-60V 40mΩ P-Ch Power MOSFET

Features

- Low Gate Charge
- 100% UIS Tested, 100% R_g Tested
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant

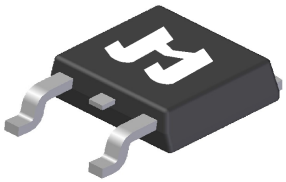
Applications

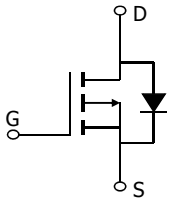
- LED Back-lighting Application
- DC/DC Power Management
- High Side Switch for Full Bridge Converter

Product Summary

Parameter	Value	Unit
V_{DS}	-60	V
$V_{GS(th)\_Typ}$	-2.0	V
I_D (@ V_{GS} = -10V) (1)	-23	A
$R_{DS(ON)\_Typ}$ (@ V_{GS} = -10V)	40	mΩ
$R_{DS(ON)\_Typ}$ (@ V_{GS} = -4.5V)	55	mΩ

TO-252-3L Top View



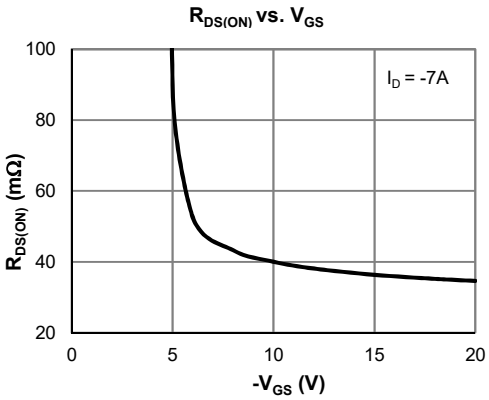


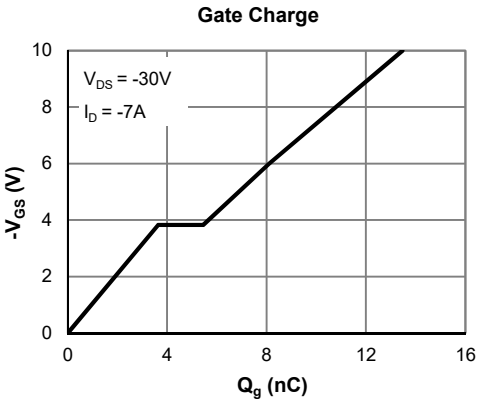
Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMPL0648AK-13	TO-252-3L	3	PL0648A	1	-55 to 150	13-inch Reel	2500

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

Parameter		Symbol	Value	Unit
Drain-to-Source Voltage		V_{DS}	-60	V
Gate-to-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (1)	T_C = 25°C	I_D	-23	A
	T_C = 100°C		-14.8	
Pulsed Drain Current (2)		I_{DM}	-59	A
Avalanche Energy (3)		E_{AS}	75	mJ
Power Dissipation (4)	T_C = 25°C	P_D	44	W
	T_C = 100°C		17.8	
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C





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	-60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -48V, 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	-1.0	-2.0	-3.0	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	V_{GS} = -10V, I_D = -7A		40	50	mΩ
		V_{GS} = -4.5V, I_D = -5A		55	72	mΩ
Forward Transconductance	g_{FS}	V_{DS} = -5V, I_D = -7A		20		S
Diode Forward Voltage	V_{SD}	I_S = -1A, V_{GS} = 0V		-0.78	-1.0	V
Diode Continuous Current	I_S	T_C = 25°C			-23	A
DYNAMIC PARAMETERS (5)						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = -30V, f = 1MHz		855		pF
Output Capacitance	C_{oss}			189		pF
Reverse Transfer Capacitance	C_{rss}			9.5		pF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz		9.2		Ω
SWITCHING PARAMETERS (5)						
Total Gate Charge (@ V_{GS} = -10V)	Q_g	V_{GS} = 0 to -10V, V_{DS} = -30V, I_D = -7A		13.5		nC
Total Gate Charge (@ V_{GS} = -4.5V)	Q_g			6.4		nC
Gate Source Charge	Q_{gs}			3.6		nC
Gate Drain Charge	Q_{gd}			1.8		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS} = -10V, V_{DS} = -30V, R_L = 4.3Ω, R_{GEN} = 3Ω		5.4		ns
Turn-On Rise Time	t_r			1.9		ns
Turn-Off DelayTime	$t_{D(off)}$			23		ns
Turn-Off Fall Time	t_f			4.2		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F = -7A, dI_F/dt = -100A/μs		27		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = -7A, dI_F/dt = -100A/μs		28		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	60	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.8	3.4	°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. E_{AS} of 75 mJ is based on starting T_J = 25°C, L = 3.0mH, I_{AS} = -7.1A, V_{GS} = -10V, V_{DD} = -30V; 100% test at L = 0.1mH, I_{AS} = -25A. 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

