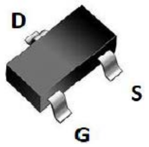
20V P-Channel Power MOSFET

DESCRIPTION：

- Excellent $R_{DS(ON)}$
- Low Gate Charge
- Advanced Trench Technology
- Pb-Free Lead Plating
- RoHS compliant

V_{DS}	-20V
I_D @V_{GS}= -10V	-0.7A
$R_{DS(ON)\_Typ.}$@V_{GS}=-4.5V	307mΩ



SOT-523

TYPICAL APPLICATIONS：

- Power Management
- Load Switch
- PWM Application

MAXIMUM RATINGS (at T_A = 25 °C, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±10	V
Continuous Drain Current	T_A=25℃ T_A=100℃	I_D	-0.7 -0.4	A
Pulsed Drain Current		I_{DM}	Refer to Fig.4	A
Power dissipation	T_A=25℃ T_A=100℃	P_D	0.5 0.1	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	℃

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient	$R_{\theta JA}$	412-	℃/W

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = -250uA	$V_{(BR)DSS}$	-20			V
Zero Gate Voltage Drain Current VDS = -20 V, VGS = 0 V	I_{DSS}			-1	uA
Gate-Source Leakage Current VGS = ±10V, VDS = 0V	I_{GSS}			±10	uA
Gate-Source threshold voltage VDS = VGS, ID = -250uA	$V_{GS(th)}$	-0.5	-0.7	-0.9	V
Drain-Source On-State Resistance VGS = -4.5V, ID = -0.5A VGS = -2.5V, ID = -0.4A	$R_{DS(on)}$		307 394	399 600	mΩ
Gate Resistance f=1MHz	R_G		174		Ω
Input capacitance f=1MHz, VDS=-10 V, VGS=0 V	C_{iss}		70		pF
Output capacitance f=1MHz, VDS=-10 V, VGS=0 V	C_{oss}		18		pF
Reverse transfer capacitance f=1MHz, VDS=-10 V, VGS=0 V	C_{rss}		10		pF
Total Gate Charge VDS= -10V, ID= -1A,VGS= 0 to -4.5V	Q_G		1.0		nC
Gate to Source Charge VDS= -10V, ID= -1A,VGS= 0 to -4.5V	Q_{GS}		0.3		nC
Gate to Drain Charge VDS= -10V, ID= -1A,VGS= 0 to -4.5V	Q_{GD}		0.1		nC
Turn-on delay time VDD=-10 V, VGS= -4.5V, ID= -0.5A, R_{GEN}=3Ω	$td_{(ON)}$		62.		ns
Rise time VDD=-10 V, VGS= -4.5V, ID= -0.5A, R_{GEN}=3Ω	tr		7.3		ns
Turn-off delay time VDD=-10 V, VGS= -4.5V, ID= -0.5A, R_{GEN}=3Ω	$td_{(OFF)}$		40		ns
Fall time VDD=-10 V, VGS= -4.5V, ID= -0.5A, R_{GEN}=3Ω	tf		22		ns

Body Diode

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage VGS = 0V, I_S = -0.5A	V_{SD}			-1.2	V
Maximum Continuous Body Diode Forward Current	I_S			-0.7	A
Maximum Pulsed Body Diode Forward Current	I_{SM}			-2.8	A
Revers Recovery Time IF=-2A, dI_F/dt = 100A/us	Trr		10		ns
Revers Recovery Charge IF=-2A, dI_F/dt = 100A/us	Qrr		0.6		nC

