

N-Channel 20-V (D-S) MOSFET

Key Features:

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

Typical Applications:

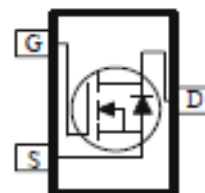
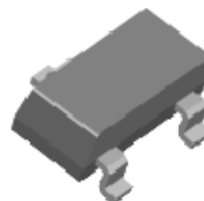
- Power Routing
- Li Ion Battery Packs
- Level Shifting and Driver Circuits

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (m Ω)	I_D (A)
20	10 @ $V_{GS} = 4.5V$	9.4
	13 @ $V_{GS} = 2.5V$	8.2

SOT-23



RoHS
COMPLIANT
HALOGEN
FREE



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 8	
Continuous Drain Current ^a	I_D	9.4	A
Pulsed Drain Current ^b	I_{DM}	30	
Continuous Source Current (Diode Conduction) ^a	I_S	1.7	A
Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	1.3
		$T_A = 70^\circ\text{C}$	0.8
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient ^a	$R_{\theta JA}$	100	$^\circ\text{C}/\text{W}$
Maximum Junction-to-Case	$R_{\theta JC}$	166	

Notes

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

Electrical Characteristics

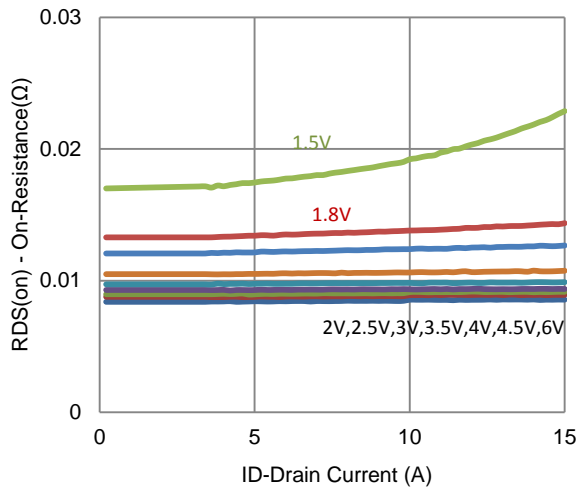
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	0.4			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 8 V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 16 V, V_{GS} = 0 V$			1	uA
		$V_{DS} = 16 V, V_{GS} = 0 V, T_J = 55^\circ C$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 4.5 V$	12			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = 4.5 V, I_D = 6.8 A$			10	mΩ
		$V_{GS} = 2.5 V, I_D = 5.4 A$			13	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 V, I_D = 6.8 A$		7		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 0.8 A, V_{GS} = 0 V$		0.74		V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = 10 V, V_{GS} = 4.5 V,$ $I_D = 6.8 A$		24		nC
Gate-Source Charge	Q_{gs}			3.1		
Gate-Drain Charge	Q_{gd}			5.5		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 10 V, R_L = 1.5 \Omega,$ $I_D = 6.8 A,$ $V_{GEN} = 4.5 V, R_{GEN} = 6 \Omega$		8		ns
Rise Time	t_r			18		
Turn-Off Delay Time	$t_{d(off)}$			82		
Fall Time	t_f			23		
Input Capacitance	C_{iss}	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 \text{ Mhz}$		1968		pF
Output Capacitance	C_{oss}			164		
Reverse Transfer Capacitance	C_{rss}			146		

Notes

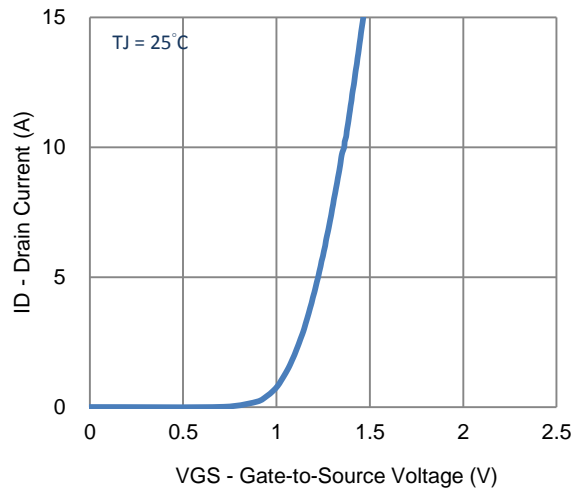
- Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

