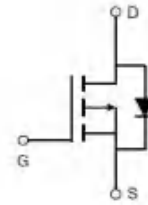


AP2335

P-Channel Enhancement Mosfet

Feature

- -20V,-7A
 $R_{DS(ON)} < 25m\Omega @ V_{GS} = -4.5V$ TYP: 19 m Ω
 $R_{DS(ON)} < 35m\Omega @ V_{GS} = -2.5V$ TYP: 26 m Ω
- 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}	± 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 ⁽⁴⁾	$R_{\theta JA}$	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)

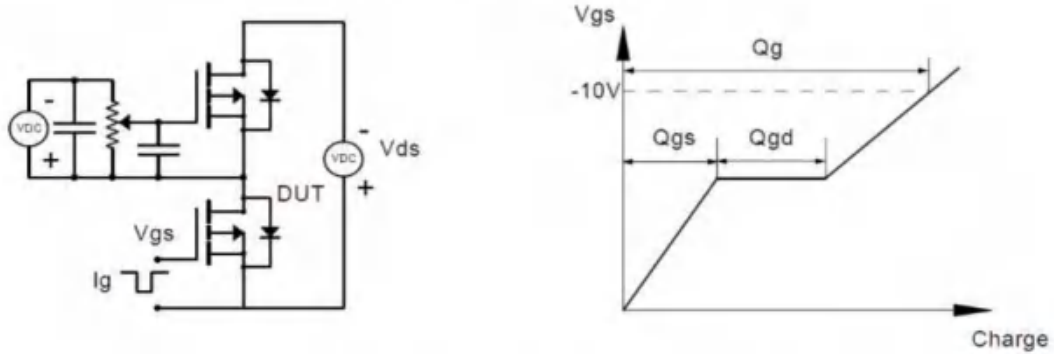
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -20V, V_{GS} = 0V$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 12V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage ⁽³⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.3	-0.7	-1.0	V
Drain-source on-resistance ⁽³⁾	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -5A$	-	19	25	m Ω
		$V_{GS} = -2.5V, I_D = -3A$	-	26	35	
Dynamic characteristics						
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	-	
Switching characteristics						
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	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V_{DS}	$V_{GS} = 0V, I_S = -7A$	-	-	-1.2	V
Diode Forward current ⁽⁴⁾	I_S		-	-	-7.0	A

Notes:

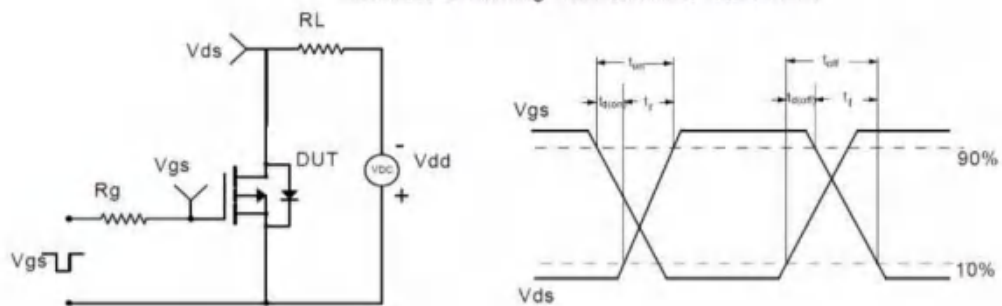
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. Surface Mounted on FR4 Board, $t_s \leq 10$ sec

