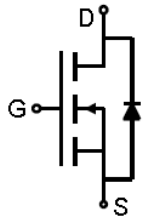
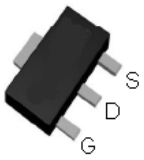
N-channel Enhancement Mode MOSFET 4520 DATASHEET

DESCRIPTION

The 4520 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.



Schematic diagram



Top View SOT-89

GENERAL FEATURES

- RDS(ON) <22mΩ @ VGS=4.5V
  RDS(ON) <15mΩ @ VGS=10V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management

ABSOLUTE MAXIMUM RATINGS(T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	45	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current @ Continuous(Note 2)	I_D（25℃）	30	A
	I_D（100℃）	20	A
Drain Current @ Current-Pulsed (Note 1)	I_{DM}	112	A
Maximum Power Dissipation (T_A=25℃)	P_D	35	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	35	℃/W

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	45			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V,V_{GS}=0V			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V			±100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=VGS,I_D=250μA	1		2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=15A		16	22	mΩ
		V_{GS}=10V, I_D=15A		12	15	mΩ
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V, F=1.0MHz		930	1350	PF
Output Capacitance	C_{oss}			135	190	PF
Reverse Transfer Capacitance	C_{rss}			110	160	PF
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=15V, V_{GS}=10V,R_{GEN}=3.3Ω Ids=15A		4.5		nS
Turn-on Rise Time	t_r			9		nS
Turn-Off Delay Time	$t_{d(off)}$			32		nS
Turn-Off Fall Time	t_f			5		nS
Total Gate Charge	Q_g	V_{DS}=15V,I_D=15A,V_{GS}=4.5V		15		nC
Gate-Source Charge	Q_{gs}			4.5		nC
Gate-Drain Charge	Q_{gd}			7		nC
Body Diode Reverse Recovery Time	T_{rr}	I_F=5A, dI/dt=100A/μs		20		nS
Body Diode Reverse Recovery Charge	Q_{rr}			10		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=1A		0.80	1.2	V

NOTES:

1. **Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.**
2. **$R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.$R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design. $R_{\theta JA}$ shown below for single device operation on FR-4 in still air.**

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

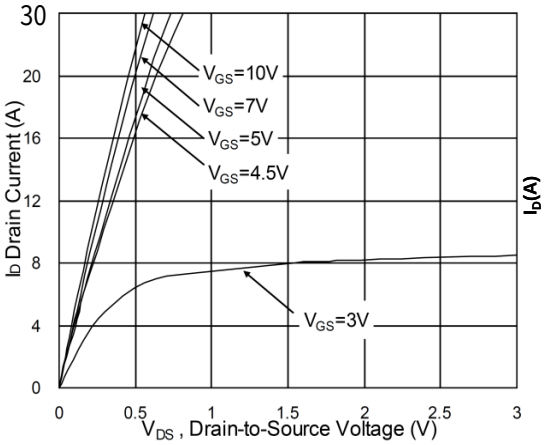


Fig.1 Typical Output Characteristics

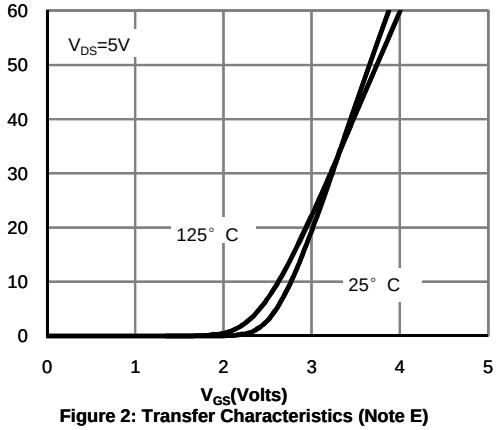


Figure 2: Transfer Characteristics (Note E)

