

850V N-Channel Depletion-Mode Power MOSFET

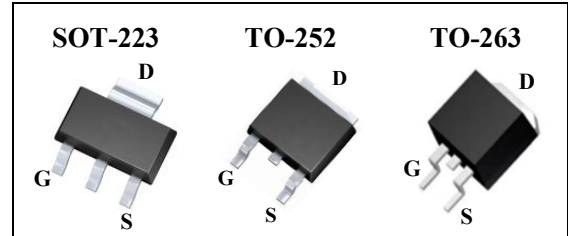
General Features

- Depletion Mode (Normally-on)
- ESD Improved Capability
- Fast Switching Speed
- High Breakdown Voltage: 850V
- Proprietary Advanced Planar Technology
- Rugged Polysilicon Gate Cell Structure
- RoHS Compliant
- Halogen-free Available

BV_{DSX}	$R_{DS(on)}(Typ.)$	$I_{DSS}(Min.)$
850V	15Ω	200mA

Applications

- Audio Amplifiers
- Start-up Circuits
- Protection Circuits
- Ramp Generators
- Current Regulators
- Active Loads



Ordering Information

Part Number	Package	Marking	Remark
DMS8515E	SOT-223	8515	Halogen Free
DMD8515E	TO-252	8515	Halogen Free
DMB8515E	TO-263	8515	Halogen Free

Absolute Maximum Ratings

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

Symbol	Parameter	DMS8515E	DMD8515E	DMB8515E	Unit
V_{DSX}	Drain-to-Source Voltage ^[1]	850			V
V_{GS}	Gate-to-Source Voltage	±20			V
I_D	Continuous Drain Current ^[2]	0.2	0.4	0.6	A
I_{DM}	Pulsed Drain Current ^[3]	0.8	1.6	2.4	A
P_D	Power Dissipation ^[4]	1.5	28	42	W
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300			°C
T_J & T_{STG}	Operating and Storage Temperature Range	-55 to 150			°C

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

Thermal Characteristics

Symbol	Parameter	DMS8515E	DMD8515E	DMB8515E	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	83	4.46	2.97	°C/W

Electrical Characteristics

OFF Characteristics

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSX}	Drain-to-Source Breakdown Voltage	850	--	--	V	$V_{GS} = -10\text{V}$, $I_D = 250\mu\text{A}$
$I_{D(off)}$	Drain-to-Source Leakage Current	--	--	10	μA	$V_{DS} = 850\text{V}$, $V_{GS} = -10\text{V}$
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

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
I_{DSS}	Saturated Drain-to-Source Current	200	--	--	mA	$V_{DS} = 50\text{V}$, $V_{GS} = 0\text{V}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	--	15	30	Ω	$V_{GS} = 0\text{V}$, $I_D = 200\text{mA}$ [5]
$V_{GS(off)}$	Gate-to-Source Cut-off Voltage	-4.0	--	-1.5	V	$V_{DS} = 3\text{V}$, $I_D = 8\mu\text{A}$
g_{fs}	Forward Transconductance	--	720	--	mS	$V_{DS} = 20\text{V}$, $I_D = 200\text{mA}$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	393.4	--	pF	$V_{GS} = -10\text{V}$, $V_{DS} = 50\text{V}$, $f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	--	20.7	--		
C_{rss}	Reverse Transfer Capacitance	--	4.1	--		
Q_g	Total Gate Charge	--	13.6	--	nC	$V_{GS} = -10$ to 10V , $V_{DD} = 150\text{V}$, $I_D = 200\text{mA}$
Q_{gs}	Gate-to-Source Charge	--	4.0	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	3.6	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-on Delay Time	--	18.1	--	ns	$V_{GS} = -10$ to 0V , $V_{DD} = 150\text{V}$, $I_D = 200\text{mA}$, $R_G = 10\Omega$
t_r	Rise Time	--	10.5	--		
$t_{d(off)}$	Turn-off Delay Time	--	35.6	--		
t_f	Fall Time	--	94	--		



Source-Drain Diode Characteristics

T_A = 25°C unless otherwise specified

Symbol	Parameter	Min	Typ.	Max.	Unit	Test Conditions
V _{SD}	Diode Forward Voltage	--	--	1.2	V	I _{SD} = 200mA, V _{GS} = -10V

NOTE:

[1] T_J = +25°C to +150°C.

