

20V P-Channel Power MOSFET

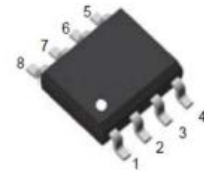
DESCRIPTION :

- Excellent $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100% ΔV_{DS} Tested
- Pb-Free Lead Plating
- RoHS compliant

V_{DS}	-20V
$I_D @ T_A=25^\circ C$	-15A
$R_{DS(ON)_{Typ.}} @ V_{GS} = -4.5V$	7 m Ω

TYPICAL APPLICATIONS :

- Load Switch
- PWM Application



SOP-8

MAXIMUM RATINGS (at $T_A = 25^\circ C$, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	± 12	V
Continuous Drain Current	$T_A=25^\circ C$ $T_A=100^\circ C$	I_D	-15 -9.8	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	-60	A
Single Pulsed Avalanche Energy ⁽²⁾		EAS	56	mJ
Power dissipation		P_D	3.3	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	$^\circ C$

Notes : 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. EAS condition: Starting $T_J=25^\circ C$, $V_{DD} = -15V$, $V_G = -10V$, $R_G=25\Omega$, $L=0.5mH$, $I_{AS} = -15A$, $V_{DD}=0V$ during time in avalanche.

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient	$R_{\theta JA}$	38	$^\circ C/W$

ELECTRICAL CHARACTERISTICS (at $T_J = 25\text{ }^\circ\text{C}$, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage $V_{GS} = 0\text{V}$, $I_D = -250\mu\text{A}$	$V_{(BR)DSS}$	-20			V
Zero Gate Voltage Drain Current $V_{DS} = -20\text{V}$, $V_{GS} = 0\text{V}$	I_{DSS}			-1	μA
Gate-Source Leakage Current $V_{GS} = \pm 12\text{V}$, $V_{DS} = 0\text{V}$	I_{GSS}			± 100	nA
Gate-Source threshold voltage $V_{DS} = V_{GS}$, $I_D = -250\mu\text{A}$	$V_{GS(th)}$	-0.35	-0.7	-1.0	V
Drain-Source On-State Resistance $V_{GS} = -4.5\text{V}$, $I_D = -15\text{A}$ $V_{GS} = -2.5\text{V}$, $I_D = -12\text{A}$	$R_{DS(on)}$		7 9	9 13	m Ω
Input capacitance $f = 1\text{MHz}$, $V_{DS} = -10\text{V}$, $V_{GS} = 0\text{V}$	C_{iss}		4600		pF
Output capacitance $f = 1\text{MHz}$, $V_{DS} = -10\text{V}$, $V_{GS} = 0\text{V}$	C_{oss}		460		pF
Reverse transfer capacitance $f = 1\text{MHz}$, $V_{DS} = -10\text{V}$, $V_{GS} = 0\text{V}$	C_{rss}		459		pF
Total Gate Charge $V_{DS} = -10\text{V}$, $I_D = -15\text{A}$, $V_{GS} = -4.5\text{V}$	Q_G		56		nC
Gate to Source Charge $V_{DS} = -10\text{V}$, $I_D = -15\text{A}$, $V_{GS} = -4.5\text{V}$	Q_{GS}		8		nC
Gate to Drain Charge $V_{DS} = -10\text{V}$, $I_D = -15\text{A}$, $V_{GS} = -4.5\text{V}$	Q_{GD}		16		nC
Turn-on delay time $V_{DD} = -10\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -15\text{A}$, $R_{GEN} = 2.7\Omega$	$t_{d(ON)}$		8		ns
Rise time $V_{DD} = -10\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -15\text{A}$, $R_{GEN} = 2.7\Omega$	t_r		59		ns
Turn-off delay time $V_{DD} = -10\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -15\text{A}$, $R_{GEN} = 2.7\Omega$	$t_{d(OFF)}$		111		ns
Fall time $V_{DD} = -10\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -15\text{A}$, $R_{GEN} = 2.7\Omega$	t_f		43		ns