Fig.2 On Resistance vs. G S Voltage

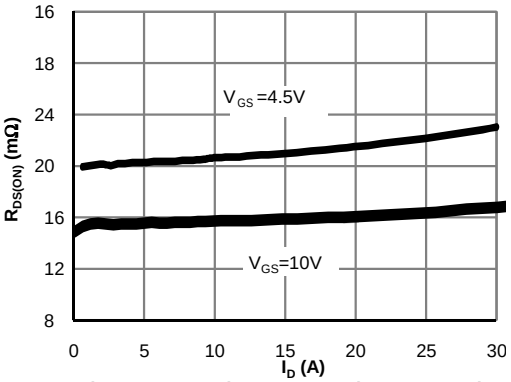


Figure 3: On-Resistance vs. Drain Current and Ga Voltage (Note E)

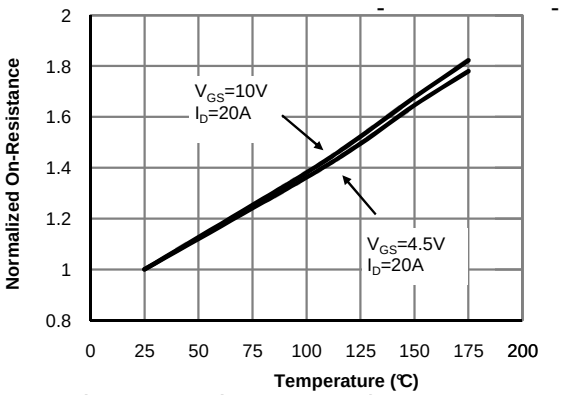


Figure 4: On-Resistance vs. Junction Temperature (Note E)

