

General Description

The WSK78P10 uses advanced SGT technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V.

This device is suitable for use as a Battery protection or in other Switching application.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Green Device Available

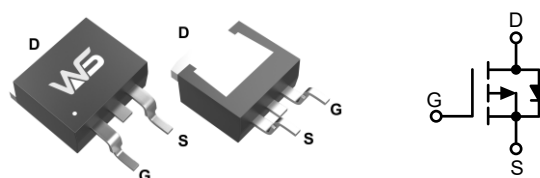
Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D
-100V	19mΩ	-78A

Applications

- Brushless motor
- Load switch.
- Uninterruptible power supply

TO-263-2L Pin Configuration



Absolute Maximum Ratings ($T_C=25^{\circ}\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	± 20	
$I_D@T_C=25^{\circ}\text{C}$	Continuous Drain Current, $V_{GS} @ -10\text{V}^1$	-78	A
$I_D@T_C=100^{\circ}\text{C}$	Continuous Drain Current, $V_{GS} @ -10\text{V}^1$	-56	
I_{DM}	Pulsed Drain Current ²	-300	
E_{AS}	Single Pulse Avalanche Energy ³	174	mJ
I_{AS}	Avalanche Current	-50	A
$P_D@T_C=25^{\circ}\text{C}$	Total Power Dissipation ⁴	280	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	

Thermal Data

Symbol	Parameter	Rating	Units
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	62	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	0.65	

Electrical Characteristics ($T_J=25^{\circ}\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V$, $I_D=-20A$	---	19	25	m Ω
		$V_{GS}=-4.5V$, $I_D=-10A$	---	25	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.0	-1.6	-2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-100V$, $V_{GS}=0V$	---	---	-1.0	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
Q_g	Total Gate Charge	$V_{DS}=-50V$, $V_{GS}=-10V$, $I_D=-5A$	---	80	---	nC
Q_{gs}	Gate-Source Charge		---	15.6	---	
Q_{gd}	Gate-Drain Charge		---	17.2	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DD}=-50V$, $V_{GS}=-10V$, $R_G=6\Omega$, $I_D=-5A$	---	26	---	ns
T_r	Rise Time		---	78	---	
$T_{d(off)}$	Turn-off Delay Time		---	210	---	
T_f	Fall Time		---	200	---	
C_{iss}	Input Capacitance	$V_{DS}=-50V$, $V_{GS}=0V$, $f=1.0\text{MHz}$	---	4230	---	pF
C_{oss}	Output Capacitance		---	388	---	
C_{rss}	Reverse Transfer Capacitance		---	26	---	