[2] T_C = 25°C.

[3] Repetitive rating, pulse width limited by maximum junction temperature.

[4] T_C = 25°C.

[5] Pulse width ≤ 380μs, duty cycle ≤ 2%.

Typical Characteristics

Figure 1. Maximum Power Dissipation vs. Case Temperature

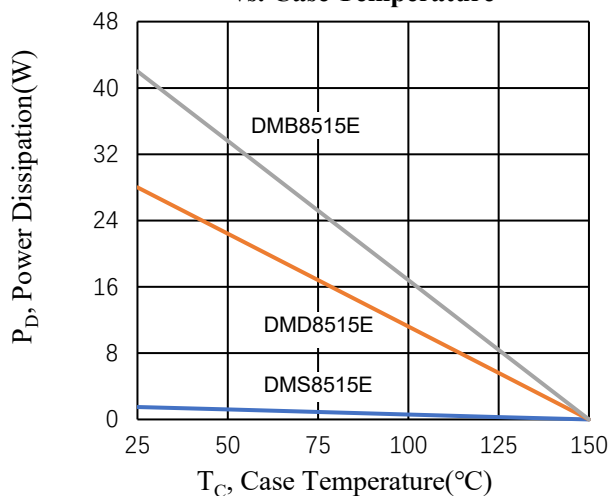


Figure 2. Maximum Continuous Drain Current vs. Case Temperature