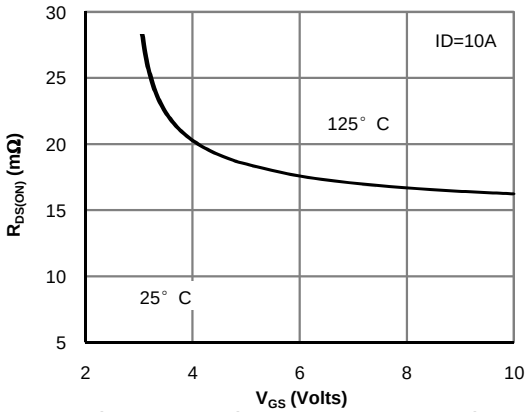


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

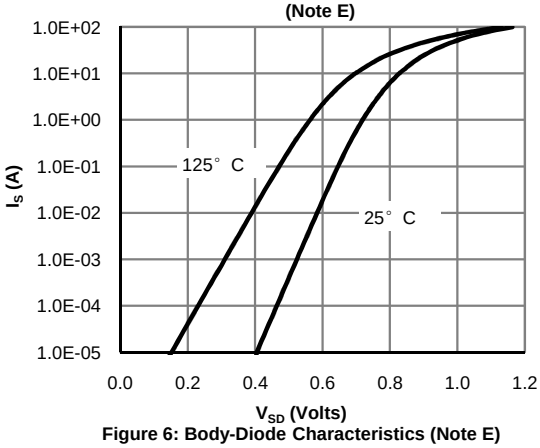


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

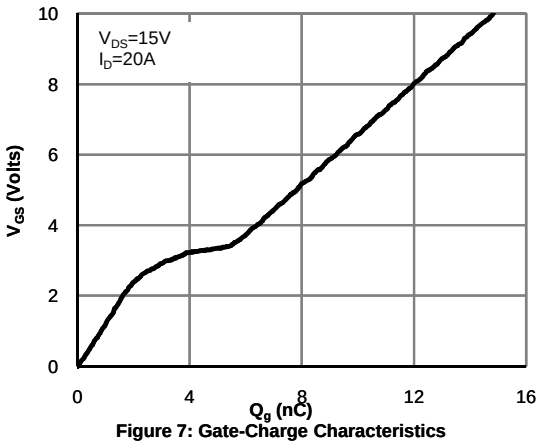


Figure 7: Gate-Charge Characteristics

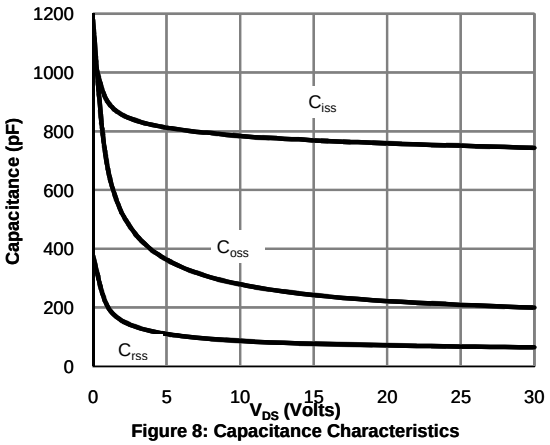


Figure 8: Capacitance Characteristics

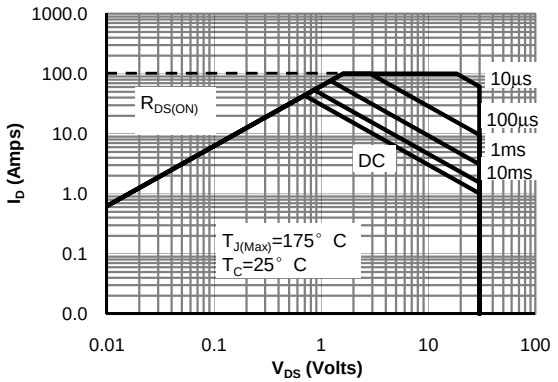


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

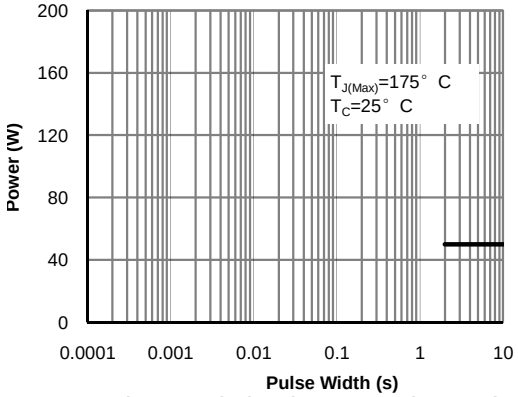


Figure 10: Single Pulse Power Rating Junction-to-

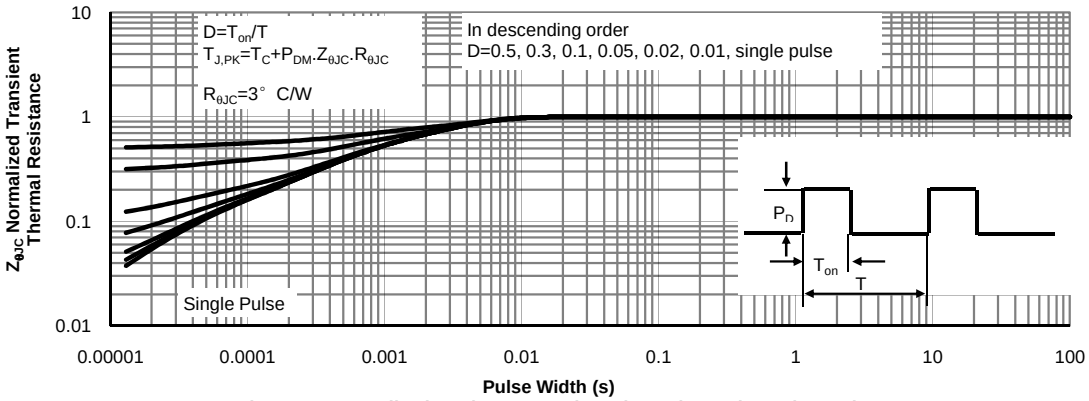


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

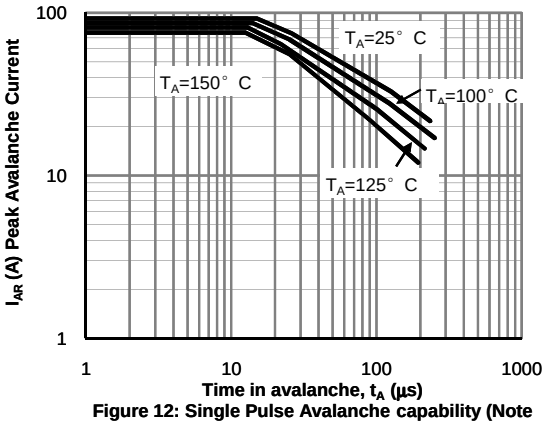


Figure 12: Single Pulse Avalanche capability (Note C)

