

MOSFETs Silicon 30V P-Channel MOS
■ Applications

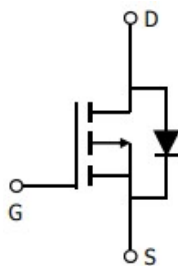
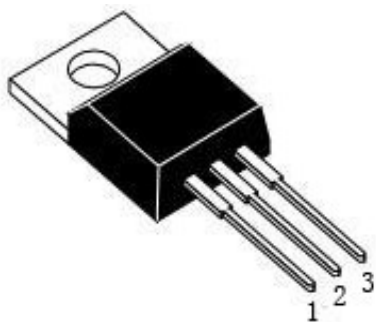
- Synchronus Rectification
- Industrial and Motor Drive
- DC/DC and AC/DC Converters
- Power Tools

■ Features

- High-Speed Switching
- Low gate charge
- low reverse transmission capacitance
- Improved dv/dt capability
- RoHS and Halogen-Free Compliant
- 100% UIS and RG Tested

■ Product Summary

V_{DS}	-30	V
I_D	-80	A
$R_{DS(ON)}, Typ @ -10V$	5.1	m Ω
$R_{DS(ON)}, Typ @ -4.5V$	7.4	m Ω
Q_g	84	nC



Gate: 1
Drain: 2
Source: 3

TO-220

Marking	Package	Packaging	Min. package quantity
MC5D5P030TL	TO-220	Tube	1000



■ Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current Tc=25°C (Note 1)	I_D	-80	A
Continuous Drain Current Tc=100°C (Note 1)		-54	A
Drain Current-Pulsed (Note 1)	I_{DM}	-320	A
Total Dissipation	P_D	88	W
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	-55-150	°C
Single Pulse Avalanche Energy (Note 2)	E_{AS}	124	mJ

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

■ Thermal Characteristics

Parameter	Symbol	Max	Unit
Maximum Junction-to-Case	$R_{\theta JC}$	1.42	°C/W
Maximum Junction-to-Ambient	$R_{\theta JA}$	60	°C/W

Note 1: Ensure that the channel temperature does not exceed 150°C.

Note 2: $V_{DD} = -30V$, $T_{ch} = 25^\circ C$ (initial), $L = 0.5mH$, $R_g = 25\Omega$.

Note: This transistor is sensitive to electrostatic discharge and should be handled with care.

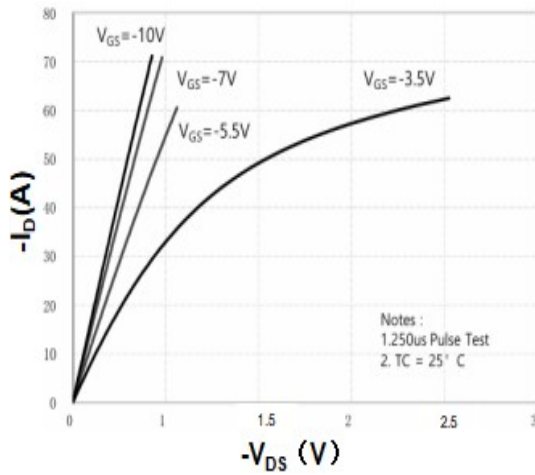


■ Electrical Characteristics (Tc=25°C unless otherwise noted)

