

Description

The MPC-155E series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to an integrated circuit with a power output stage in a plastic SOP5 package with different lead forming options.

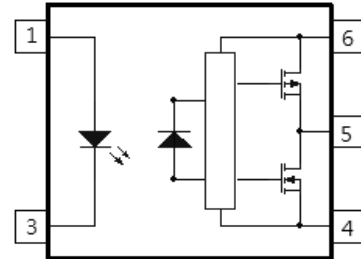
Features

- High isolation 3750 VRMS
- DC input with a high speed driver
- Operating temperature range - 40 °C to 100 °C

Applications

- Isolated IGBT/Power MOSFET gate drive
- Industrial Inverter
- AC brushless and DC motor drives
- Induction Heating

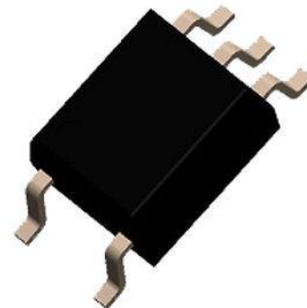
SCHEMATIC



PIN DEFINITION

	6.VCC
1.Anode	5.VO
3.Cathode	4.GND

Package



DC Input, 0.8A, Gate Driver Photo Coupler

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	VALUE	UNIT	Note
INPUT				
Forward Current	IF	25	mA	
Peak Forward Current	IFP	50	mA	1
Peak Transient Current	IF(trans)	1	A	2
Operating Frequency	f	150	kHz	3
Reverse Voltage	VR	5	V	
Input Power Dissipation	PI	100	mW	
OUTPUT				
Supply Voltage	VCC	35	V	
Output Voltage	VO	35	V	
Peak Output Current	IO	0.8	A	
Output Power Dissipation	PO	250	mW	
COMMON				
Total Power Dissipation	Ptot	295	mW	
Isolation Voltage	Viso	3750	Vrms	4
Operating Temperature	Topr	-40~100	°C	
Storage Temperature	Tstg	-55~150	°C	
Soldering Temperature	Tsol	260	°C	5

Note 1. 50% duty, 1ms P.W

Note 2. $\leq 1\mu\text{s}$ P.W, 300pps

Note 3. Exponential waveform with pulse width $\leq 0.3\ \mu\text{s}$, $T_a = 100^\circ\text{C}$

Note 4. AC For 1 Minute, R.H. = 40 ~ 60%

Note 5. For 10 seconds

TRUTH TABLE			
LED	VDD-VSS "Positive Going" (Turn-on)	VDD-VSS "Negative Going" (Turn-off)	VO
Off	0V to 30V	0V to 30V	Low
On	0V to 11.5V	0V to 10V	Low
On	11.5V to 13.5V	10V to 12V	Transition
On	13.5V to 30V	12V to 30V	High

DC Input, 0.8A, Gate Driver Photo Coupler**RECOMMENDED OPERATION CONDITIONS**

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Operating Temperature	TA	-40	100	°C
Supply Voltage	VCC	10	30	V
Input Current (ON)	IF(ON)	7	16	mA
Input Voltage (OFF)	VF(OFF)	0	0.8	V

ELECTRICAL OPTICAL CHARACTERISTICS (VCC=30V, VEE=GND, TA=25°C unless specified otherwise)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT CHARACTERISTICS							
Forward Voltage	VF	-	1.38	1.8	V	IF=10mA	
Reverse Current	IR	-	-	10	μA	VR=5V	
Input Capacitance	C _{in}	-	13	-	pF	V=0, f=1MHz	
OUTPUT CHARACTERISTICS							
High Level Supply Current	ICCH	-	1.9	3	mA	IF= 7mA to 10mA, VO= Open	
Low Level Supply Current	ICCL	-	2.1	3	mA	VF = 0 to 0.8V, VO= Open	
TRANSFER CHARACTERISTICS							
High Level Output Voltage	VOH	VCC-0.6	VCC-0.35	-	V	IF= 10mA, IO= -100mA	
Low Level Output Voltage	VOL	-	VEE+0.25	VEE+0.4	V	IF= 0mA, IO= 100mA	
High Level Output Current	IOPH	-0.3	-	-	A	VO= VCC-3.0V	
		-0.8	-	-	A	VO= VCC-6.0V	
Low Level Output Current	IOPL	0.3	-	-	A	VO= VEE+1.5V	
		0.8	-	-	A	VO= VEE+2.5V	
Input Threshold Current	IFLH	-	2	5	mA	IO= 0mA, VO> 5V	
Input Threshold Voltage	VFHL	0.8	-	-	V	IO= 0mA, VO< 5V	
Under Voltage Lockout Threshold	VUVLO+	6.9	7.8	8.7	V	IO= 10mA, VO> 5V	
	VUVLO-	5.9	6.7	7.5	V	IO= 10mA, VO< 5V	
Isolation Resistance	R _{iso}	10 ¹²	10 ¹⁴	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C _{IO}	-	1.0	-	pF	V=0, f=1MHz	