Typical Performance Characteristics

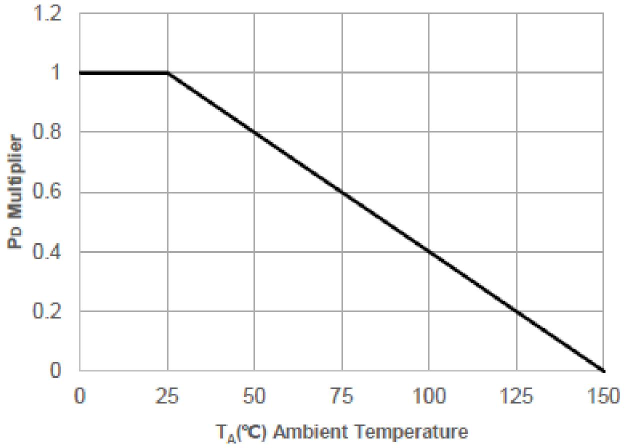


Figure 1. Power De-rating

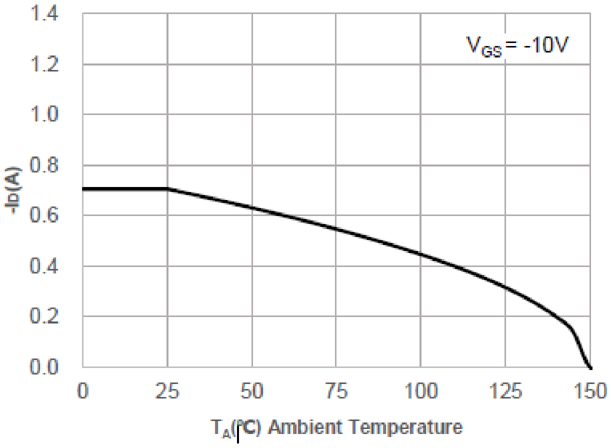


Figure 2. Current De-rating

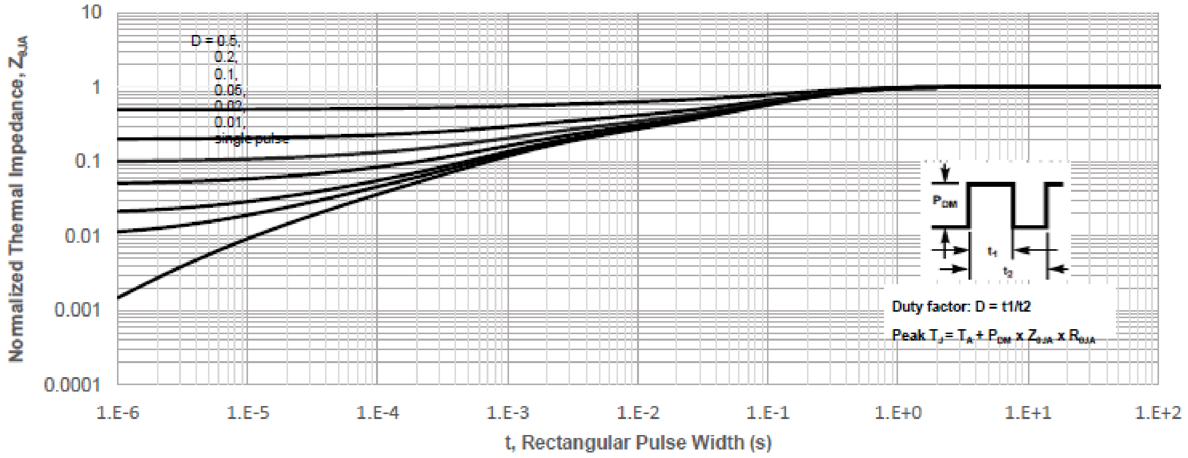


Figure 3. Normalized Maximum Transient Thermal Impedance

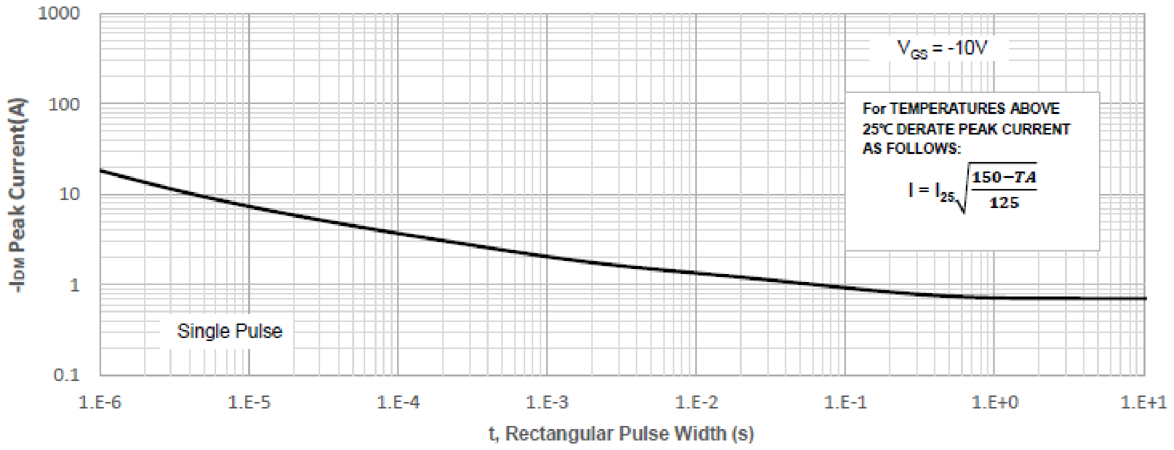


Figure 4. Peak Current Capacity

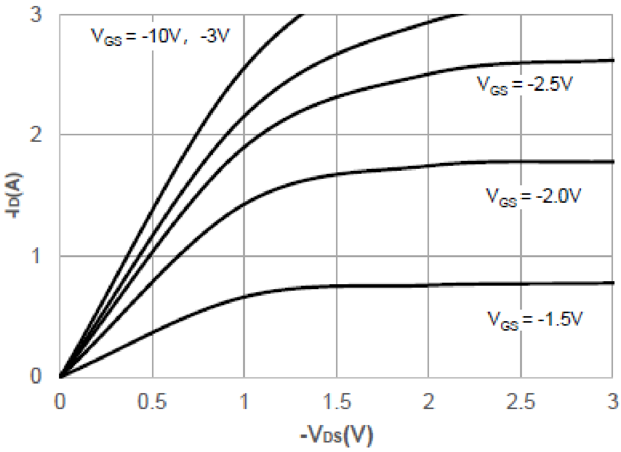