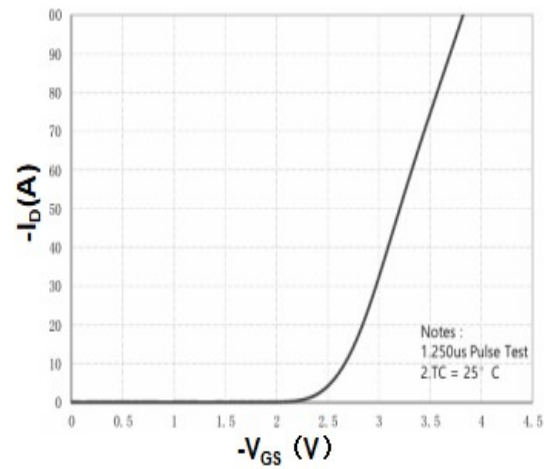
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static Parameters						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250uA	-30	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-30V, V _{GS} =0V	-	-	-1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =-250uA	-1.1	-1.6	-2.1	V
Drain-Source On Resistance	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-15A	-	7.4	9.0	mΩ
		Tj=125℃	-	10.4	-	
		V _{GS} =-10V, I _D =-20A	-	5.1	5.5	
		Tj=125℃	-	7.1	-	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =-25V, V _{GS} =0V, f=1.0MHz	-	4300	-	pF
Output Capacitance	C _{oss}		-	385	-	pF
Reverse Transfer Capacitance	C _{rss}		-	354	-	pF
Switching Paramters						
Turn-On Delay Time	t _{d(on)}	V _{DS} =-15V, I _D =-20A, V _{GS} =-10V, R _G =3Ω	-	16	-	ns
Turn-On Rise Time	t _r		-	59	-	ns
Turn-Off Delay Time	t _{d(off)}		-	143	-	ns
Turn-Off Fall Time	t _f		-	37	-	ns
Total Gate Charge	Q _g	V _{DS} =-15V, I _D =-20A, V _{GS} =-10V	-	84	-	nC
Gate-Source Charge	Q _{gs}		-	12	-	nC
Gate-Drain Charge	Q _{gd}		-	20	-	nC
Source-Drain Characteristics						
Diode Forward Voltage	V _{sd}	V _{GS} =0V, I _S =-10A	-	-0.8	-1.2	V
Reverse Recovery Time	t _{rr}	V _R =-15V, I _F =-20A, di/dt=100A/us	-	13	-	ns
Reverse Recovery Charge	Q _{rr}		-	2.5	-	nC