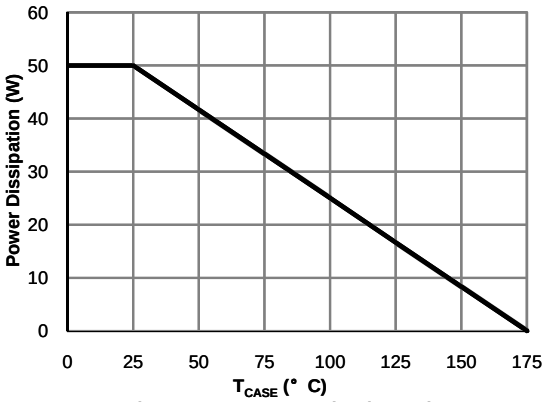


Figure 13: Power De-rating (Note F)

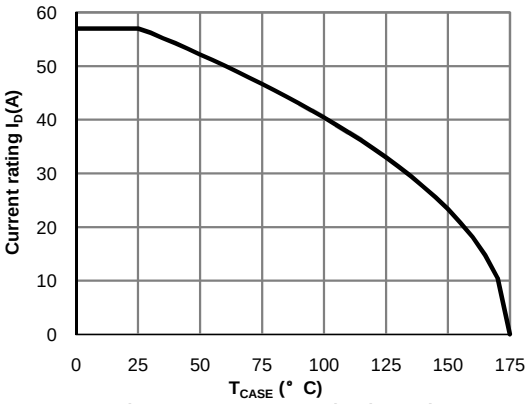


Figure 14: Current De-rating (Note F)