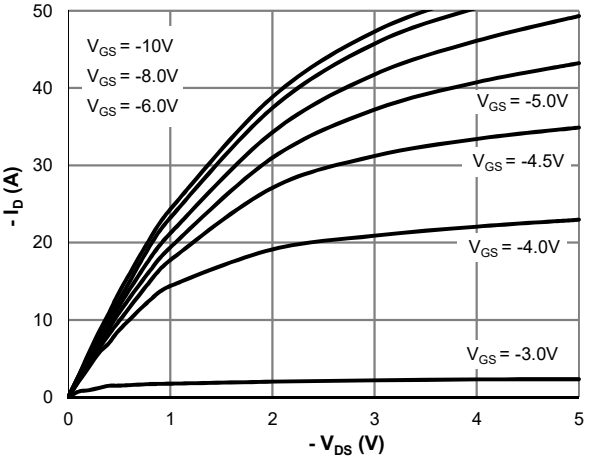


Figure 1: Saturation Characteristics

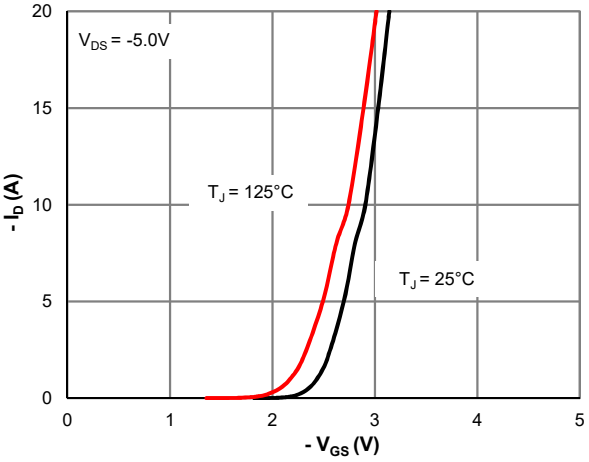


Figure 2: Transfer Characteristics

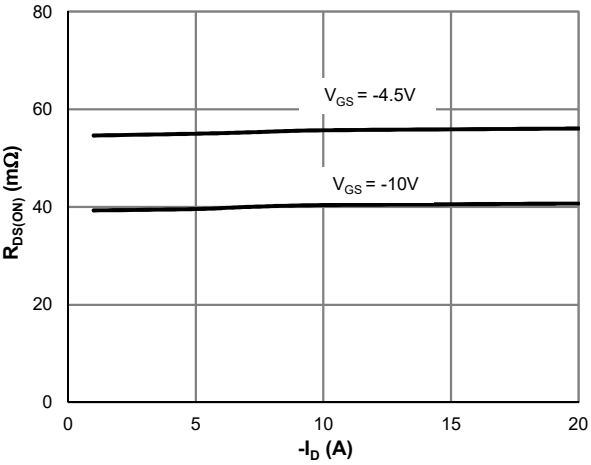


Figure 3: $R_{DS(ON)}$ vs. Drain Current

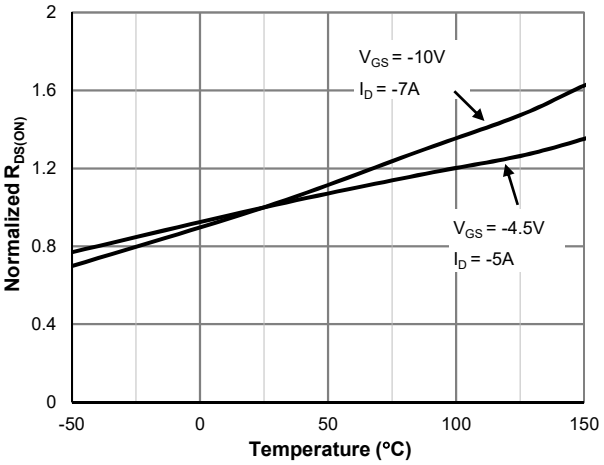


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

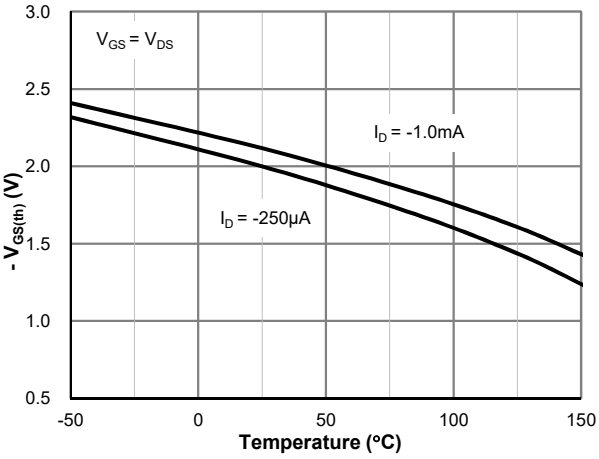


Figure 5: $V_{GS(th)}$ vs. Junction Temperature

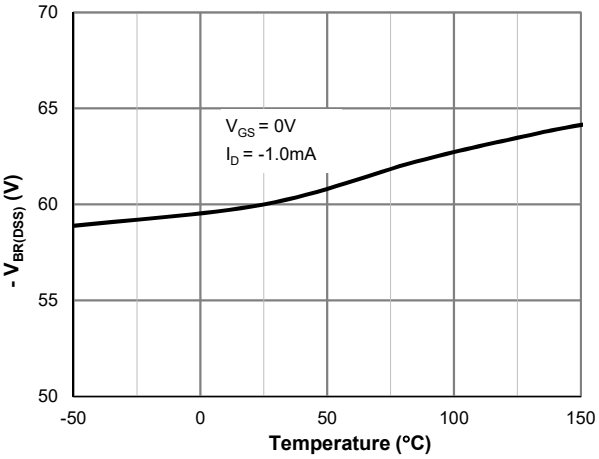


Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