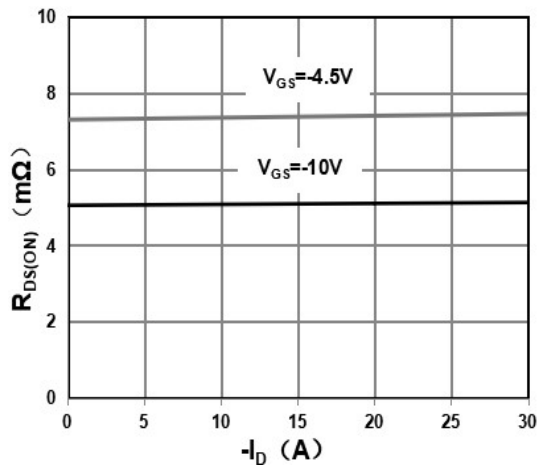
■ Characteristics Curves



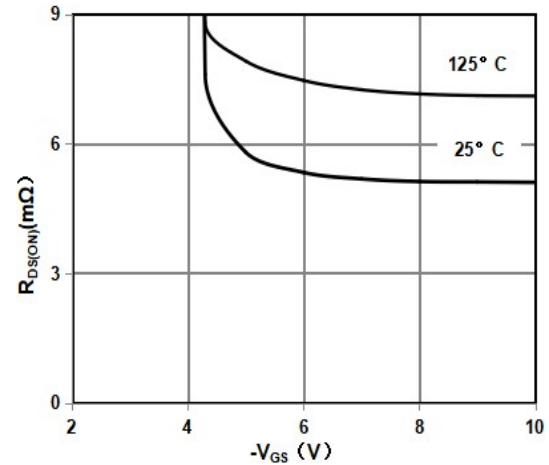
Output Characteritsics



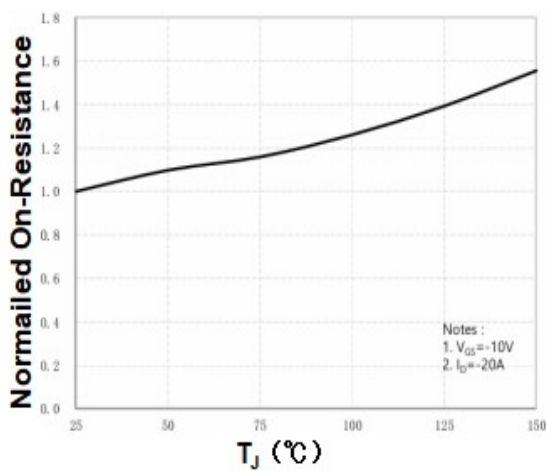
Transfer Characteritsics



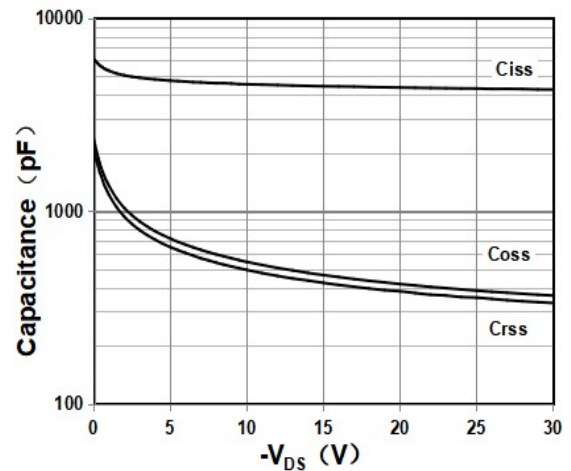
On Resistance Vs Drain Current



On Resistance Vs Gate Source Voltage

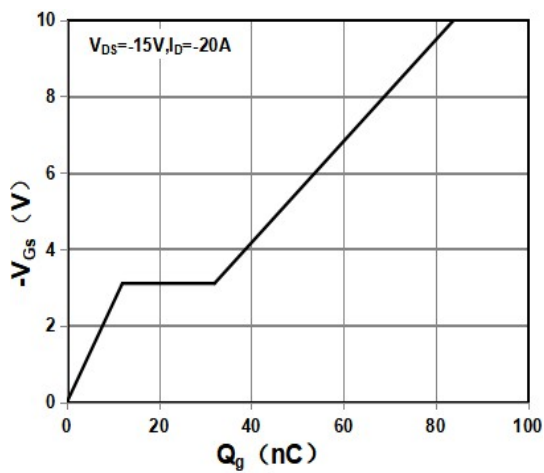


Rdson-JunctionTemperature

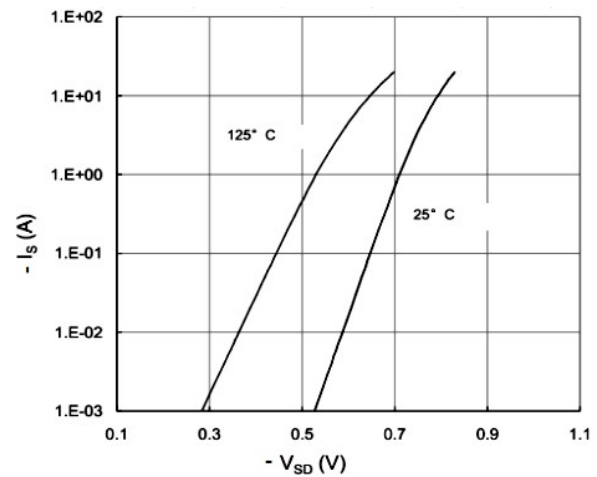


Capacitance

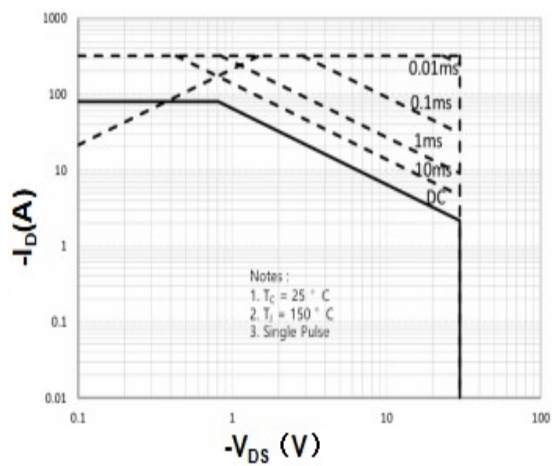




Gate Charge Waveform



Source-Drain Diode Forward Voltage



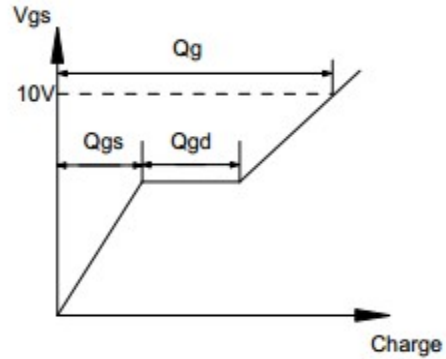
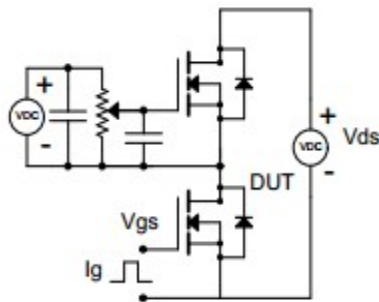
Maximum Safe Operating Area