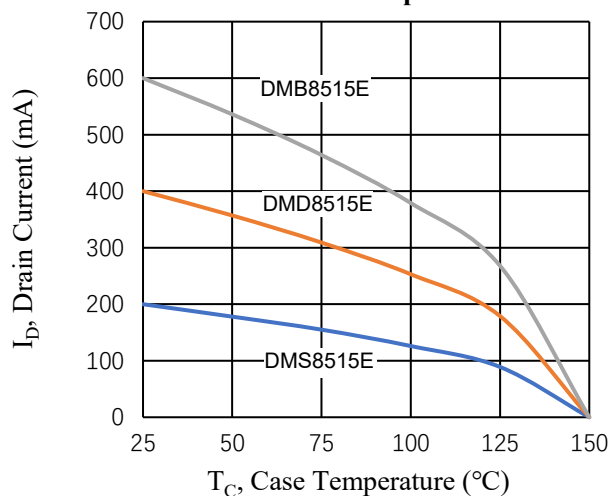


Figure 3. Typical Output Characteristics

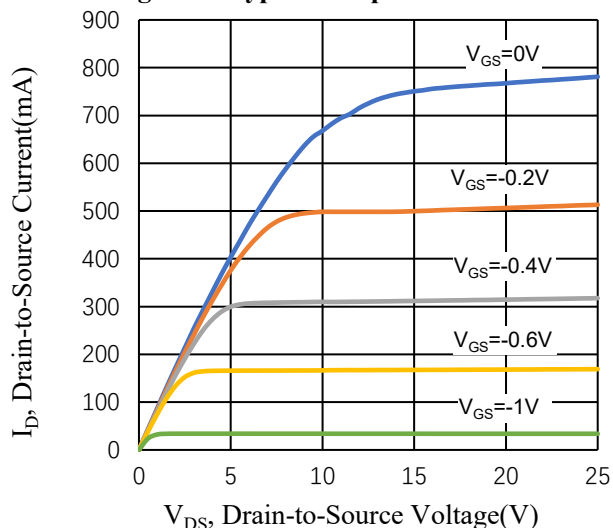


Figure 4. Typical Transfer Characteristics

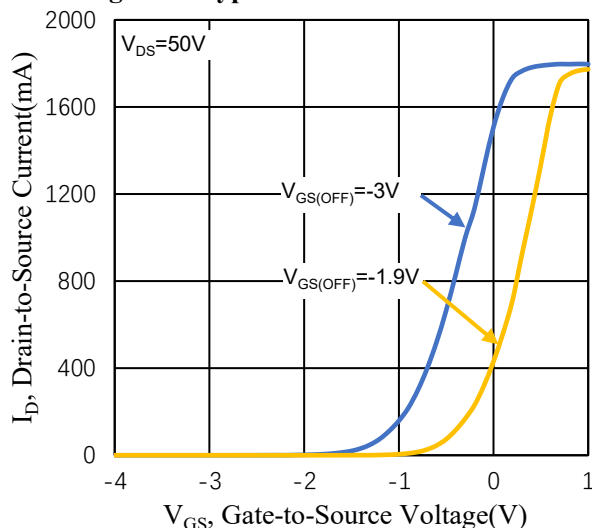


Figure 5. Typical Transfer Characteristics

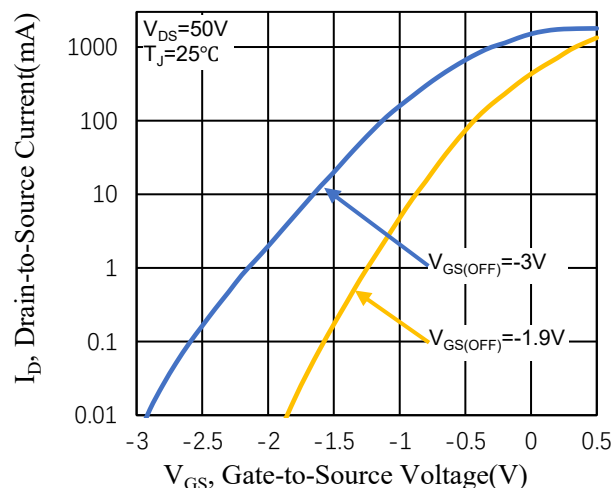