Typical Electrical & Thermal Characteristics

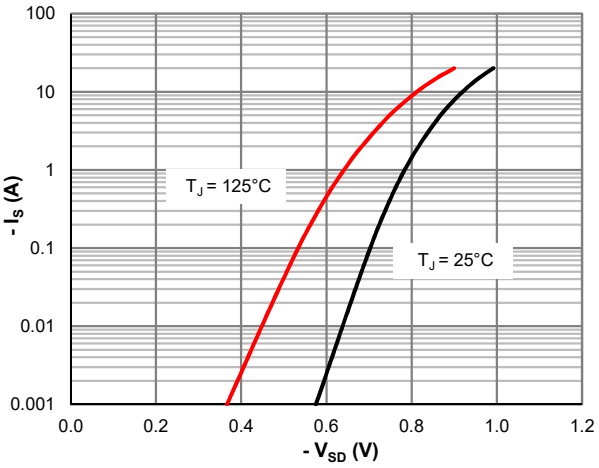


Figure 7: Body-Diode Characteristics

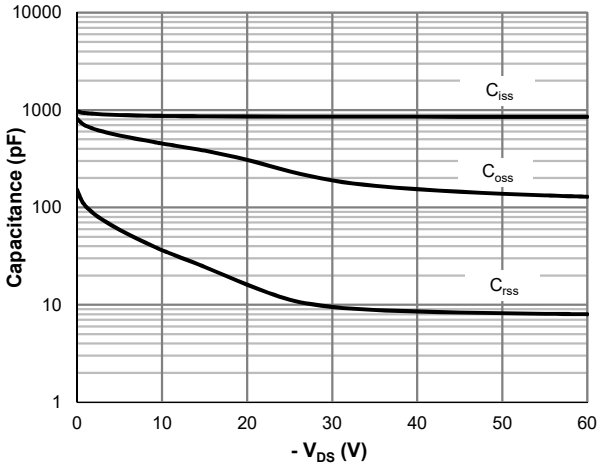


Figure 8: Capacitance Characteristics

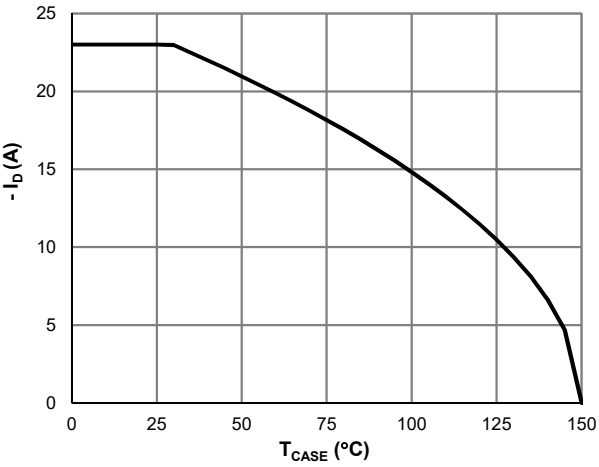


Figure 9: Current De-rating

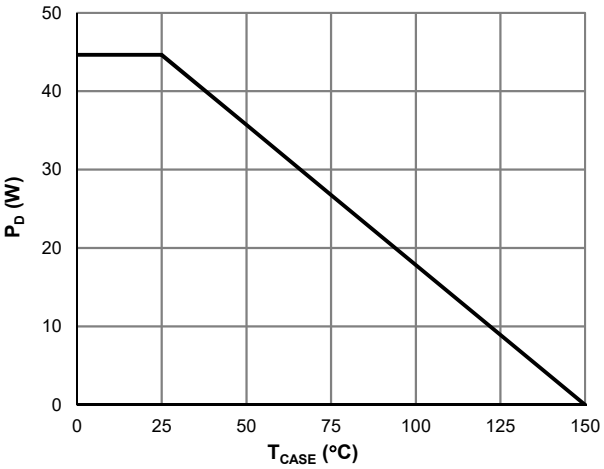


Figure 10: Power De-rating

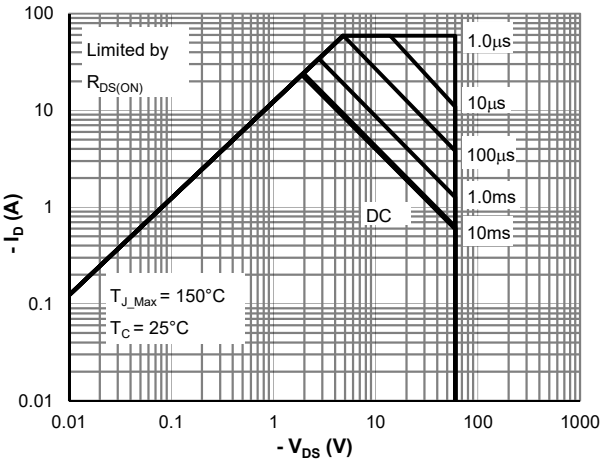


Figure 11: Maximum Safe Operating Area

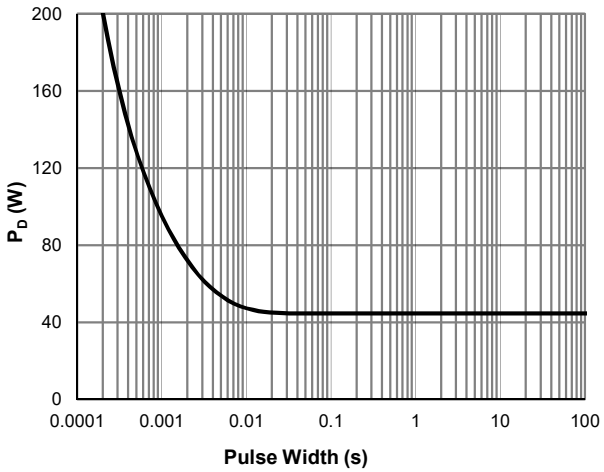


Figure 12: Single Pulse Power Rating, Junction-to-Case