MPC-155E

DC Input, 0.8A, Gate Driver Photo Coupler

ELECTRICAL OPTICAL CHARACTERISTICS (VCC=30V, VEE=GND, TA=25°C unless specified otherwise)							
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
SWITCHING CHARACTERISTICS							
Propagation Delay Time to Output Low Level	TPHL	-	130	200	ns	IF= 7 to 16mA, CL= 1nF, RL= 30Ω, f= 10kHz, Duty = 50%, TA= 25 °C	
Propagation Delay Time to Output High Level	TPLH	-	120	200	ns		
Pulse Width Distortion	TPHL-TPLH	-	10	70	ns		
Propagation Delay Skew	tPSK	-100	-	100	ns		
Rise Time	tr	-	30	-	ns		
Fall Time	tf	-	30	-	ns		
UVLO Turn On Delay	tUVLO(ON)	-	1.6	-	μs	IF= 10mA, VO> 5V	
UVLO Turn Off Delay	tUVLO(OFF)	-	0.4	-	μs	IF= 10mA, VO< 5V	
Common Mode Transient Immunity at Logic High	CMH	-20	-	-	kV/μs	IF=7 to 16mA VCC= 30V, TA= 25 °C, VCM= 2kV	
Common Mode Transient Immunity at Logic Low	CML	20	-	-	kV/μs	IF=0mA VCC= 30V, RL, TA= 25 °C, VCM= 2kV	

