

N-Channel Multilayer Epitaxial Super Junction Power MOSFET

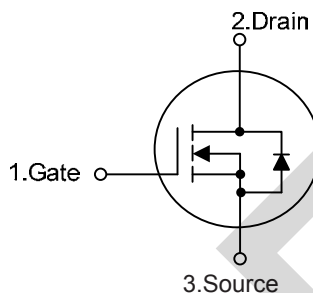
MCR65B360CT
TO-220AB



MCR65B360CTF
TO-220F



MCR65B360CTB
TO-263



Features

- New technology for high voltage device
- Low on-resistance and low conduction losses
- small package
- Ultra Low Gate Charge cause lower driving requirements
- 100% Avalanche Tested
- ROHS compliant

Application

- Power factor correction (PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply (UPS)

Table 1. Absolute Maximum Ratings (T_C=25°C)

Parameter	Symbol	MCR65B360CTB MCR65B360CT	MCR65B360CTF	Unit
Drain-Source Voltage (V _{GS} =0V)	V _{DS}	650		V
Gate-Source Voltage (V _{DS} =0V), AC(f>1HZ)	V _{GS}	±30		V
Continuous Drain Current at T _C =25°C	I _D (DC)	11.5	11.5*	A
Continuous Drain Current at T _C =100°C	I _D (DC)	7	7*	A
Pulsed drain current (Note 1)	I _{DM} (pluse)	33	33*	A
Maximum Power Dissipation(T _C =25°C)	P _D	101	32.6	W
Single pulse avalanche energy (Note2)	E _{AS}	215		mJ
Avalanche current (Note 1)	I _{AR}	1.8		A
Repetitive Avalanche energy , t _{AR} limited by T _{jmax} (Note 1)	E _{AR}	0.32		mJ
Drain Source voltage slope, V _{DS} ≤480 V,	dv/dt	50		V/ns
Reverse diode dv/dt, V _{DS} ≤480 V,I _{SD} <I _D	dv/dt	15		V/ns
Operating Junction and Storage Temperature Range	T _J ,T _{STG}	-55...+150		°C
* limited by maximum junction temperature				

Table 2. Thermal Characteristic

Parameter	Symbol	MCR65B360CTB MCR65B360CT	MCR65B360CTF	Unit
Thermal Resistance, Junction-to-Case (Maximum)	R_{thJC}	1.24	3.83	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient (Maximum)	R_{thJA}	62	80	$^{\circ}\text{C}/\text{W}$

Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/off states						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	650			V
Zero Gate Voltage Drain Current(Tc=25℃)	I _{DSS}	V _{DS} =650V, V _{GS} =0V		0.05	1	μA
Zero Gate Voltage Drain Current(Tc=125℃)	I _{DSS}	V _{DS} =650V, V _{GS} =0V			100	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.5		4.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =5.5A		310	360	mΩ
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =100V, V _{GS} =0V, F=1.0MHz		788		pF
Output Capacitance	C _{oss}			35		pF
Reverse Transfer Capacitance	C _{rss}			2		pF
Total Gate Charge	Q _g	V _{DS} =520V, I _D =11A, V _{GS} =10V		22		nC
Gate-Source Charge	Q _{gs}			4		nC
Gate-Drain Charge	Q _{gd}			8		nC
Switching times						
Turn-on Delay Time	t _{d(on)}	V _{DD} =400V, I _D =11A, R _G =25Ω		69.7		nS
Turn-on Rise Time	t _r			69.5		nS
Turn-Off Delay Time	t _{d(off)}			145		nS
Turn-Off Fall Time	t _f			59		nS
Source- Drain Diode Characteristics						
Forward on voltage	V _{SD}	T _J =25℃, I _{SD} =11A, V _{GS} =0V		0.9	1.2	V
Reverse Recovery Time	t _{rr}	V _R =400V, I _F =I _S , di/dt=100A/μs		377		nS
Reverse Recovery Charge	Q _{rr}			3.4		uC
Peak Reverse Recovery Current	I _{rrm}			17.8		A

Notes: 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2. $T_J=25^{\circ}\text{C}, V_{DD}=50V, V_G=10V, R_G=25\Omega$

