

General Description

The iML3160 is a silicon N-channel enhanced power MOSFET. With low conduction loss, good switching performance and high avalanche energy, it is suitable for various power supply system, especially for AC step driving application for LED lighting.

The package type is SOT-223, which comply with the RoHS standard.

Features

- Fast Switching
- ESD Improved Capability
- Low Gate Charge (typ. 7.5nC)
- Low Reverse Transfer Capacitance (Typ. 5.0pF)

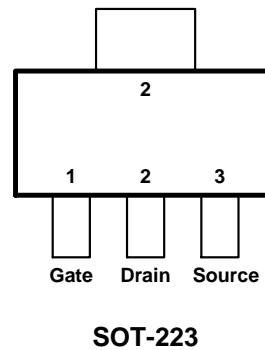
Applications

- LED lighting products.
- Fluorescent lamp ballast.
- Switching power supply.

Key Parameters

V_{DSS}	600	V
I_D	1.5	A
$P_D (T_C=25^\circ C)$	20	W
$R_{DS,ON,typ}$	7.0	Ω

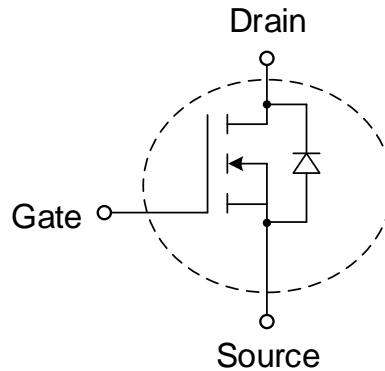
Pin Diagram (Top View)



Ordering Information

Package	Part Number	Tape & Reel
SOT-223	iML3160AK	iML3160AK-TR
Dice	iML3160AZ	

Equivalent Circuit



Absolute Maximum Ratings (T_C=25°C unless otherwise noted)

Caution: Values beyond absolute ratings can cause the device to be prematurely damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not guaranteed.

Symbol	Parameter	Rating	Units
V _{DSS}	Drain-to-Source Voltage	600	V
I _D	Continuous Drain Current (T _C =25°C)	1.5	A
	Continuous Drain Current (T _C =100°C)	0.85	A
I _{DM}	Pulsed Drain Current	6	A
V _{GS}	Gate-to-Source Voltage	±30	V
P _D	Power Dissipation (T _C =25°C)	20	W
	Derating Factor above 25°C	0.16	W/°C
T _J	Operating Junction Temperature	150	°C
T _A	Operating Ambient Temperature	-40°C to 85°C	°C
T _{Storage}	Storage Temperature Range	-65°C to 150°C	°C
E _{as}	Single Pulse Avalanche Energy	80	mJ

Note: Unless otherwise noted, all tests are pulsed tests at the specified temperature, therefore: T_J = T_C = T_A.

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

OFF Characteristic						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain to Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	600			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$, reference 25°C		0.71		$V/^\circ\text{C}$
Drain to source Leakage Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V, T_A=25^\circ\text{C}$			25	uA
		$V_{DS}=600V, V_{GS}=0V, T_A=125^\circ\text{C}$			250	
Gate to Source Forward Leakage	$I_{GSS(F)}$	$V_{GS}=+30V$			12	uA
Gate to Source Reverse Leakage	$I_{GSS(R)}$	$V_{GS}=-30V$			-12	
ON Characteristic (pulse width $t_p \leq 380\mu s$, $\delta \leq 2\%$)						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain to Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=0.75A$		7.0	8.0	Ω
Gate Threshold voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V
Dynamic Characteristic						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Forward Transconductance	g_{fs}	$V_{DS}=15V, I_D=0.75A$		1.0		S
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V$ $f=1\text{MHz}$		170		pF
Output Capacitance	C_{oss}			27		
Reverse Transfer Capacitance	C_{rss}			5		
Resistive Switching Characteristic						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Turn-On Delay Time	$t_{d(ON)}$	$I_D=1.5A, V_{DD}=300V, V_{GS}=10V,$ $R_G=4.7\Omega$		8		nS
Rise Time	t_r			30		
Turn-Off Delay Time	$t_{d(OFF)}$			22		
Fall Time	t_f			55		
Total Gate charge	Q_g	$I_D=1.5A, V_{DD}=480V, V_{GS}=10V$		7.5		nC
Gate to Source Charge	Q_{gs}			1.7		
Gate to Drain "Miller" Charge	Q_{gd}			4.0		