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Forward Voltage

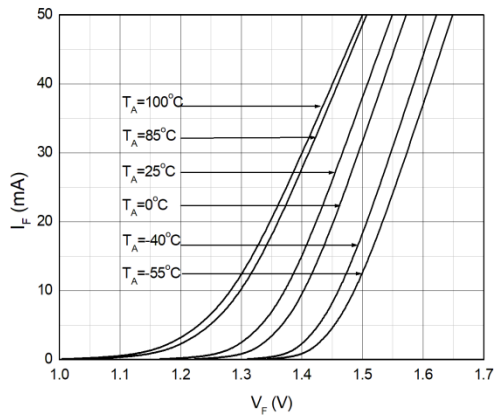


Fig.2 Forward Voltage vs. Ambient Temperature

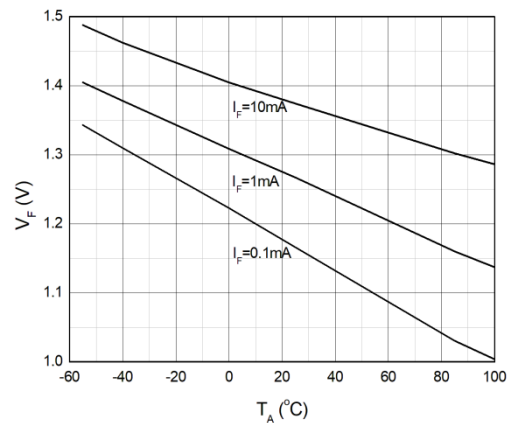


Fig.3 Supply Current vs. Ambient Temperature

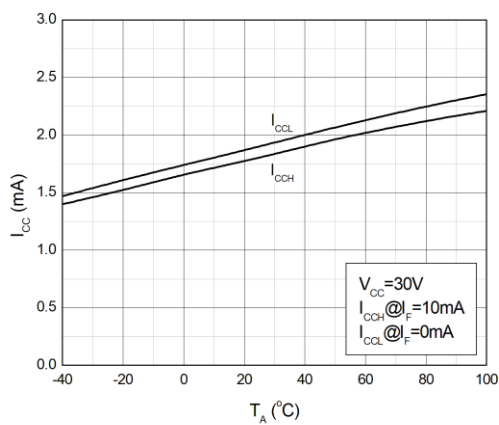


Fig.4 Supply Current vs. Supply Voltage

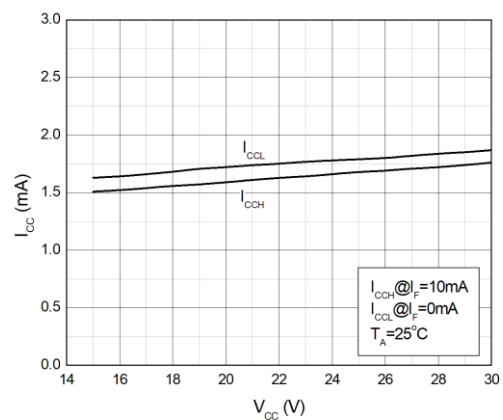


Fig.5 High Level Output Voltage vs. High Level Output Current

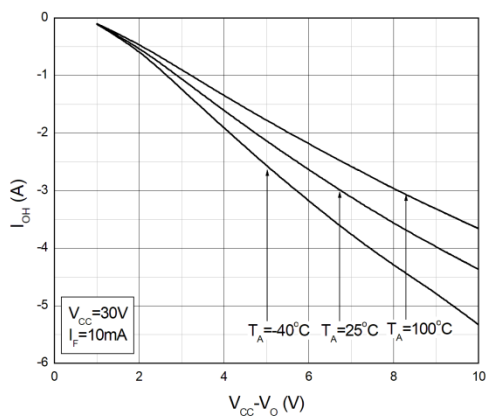
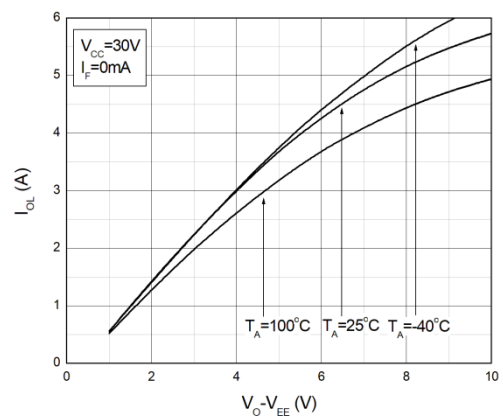


Fig.6 Low Level Output Voltage vs. Low Level Output Current



CHARACTERISTIC CURVES

Fig.7 High Level Output Voltage vs. Ambient Temperature

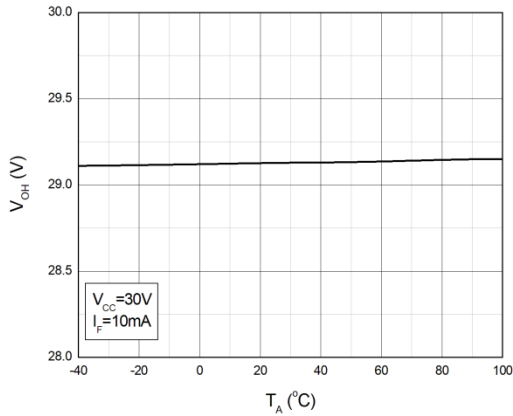


Fig.8 Low Level Output Voltage vs. Ambient Temperature

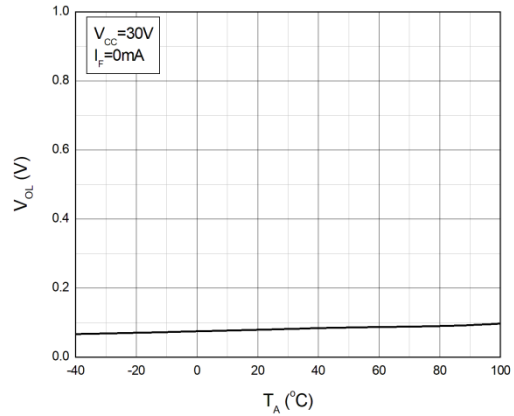


Fig.9 Output Voltage vs. Forward Current

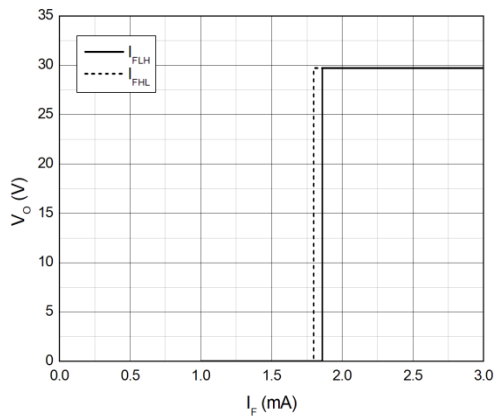


Fig.10 Output Voltage vs. Supply Voltage

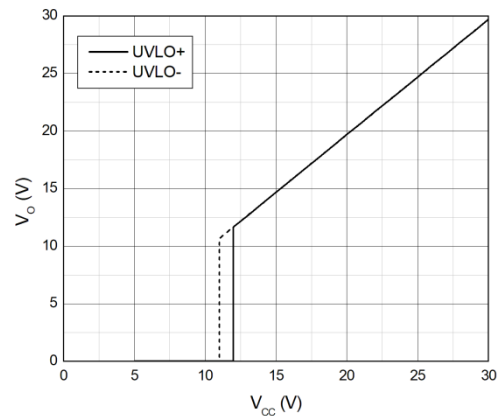


Fig.11 Forward Current vs. Ambient Temperature

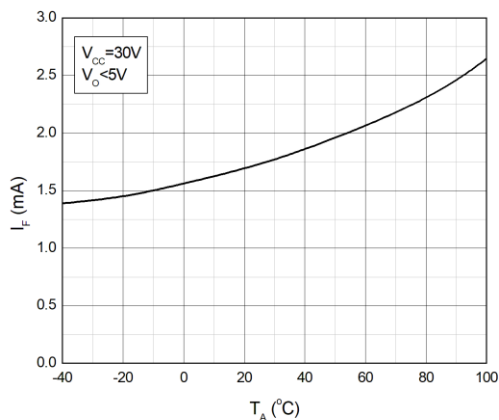
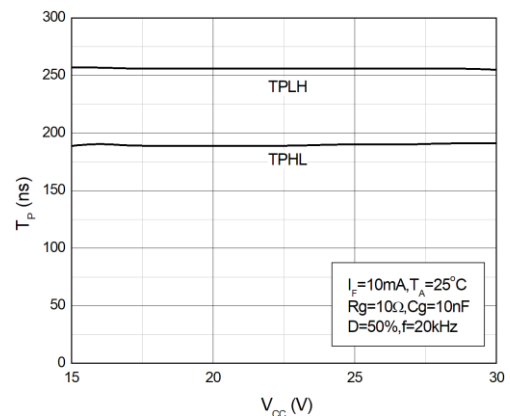


