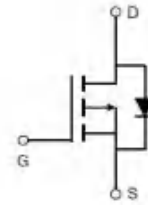


# AP2335

## P-Channel Enhancement Mosfet

### Feature

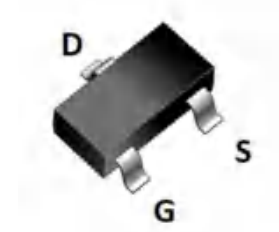
- -20V,-7A  
 $R_{DS(ON)} < 25m\Omega @ V_{GS} = -4.5V$  TYP: 19 m $\Omega$   
 $R_{DS(ON)} < 35m\Omega @ V_{GS} = -2.5V$  TYP: 26 m $\Omega$
- Advanced Trench Technology
- Lead free product is acquired



Schematic Diagram

### Application

- Interfacing Switching
- Load Switching
- Power management



SOT-23-3 top view

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
2335	AP2335	Sot-23-3	7 inch	-	3000

### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current ( $T_a = 25^\circ C$ )	$I_D$	-7	A
Continuous Drain Current ( $T_a = 70^\circ C$ )	$I_D$	-4.6	A
Pulsed Drain Current	$I_{DM}$	-28	A
Power Dissipation	$P_D$	2.0	W
Thermal Resistance from Junction to Ambient <sup>(4)</sup>	$R_{\theta JA}$	62.5	$^\circ C/W$
Junction Temperature	$T_J$	150	$^\circ C$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ C$

**MOSFET ELECTRICAL CHARACTERISTICS**( $T_a=25^{\circ}\text{C}$  unless otherwise noted)

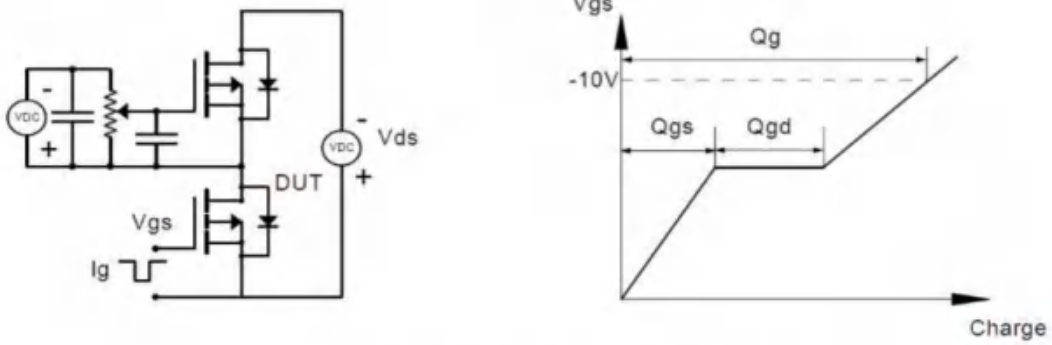
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = -20V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 12V, V_{DS} = 0V$	-	-	$\pm 100$	nA
Gate threshold voltage <sup>(3)</sup>	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.3	-0.7	-1.0	V
Drain-source on-resistance <sup>(3)</sup>	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -5A$	-	19	25	m $\Omega$
		$V_{GS} = -2.5V, I_D = -3A$	-	26	35	
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -10V, V_{GS} = 0V, f = 1MHz$	-	2000	-	pF
Output Capacitance	$C_{oss}$		-	242	-	
Reverse Transfer Capacitance	$C_{rss}$		-	231	-	
<b>Switching characteristics</b>						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -10V, I_D = -7.0A,$ $V_{GS} = -4.5V, R_G = 2.5\Omega$	-	10	-	ns
Turn-on rise time	$t_r$		-	31	-	
Turn-off delay time	$t_{d(off)}$		-	28	-	
Turn-off fall time	$t_f$		-	8	-	
Total Gate Charge	$Q_g$	$V_{DS} = -10V, I_D = -3A,$ $V_{GS} = -4.5V$	-	15.3	-	nC
Gate-Source Charge	$Q_{gs}$		-	2.2	-	
Gate-Drain Charge	$Q_{gd}$		-	4.4	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	$V_{DS}$	$V_{GS} = 0V, I_S = -7A$	-	-	-1.2	V
Diode Forward current <sup>(4)</sup>	$I_S$		-	-	-7.0	A