Source-Drain Diode Characteristics (pulse width $t_p \leq 380\mu s$, $\delta \leq 2\%$)						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Continuous Source Current (Body Diode)	I_s				1.5	A
Maximum Source Current (Body Diode)	I_{sM}				6.0	
Diode Forward Voltage	V_{SD}	$I_s=1.5A, V_{GS}=0V$			1.5	V
Reverse Recovery Time	T_{rr}	$I_D=1.5A, T_J=25^\circ C, di_F/dt=100A/\mu s, V_{GS}=0V$		530		ns
Reverse Recovery Charge	Q_{rr}			1100		nC
Reverse Recovery Current	I_{RRM}				4.4	A

Characteristic Curves

Figure 1 Safe Operating Area

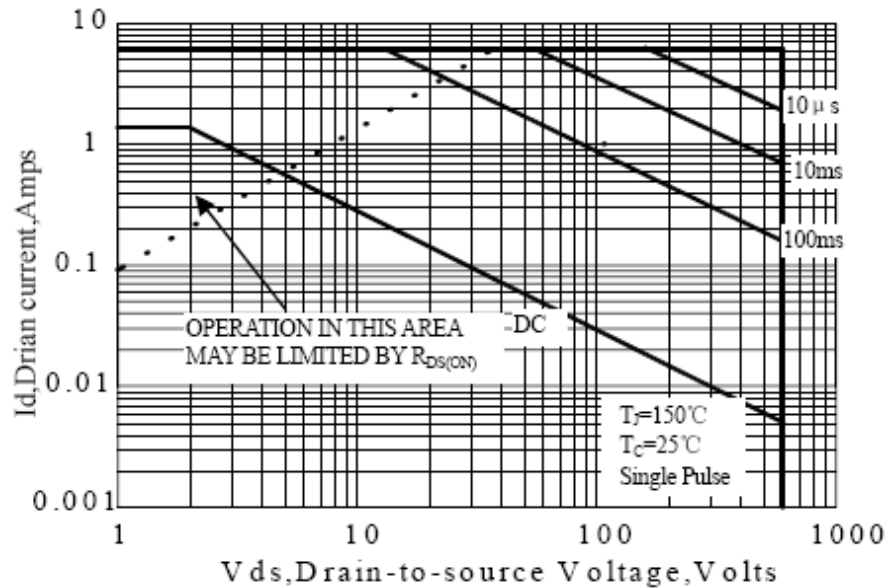


Figure 2 Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