Figure 5. Output Characteristics

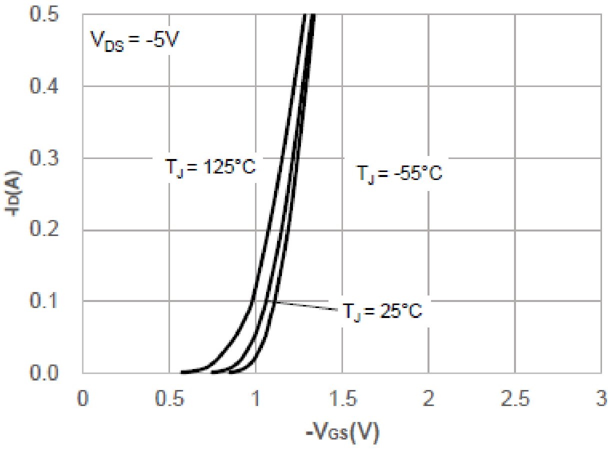


Figure 6. Typical Transfer Characteristics

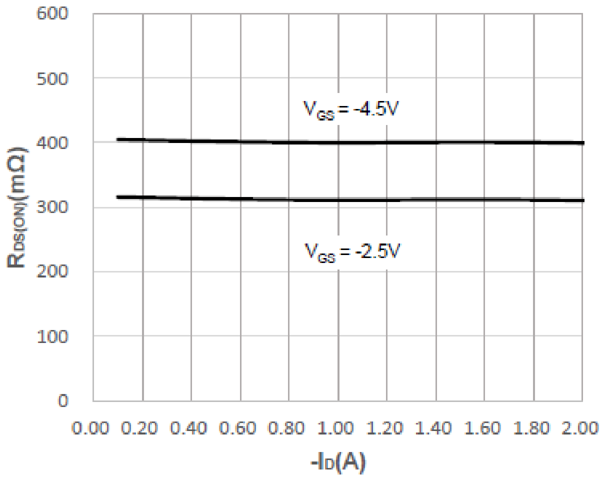


Figure 7. On-resistance vs. Drain Current

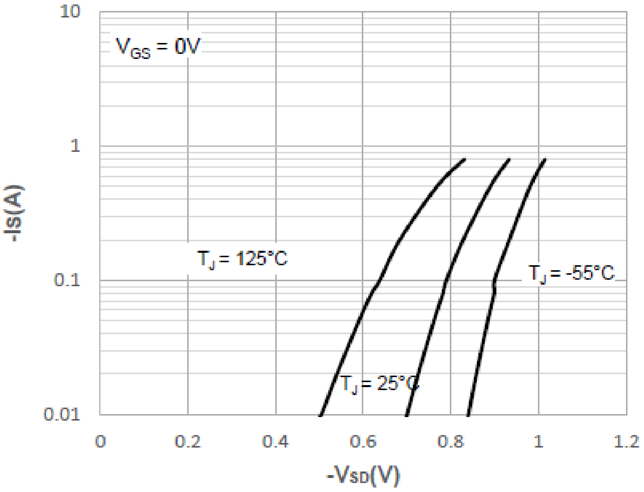


Figure 8. Body Diode Characteristics

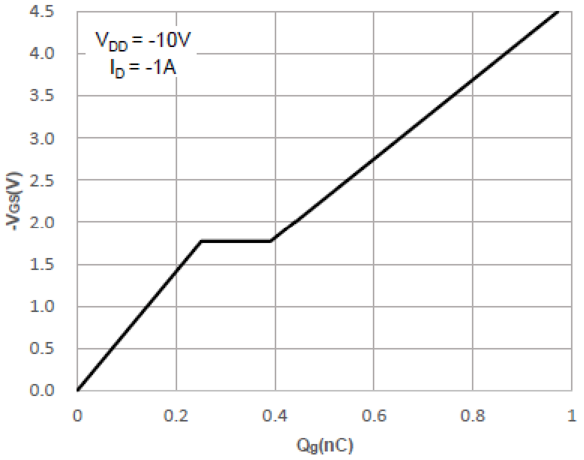


Figure 9. Gate Charge Characteristics

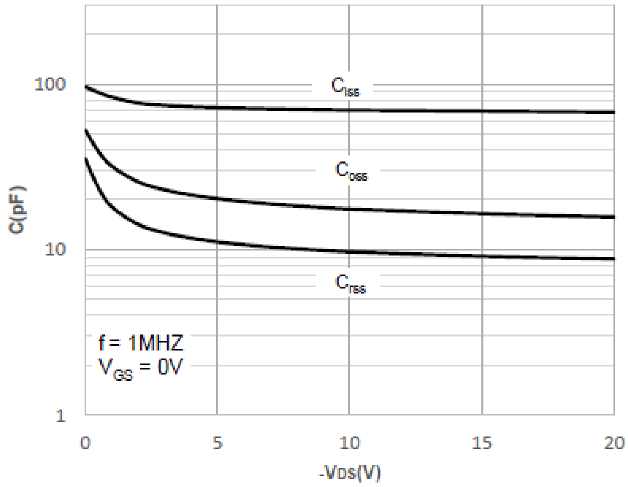