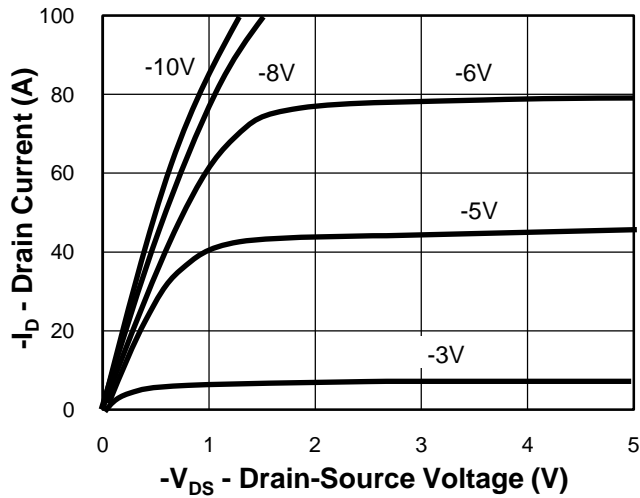
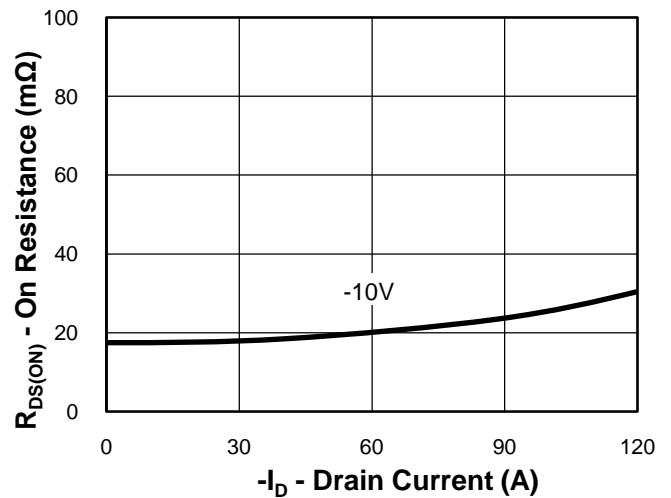
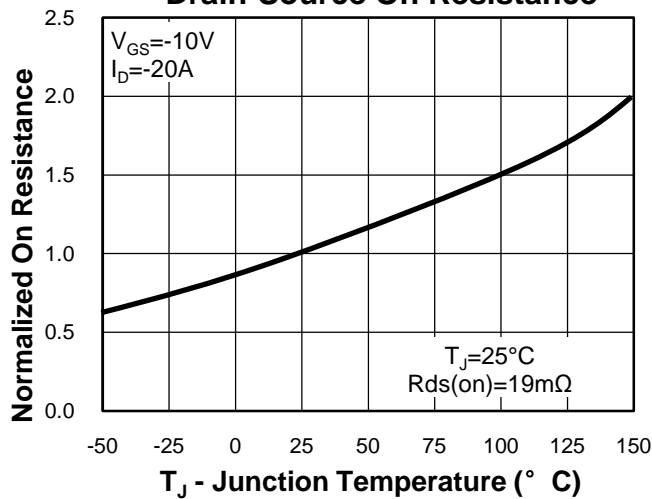
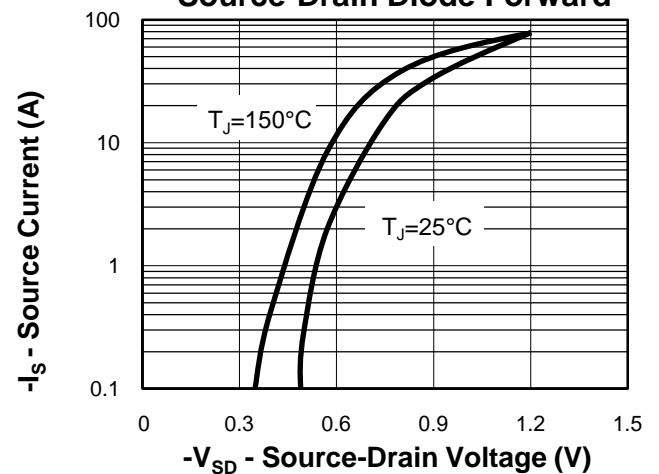
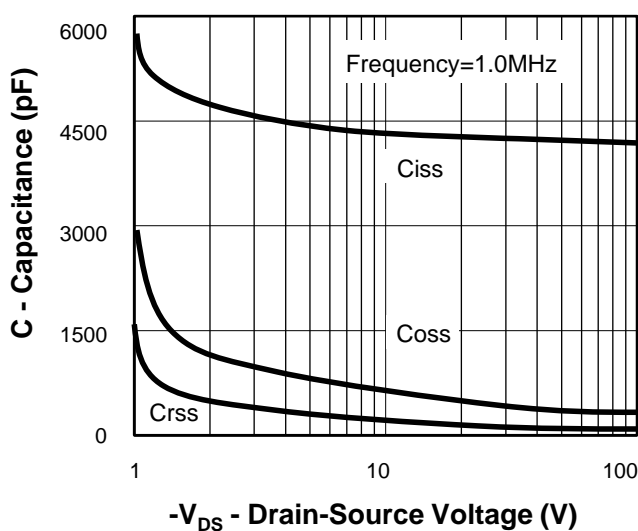
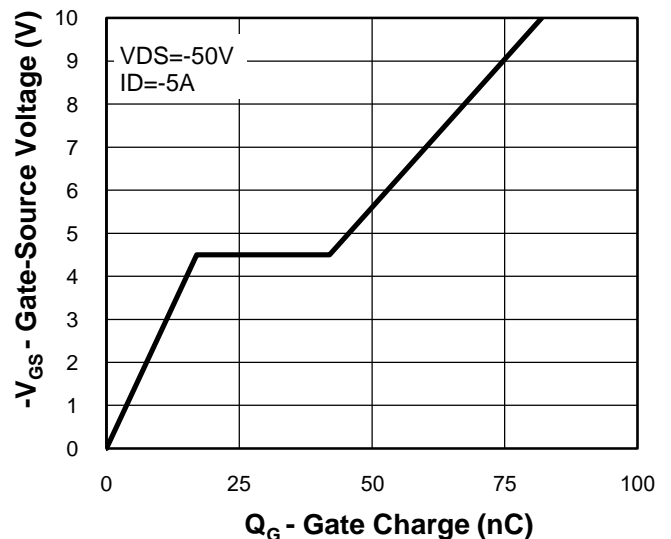
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	-80	A
I_{SM}	Pulsed Source Current		---	---	280	
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=-30A$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-5A$, $di/dt=100A/\mu s$, $T_J=25^{\circ}\text{C}$	---	208	---	ns
Q_{rr}	Reverse Recovery Charge		---	560	---	nC