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (curves)

Figure 1. Output Characteristics

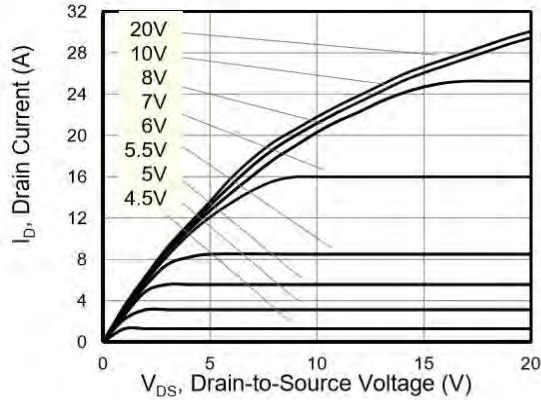


Figure 2. Transfer Characteristics

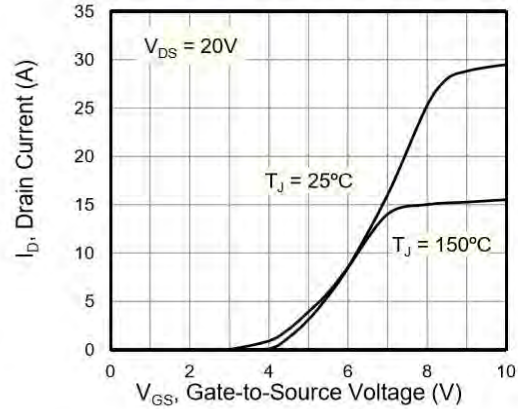


Figure 3. On-Resistance vs. Drain Current

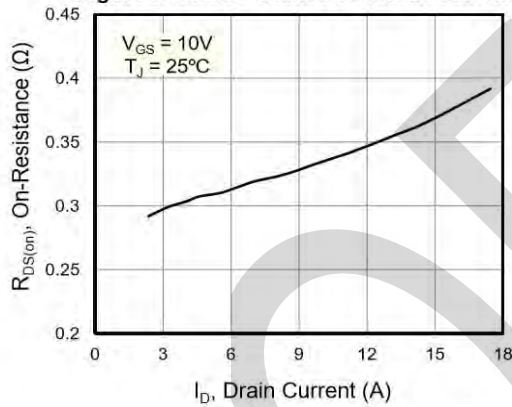


Figure 4. Capacitance

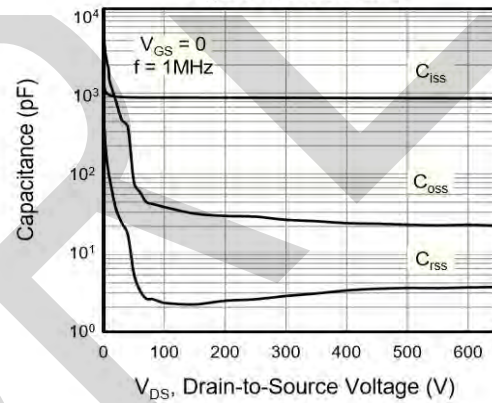


Figure 5. Gate Charge

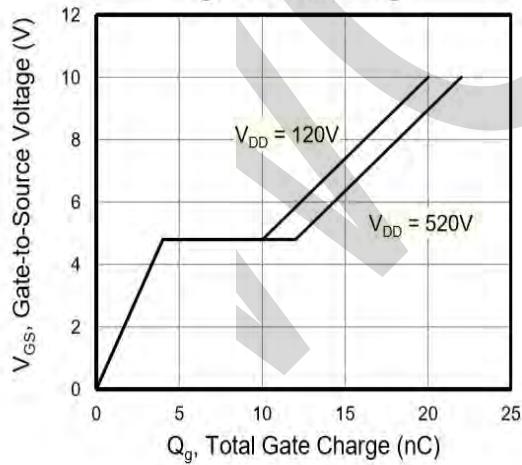
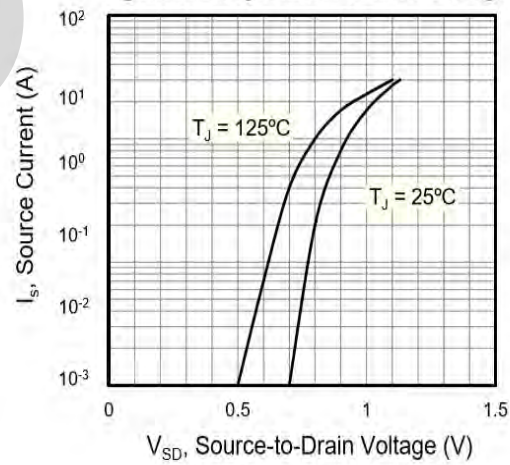