Body Diode

ELECTRICAL CHARACTERISTICS (at $T_J = 25\text{ }^\circ\text{C}$, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage $V_{GS} = 0V, I_S = -15A$	V_{SD}			-1.2	V
Maximum Continuous Body Diode Forward Current	I_S			-15	A
Maximum Pulsed Body Diode Forward Current	I_{SM}			-60	A
Revers Recovery Time $V_{GS} = 0V, I_{SD} = -15A, di/dt = -100A/us$	T_{rr}		23		ns
Revers Recovery Charge $V_{GS} = 0V, I_{SD} = -15A, di/dt = -100A/us$	Q_{rr}		14		nC

Typical Performance Characteristics

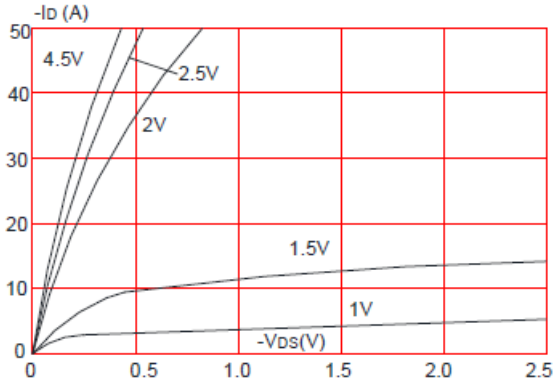


Figure 1. Output Characteristics

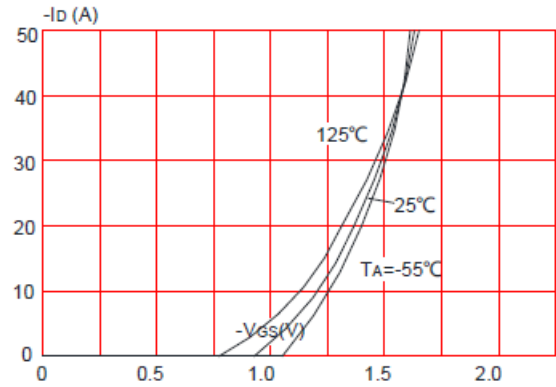


Figure 2. Typical Transfer Characteristics