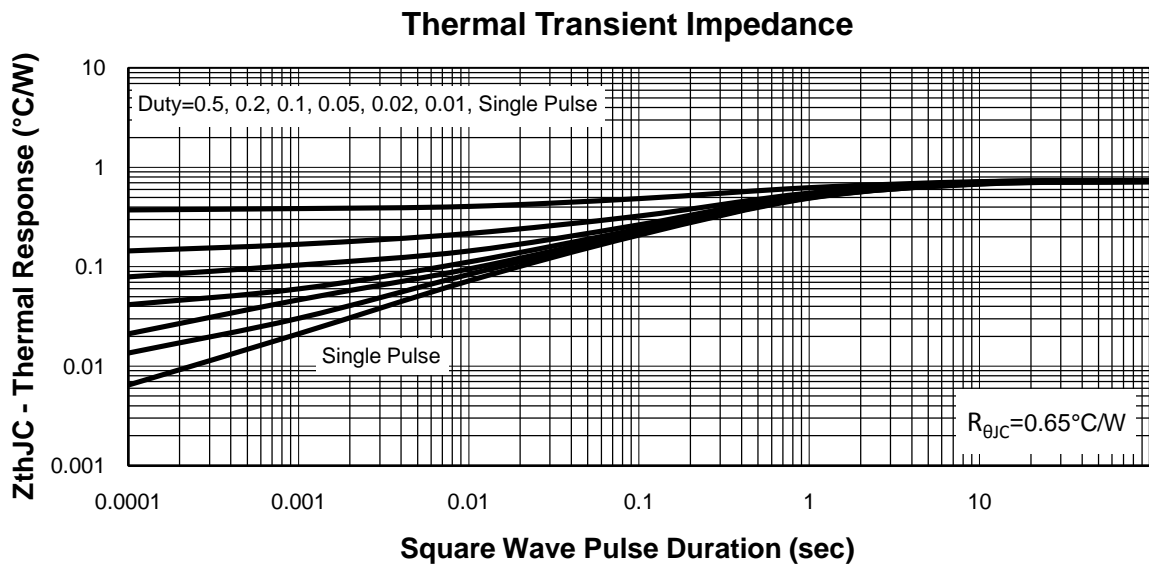
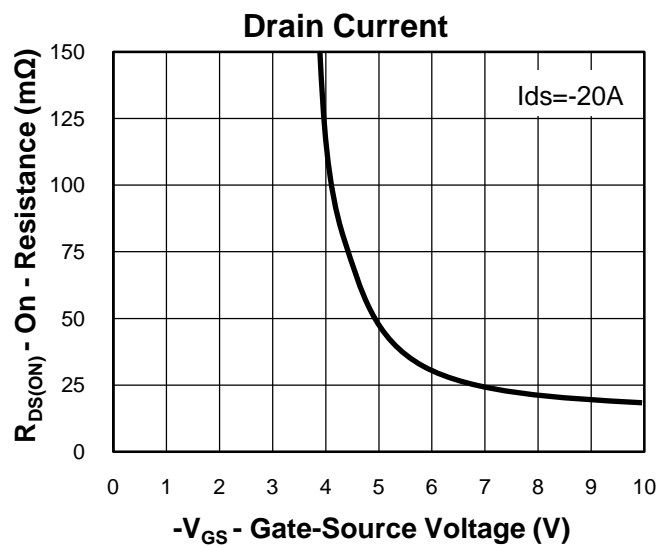
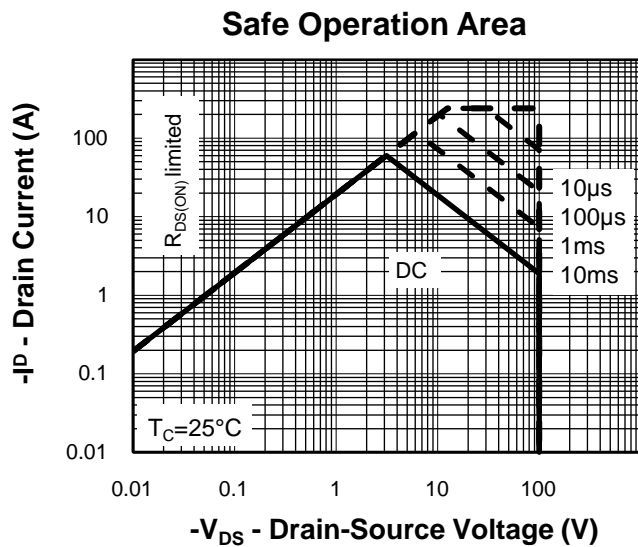
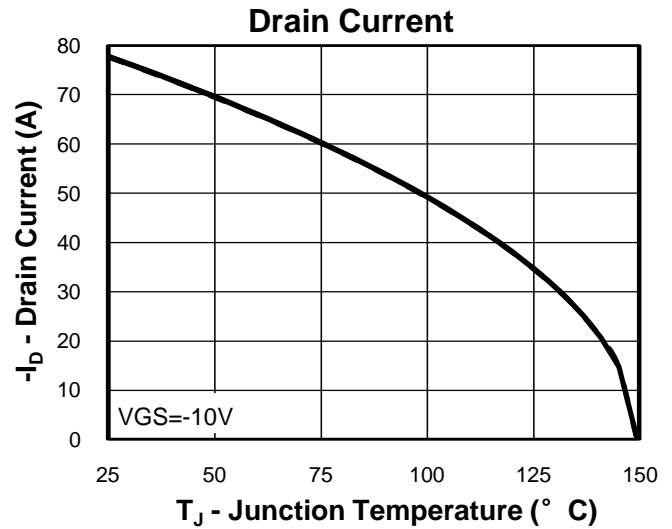
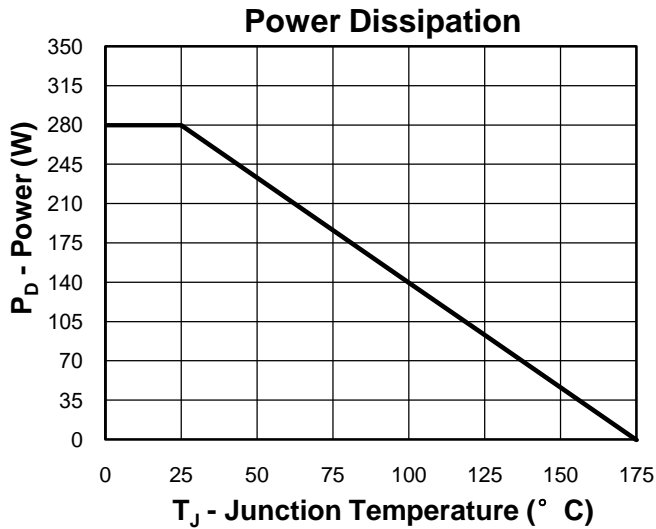
Note:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. The E_{AS} data shows Max. rating. The test condition is $V_{DD}=-72V$, $V_{GS}=-10V$, $L=0.1mH$, $I_{AS}=-50A$
4. The power dissipation is limited by 150°C junction temperature.
5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