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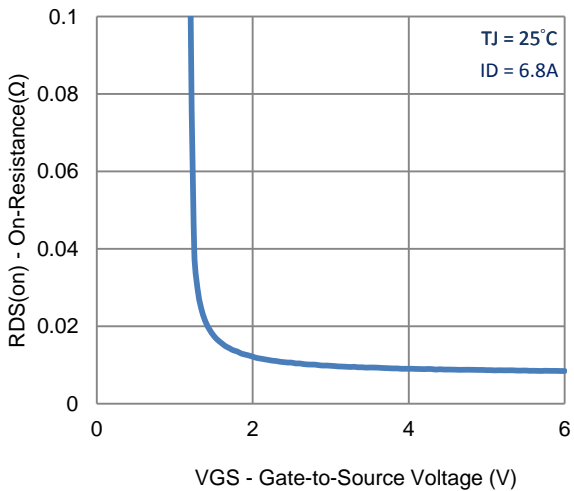
Typical Electrical Characteristics



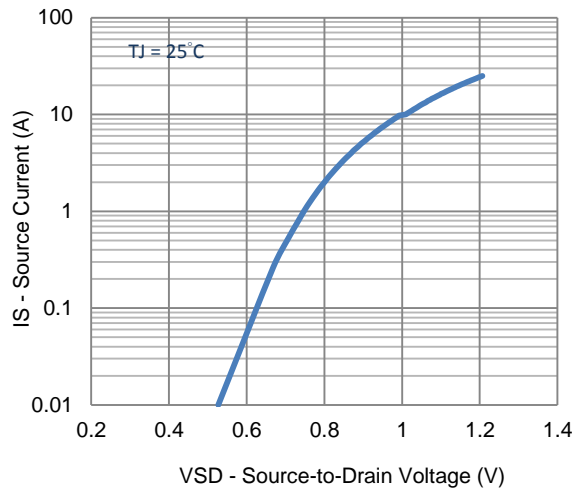
1. On-Resistance vs. Drain Current



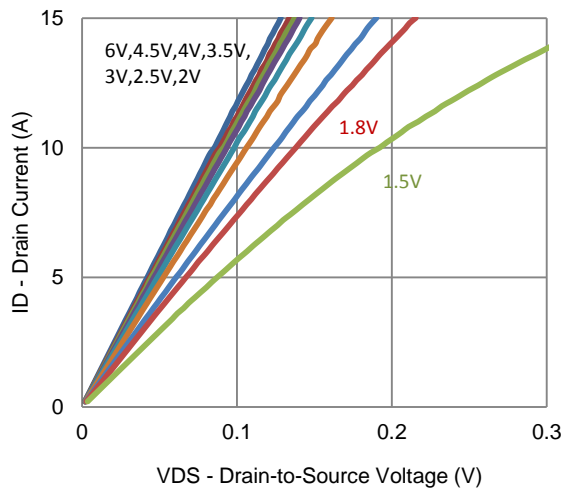
2. Transfer Characteristics



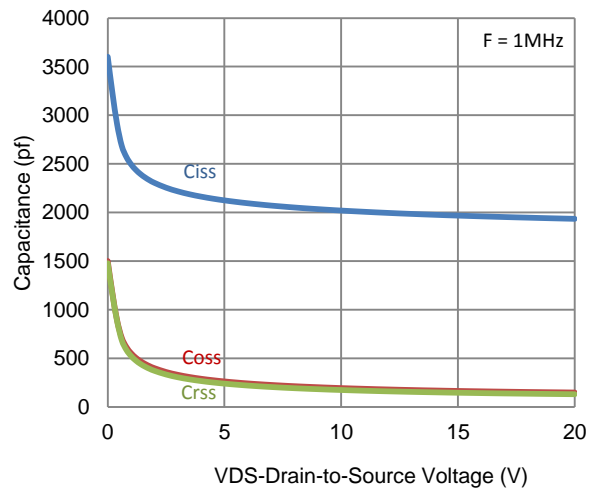
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