Figure 10. Capacitance Characteristics

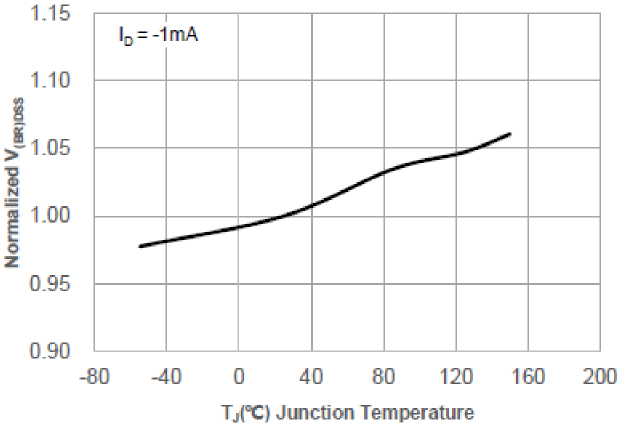


Figure 11. Normalized Breakdown voltage vs. Junction Temperature

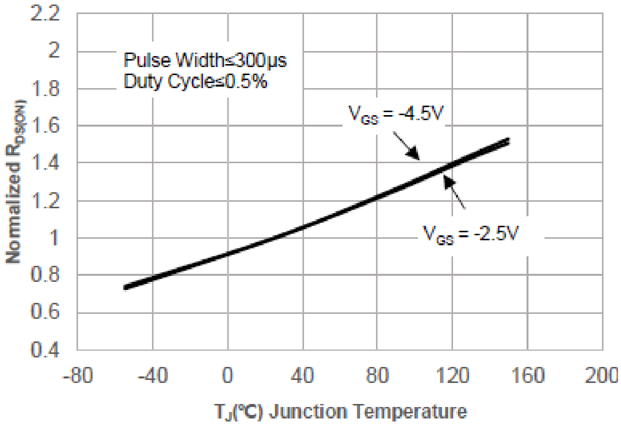


Figure 12. Normalized on Resistance vs. Junction Temperature

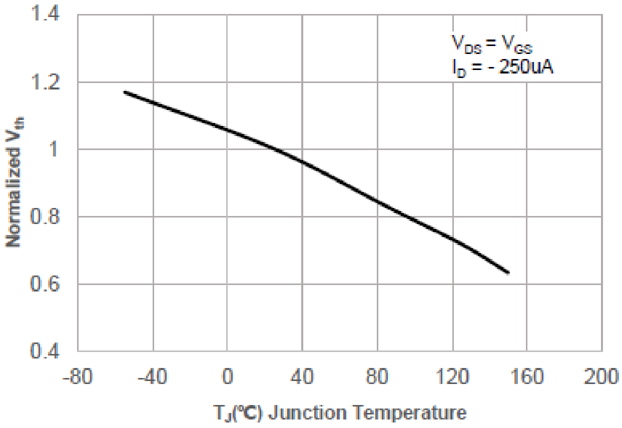


Figure 13. Normalized Threshold Voltage vs. Junction Temperature

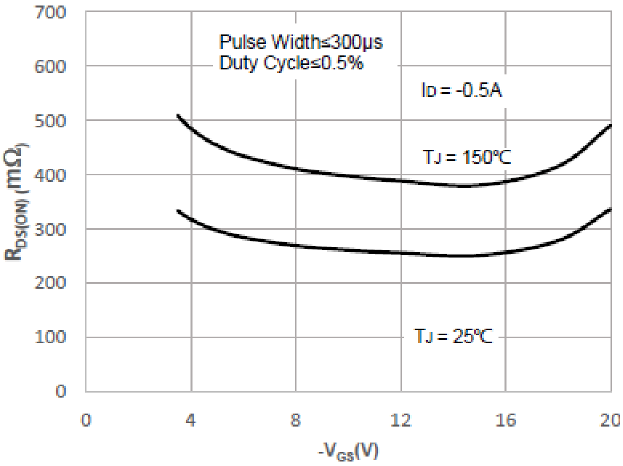


Figure 14. RDS(ON) vs. VGS