Figure 6. Body Diode Forward Voltage



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (curves)

Figure 7. On-Resistance vs. Junction Temperature

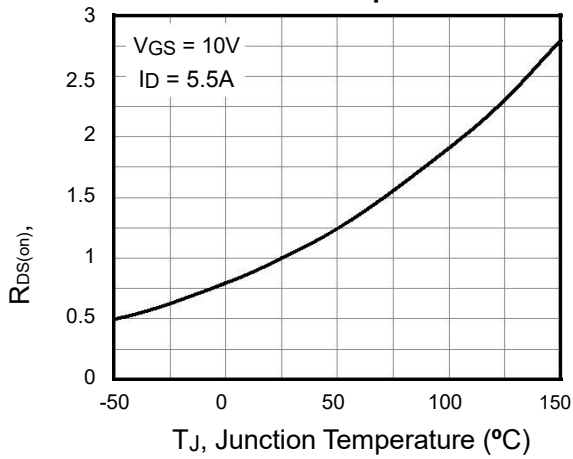


Figure 8. Breakdown voltage vs. Junction Temperature

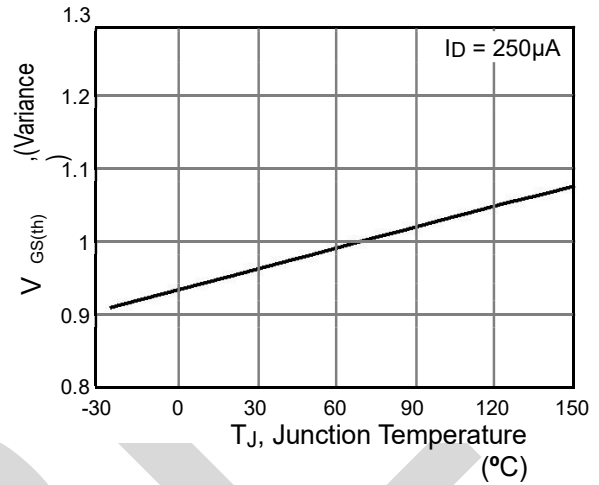


Figure 9. Transient Thermal Impedance

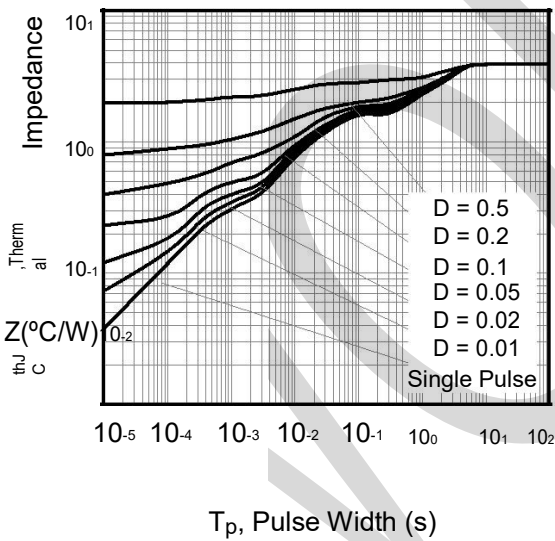
