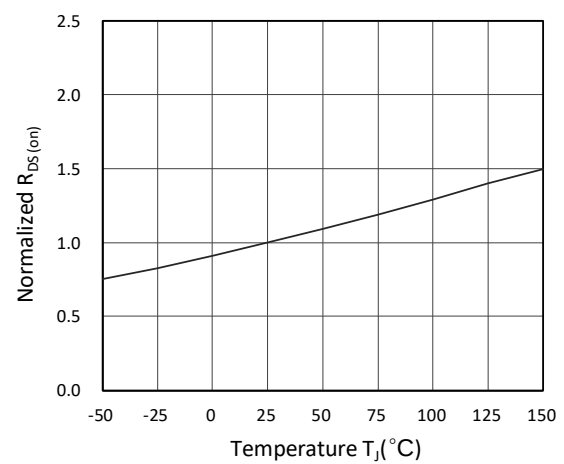


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

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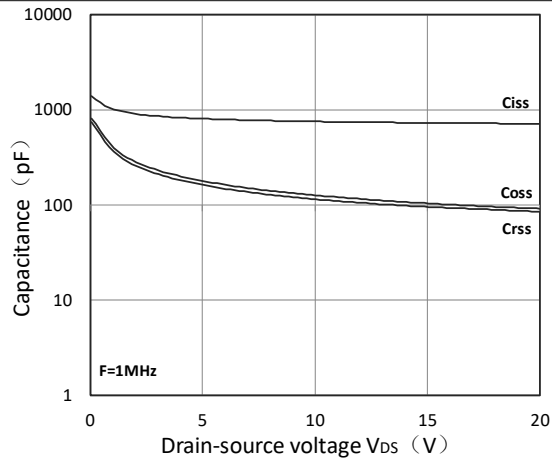


Figure 7. Capacitance Characteristics

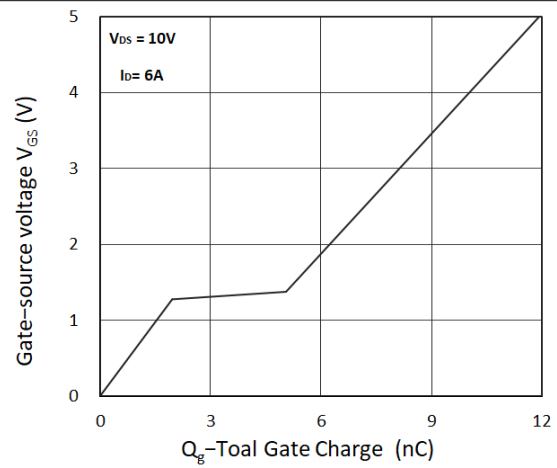
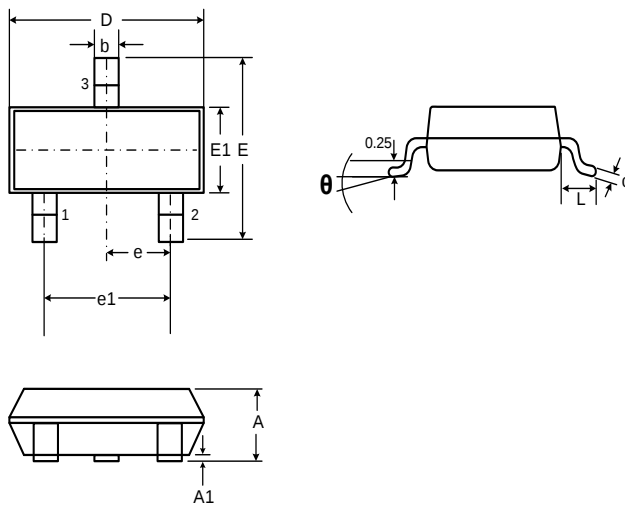


Figure 8. Gate Charge Characteristics

Package Dimension

SOT-23 (Unit: mm)



SYMBOL	MILLIMETER	
	MIN	MAX
A	0.90	1.15
A1	0.00	0.10
b	0.30	0.50
c	0.08	0.15
D	2.80	3.00
E	2.25	2.55
E1	1.20	1.40
e	0.95 BSC	
e1	1.80	2.00
L	0.55REF	
θ	0°	8°

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Ordering Information

Part	Package	Marking	Packing Information
EM02N70M	SOT-23	3416E	3k/Reel

Revision History and Checking Table

No.	Version	Date	Revision Item	Request	Function & Spec Checking	Package Checking	Tape Checking
1	1.0	2019-04-19	Released Version	Qi Shu Kun	Qi Shu Kun	Liu Jia Ying	Liu Jia Ying