**Notes:**

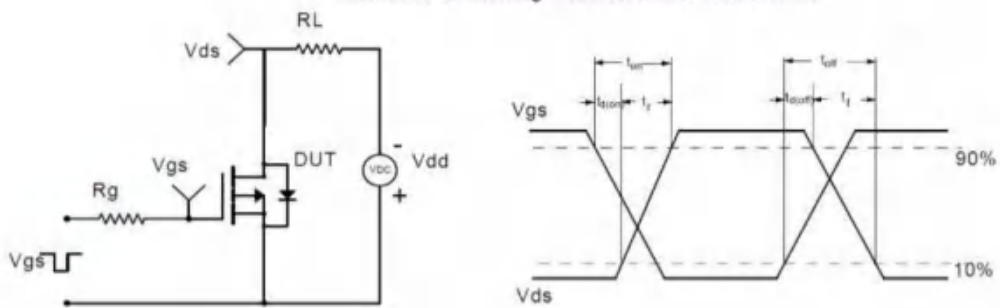
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
3. Surface Mounted on FR4 Board,  $t_s \leq 10$  sec

**Test Circuit**

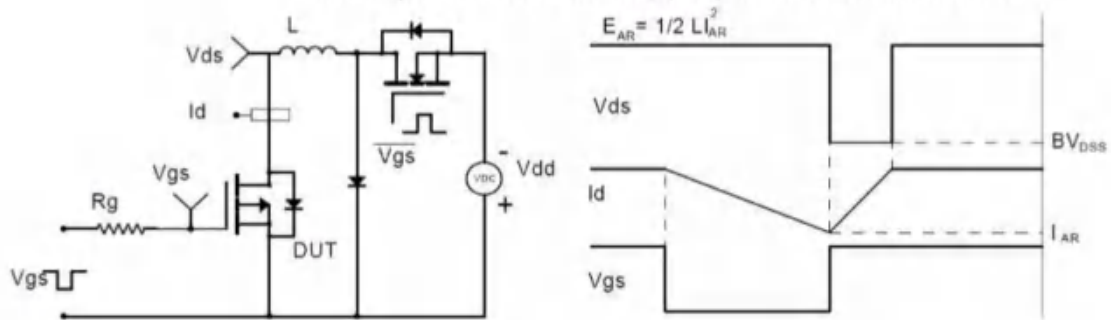
Gate Charge Test Circuit & Waveform



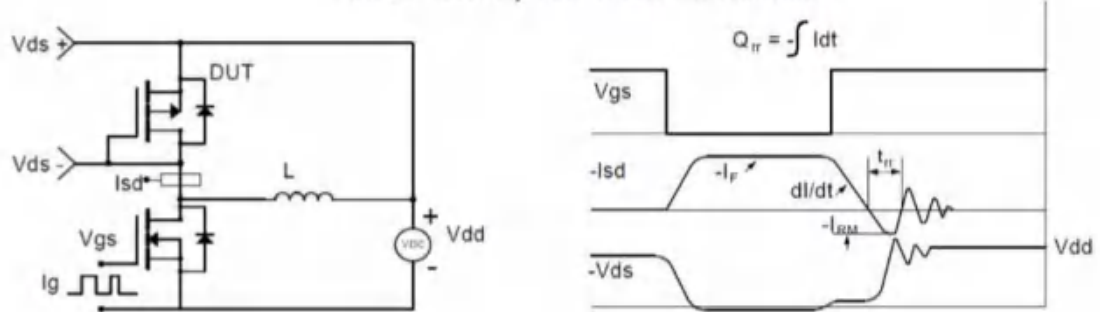
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