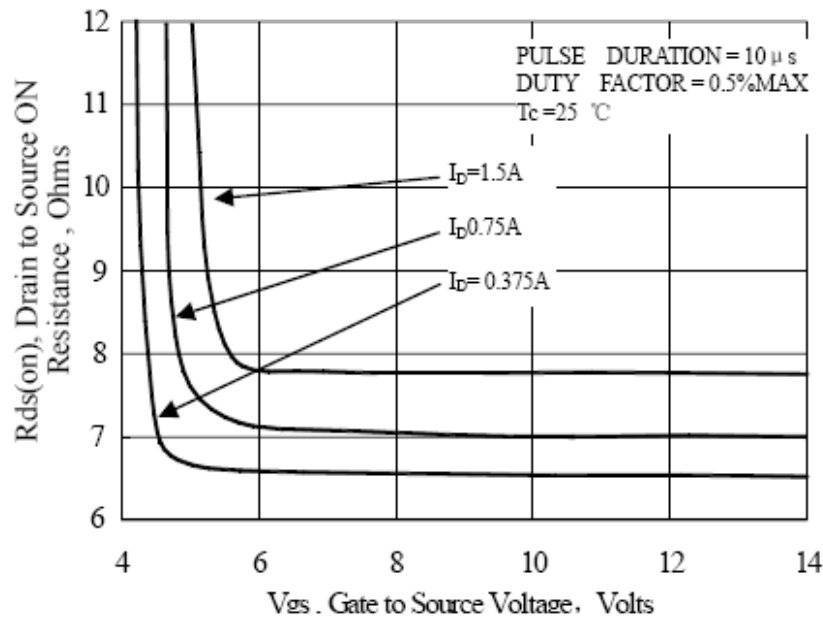
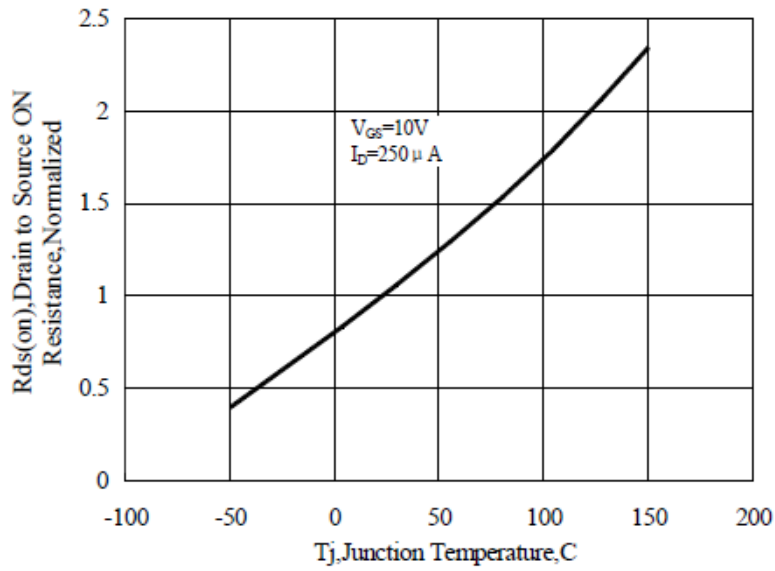
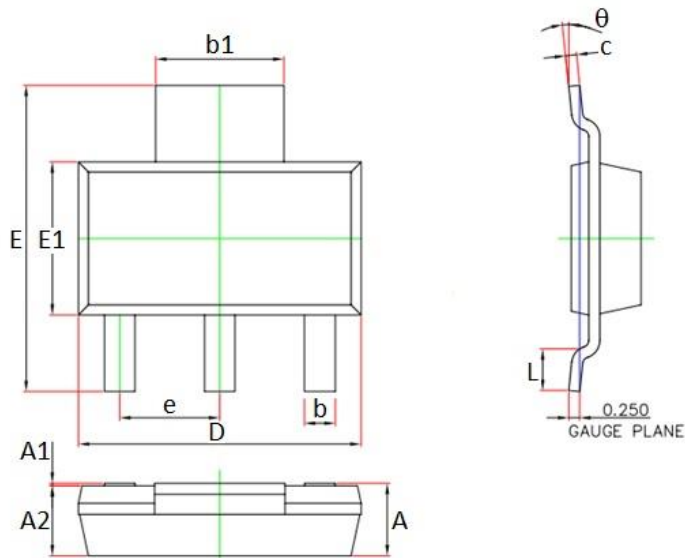


Figure 3 Typical Drain-to-Source ON Resistance vs Junction Temperature



Package Information

SOT- 223

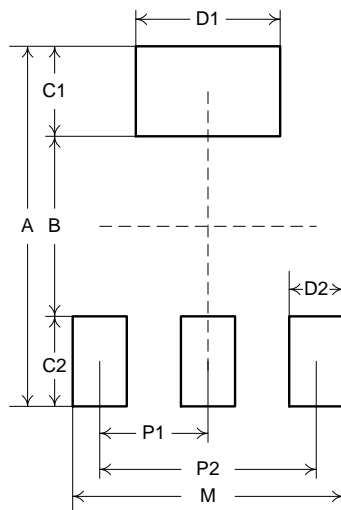


SYMBOLS	MIN.	MAX.
A	-	1.80
A1	0.02	0.10
A2	1.50	1.70
b	0.66	0.84
b1	2.90	3.10
c	0.23	0.35
D	6.30	6.70
E	6.70	7.30
E1	3.30	3.70
e	2.3 (BSC)	
L	0.75	-
θ	0°	10°

UNIT: MILLIMETERS

θ_{JA}	100 °C / W
θ_{JC}	6.25 °C / W

Footprint Suggestion



SYMBOLS	Footprint Dimension
A	8.0
B	4.0
C1	2.0
C2	2.0
D1	3.2
D2	1.2
M	5.8
P1	2.3
P2	4.6

UNIT: MILLIMETERS