100V 54mΩ N-Ch Power MOSFET

Features

- Low Gate Charge
- High Current Capability
- 100% UIS Tested, 100% R_g Tested

Applications

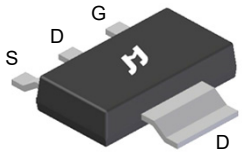
- Power Management in Computing, CE, IE 4.0, Communications
- Current Switching in DC/DC & AC/DC (SR) Sub-systems
- Load Switching, Quick/Wireless Charging, Motor Driving

Product Summary

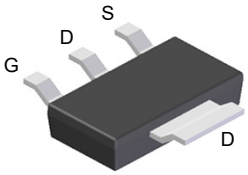
Parameter	Value	Unit
V_{DS}	100	V
$V_{GS(th)\_Typ}$	2.0	V
I_D (@ V_{GS} = 10V) (1)	8.4	A
$R_{DS(ON)\_Typ}$ (@ V_{GS} = 10V)	54	mΩ
$R_{DS(ON)\_Typ}$ (@ V_{GS} = 4.5V)	75	mΩ

SOT-223-3L

Top View

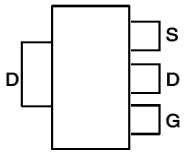


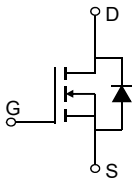
Bottom View



Pin Configuration

Top View





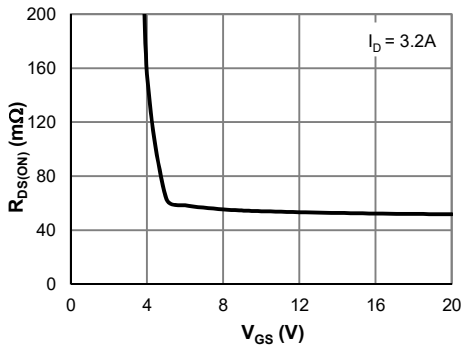
Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSL1070AY-13	SOT-223-3L	3	SL1070A	3	-55 to 150	13-inch Reel	4000

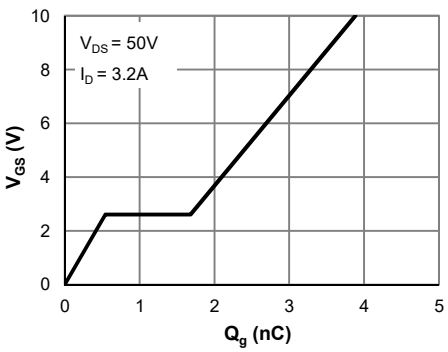
Absolute Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-to-Source Voltage		V_{DS}	100	V
Gate-to-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (1)	T_C = 25°C	I_D	8.4	A
	T_C = 100°C		5.3	
Pulsed Drain Current (2)		I_{DM}	34	A
Avalanche Current (3)		I_{AS}	4.5	A
Avalanche Energy (3)		E_{AS}	1.0	mJ
Power Dissipation (4)	T_C = 25°C	P_D	9.6	W
	T_C = 100°C		3.8	
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