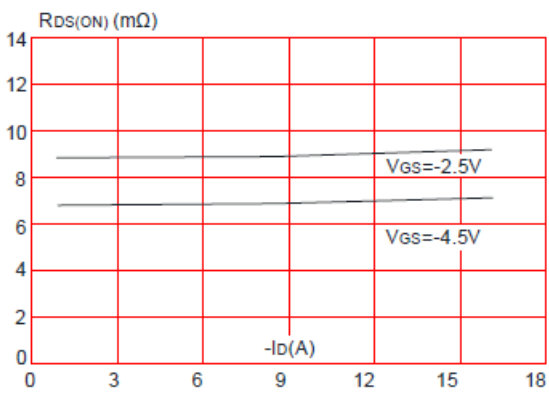


Figure 3. On-resistance vs. Drain Current

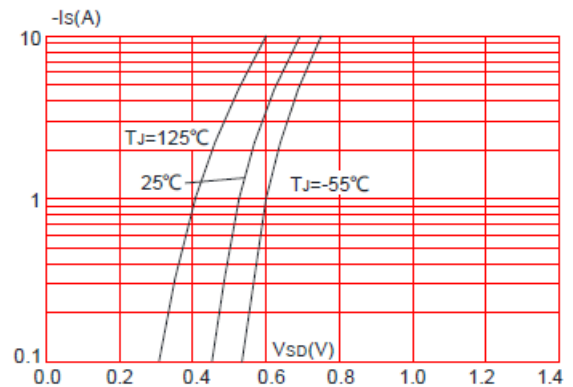


Figure 4. Body Diode Characteristics

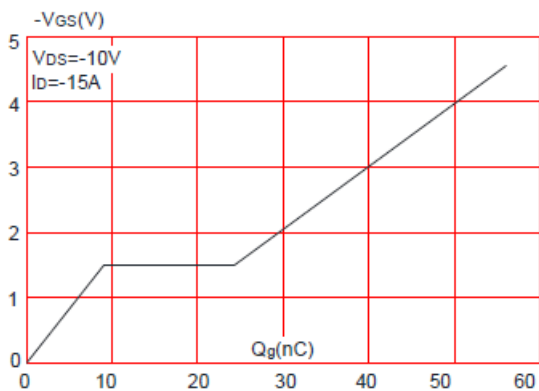


Figure 5. Gate Charge Characteristics

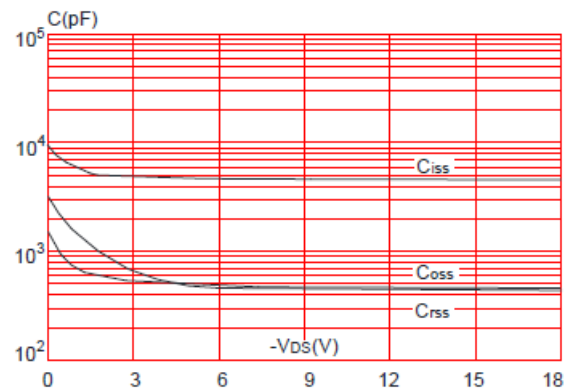


Figure 6. Capacitance Characteristics

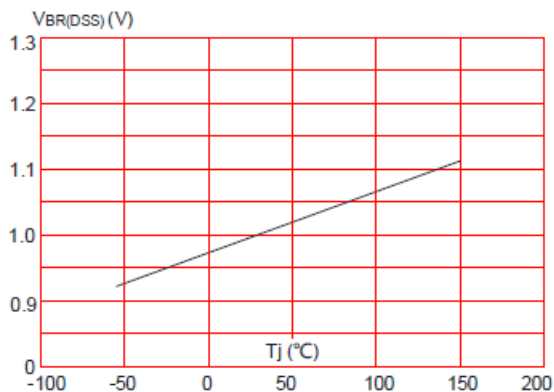


Figure 7. Normalized Breakdown voltage vs. Junction Temperature

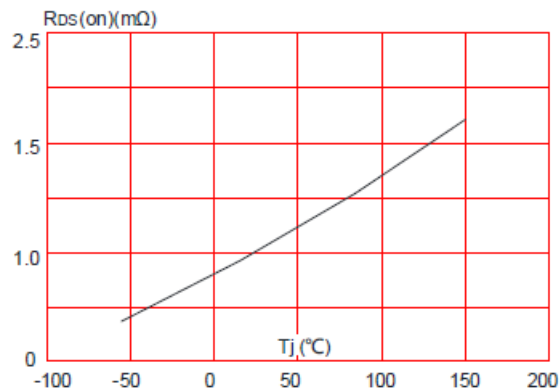


Figure 8. Normalized on Resistance vs. Junction Temperature

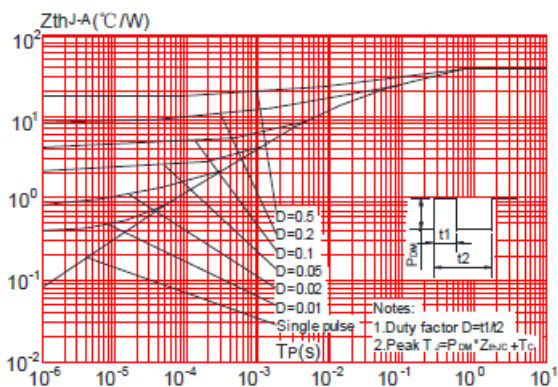


Figure 9. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