Fig.12 Propagation Delay vs. Supply Voltage



CHARACTERISTIC CURVES

Fig.13 Propagation Delay vs. Forward Current

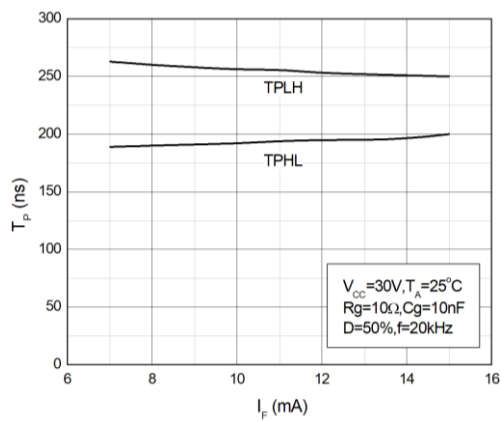


Fig.14 Propagation Delay vs. Ambient Temperature

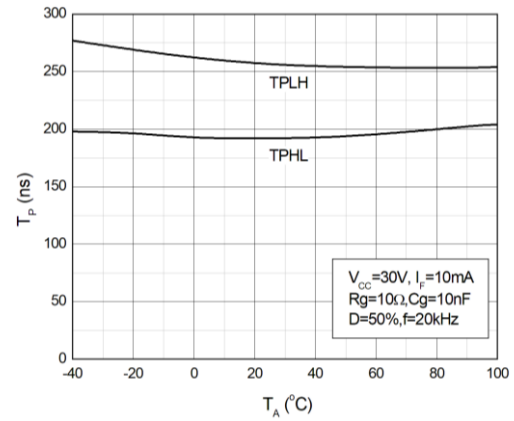


Fig.15 Propagation Delay vs. Load Resistance

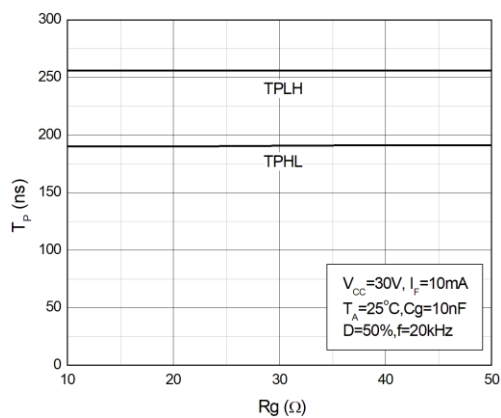
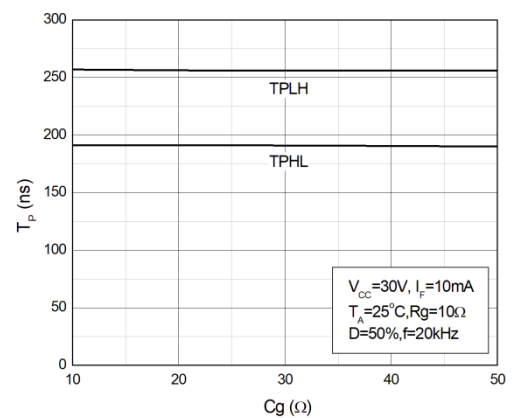