Figure 6. Typical Capacitance vs. Drain-to-Source Voltage

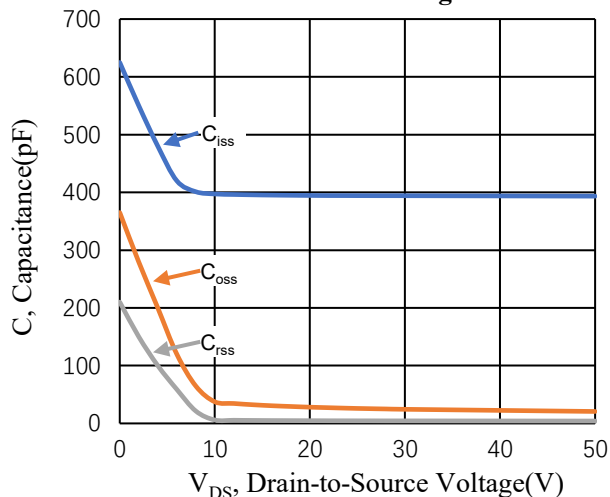


Figure 7. Typical Gate Charge vs. Gate-to-Source Voltage

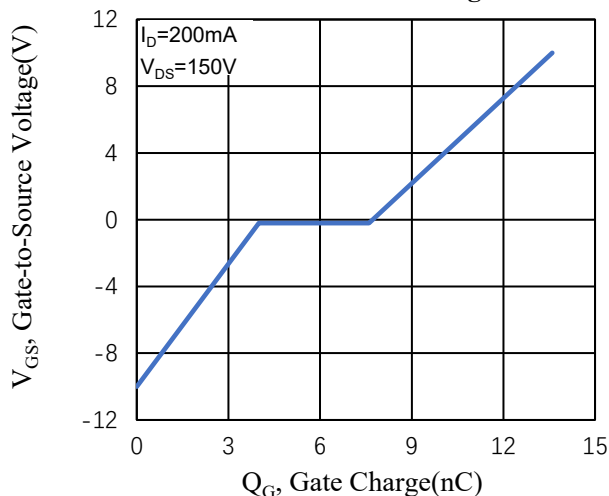


Figure 8. Normalized On-Resistance vs. Junction Temperature

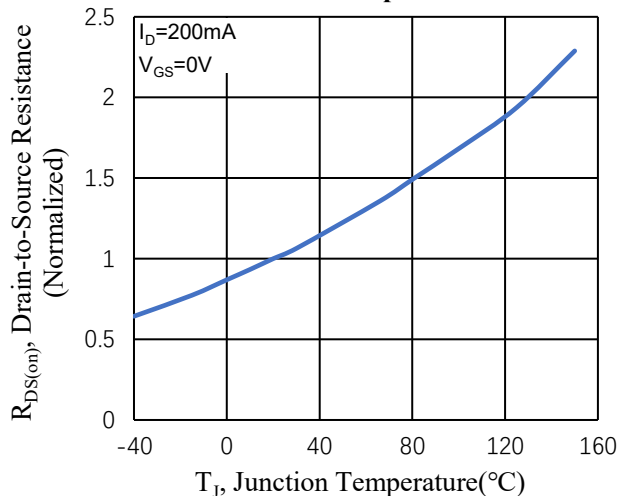