Note : The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

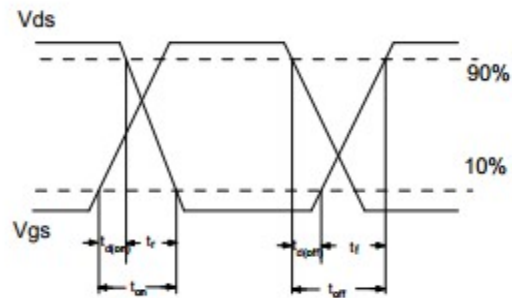
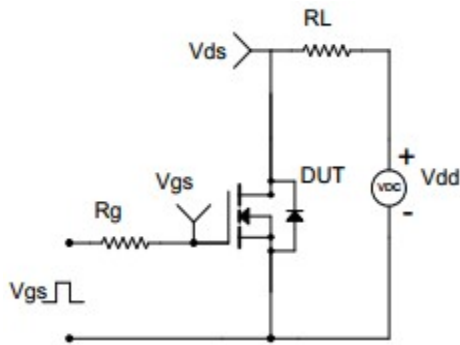


■ Test Circuit & Waveform

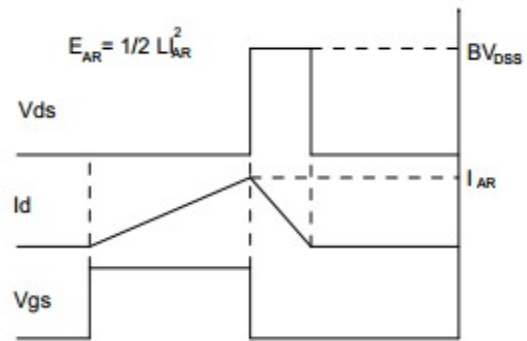
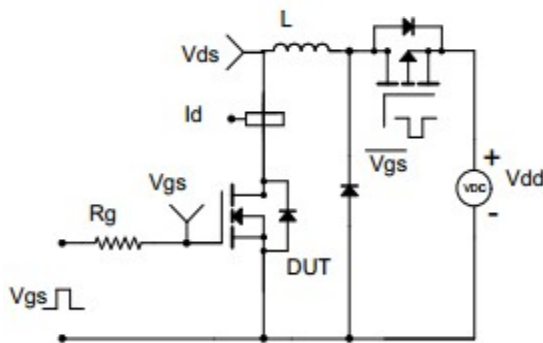
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching (UIS) Test Circuit & Waveform



■ TO-220 Package Dimensions

Unit: mm

Symbol	Min	Nom	Max	Symbol	Min	Nom	Max
A	4.00		4.80	e	2.44	2.54	2.64
B	1.20		1.40	F	1.10		1.40
B1	1.00		1.40	L	12.50		14.50
b1	0.75		0.95	L1	3.00	3.50	4.00
c	0.40		0.55	ΦP	3.70	3.80	3.90
D	15.00		16.50	Q	2.50		3.00
D1	5.90		6.90	Q1	2.00		2.90
E	9.90		10.70	Y	8.02	8.12	8.22