Fig.16 Propagation Delay vs. Load Capacitance



TEST CIRCUITS

Fig.17 Test Circuits for IOH

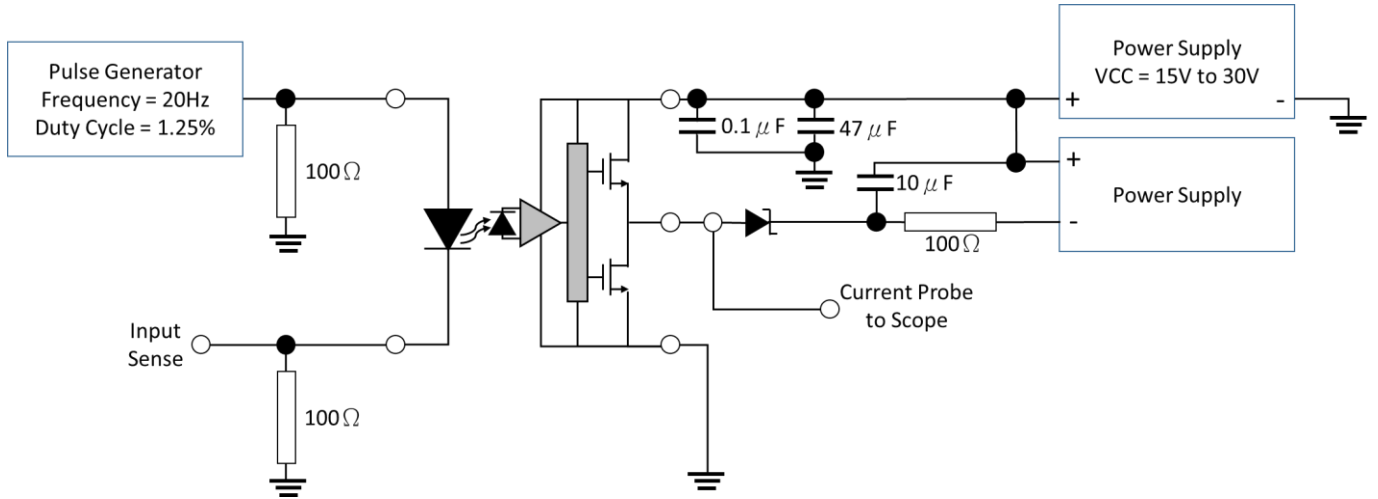
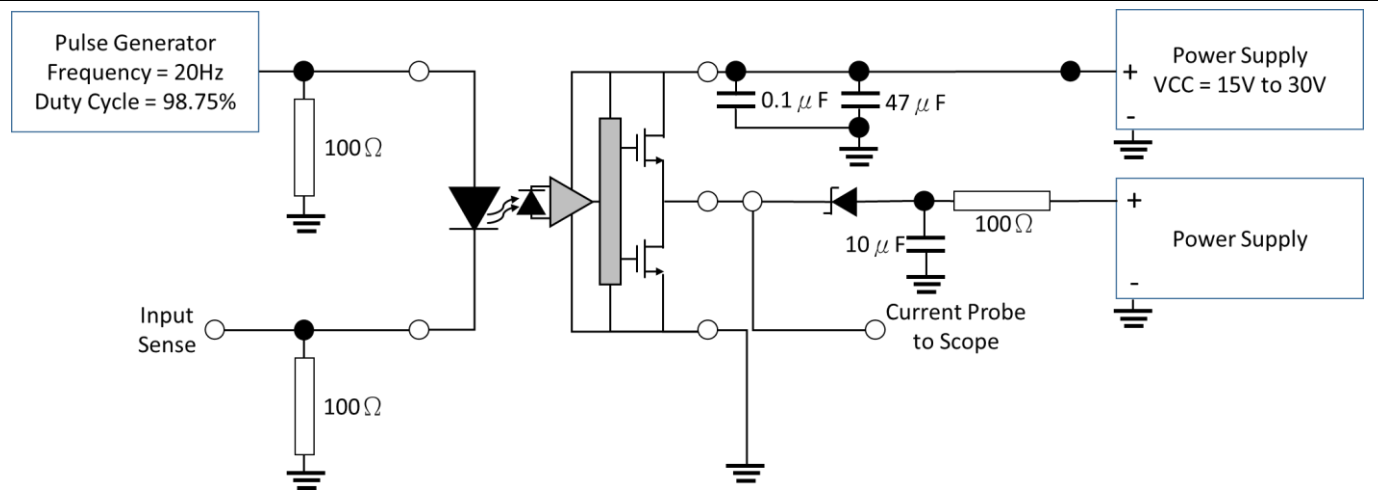


Fig.18 Test Circuits for IOL



TEST CIRCUITS

Fig.19 Test Circuits for TPHL, TPLH, tr, tf

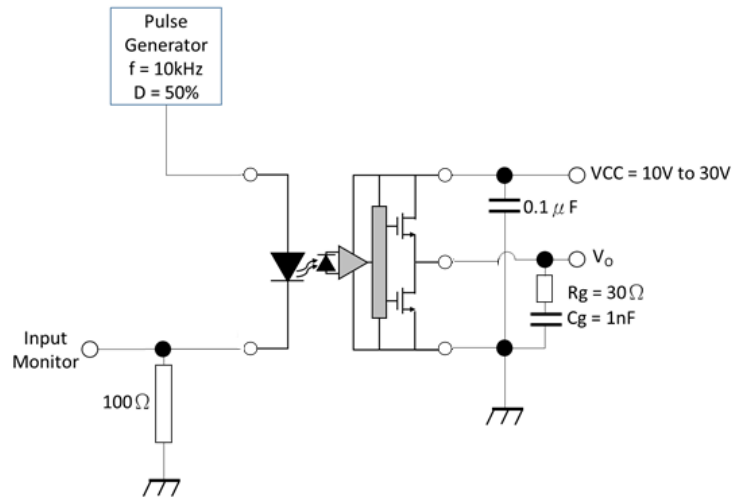
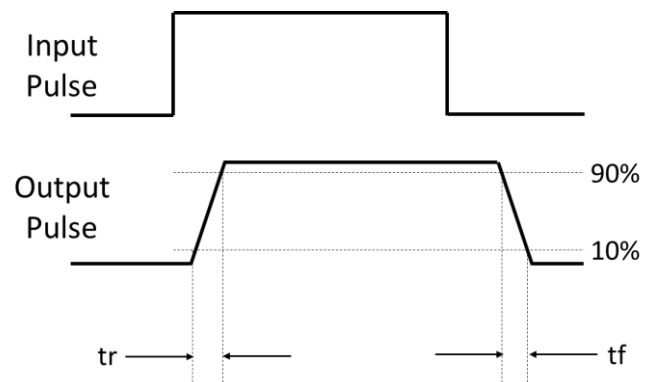
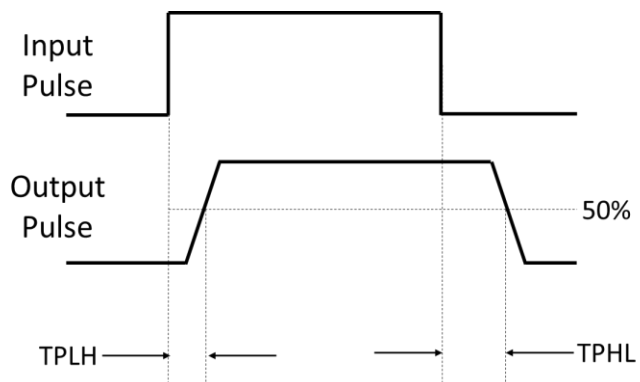