Test Circuit

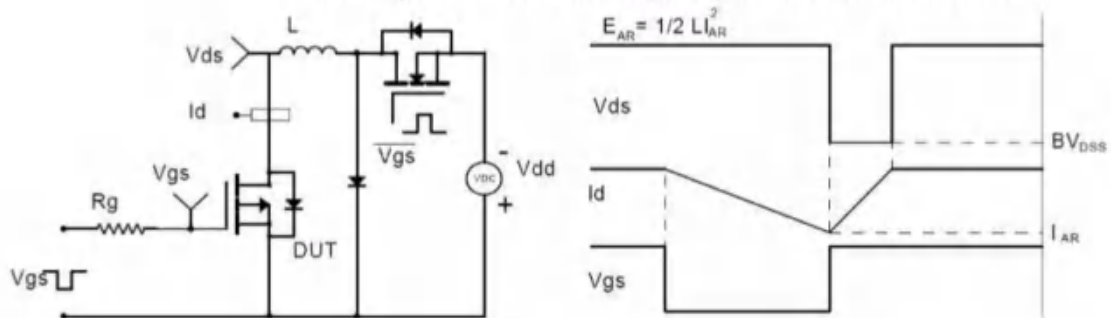
Gate Charge Test Circuit & Waveform



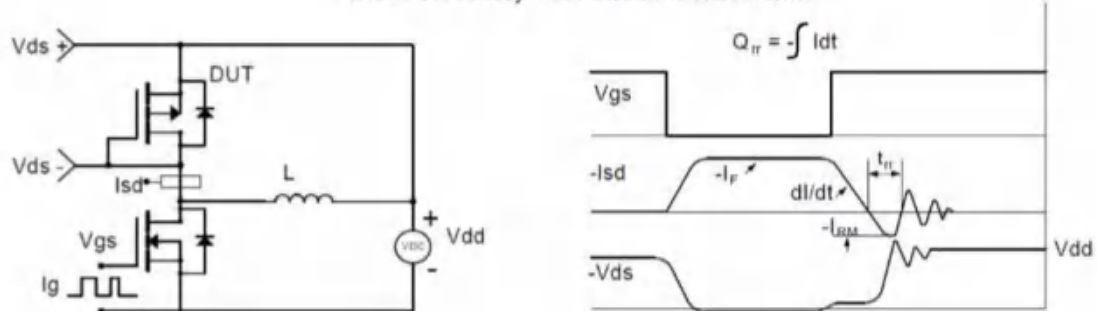
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Performance Characteristics