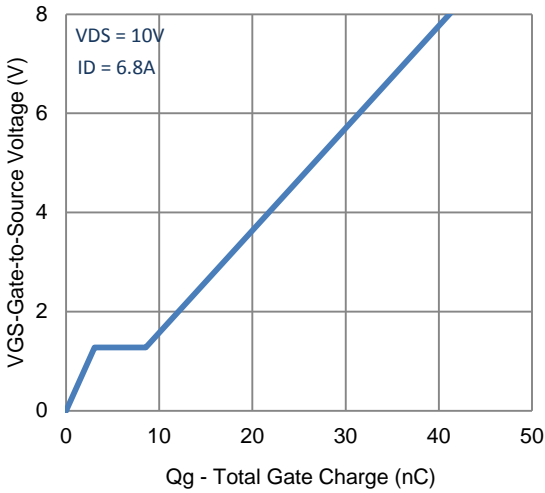


5. Output Characteristics

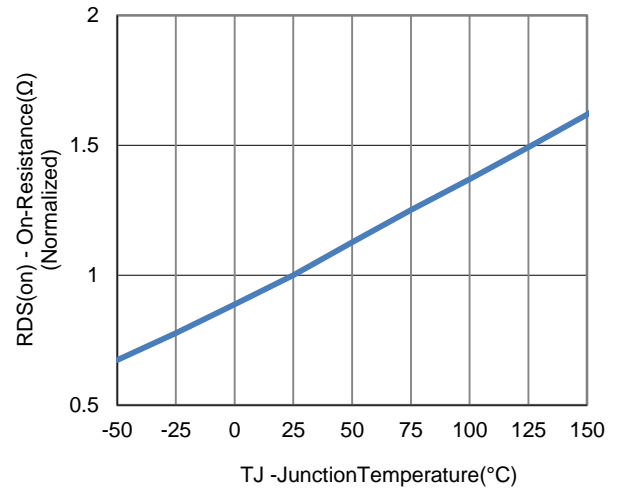


6. Capacitance

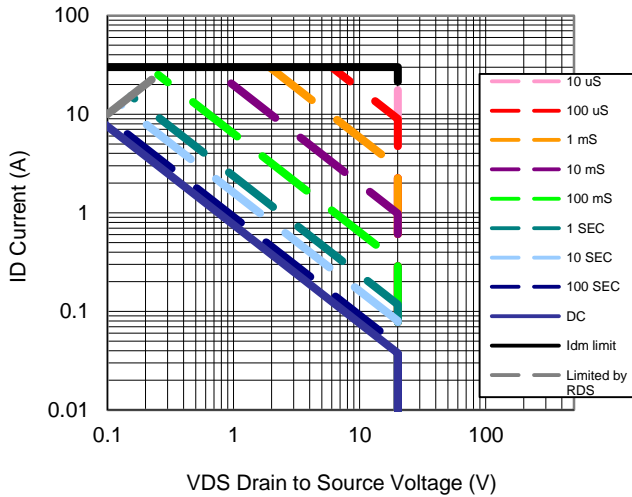
Typical Electrical Characteristics



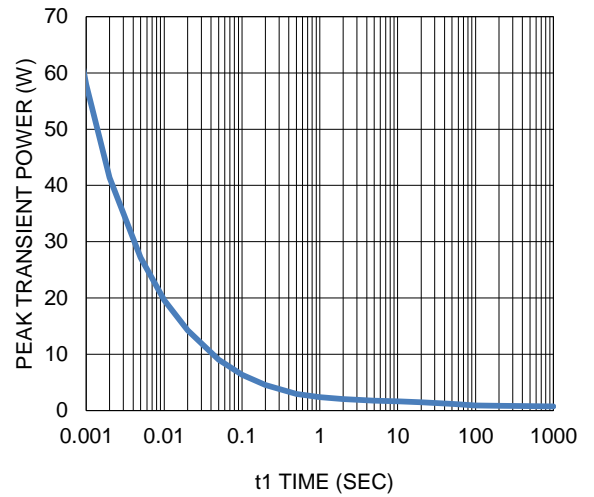
7. Gate Charge



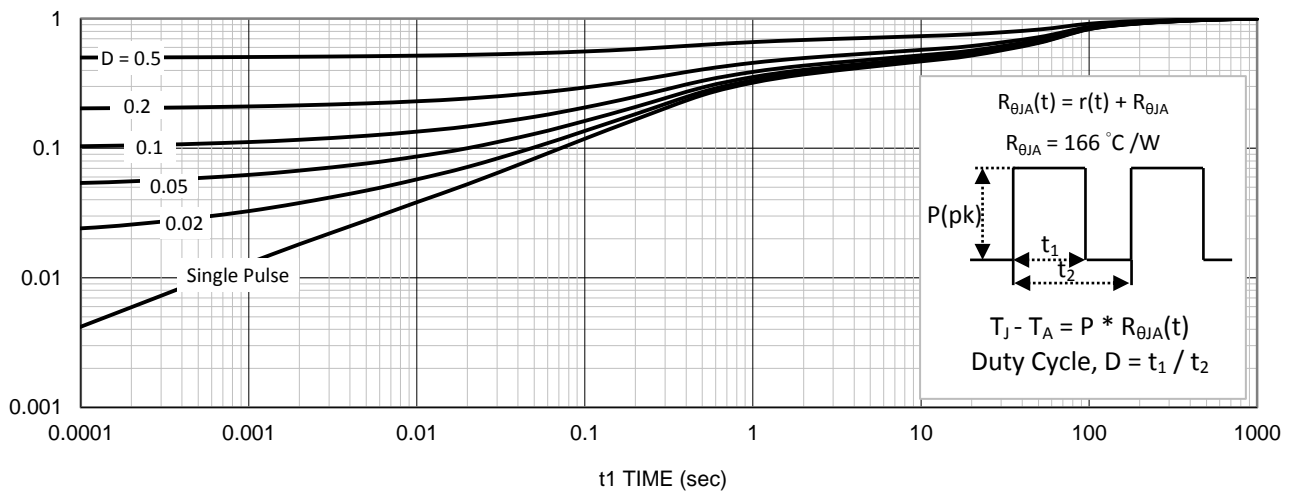
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