Fig.20 Waveforms of TPHL, TPLH, tr, tf



TEST CIRCUITS

Fig.21 Test Circuits for Common Mode Transient Immunity

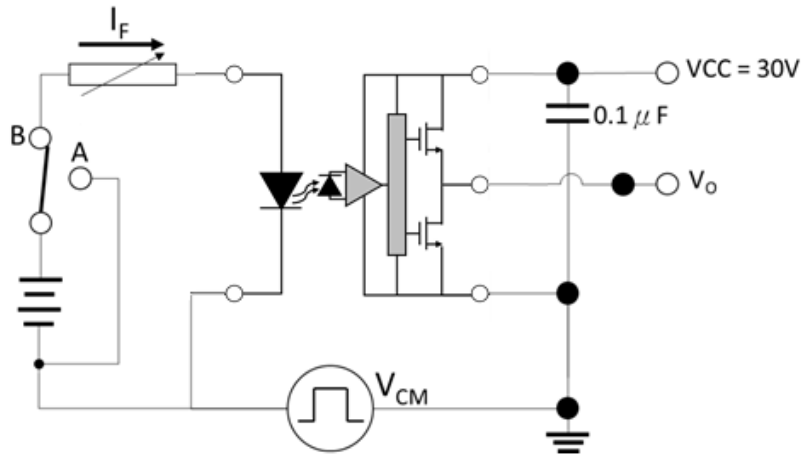
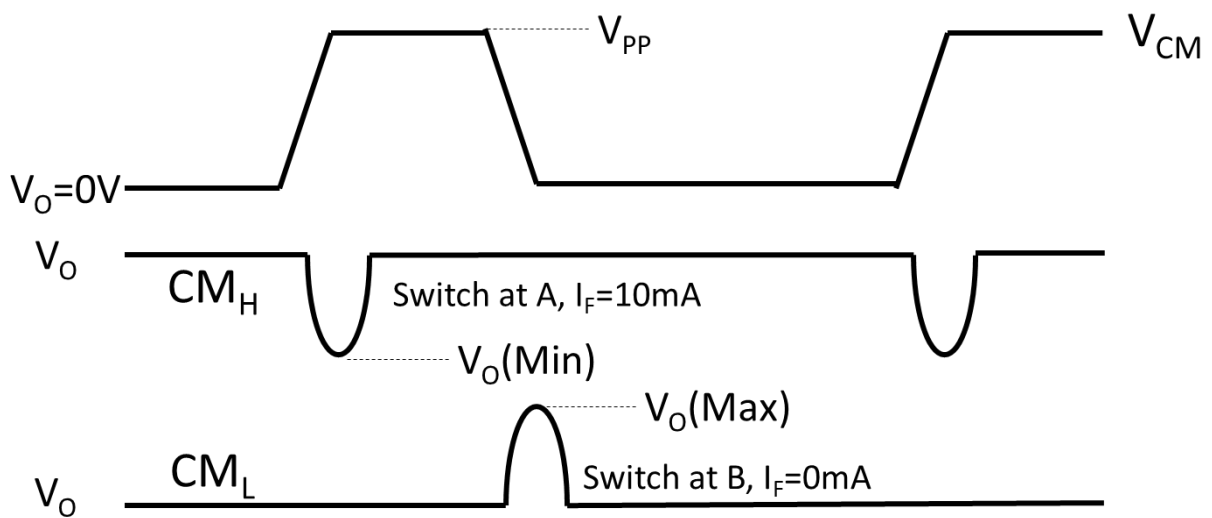