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



Gate Charge



Electrical Characteristics (@ T_J = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 250μA, V_{GS} = 0V	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =80V, V_{GS} = 0V			1.0	μA
		T_J = 55°C			5.0	
Gate-Body Leakage Current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.2	2.0	3.0	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 3.2A		54	70	mΩ
		V_{GS} = 4.5V, I_D = 2.7A		75	98	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 3.2A		11.0		S
Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0V		0.70	1.0	V
Diode Continuous Current	I_S	T_C = 25°C			10	A
DYNAMIC PARAMETERS (5)						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 1MHz		187		pF
Output Capacitance	C_{oss}			54		pF
Reverse Transfer Capacitance	C_{rss}			5.0		pF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz		1.4		Ω
SWITCHING PARAMETERS (5)						
Total Gate Charge (@ V_{GS} = 10V)	Q_g	V_{GS} = 0 to 10V V_{DS} = 50V, I_D = 3.2A		3.9		nC
Total Gate Charge (@ V_{GS} = 4.5V)	Q_g			2.2		nC
Gate Source Charge	Q_{gs}			0.50		nC
Gate Drain Charge	Q_{gd}			1.1		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS} = 10V, V_{DS} = 50V R_L = 15.6Ω, R_{GEN} = 6Ω		2.6		ns
Turn-On Rise Time	t_r			3.5		ns
Turn-Off DelayTime	$t_{D(off)}$			9.4		ns
Turn-Off Fall Time	t_f			5.5		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F = 3.2A, dI_F/dt = 100A/μs		30		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = 3.2A, dI_F/dt = 100A/μs		16.1		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	58	70	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	9.8	13.0	°C/W

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under T_{J_Max} = 150°C.
3. This single-pulse measurement was taken under the following condition [L = 100μH, V_{GS} = 10V, V_{DS} = 50V] while its value is limited by T_{J_Max} = 150°C.
4. The power dissipation P_D is based on T_{J_Max} = 150°C.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical & Thermal Characteristics