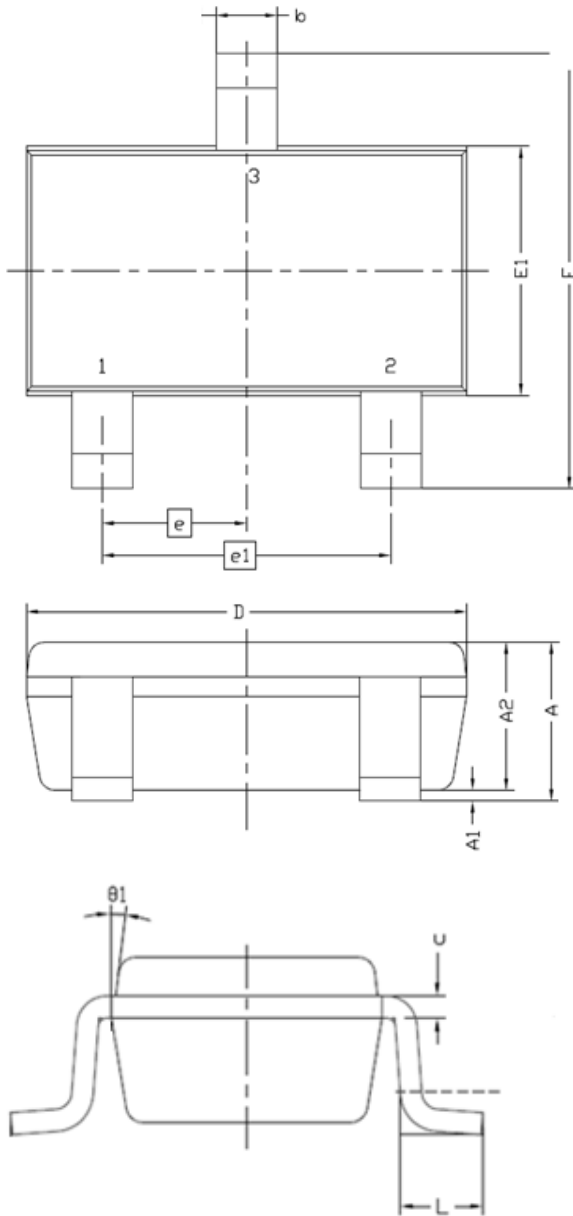


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

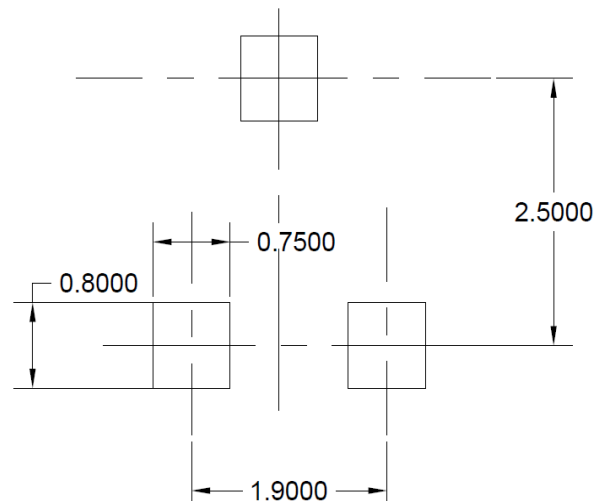
Package Information



Symbol	MILLIMETERS	
	MIN	MAX
A	0.8	1.2
A1	0	0.1
A2	0.7	1.1
b	0.3	0.5
c	0.1	0.2
D	2.7	3.1
E	2.6	3
E1	1.4	1.8
e	0.95 BSC	
e1	1.9 BSC	
L	0.3	0.6
θ1	7° NOM	

Recommended Pad Layout

Note: Drain opening is recommended to be solder mask defined in a copper fill to provide improved thermal performance



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