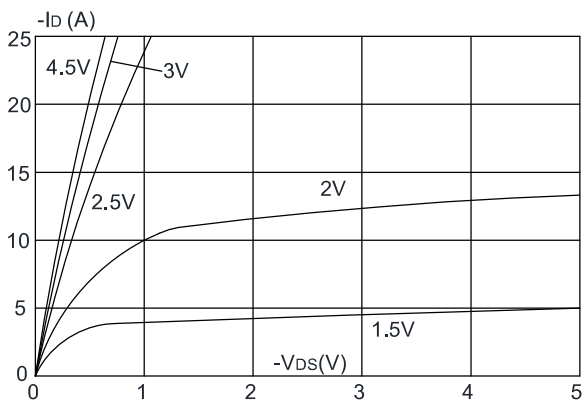


Diode Recovery Test Circuit & Waveforms

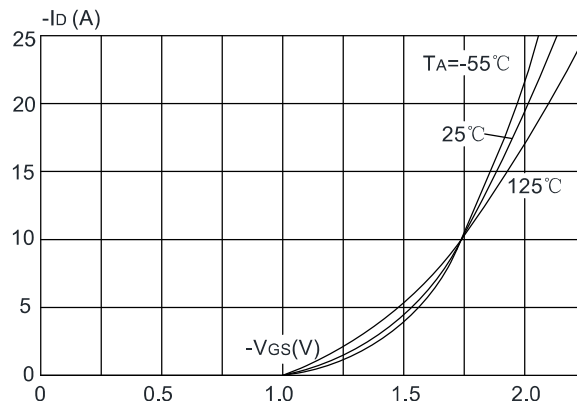


**Typical Performance Characteristics**

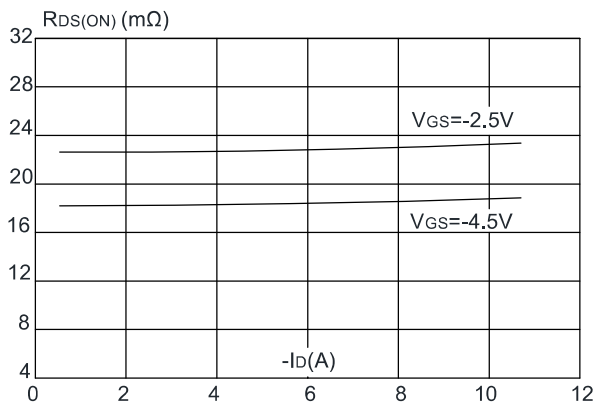
**Figure 1: Output Characteristics**



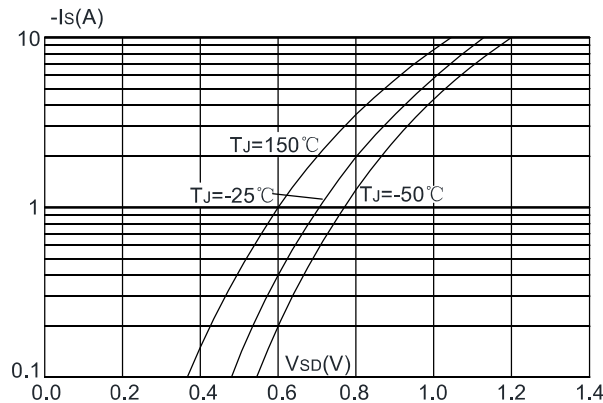
**Figure 2: Typical Transfer Characteristics**



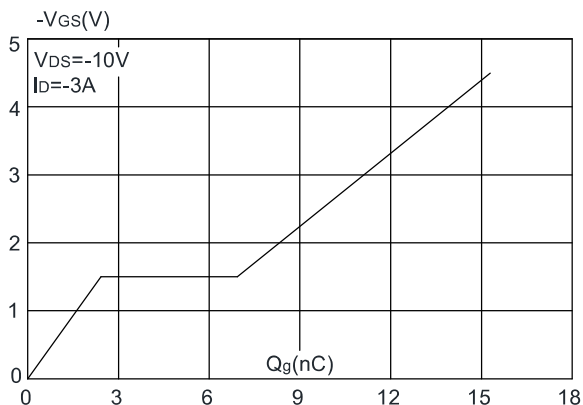
**Figure 3: On-resistance vs. Drain Current**