Figure 9. Gate-to-Source Cut-off Voltage vs. Junction Temperature

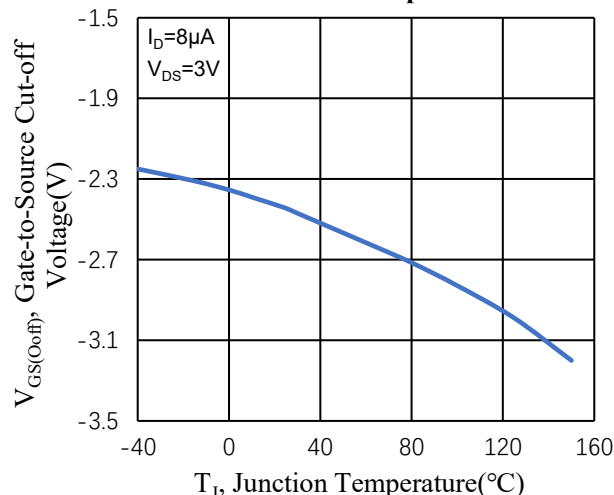


Figure 10. Drain-to-Source Breakdown Voltage vs. Junction Temperature

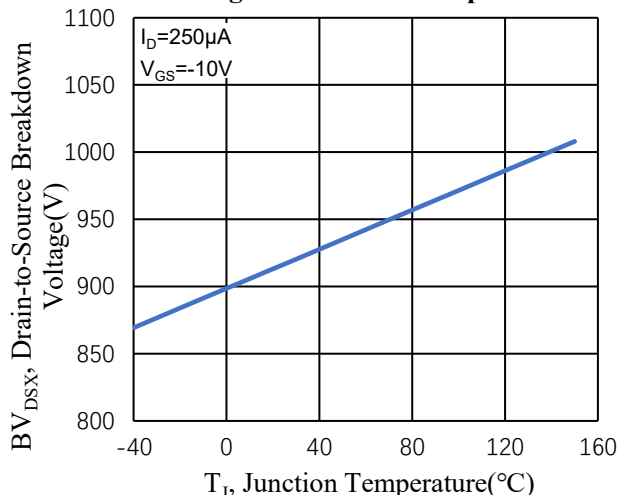
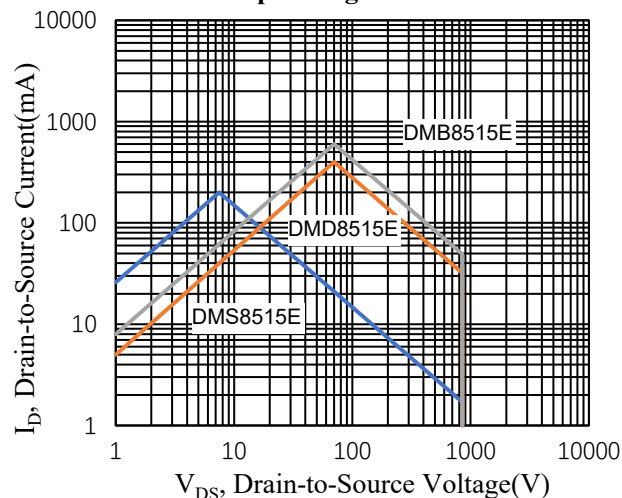
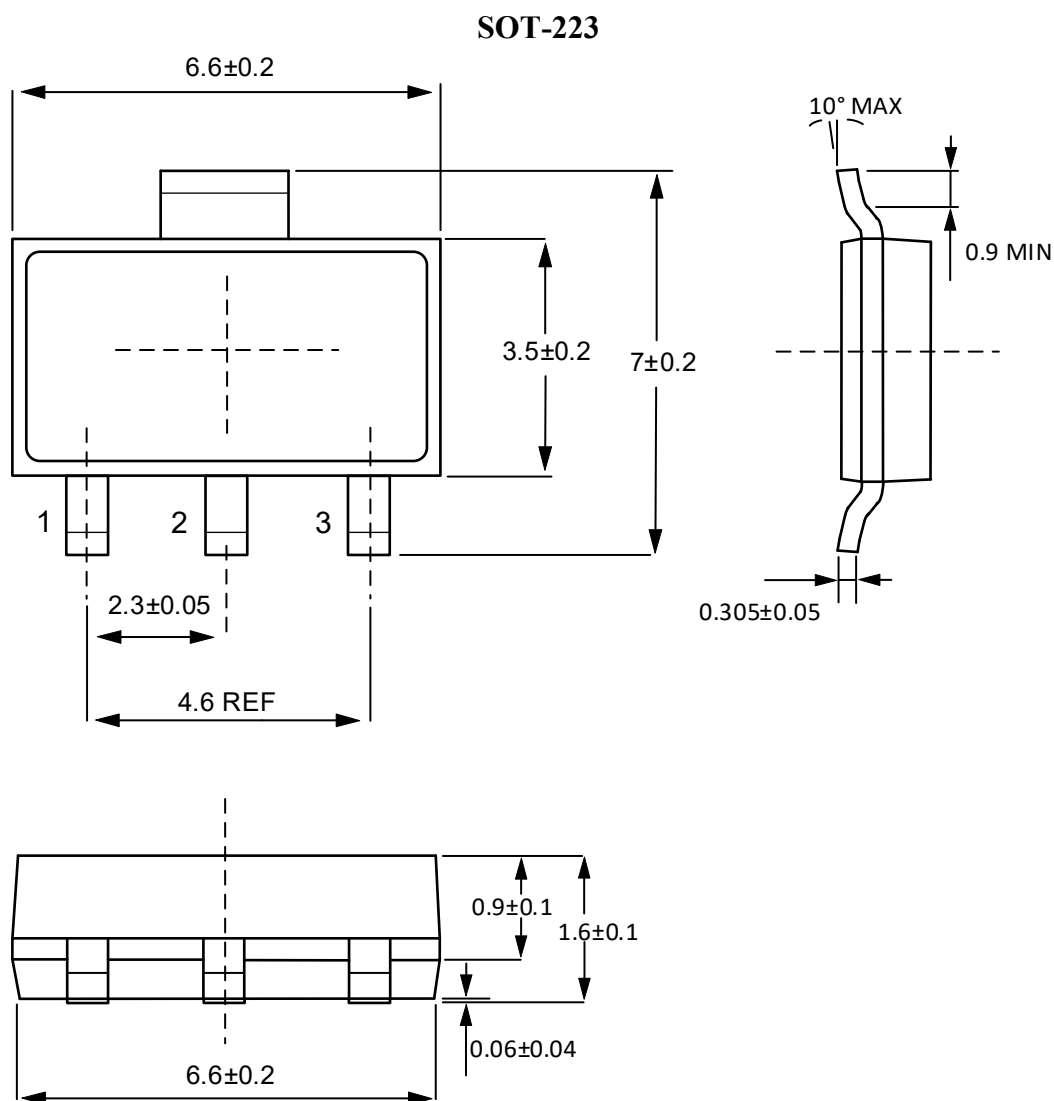


