

150V Depletion-Mode Power MOSFET

Pb Lead Free Package and Finish

General Features

- Proprietary Advanced Planar Technology
- Depletion Mode (Normally On)
- ESD improved Capability
- Rugged Polysilicon Gate Cell Structure
- Fast Switching Speed
- RoHS Compliant
- Halogen-free available

Applications

- Synchronous Rectification
- Normally-on Switches
- Linear Amplifier, Converters
- Constant Current Source
- Telecom

Ordering Information

Part Number	Package
HM2015E	SOT-23

Absolute Maximum Ratings

$T_C=25^{\circ}\text{C}$ unless otherwise specified

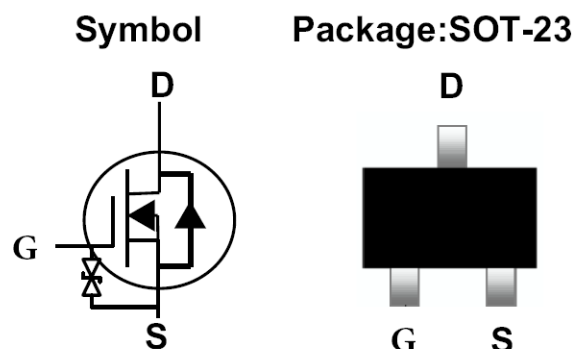
Symbol	Parameter	HM2015E	Unit
V_{DSX}	Drain-to-Source Voltage _[1]	150	V
V_{DGX}	Drain-to-Gate Voltage _[1]	150	
V_{GS}	Gate-to-Source Voltage	± 20	
I_D	Continuous Drain Current	0.2	A
I_{DM}	Pulsed Drain Current _[2]	0.6	
$V_{ESD(G-S)}$	Gate source ESD (HBM-C= 100pF, R=1.5k Ω)	400	V
P_D	Power Dissipation	0.5	W
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300	$^{\circ}\text{C}$
$T_J \& T_{STG}$	Operating and Storage Temperature Range	-55 to 150	

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter	HM2015E	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	250	K / W

BV_{DSX}	$R_{DS(ON),typ.}$	$I_{DSS,typ.}$
150V	10 Ω	200mA



Electrical Characteristics

OFF Characteristics $T_J = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSX}	Drain-to-Source Breakdown Voltage	150	--	--	V	$V_{GS} = -15\text{V}$, $I_D = 250\mu\text{A}$
$I_{D(OFF)}$	Drain-to-Source Leakage Current	--	--	1	μA	$V_{DS} = 150\text{V}$, $V_{GS} = -15\text{V}$
		--	--	1.0		$V_{DS} = 150\text{V}$, $V_{GS} = -15\text{V}$, $T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Leakage Current	--	--	+20	μA	$V_{GS} = +20\text{V}$, $V_{DS} = 0\text{V}$
		--	--	-20		$V_{GS} = -20\text{V}$, $V_{DS} = 0\text{V}$

ON Characteristics

$T_J = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
I_{DSS}	Saturated Drain-to-Source Current	150	--	--	mA	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	10	15	Ω	$V_{GS} = 0\text{V}$, $I_D = 200\text{mA}_{[3]}$
$V_{GS(OFF)}$	Gate-to-Source Cut-off Voltage	-8.0	--	-6.0	V	$V_{DS} = 3\text{V}$, $I_D = 8.0\mu\text{A}$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	12	--	pF	$V_{GS} = -15\text{V}$, $V_{DS} = 25\text{V}$, $f = 1.0\text{MHz}$
C_{rss}	Reverse Transfer Capacitance	--	3.3	--		
C_{oss}	Output Capacitance	--	5.2	--		
Q_g	Total Gate Charge	--	1.0	--	nC	$V_{GS} = -5\text{V} \sim +5\text{V}$, $I_D = 200\text{mA}$, $V_{DS} = 75\text{V}$
Q_{gs}	Gate-to-Source Charge	--	0.5	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	0.35	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	9.9	--	nS	$V_{DD} = 75\text{V}$, $I_D = 200\text{mA}$, $V_{GS} = -5\text{V} \sim +5\text{V}$, $R_G = 9.1\Omega$
t_{rise}	Rise Time	--	50	--		
$t_{d(OFF)}$	Turn-Off Delay Time	--	46	--		
t_{fall}	Fall Time	--	75	--		

Source-Drain Body Diode Characteristics

$T_J=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min	Typ.	Max.	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	--	--	1.2	V	$I_S=200\text{mA}$, $V_{GS}=-15\text{V}$

Note:

[1] $T_J=+25^{\circ}\text{C}$ to $+150^{\circ}\text{C}$

[2] Repetitive rating; pulse width limited by maximum junction temperature.