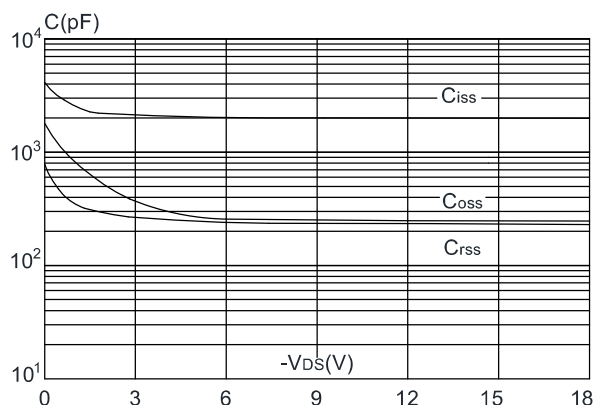
**Figure 4: Body Diode Characteristics**



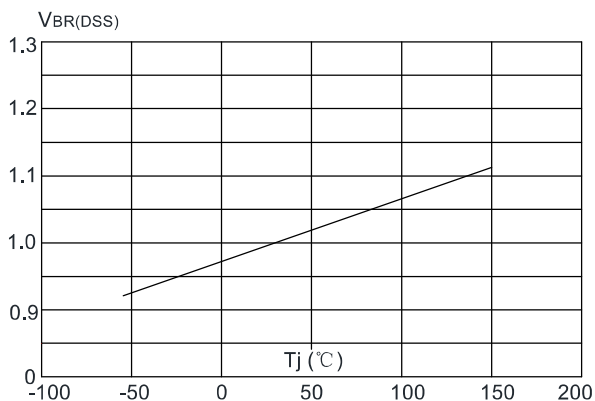
**Figure 5: Gate Charge Characteristics**



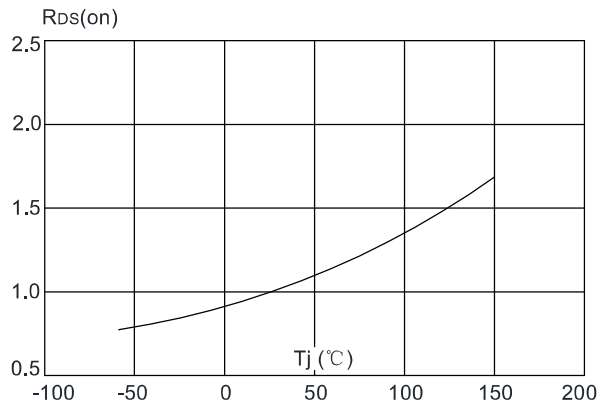
**Figure 6: Capacitance Characteristics**



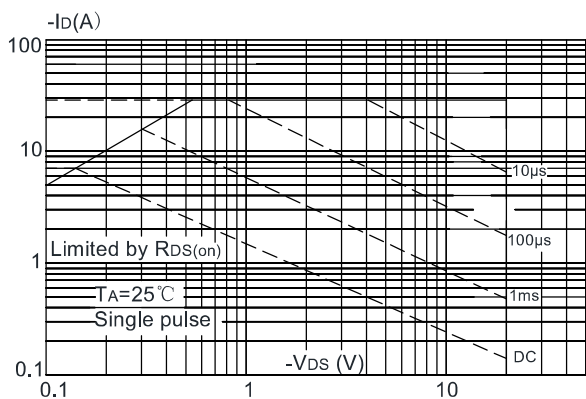
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