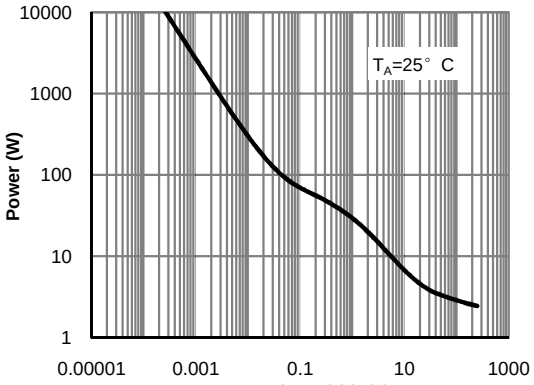


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

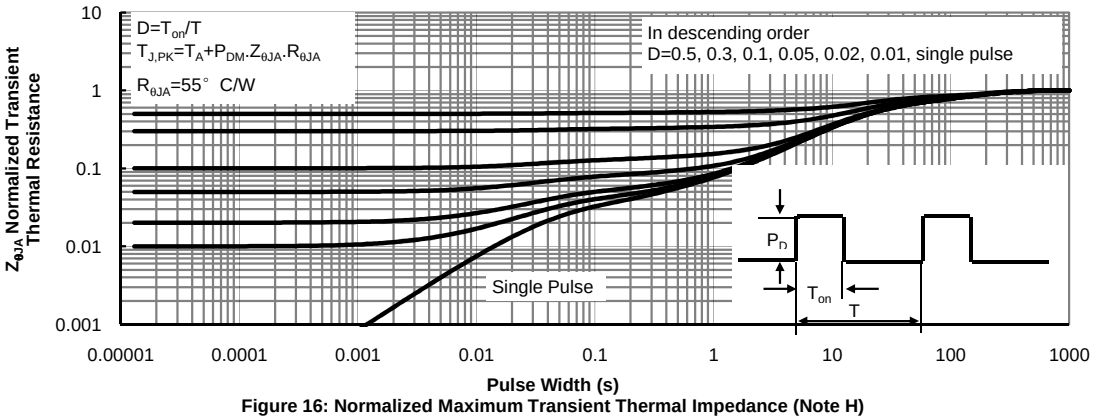
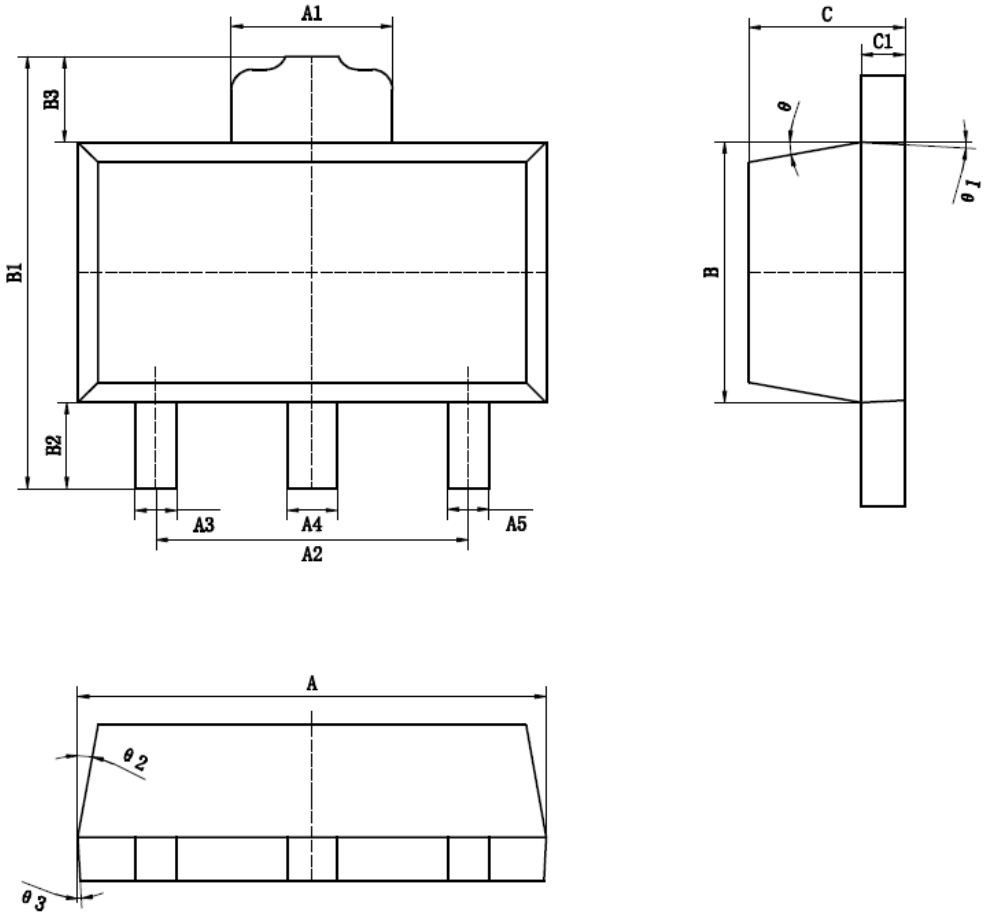


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

Package Information

SOT89-3 Package



尺寸 / 标注	最小(mm)	最大(mm)	尺寸 / 标注	最小(mm)	最大(mm)
A	4.40	4.60	B3	0.82	0.83
A1	1.65	1.75	C	1.40	1.60
A2	2.95	3.05	C1	0.35	0.45
A3	0.35	0.45	θ	6° TYP4	
A4	0.43	0.53	θ1	3° TYP4	
A5	0.35	0.45	θ2	6° TYP4	
B	2.40	2.60	θ3	3° TYP4	
B1	4.05	4.25			
B2	0.82	0.83			