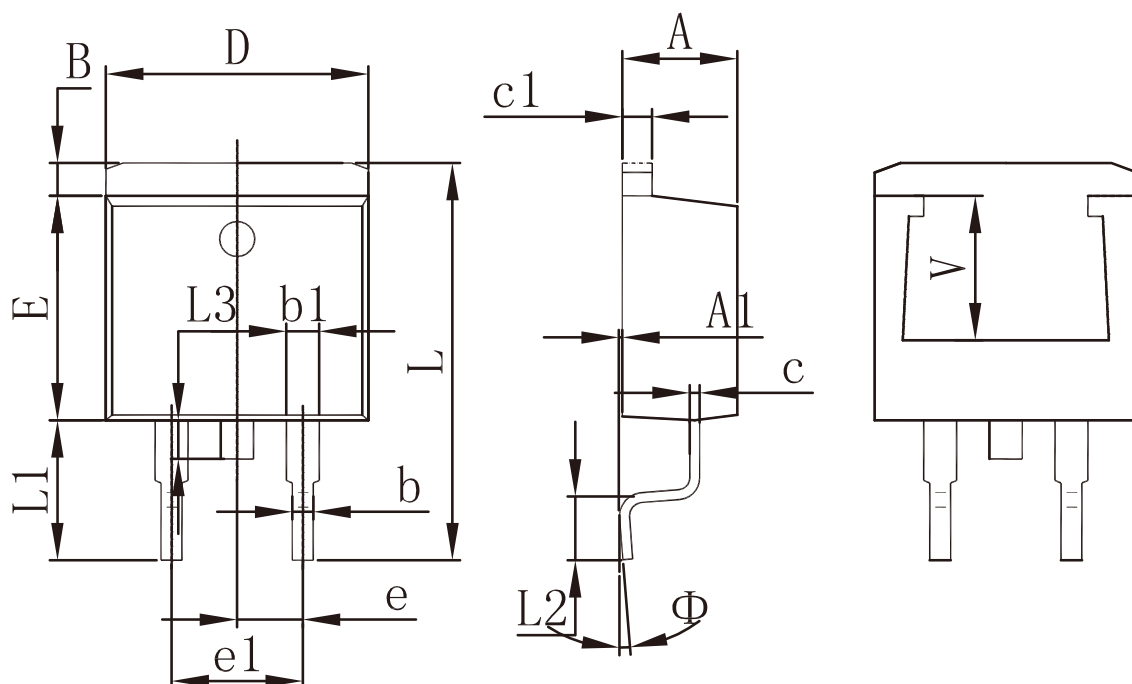
Typical Characteristics

Output Characteristics

Drain-Source On Resistance

Drain-Source On Resistance

Source-Drain Diode Forward

Capacitance

Gate Charge


Typical Characteristics (Cont.)



Packaging information



SYMBOL	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.120	1.420	0.044	0.056
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	14.940	15.500	0.588	0.610
L1	4.950	5.450	0.195	0.215
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
Φ	0°	8°	0°	8°
V	5.600 REF.		0.220 REF.	

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