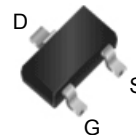




N-Channel 20V,1.2A, N-MOSFET

FEATURES

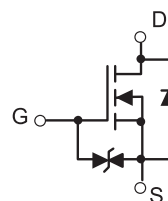
- TrenchFET® Power MOSFET: 1.8-V Rated
- Gate-Source ESD Protected
- High-Side Switching
- Low On-Resistance: $0.4\Omega(\text{max})$
- Low Threshold: 0.7V (typ)
- Fast Switching Speed: 10 ns
- S- Prefix for Automotive and Other Applications Requiring



SOT-523

BENEFITS

- Ease in Driving Switches
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Low Battery Voltage Operation



APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, Pagers

ABSOLUTE MAXIMUM RATINGS (T _A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	5 secs	Steady State	Unit
Drain-Source Voltage		V _{DS}	20		V
Gate-Source Voltage		V _{GS}	± 8		
Continuous Drain Current (T _J = 150°C) ^b	T _A = 25°C	I _D	1200	900	mA
	T _A = 85°C		800	600	
Pulsed Drain Current ^a		I _{DM}	2500		
Continuous Source Current (diode conduction) ^b		I _S	275	250	
Maximum Power Dissipation ^b for SC-89	T _A = 25°C	P _D	275	250	mW
	T _A = 85°C		160	140	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150		°C

Notes

- d. Pulse width limited by maximum junction temperature.
- e. Surface Mounted on FR4 Board.



● **Electrical Characteristics (@TA=25°C unless otherwise noted)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V$, $I_D=250\mu A$	20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=16V$, $V_{GS}=0V$	--	--	1	μA
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_{DS}=250\mu A$	0.5	--	1.0	V
Gate Leakage Current	I_{GSS}	$V_{GS}=\pm 8V$, $V_{DS}=0V$	--	--	± 10	μA
Drain-Source On-state Resistance	$R_{DS(on)}$	$V_{GS}=4.5V$, $I_D=0.5A$	--	250	400	m Ω
		$V_{GS}=2.5V$, $I_D=0.5A$	--	300	500	m Ω
		$V_{GS}=1.8V$, $I_D=0.35A$	--	400	650	m Ω
Total Gate Charge	Q_g	$V_{GS}=4.5V$, $V_{DS}=10V$, $I_D=1A$	--	2	--	nC
Gate- Source Charge	Q_{gs}		--	0.3	--	nC
Gate- Drain Charge	Q_{gd}		--	0.3	--	nC
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=4.5V$, $V_{DS}=10V$, $R_{GEN}=6\Omega$, $I_D=2A$	--	1.2	--	ns
Turn-on Rise Time	t_r		--	25	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	14	--	ns
Turn-off Fall Time	t_f		--	15	--	ns
Input Capacitance	C_{iss}	$V_{GS}=0V$, $V_{DS}=10V$, $f=1MHz$	--	43	--	pF
Output Capacitance	C_{oss}		--	9	--	pF
Reverse Transfer Capacitance	C_{rss}		--	6	--	pF

● **Reverse Diode Characteristics (@TA=25°C unless otherwise noted)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Diode Forward Current	I_{SD}	$V_G=V_D=0V$, Force Current	--	--	3.5	A
Diode Forward Voltage	V_{SD}	$I_{SD}=0.5A$, $V_{GS}=0V$	--	--	1.3	V
Reverse Recovery Time	t_{rr}	$I_F = 1A$ $di/dt = 100 A/\mu s$	--	9	--	nS
Reverse Recovery Charge	Q_{rr}		--	1	--	nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with TA=25°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the t<10s junction to ambient thermal resistance rating.



● TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

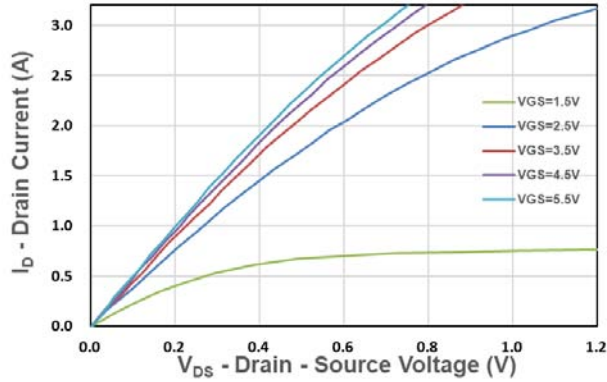


Figure 1. Output Characteristics

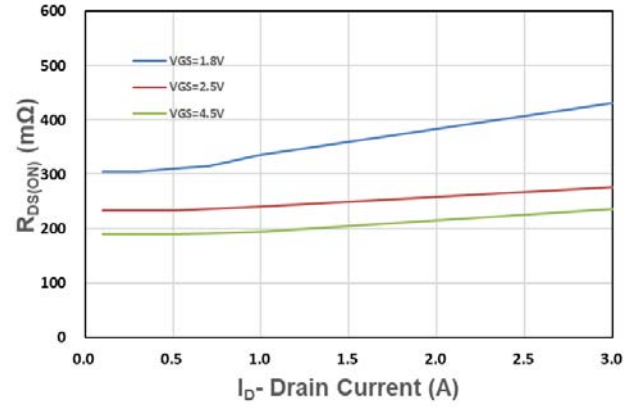


Figure 2. On-Resistance vs. I

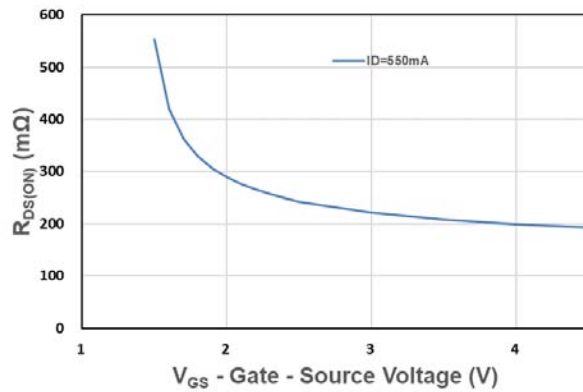


Figure 3. On-Resistance vs. V_{GS}

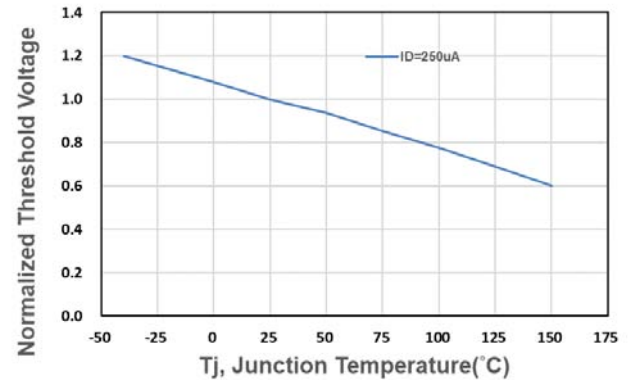


Figure 4. Gate Threshold Voltage

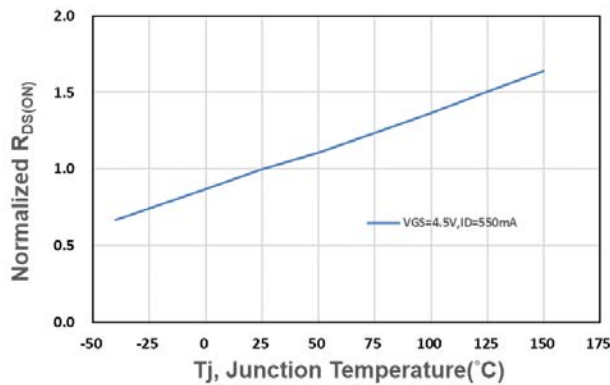


Figure 5. Drain-Source On Resistance

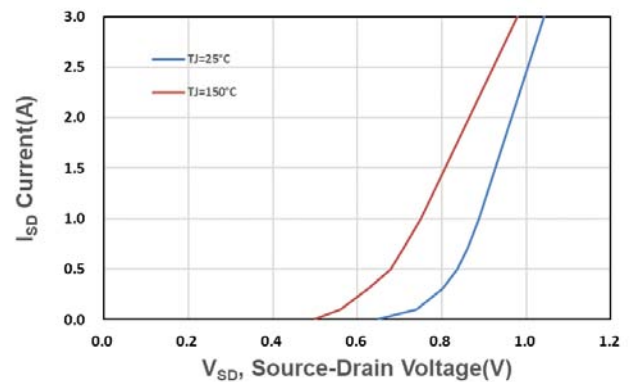


Figure 6. Source-Drain Diode Forward