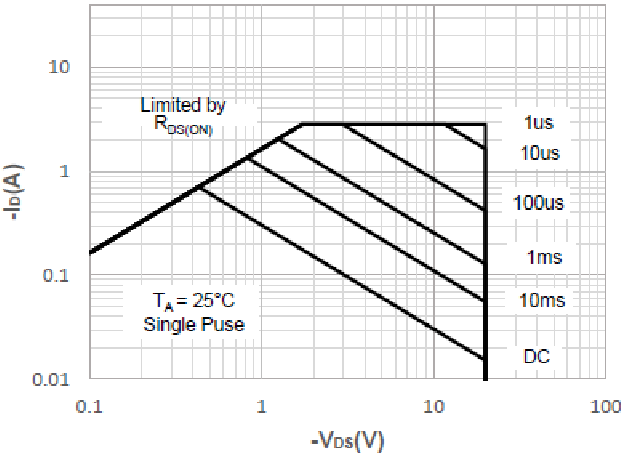
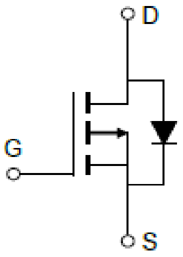
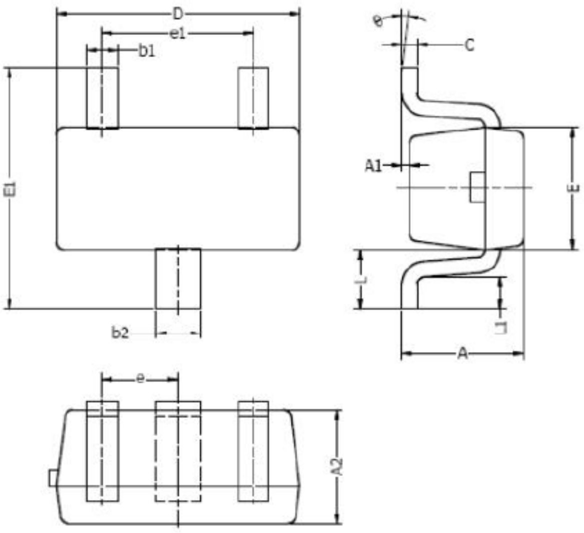


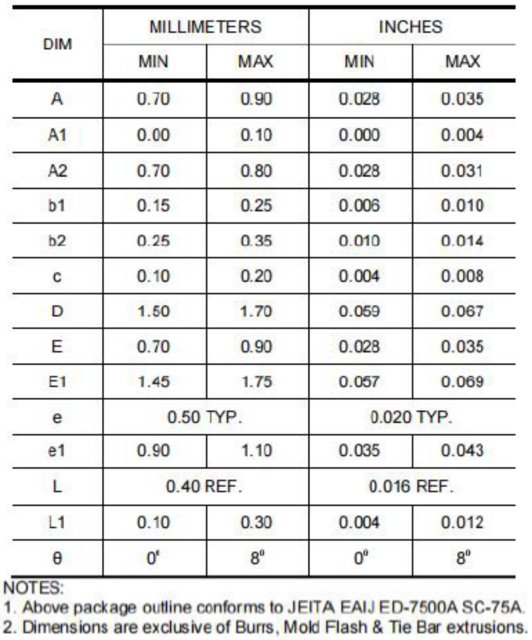
Figure 15. Maximum Safe Operating Area

- Circuit diagram



- Package outlines :





DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.90	0.028	0.035
A1	0.00	0.10	0.000	0.004
A2	0.70	0.80	0.028	0.031
b1	0.15	0.25	0.006	0.010
b2	0.25	0.35	0.010	0.014
c	0.10	0.20	0.004	0.008
D	1.50	1.70	0.059	0.067
E	0.70	0.90	0.028	0.035
E1	1.45	1.75	0.057	0.069
e	0.50 TYP.		0.020 TYP.	
e1	0.90	1.10	0.035	0.043
L	0.40 REF.		0.016 REF.	
L1	0.10	0.30	0.004	0.012
θ	0°	8°	0°	8°

NOTES:
1. Above package outline conforms to JEITA EAIJ ED-7500A SC-75A.
2. Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

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