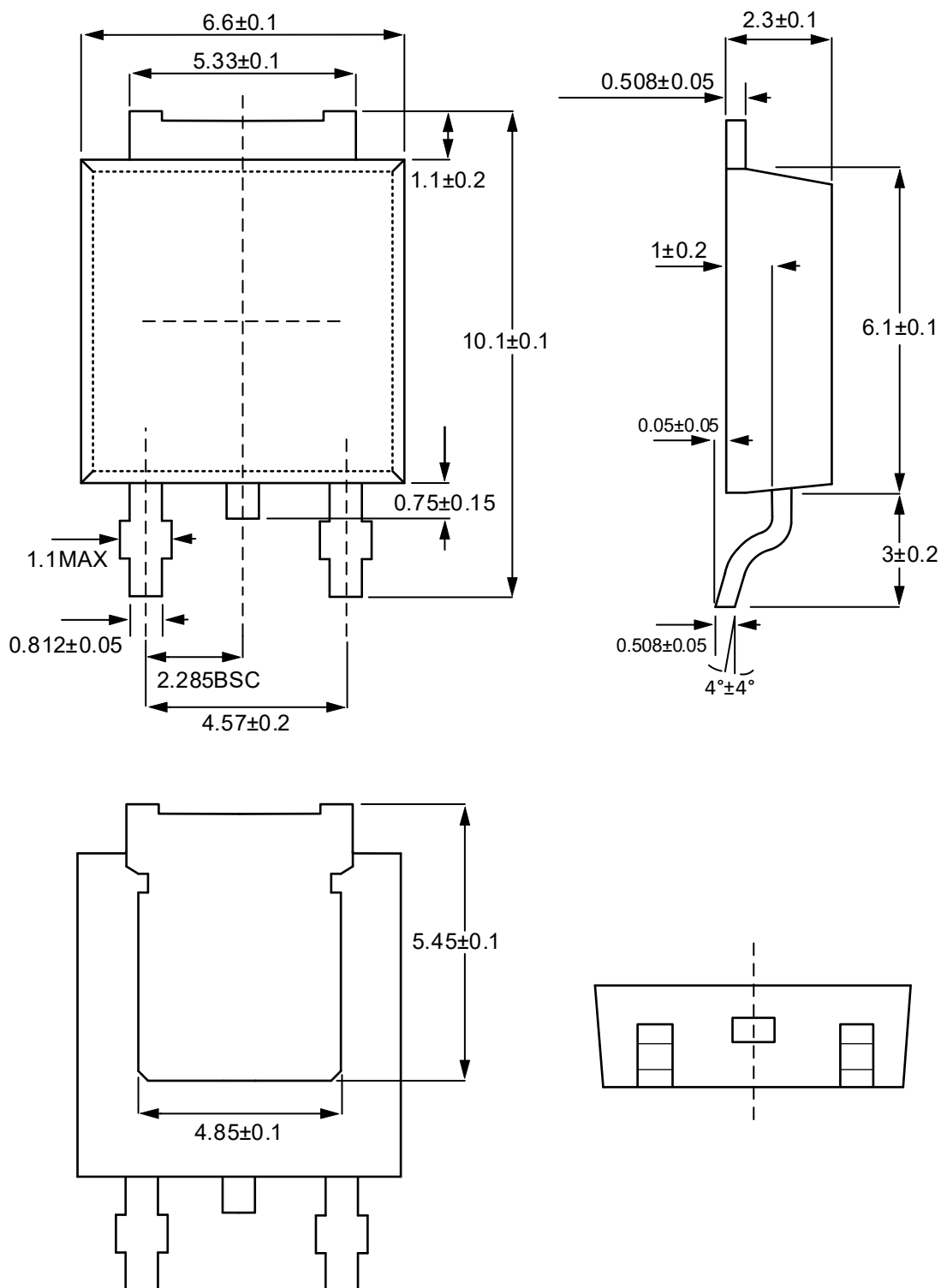
Figure 11. Maximum Forward Safe Operating Area