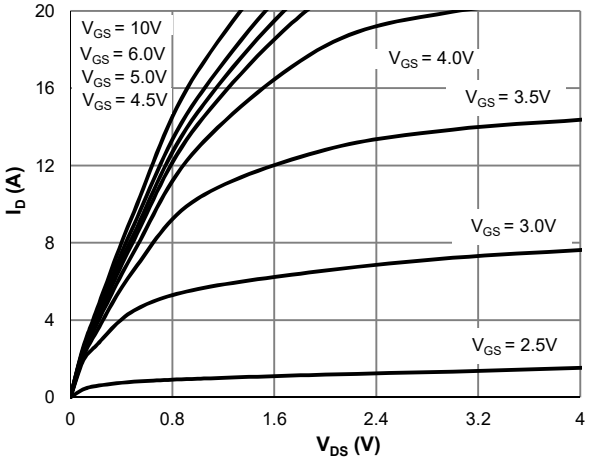


Figure 1: Saturation Characteristics

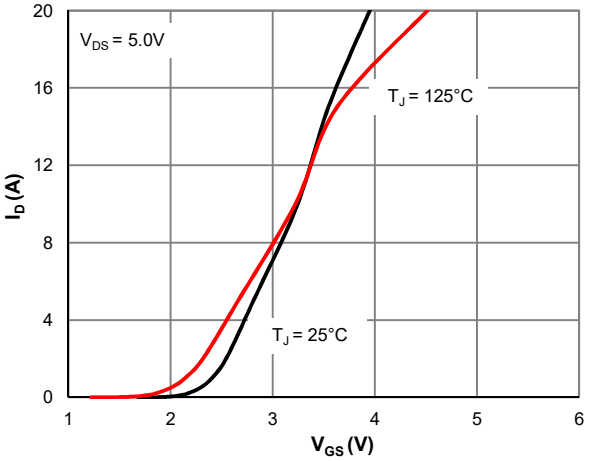


Figure 2: Transfer Characteristics

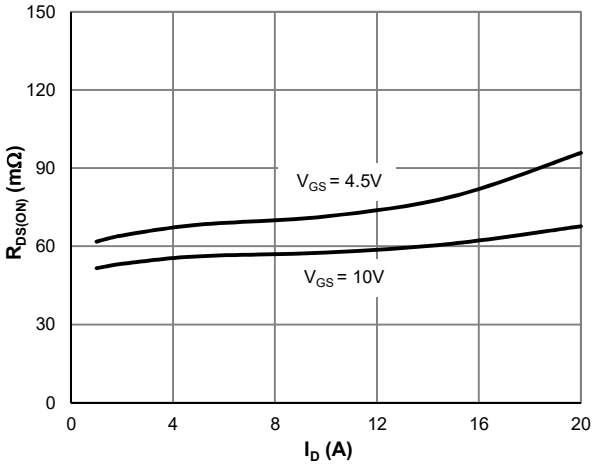


Figure 3: $R_{DS(ON)}$ vs. Drain Current

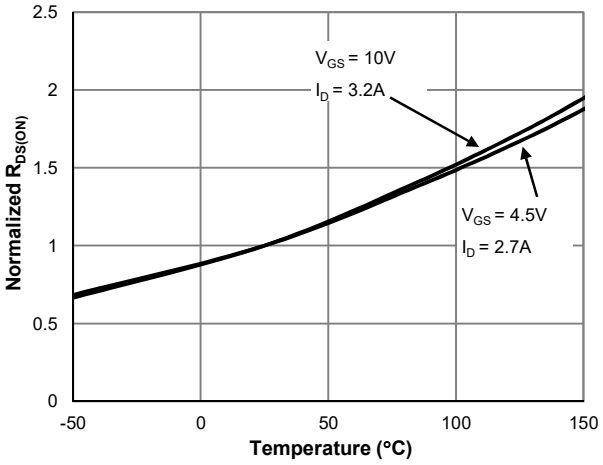


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