Figure 1: Output Characteristics

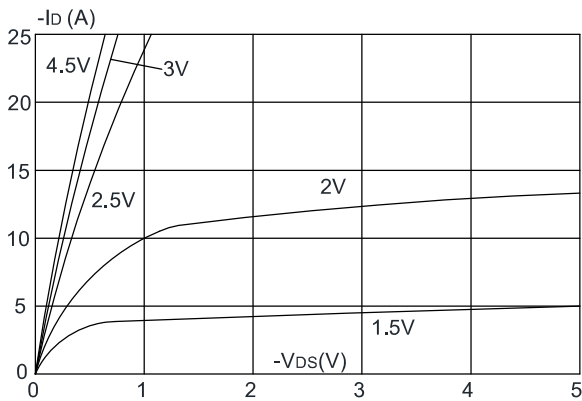


Figure 2: Typical Transfer Characteristics

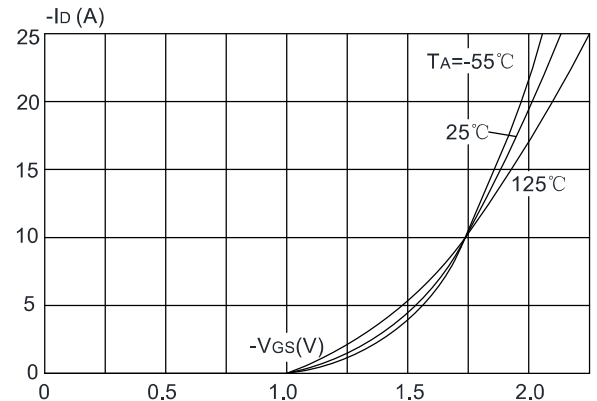


Figure 3: On-resistance vs. Drain Current

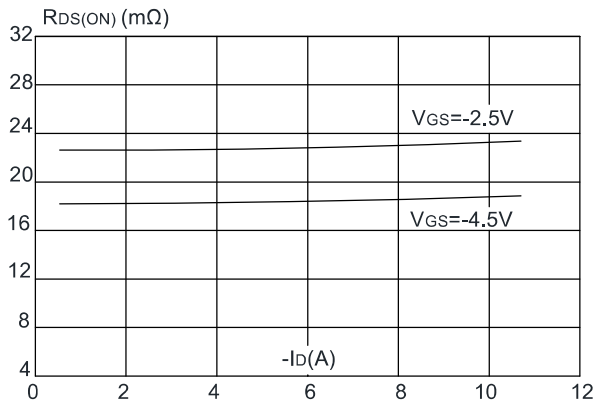


Figure 4: Body Diode Characteristics

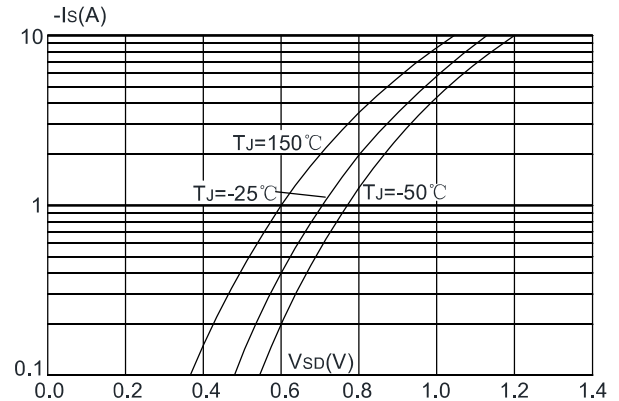


Figure 5: Gate Charge Characteristics

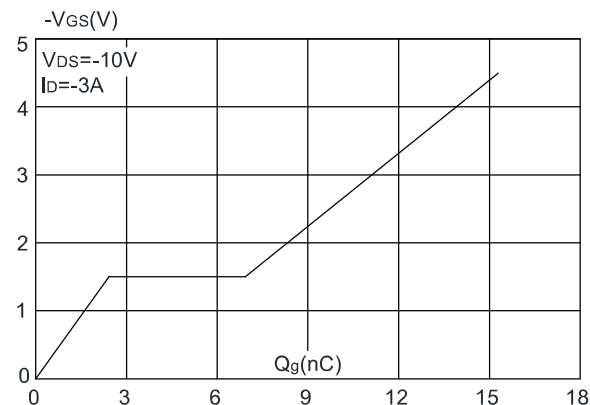


Figure 6: Capacitance Characteristics

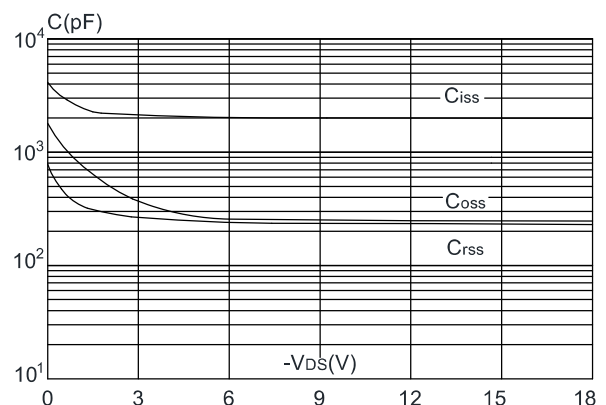


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