Fig.22 Waveforms of Common Mode Transient Immunity

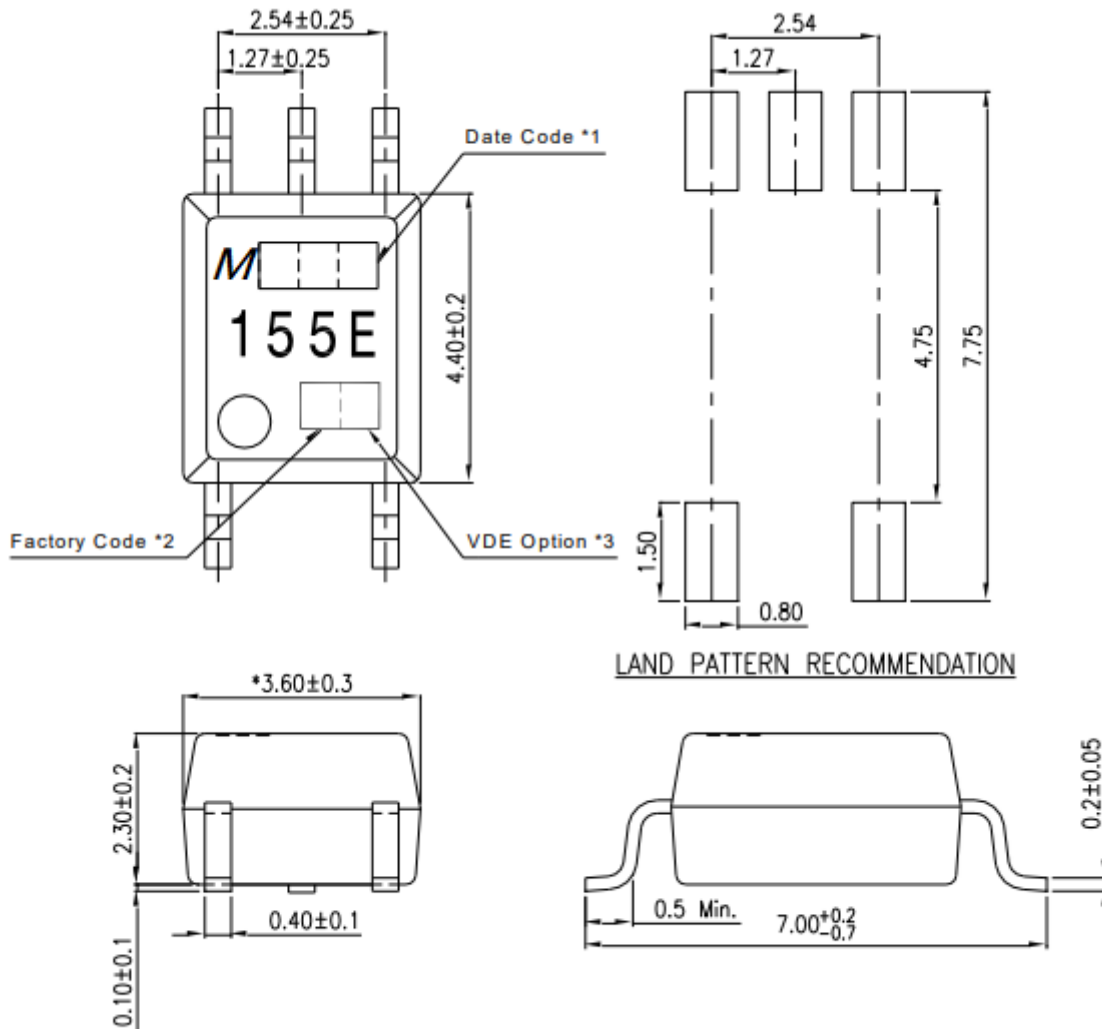


MPC-155E

DC Input, 0.8A, Gate Driver Photo Coupler

PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

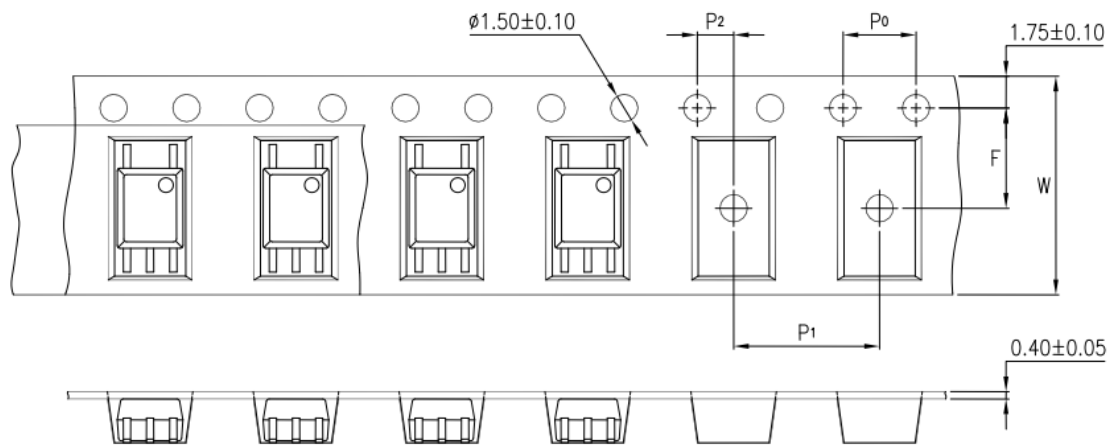
Surface Mount Lead Forming



MPC-155E

DC Input, 0.8A, Gate Driver Photo Coupler

Carrier Tape Specifications (Dimensions in mm unless otherwise stated)