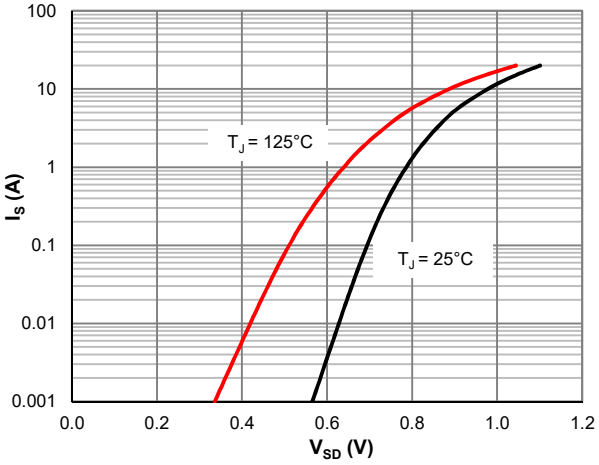


Figure 5: Body-Diode Characteristics

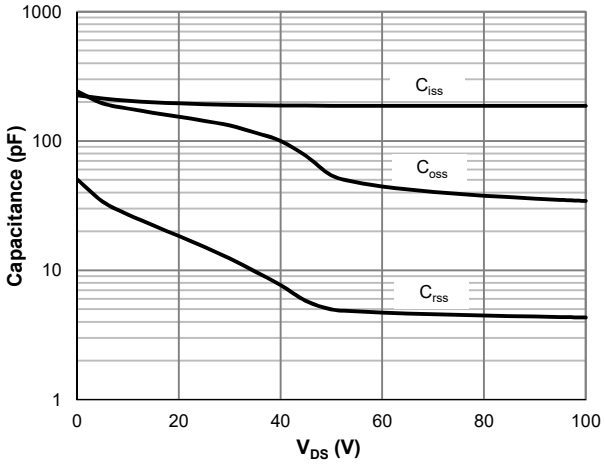


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

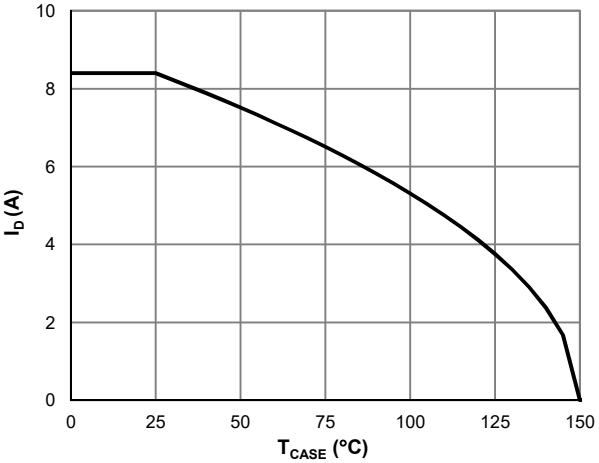


Figure 7: Current De-rating

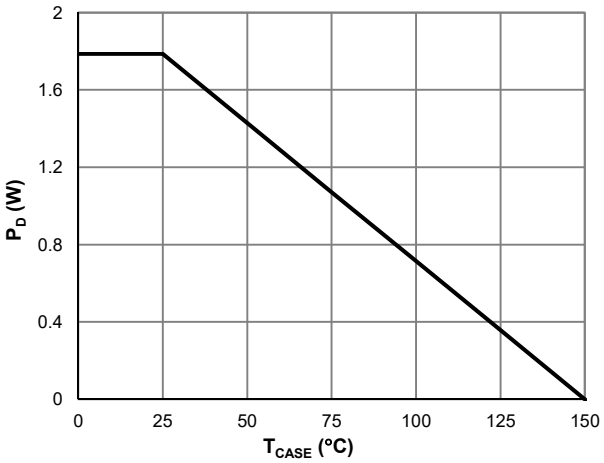
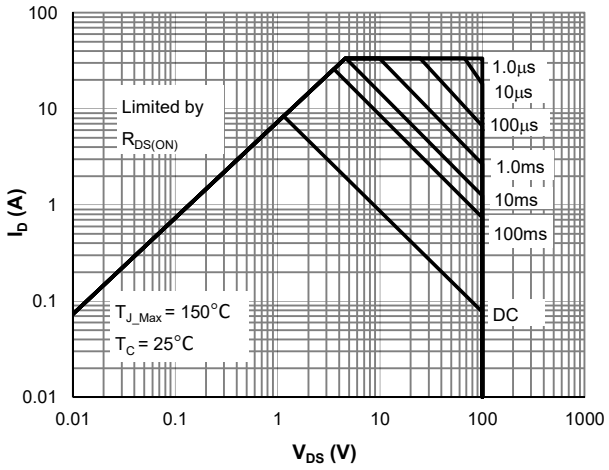