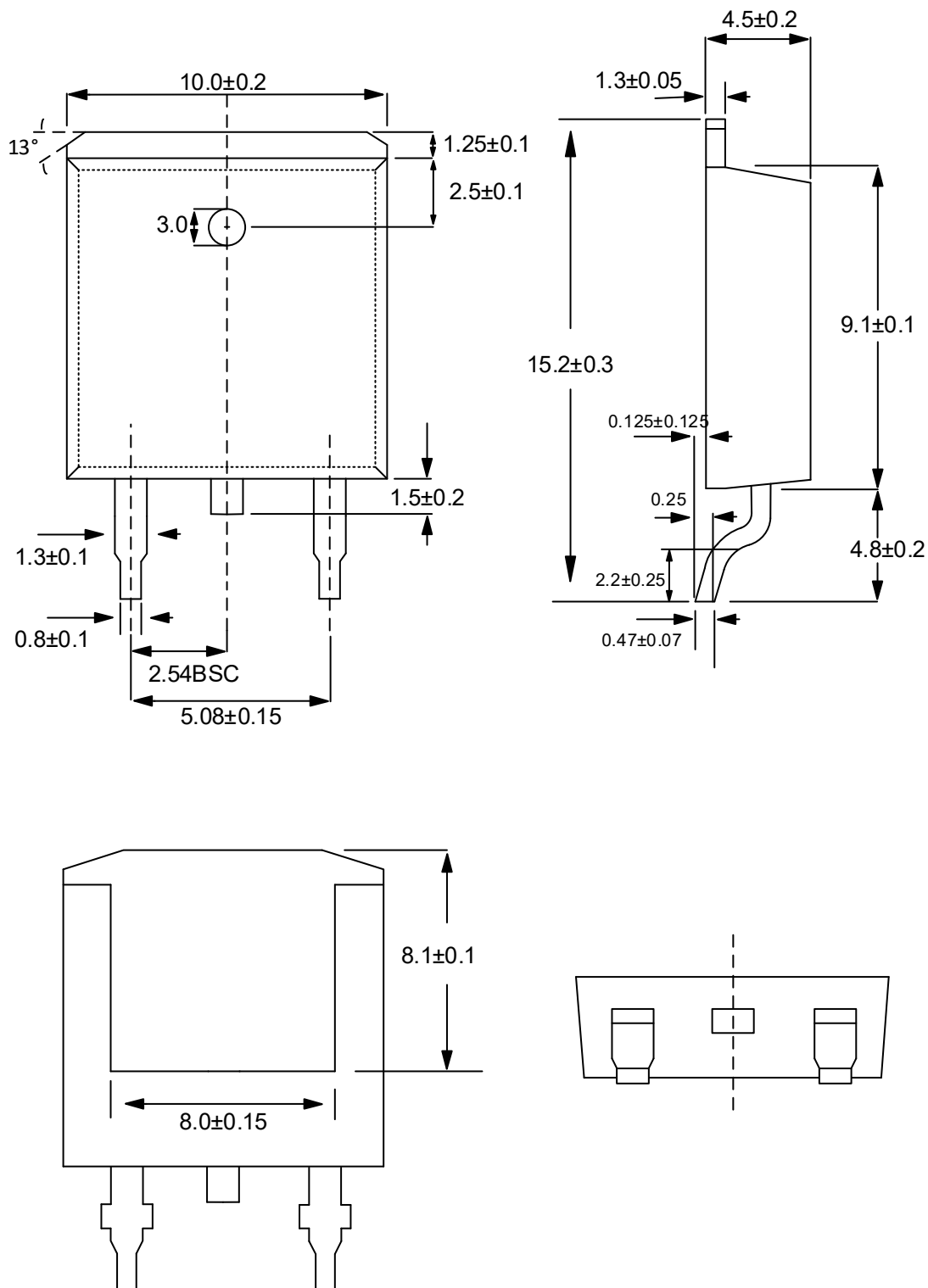
Package Dimensions



TO-252



TO-263



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