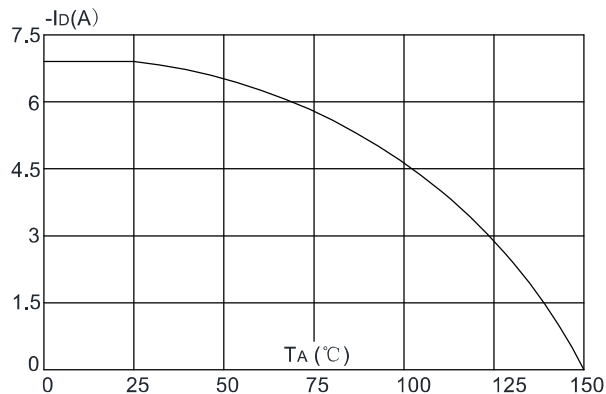
**Figure 8:** Normalized on Resistance vs. Junction Temperature



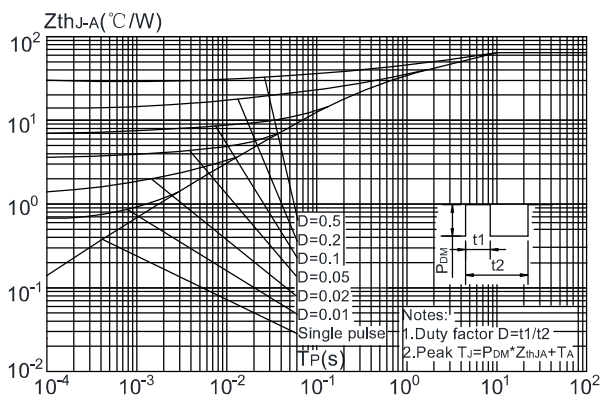
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



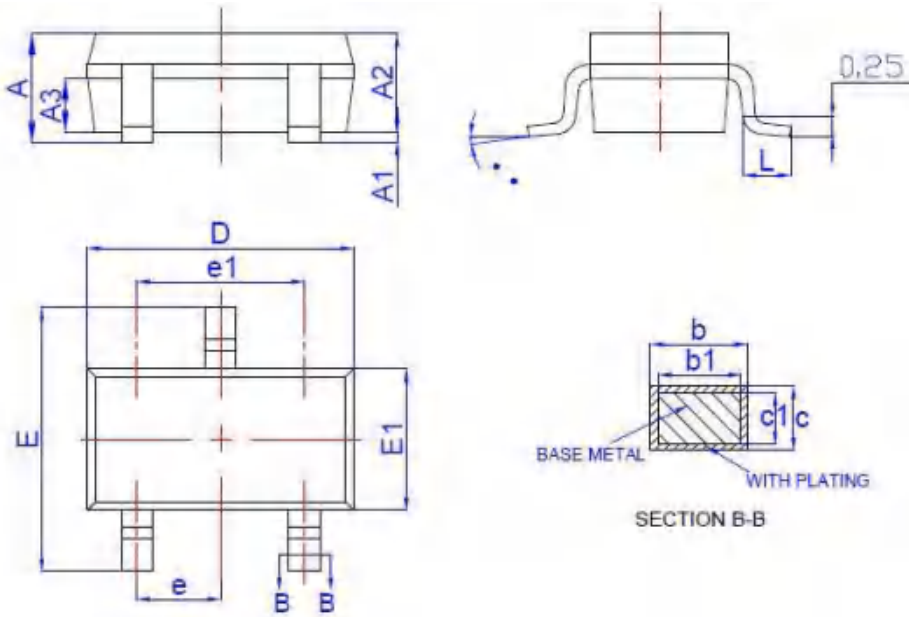
**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



# AP2335

P-Channel Enhancement Mosfet

## SOT-23-3 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.25
A1	0.04	—	0.10
A2	1.00	1.10	1.20
A3	0.55	0.65	0.75
b	0.38	—	0.48
b1	0.37	0.40	0.43
c	0.11	—	0.21
c1	0.10	0.13	0.16
D	2.72	2.92	3.12
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95BSC		
e1	1.90BSC		
L	0.30	—	0.60
••	0	—	••••