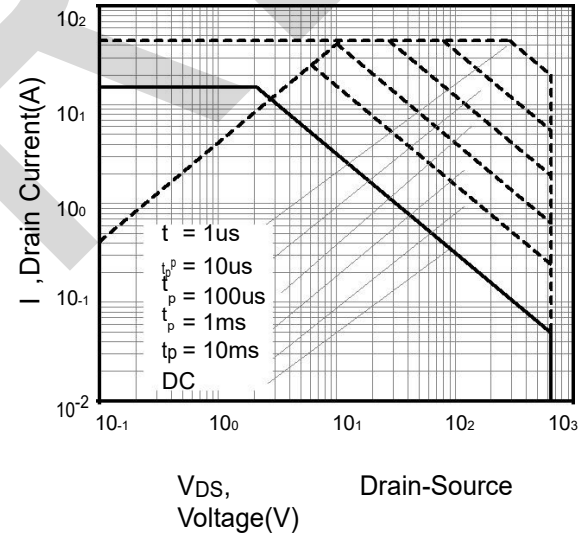
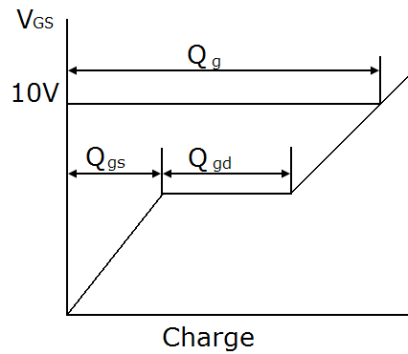
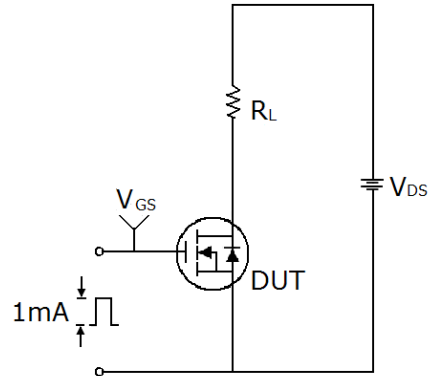


Figure 10. Safe operation area for

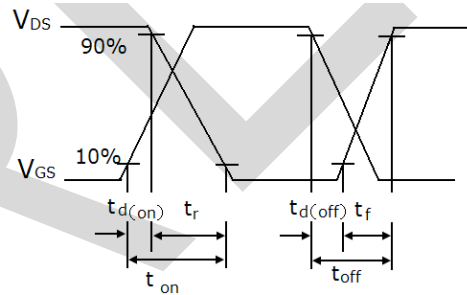
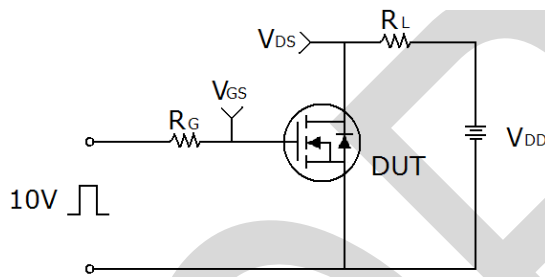


Test circuit

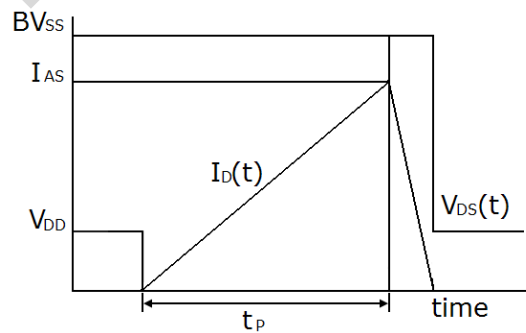
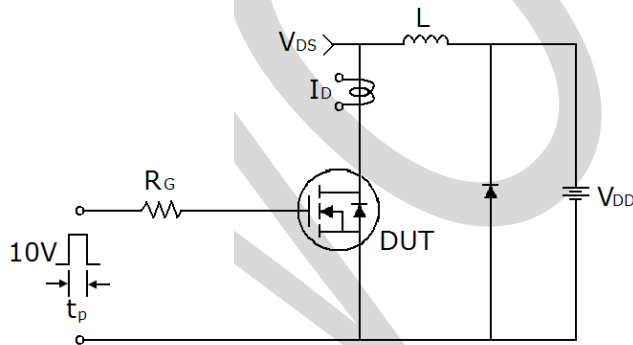
1) Gate charge test circuit & Waveform



2) Switch Time Test Circuit:

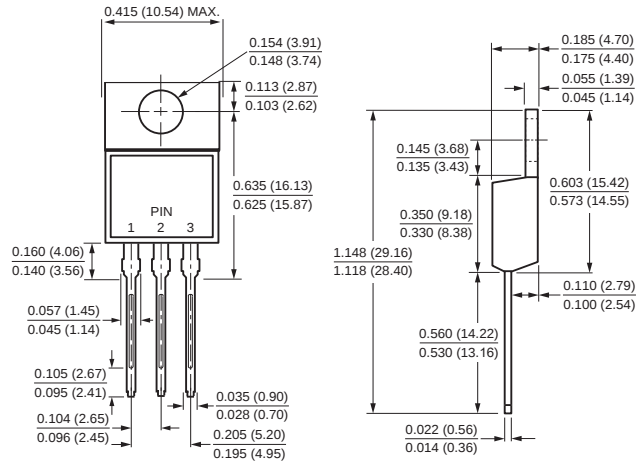


3) Unclamped Inductive Switching Test Circuit & Waveforms

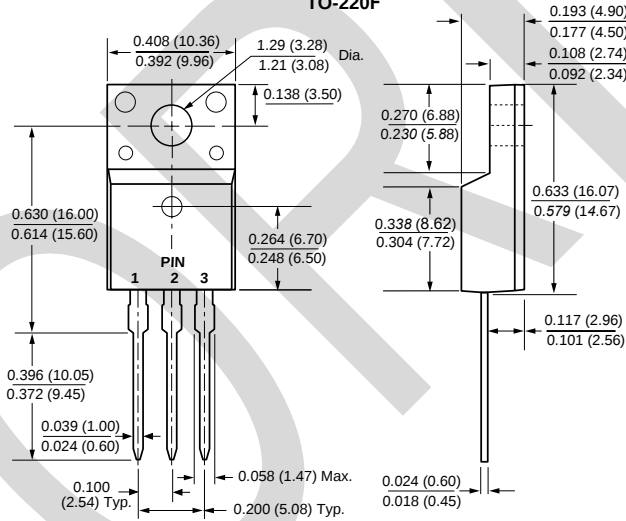


PACKAGE OUTLINE DIMENSIONS

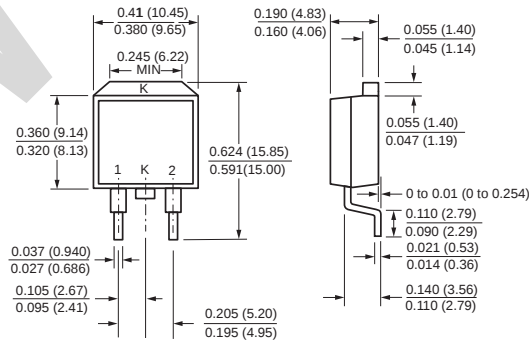
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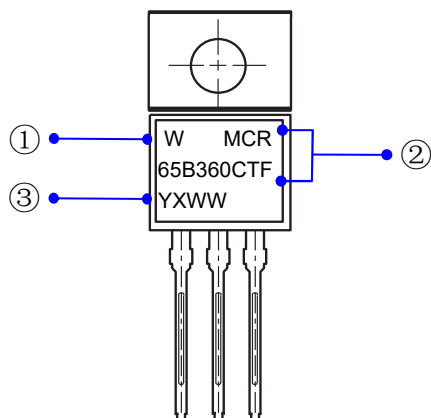
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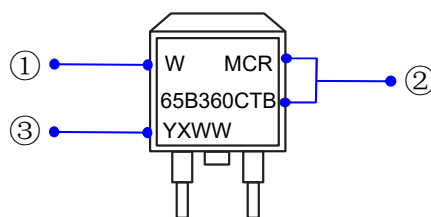
Marking Information



- ①W : Company's trademark
- ②Product model : MCR65B360CT or MCR65B360CTF
- ③PDC information :

Y X WW

WW:Week code(01 to 53)
X:Internal identification code
Y:Year code(ex:0=2020)



- ①W : Company's trademark
- ②Product model : MCR65B360CTB
- ③PDC information :

Y X WW

WW:Week code(01 to 53)
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