[3] Pulse width $\leq 380\mu\text{s}$; duty cycle $\leq 2\%$.

Typical Characteristics

Figure 1. Maximum Power Dissipation vs. Case Temperature

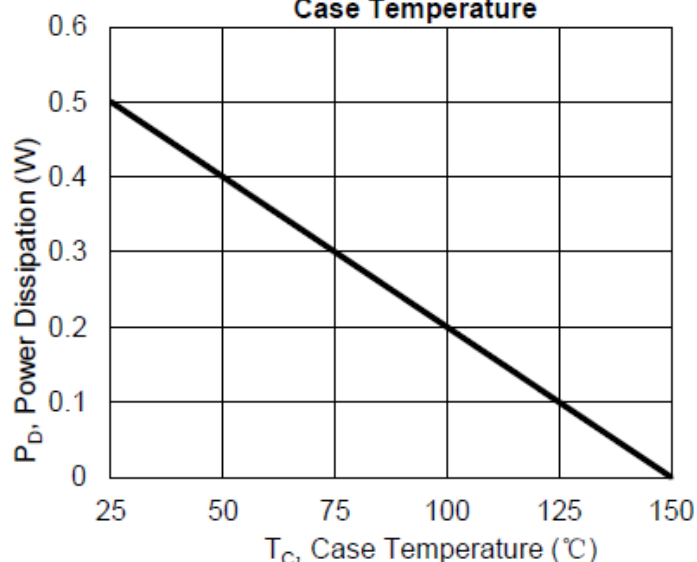


Figure 2. Maximum Continuous Drain Current vs Case Temperature

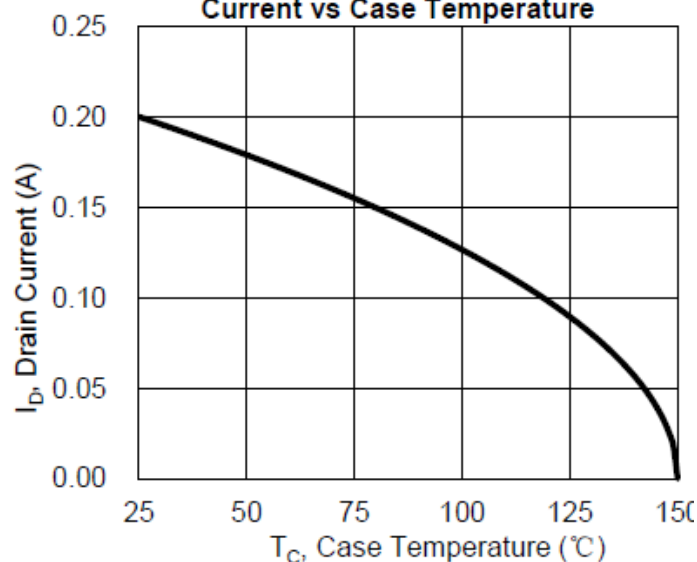


Figure 3. Typical Output Characteristics

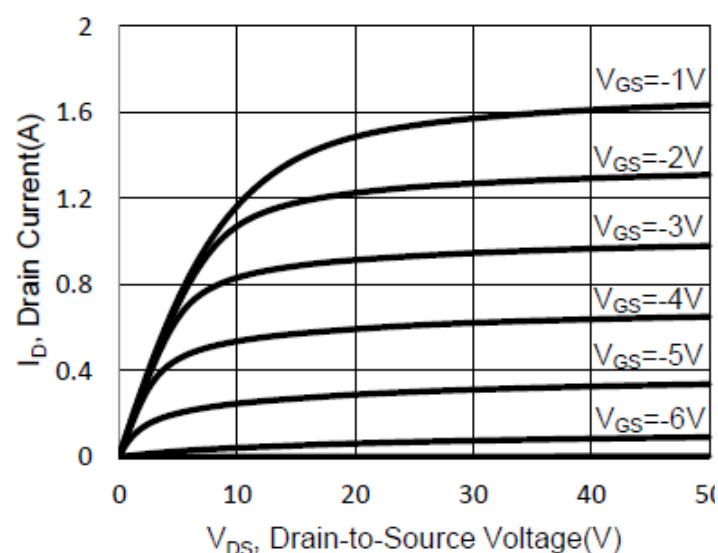


Figure 4. Typical Transfer Characteristics