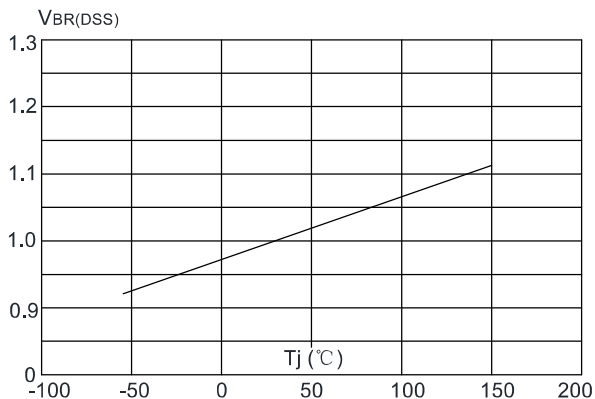


Figure 8: Normalized on Resistance vs. Junction Temperature

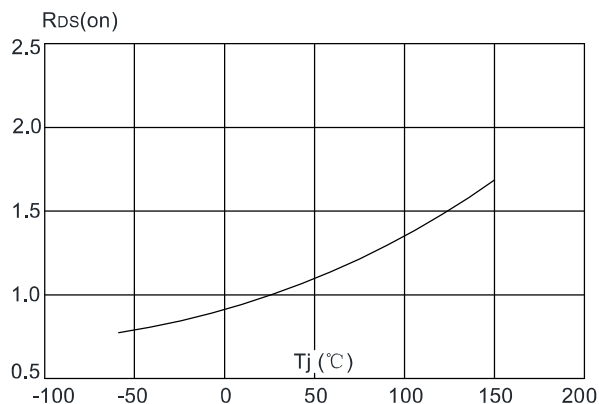


Figure 9: Maximum Safe Operating Area

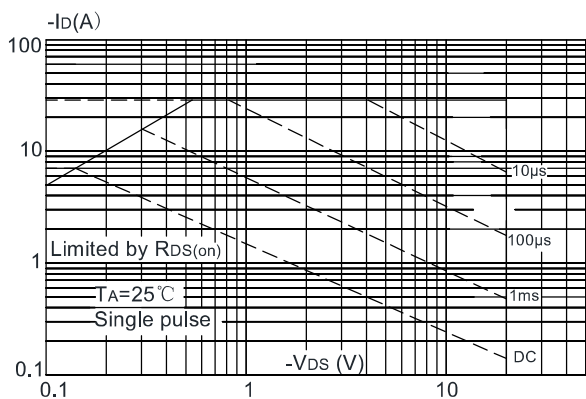


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

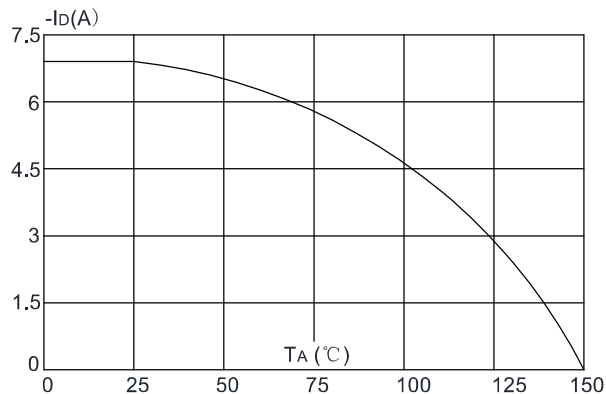
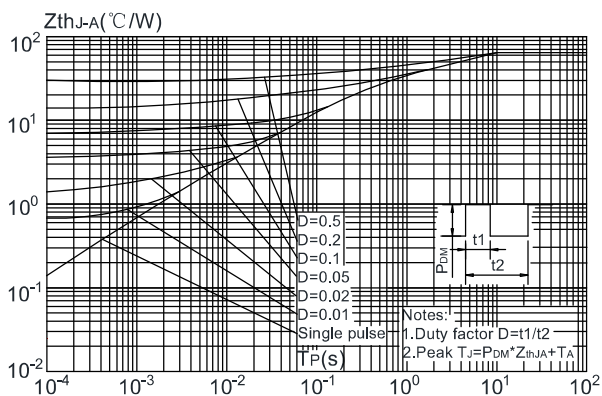


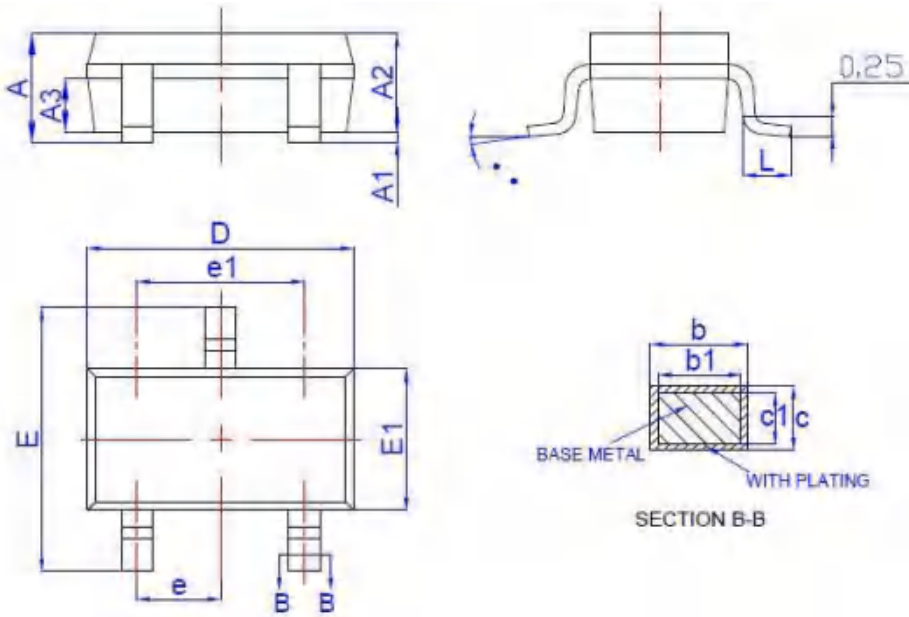
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



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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	—	••••