Typical Electrical & Thermal Characteristics

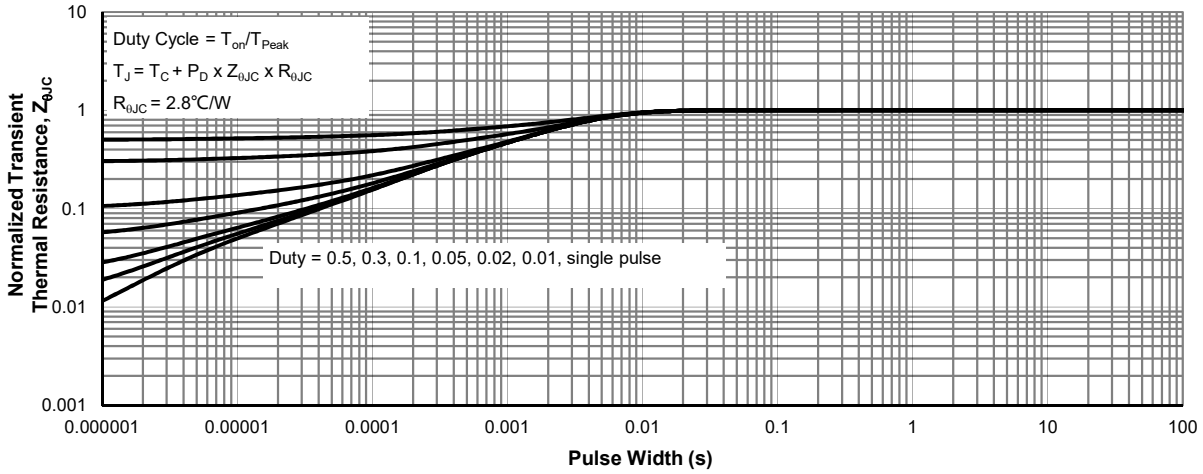
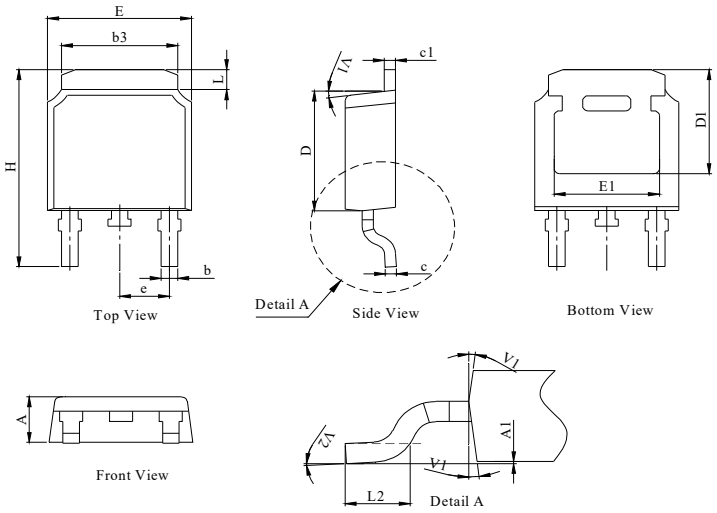


Figure 13: Normalized Maximum Transient Thermal Impedance

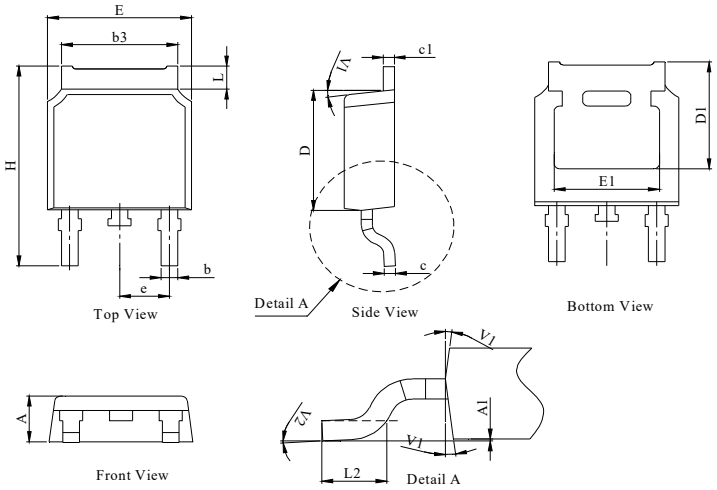
TO-252-3L Package Information

Package Outline Type-A



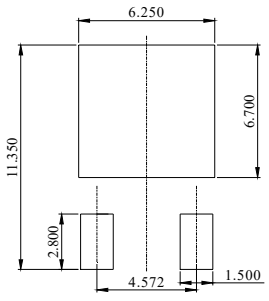
DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.18	2.30	2.39
A1	0	--	0.13
b	0.64	0.76	0.89
c	0.40	0.50	0.61
c1	0.46	0.50	0.58
D	5.97	6.10	6.23
D1	5.05	--	--
E	6.35	6.60	6.73
E1	4.32	--	--
b3	5.21	5.38	5.55
e	2.29 BSC		
H	9.40	10.00	10.40
L	0.89	--	1.27
L2	1.40	--	1.78
V1	7° REF		
V2	0°	--	6°

Package Outline Type-B



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.10	2.30	2.40
A1	0	--	0.13
b	0.66	0.76	0.86
b3	5.21	5.38	5.55
c	0.40	0.50	0.60
c1	0.44	0.50	0.58
D	5.90	6.10	6.30
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.29 BSC		
H	9.50	10.00	10.70
L	1.09	--	1.21
L2	1.35	--	1.65
V1	7° REF		
V2	0°	--	6°

Recommended Soldering Footprint



DIMENSIONS:MILLIMETERS