Figure 8: Power De-rating



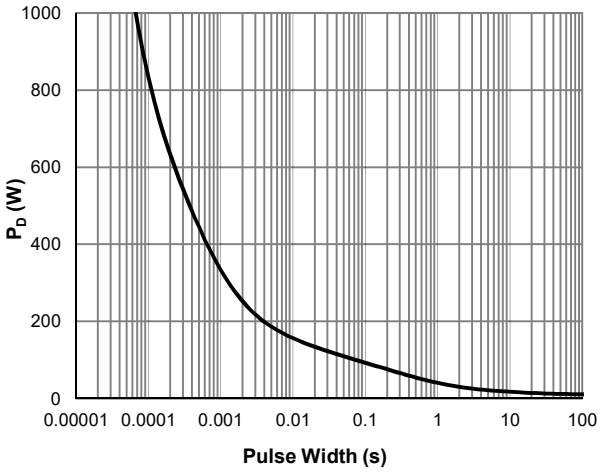


Figure 10: Single Pulse Power Rating, Junction-to-Case

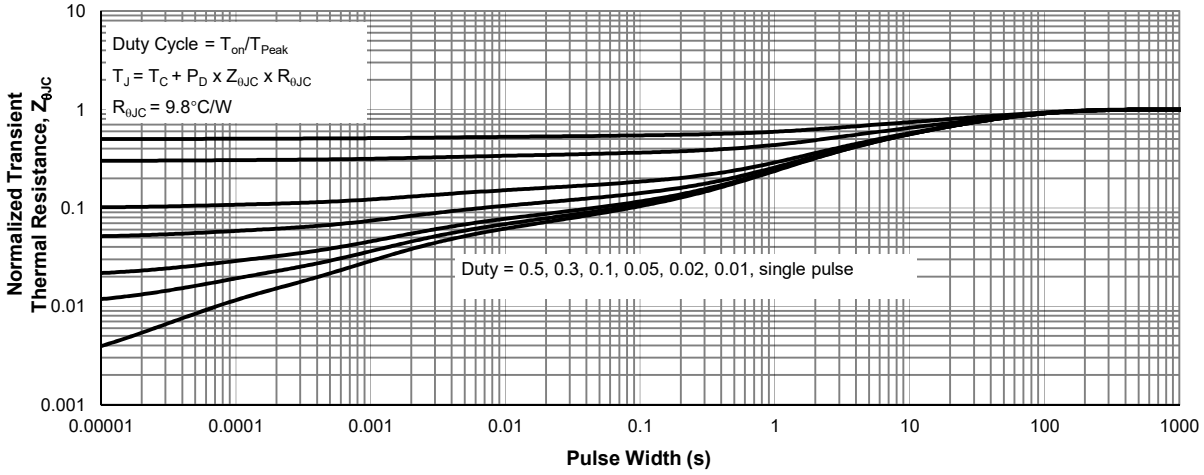
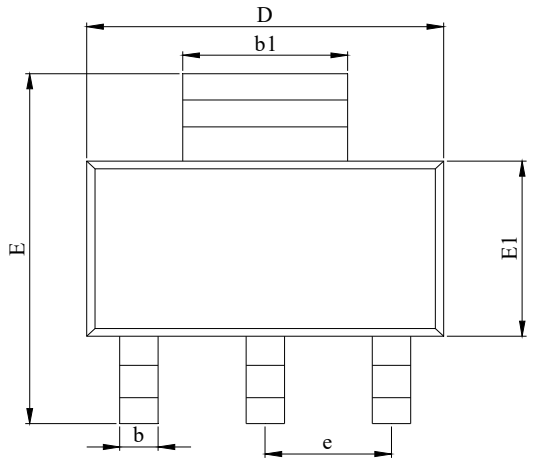


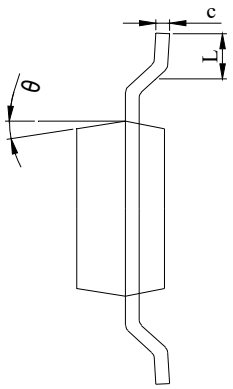
Figure 11: Normalized Maximum Transient Thermal Impedance

SOT-223-3L Package Information

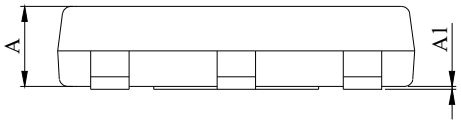
Package Outline



Top View



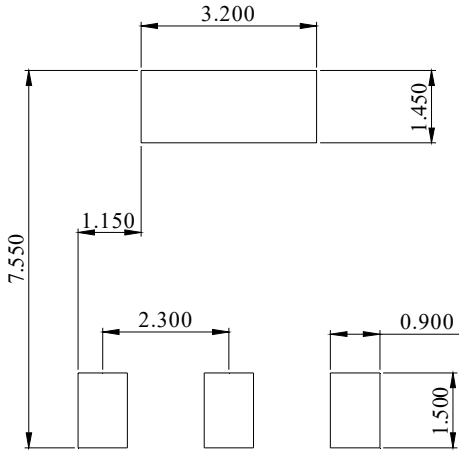
Side View



Front View

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	1.50	1.60	1.80
A1	0.01	0.06	0.10
b	0.60	0.70	0.80
b1	2.90	3.00	3.10
D	6.30	6.50	6.70
E	6.70	7.00	7.30
E1	3.30	3.50	3.70
c	0.22	0.26	0.32
L	0.70	0.90	1.10
e	2.30 BSC		
θ	-	-	10°

Recommended Soldering Footprint



DIMENSIONS:MILLIMETERS