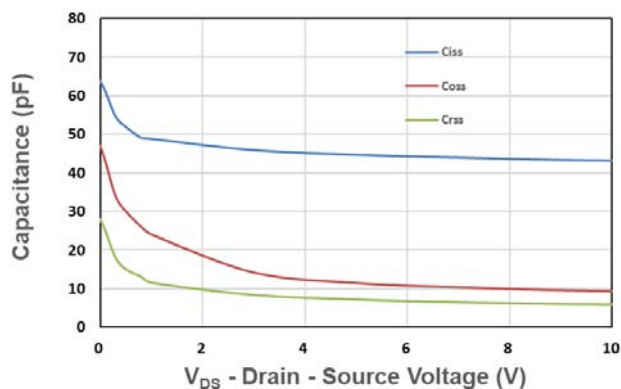


Figure 7. Capacitance

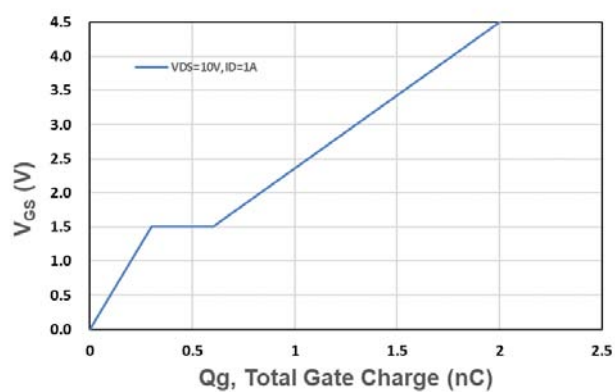


Figure 8. Gate Charge Characteristics

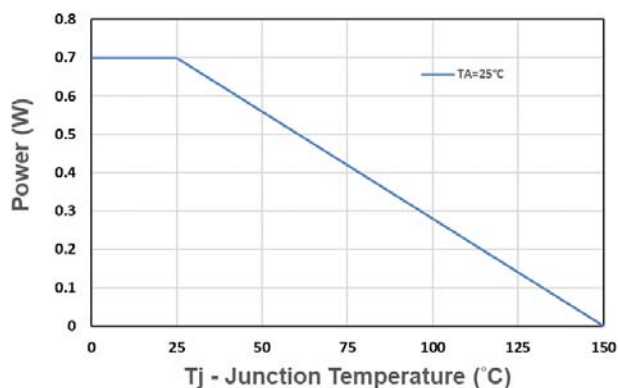


Figure 9. Power Dissipation

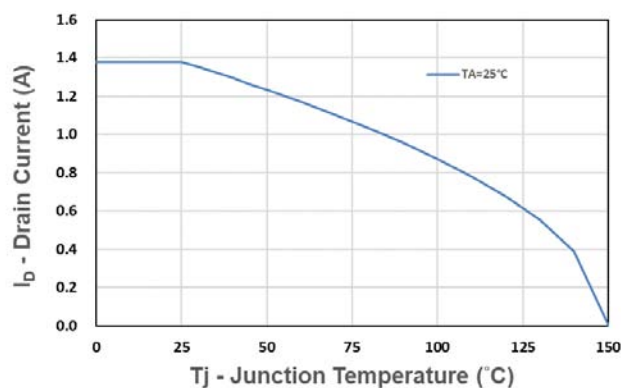


Figure 10. Drain Current

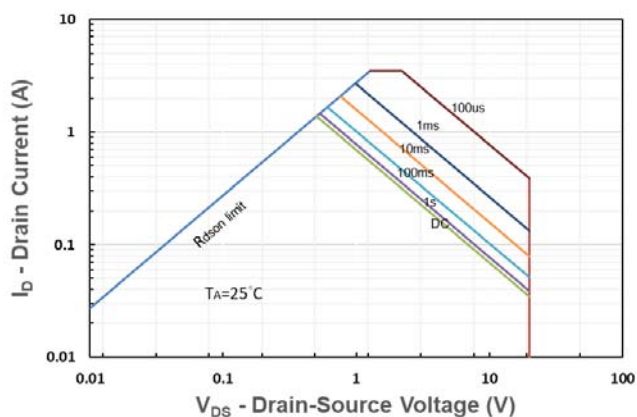


Figure 11. Safe Operating Area

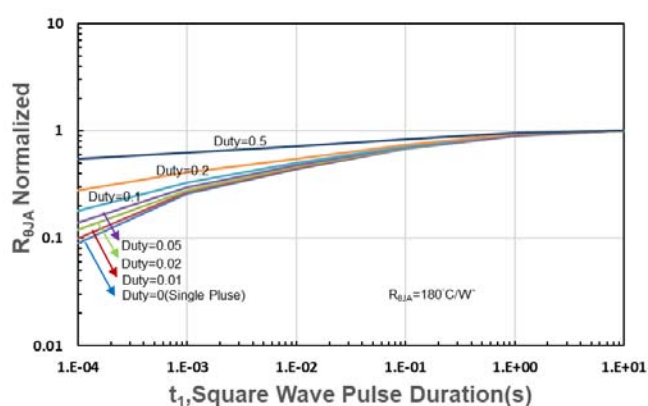
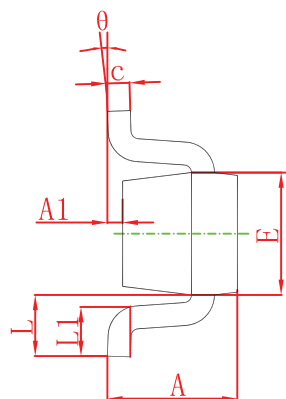
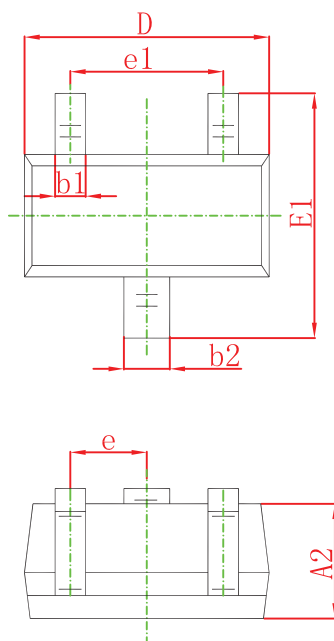


Figure 12. $R_{\theta JA}$ Transient Thermal Impedance

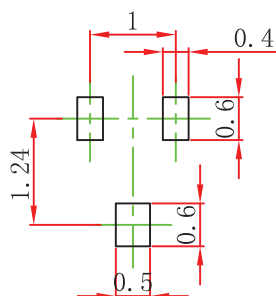


SOT-523 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b1	0.150	0.250	0.006	0.010
b2	0.250	0.350	0.010	0.014
c	0.100	0.200	0.004	0.008
D	1.500	1.700	0.059	0.067
E	0.700	0.900	0.028	0.035
E1	1.450	1.750	0.057	0.069
e	0.500 TYP.		0.020 TYP.	
e1	0.900	1.100	0.035	0.043
L	0.400 REF.		0.016 REF.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

SOT-523 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.