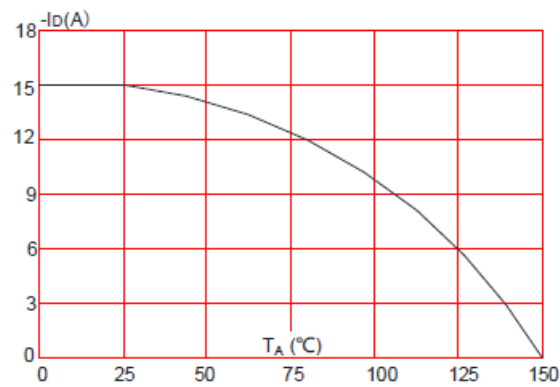


Figure 10. Maximum Continuous Drain Current vs. Ambient Temperature

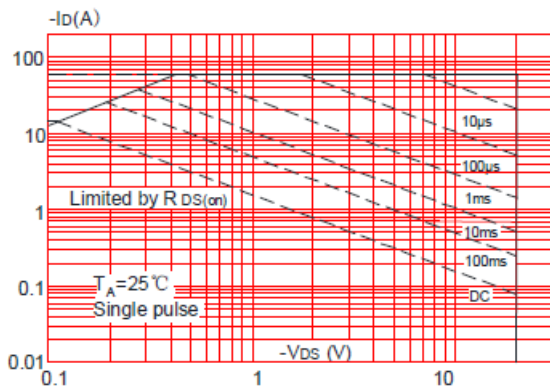
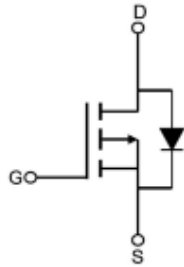
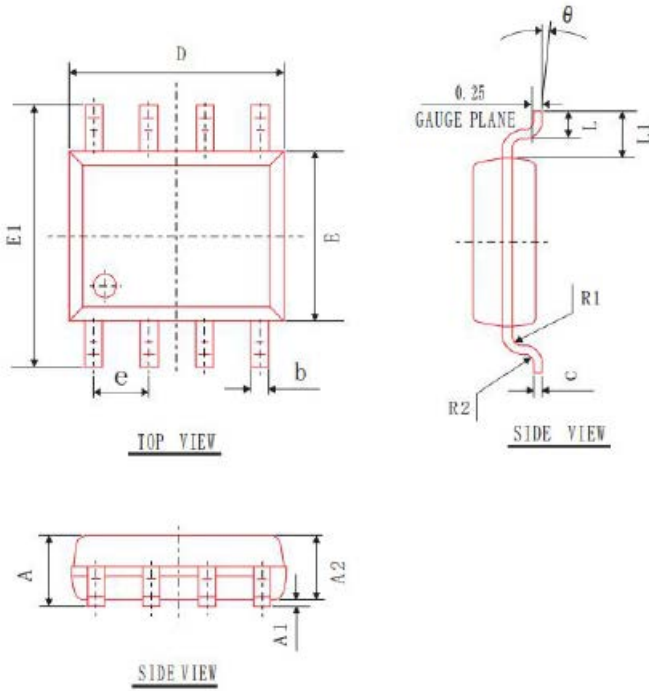


Figure 11. Maximum Safe Operating Area

- Circuit diagram



- Package outlines : Dimensions in (mm)



SYMBOL	MIN	NOM	MAX
A	1.40	1.60	1.80
A1	0.05	0.15	0.25
A2	1.35	1.45	1.55
b	0.30	0.40	0.50
c	0.153	0.203	0.253
D	4.80	4.90	5.00
E	3.80	3.90	4.00
E1	5.80	6.00	6.20
L	0.45	0.70	1.00
θ	2°	4°	6°
L 1	1.04 REF		
e	1.27 BSC		
R1	0.07 TYP		
R2	0.07 TYP		

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