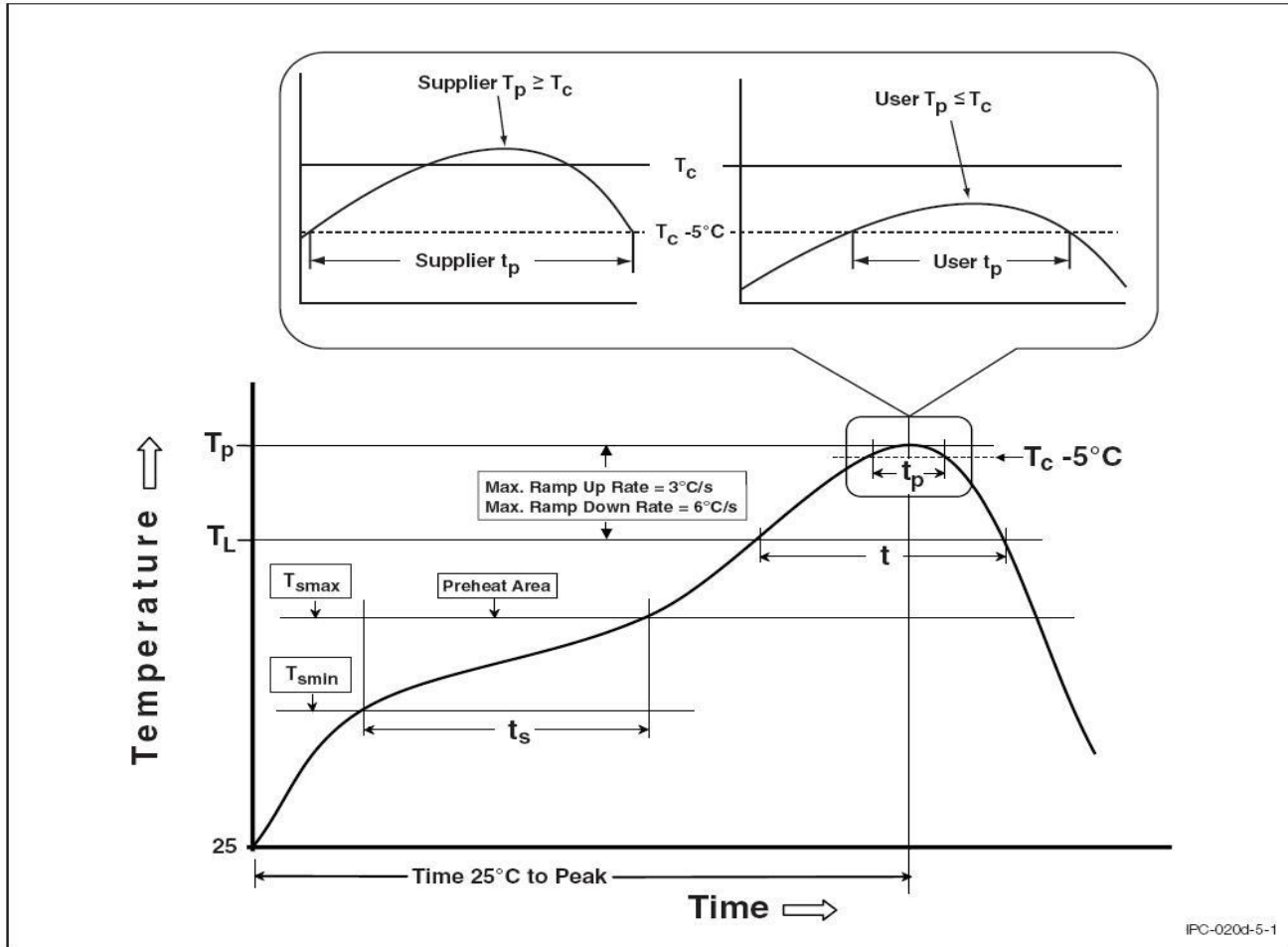
Description	Symbol	Dimension in mm (inch)
Tape wide	W	12±0.3 (0.47)
Pitch of sprocket holes	P ₀	4±0.1 (0.15)
Distance of compartment	F	5.5±0.1 (0.217)
	P ₂	2±0.1 (0.079)
Distance of compartment to compartment	P ₁	8±0.1 (0.315)

PACKING QUANTITY

Option	Description	Quantity
None	MPL-155E Series SOP-5	3000 Units/Reel

REFLOW INFORMATION

REFLOW PROFILE



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T_{smin})	100	150°C
Temperature Max. (T_{smax})	150	200°C
Time (t_s) from (T_{smin} to T_{smax})	60-120 seconds	60-120 seconds
Ramp-up Rate (t_L to t_P)	3°C/second max.	3°C/second max.
Liquidous Temperature (T_L)	183°C	217°C
Time (t_L) Maintained Above (T_L)	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t_p) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T_P to T_L)	6°C/second max	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

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- Please contact WISELITE sales agent for special application request.
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